

Compendium of Industry Specific Internal Audit Guides

(As on January 1, 2015)

Volume IV



The Institute of Chartered Accountants of India
(Set up by an Act of Parliament)
New Delhi

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Foreword

In past several decades, rapid changes amplified by technology have made the overall business environment more complex. This dynamic environment has given rise to new types of risks. Internal audit function has the potential to help manage the increasingly sophisticated risk factors faced by today's organizations, and drive efficiency and sustainability. Internal audit function needs to focus on providing business insights, becoming a strategic advisor, balancing assurance and advisory thereby meeting increased stakeholder's expectations.

The Internal Audit Standards Board of the Institute of Chartered Accountants of India (ICAI) has been bringing out high quality technical literature on internal audit and risk management to upgrade the skill sets of the members. With a view to provide guidance to the members on internal audit of different industries, the Board has brought out a number of industry specific internal audit guides highlighting the peculiar aspects of these industries. I am pleased that this "Compendium of Industry Specific Internal Audit Guides" would consolidate all these industry specific internal audit guides and will be a one stop referencer for the benefits of the members.

At this juncture, I would like to congratulate CA. Charanjot Singh Nanda Chairman, Internal Audit Standards Board and all the other members of the Board for their initiatives in developing technical literature on internal audit.

I am sure that this Compendium would prove to be a useful technical resource for the members.

February 4, 2015
New Delhi

CA. K. Raghu
President, ICAI

Preface

Globalization, advances in technology, complex regulatory environment have led to an increased focus on risk management, fraud prevention and corporate governance. It is more important than ever for internal audit to be seen as a credible business partner, able to identify control weaknesses that may undermine business drivers or breach regulatory requirements. Internal audit function should overcome these challenges of higher expectations by thinking and acting strategically, building partnership of trust with all stakeholders, remaining aligned with the organization's strategy and business objectives and by delivering high quality reports that are clear and forward looking.

The Institute of Chartered Accountants of India through Internal Audit Standards Board has been working relentlessly, to reinforce the primacy of the Institute as a promoter, source and purveyor of knowledge relating to internal audit and other aspects related to it, so as to enable it's members to provide more effective and efficient value added services. The Board has been bringing out Standards on Internal Audit, Technical Guides of both generic and industry specific nature for the guidance of the members. In 2011, the Board had issued "Compendium of Technical Guides on Internal Audit" which contained text of all the Industry Specific and Generic Guides issued by the Board till June, 2011 and further issued revised edition of the same in 2013.

In 2015, the Board is bringing out separate Compendiums for Industry Specific Internal Audit Guides and Generic Internal Audit Guides. This *Compendium of Industry Specific Internal Audit Guides (As on January 1, 2015)* is divided into five volumes. The first volume contains industry specific Guides on Aluminium Industry, Upstream Oil and Gas Companies, Telecommunication Industry, Stock Brokers, Sugar Industry. The second volumes comprises of Guides on Educational Institutions, BPO Industry, Retail Industry and Life Insurance Companies. The third volume includes Mutual Fund, Infrastructure, Stock and Receivables Audit, Mining and

Extractive Industry and Not-for-Profit Organizations Guides. The fourth volume Guides are on Construction Sector, Textile Industry, Pharmaceutical Industry and Petrochemical Industry. The fifth volume contains Oil and Gas Refining & Marketing (Downstream) Enterprise, Waste Management, Beverages and IT Software Industry. In addition to this, the text of all these Guides have also been published as a separate publication of the Institute.

I would like to express my gratitude to CA. K. Raghu, President, ICAI and CA. Manoj Fadnis, Vice President, ICAI for their continuous support and encouragement to the initiatives of the Board. I must also thank my colleagues from the Council at the Internal Audit Standards Board, viz., CA. Shriniwas Yeshwant Joshi, Vice Chairman, IASB, CA. Rajkumar S. Adukia, CA. Prafulla Premasukh Chhajed, CA. Sanjeev K. Maheshwari, CA. Dhinal Ashvinbhai Shah, CA. Shiwaji Bhikaji Zaware, CA. V. Murali, CA. S. Santhanakrishnan, CA. Abhijit Bandyopadhyay, CA. Sanjiv Kumar Chaudhary, CA. Atul Kumar Gupta, CA. Naveen N.D. Gupta, Shri Manoj Kumar, Shri P. Sesh Kumar and Shri R.K. Jain for their vision and support. I also wish to place on record my gratitude for the co-opted members on the Board, viz., CA. R. Balakrishnan, CA. N. S. Ayyanagoudar, CA. Sunil H. Talati, CA. J. Vedantha Ramanujam and CA. Milind Vijayvargia and special invitees, CA. Nagesh D. Pinge and CA. Hardik Chokshi for their invaluable guidance as also their dedication and support to various initiatives of the Board. I also wish to express my thanks to CA. Jyoti Singh, Secretary, Internal Audit Standards Board, CA. Arti Bansal, Asst. Secretary and CA. Pallavi Aggarwal, Management Trainee in giving final shape to the Compendium.

I am sure that this publication would be warmly received by the interested readers.

February 3, 2015
New Delhi

CA. Charanjot Singh Nanda
Chairman, IASB

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I-15

**TECHNICAL GUIDE ON
BUSINESS CONTROL,
MONITORING AND
INTERNAL AUDIT OF
CONSTRUCTION
SECTOR**

Foreword

Construction activities are considered as an integral part of a country's industry, economy, employment and quality of life, which goes beyond, mere development of physical infrastructure. As the second largest economic activity, the influence of construction industry in India spans across several sub-sectors of economy and the stature has multi-dimensional posture. The main characteristic feature of the construction industry is a mix of organized and unorganized players in different sub-sectors right from construction workers to supervisors, contractors and material manufactures, suppliers, etc.

In the year 2010, the Institute had issued "Technical Guide on Internal Audit of Construction Industry" which provided insight into various technicalities arising in the operations of this industry and covered the relevant issues which the internal auditors must be aware of. Since then many significant changes have taken place in the Indian business environment. These have given rise to some crucial issues relating to construction industry, including regulation, cost management, funding and pricing. Internal auditors must be fully abreast with the changes in functioning and operational activities of construction industry.

I am happy that the Internal Audit Standards Board is issuing this "Technical Guide on Business Control, Monitoring and Internal Audit of Construction Sector" which not only covers updated guidance on internal audit aspects but also include guidance on business control and monitoring aspects relevant to this sector. I congratulate CA. Rajkumar S. Adukia, Chairman, Internal Audit Standards Board and members of the Board on bringing out this fully revised Technical Guide. This Technical Guide comprehensively deals with the peculiar aspects of the construction industry, including various regulatory aspects and is written in a very lucid and logically flowing manner.

I firmly believe that this publication will assist the members and others, who are in the area of construction industry, in efficiently discharging their responsibilities.

August 9, 2012
New Delhi

CA. Jaydeep Narendra Shah
President, ICAI

Preface

The construction industry in India has been witness to a strong growth wave powered by large spends on housing, road, ports, water supply and airport development. With scale comes complexity, as the global industry and number of players are ever increasing, players navigate a tough political, commercial, regulatory and governance environment, which will test their risk management ability to the maximum extent. In this environment, organisations need to determine way to improve the efficiency and effectiveness of their efforts. The key focus, therefore needs to be on building capabilities of the construction industry to deliver the desired results with quality of international standard.

As a result, the roles and responsibilities of the members working as internal auditors in construction industry has assumed considerable significance. Keeping this in view, the Internal Audit Standards Board had issued “Technical Guide on Internal Audit of Construction Industry” in 2010 that comprehensively dealt with the peculiar aspects of construction industry and provided a step-wise approach for internal audit. In recent times, a number of developments have taken place impacting the construction industry in the country. Considering this, the Internal Audit Standards Board is issuing this Technical Guide on Business Controls, Monitoring and Internal Audit of Construction Sector which covers more elaborate guidance on internal audit and also covers business controls and monitoring aspects. The focus of this Guide is civil contracting firms, i.e., those organisations which undertake the construction activity on contractual basis. However, the aspects covered in the Guide are also relevant for real estate developers and long term infrastructure players.

This Guide, inter alia, provides guidance on aspects involved in various stages of construction industry such as, tendering, site mobilisation, project execution, project completion with more focus of functional departments like, engineering, stores, human resources, accounts, etc. This Guide also contains internal controls checklist for various processes. Further, this revised Guide also contains flowcharts to help the readers in understanding the construction environment.

At this juncture, I am grateful to authors CA. Sandesh Mundra and Mr. Sanjay Christain and their study group members, viz., Mr. Kalpesh Shah, Mr. S. H. Vora, Mr. S. N. Mundra, Mr. Pallav Dave, Mr. Rakesh Shah,

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Dr. Kalpesh Parikh for sharing their experiences and knowledge with us and preparing the draft of the publication for the benefit of the members and also to CA. M. Guruprasad for reviewing the draft.

I wish to thank CA. Jaydeep N. Shah, President and CA. Subodh Kumar Agrawal, Vice President for their continuous support and encouragement to the initiatives of the Board. I must also thank my colleagues from the Council at the Internal Audit Standards Board, viz., CA. Rajendra Kumar P., Vice-Chairman, IASB, CA. Amarjit Chopra, CA. Shiwaji B. Zaware, CA. Ravi Holani, CA. Anuj Goyal, CA. Nilesh Vikamsey, CA. Atul C. Bheda, CA. Charanjot Singh Nanda, CA. Pankaj Tyagee, CA. G. Ramaswamy, CA. J. Venkateswarlu, CA. Abhijit Bandyopadhyay, CA. S. Santhanakrishnan, Shri Prithvi Haldea, Smt. Usha Narayanan, Shri Gautam Guha, Shri Manoj Kumar and Shri Sidharth Birla for their vision and support. I also wish to place on record my gratitude for the co-opted members on the Board viz., CA. Porus Doctor, CA. Masani Hormuzd Bhadrur, CA. Ghia Tarun Jamnadas, CA. Deepjee A. Singhal, CA. Nitin Alshi, CA. Narendra Aneja and CA. Guru Prasad M. and special Invitee, CA. Sumit Behl for their invaluable guidance as also their dedication and support to the various initiatives of the Board.

I firmly believe that this publication would serve as basic guide for the members and other readers interested in the subject.

August 9, 2012
Mumbai

CA. Rajkumar S. Adukia
Chairman
Internal Audit Standards Board

Abbreviations

BOQ	Bill of Quantity is a summary showing estimated quantum of various items of work under the contract
DPR	Daily Progress Report for daily work completion
FIM	Free Issue Material
JMR	Joint Measurement Report
LC	Labour Colony
LD	Liquidity Damage which is charged by client for delay in work performance
PMC	Project Management Consultant
RMC	Ready Mix Concrete
WC Policy	Workmen Compensation Policy
WO	Work Order

Glossary

Amendment	Where work order quantity or period extension or any other change in terms of reference as compared to the original W.O., amendment is required to be issued.
Client	One who awards the work contract.
Consultant	Agency who is appointed for supervision/ design/ Project Management of project work on behalf of Client.
Contractor	One who is awarded direct work from the client.
Contractor Measurement Sheets	Measurement sheet is a detail of measurement of each item of work done maintained by the contractor. The internal auditor should ensure that the bill process is in line with the measurement sheet. These are jointly verified by and contractor and the representatives from the client side.
Disputed Claims	Claims in case of civil construction could be claims against the carriers for losses in transit, claims against the clients for non-fulfilment of contractual obligations by them, claims against suppliers, insurance companies and customs authorities for any loss or destruction of materials, equipments and duty refunds, etc.
Extra Items	Work done beyond the defined terms of the original work order by way of new work items not originally planned for execution.
Final Bill	Last bill of project where total work/ RA bills quantity and FIM reconciliation is concluded.
Measurement Contractors	Labour Contractors who bill on piece rate basis i.e. upon measurement of quantities executed.

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Project Location	Location where work is in progress.
Project Manager	Manager Incharge for the whole project.
Running Account Bill (RAB)	Running Account Bill is a unique feature in the construction industry. It is nothing but the cumulative amount billed to the client in accordance with the terms of the contract with the client. The entity bills the client on a periodic basis based on the milestones achieved as specified in the contract. Generally, at the time of initiation of the contract, the client may make an advance payment termed as Mobilisation Advance in order to enable the entity to commence the scheduled contract. The said mobilisation Advance is adjusted against RAB raised by the entity. The client makes the payment for the incremental work certified by consultant/ EIC as adjusted by Mobilisation Advance, Provisional Acceptance and Final Acceptance.
Sub Contractor	One who is awarded work by the contractor.
Supply Labour Contractors	Labour Contractors who bill on the basis of mandays.
Virtual Completion	Stage of work completion when client physically occupies major portion of the site, although the finishing and other related activities continue.

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Chapter 1

Introduction

1.1 Construction activity is an integral part of a country's Infrastructure and industrial development. It includes hospitals, schools, townships, offices, houses and other buildings, urban infrastructure (including water supply, sewage, and drainage), highways, roads, ports, railways, airports, power systems, irrigation and agriculture systems, telecommunications, etc. Construction becomes the basic input for socio-economic development as it covers such a wide spectrum. Besides, the construction industry generates substantial employment and provides a growth impetus to other sectors through backward and forward linkages. It is, essential therefore, that, this vital activity is nurtured for the healthy growth of the economy. Moreover, it is one of the earners of foreign exchange as more and more organisations have started to provide services outside India.

1.2 The construction industry has major linkages with the building material industry since construction material accounts for sizeable share of the construction costs. These include cement, steel, bricks/ tiles, sand/ aggregates, fixtures/ fittings, paints and chemicals, construction equipment, petro-products, timber, mineral products, aluminium, glass and plastics. Construction activities also include civil, mechanical and electrical engineering activities.

The construction industry is a capital intensive industry. So a contractor is really required to maintain the balance between his hiring and buying decisions. It is also labour predominant industry. In general, the construction industry deals with development of real property. It involves work to be performed at the specific location, where the property is located. Only the administrative works are carried out at the centralized location. It has become specialised in the recent years which has led to work to be performed on "turn-key" basis. On the other hand, major projects have been awarded to a consortium of contractors.

Objective and Scope of the Technical Guide

1.3 The whole of construction sector can be divided into three broad categories:

- a) Construction (Civil Contractors)

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- b) Real Estate (Builders and Developers) undertaking the activity on own account.
- c) Infrastructure – Long term projects where government is involved.

This Technical Guide is intended to assist internal auditors in carrying out internal audit of entities operating in the first category. Although the fact that all the three categories have several issues in common and hence the relevance of this guide would remain for construction industry as a whole. However, since each of these categories have certain specific issues like the entities in the first category operate purely on the basis of contracts received from the clients which is the mother agreement, so typical issues related to the contracts have been covered in this guide. Entities in the second category deal with several issues related to land and booking management and in third category again deal with various compliances listed down by the government and also the collection, normally, is a long term exercise of 15-20 years. The specific issues for the second and third category have not been covered.

Further, issues related to implementation of ERP in the construction sector, has not been dealt with as the same is a larger issue and needs to be taken up separately. An internal auditor first needs to have a basic understanding of the industry and then he can definitely make his way into an organisation's ERP. It is seen that the ERP's in the construction sector are mostly customised by the organisations for their own use, hence, there is a lack of uniformity across the industry in this aspect.

1.4 This Technical Guide, primarily, covers the following aspects:

From an internal control perspective, various issues need to be considered by an organisation. It may not be possible for the top management to frame the controls in all areas due to lack of proper understanding. This publication book intends to give the relevant understanding to them.

Construction sector is a very typical sector as all the locations are dispersed at far off locations and is very different from a factory set up where the controls can be built over a period of time. Major cost of the operations is getting incurred at the construction sites and thus it calls for proper monitoring and systems at the construction sites. There is no shortage of industrial projects in India. Hence availability of work is not an issue, but it is commonly seen that many companies lose money due to mismanagement at the project level. Many even reach till the verge of bankruptcy due to these very issues.

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Many a times, the project gets delayed to such an extent that all the fixed overheads take a heavy toll on the Profit and Loss Account. Say the Equipments taken on rental can themselves lead to severe losses. This guides one to ensure proper project monitoring and also what precautions needs to be considered for the issuance of work orders to various agencies working at the construction site from internal control perspective.

Further, the fact that the physical contact of Head office is always poor with the sites, the only way to control is by way of proper documentation and MIS. The publication also takes one through the finer aspects of preparation of MIS by various departments say Stores/ Accounts/ Engineering/ Human Resource.

Lastly, tax and labour laws are very complicated to the construction sector as a whole. Through this publication it is intended to give a basic understanding of the Indirect Taxation aspects of Works Contract applicable to the construction industry in general highlighting some of the state specific issues.

Today, the scope of internal audit has increased from mere verification of financial transactions to reviewing of proper, efficient and economical usage of resources by the entity. Also assessment of risk management is also a part of internal auditor's portfolio. And the kind of risks that the entities operating in this sector are exposed to, it becomes very important to ensure that management's risk mitigation policies are appropriately designed.

Therefore, it is imperative that an internal auditor familiarises with various management aspects and technical aspects of the construction industry for performing internal audit in a more efficient and effective manner.

Chapter 2

About Indian Construction Industry

2.1 It is important for an internal auditor to gain an understanding of the Indian construction industry, its evolution, special features of the construction industry and the challenges faced by entities operating in the industry in order to understand the critical areas, nuances and knowledge of the business thereby helping him in framing internal audit procedures to perform an efficient and effective internal audit.

Evolution

2.2 The evolution of Indian construction industry was almost similar to the construction industry evolution in other countries, i.e., founded by government and slowly taken over by private enterprises. After independence the need for industrial and infrastructural developments in India laid the foundation stone of construction, architectural and engineering services. The construction sector became organised since the 1950's post incentives taken by the government to develop these services.

History of Indian Construction Industry

2.3 The history the Indian construction industry dates back to period from early 1950 to mid 60's which witnessed the government playing an active role in the development of these services and most of construction activities during this period were carried out by state owned enterprises and supported by government departments. In the first five-year plan, construction of civil works was allotted nearly 50 per cent of the total capital outlay.

2.4 The first professional consultancy company, National Industrial Development Corporation (NIDC), was set up in the Public sector in 1954. Subsequently, many architectural, design engineering and construction companies were set up in the public sector, such as:

- Indian Railways Construction Limited (IRCON)
- National Buildings Construction Corporation (NBCC)
- Rail India Transportation and Engineering Services (RITES)
- Engineers India Limited (EIL), etc.

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In the private sector, companies, such as, following were incorporated:

- M. N. Dastur and Co.
- Hindustan Construction Company (HCC)
- Ansals

2.5 In the late 1960s, government encouraged foreign collaborations in these services. The Guidelines for Foreign Collaboration, first issued in 1968, stated that local consultant would be the prime contractor in such collaboration. The objective of such an imposition was to develop local design capabilities parallel with the inflow of imported technology and skills. This measure encouraged international construction and consultancy organisations to set up joint ventures and register their presence in India.

2.6 The importance of this sector in India need not be over-emphasized. In India, construction has accounted for around 40 percent of the development investment during the past 50 years. Around 16 percent of the nation's working population depends on construction for its livelihood. The Indian construction industry comprises 200 firms in the corporate sector. In addition to these firms, there are about 1,20,000 Class A contractors registered with various government construction bodies. There are thousands of small contractors, which work as sub-contractors of prime or other contractors.

The main reason for this is the increasing emphasis on involving the private sector infrastructure development through public-private partnerships (PPP) and mechanisms like, build-operate-transfer (BOT).

Benefits of Construction Industry to Society

2.7 The following are the benefits of the construction industry to the society:

- (i) Absorbs rural labour and unskilled workers (in addition to semi-skilled and skilled);
- (ii) Provides opportunity for seasonal employment thereby supplementing workers' income from farming;
- (iii) Permits large-scale participation of women workers; and
- (iv) Development of Infrastructure, thereby sustaining the growth of economy.

Special Features of Indian Construction Industry

2.8 The construction industry is unique in certain respects with respect to other industries. These can, broadly, be classified as follows:

(a) Business Process Related

The business of an entity operating in a construction industry has certain unique characteristics, risks, nuances. Some of them are as follows:

- (i) The risks for a construction industry are different from any other industry.
- (ii) The construction industry is capital intensive in nature. Huge investment needs to be made by the entity in purchasing of specialised equipment for its construction processes. In some cases, the entity hires specialised equipment from external sources.
- (iii) The entity might provide variety of services from building houses, commercial complexes, factories, ports, railways, roads, airports, etc. The risks for providing each type of service are different.
- (iv) The entity might be required to float tenders for projects, which requires detailed estimation of the costs required for the project.
- (v) Construction services are required to be provided at the respective sites. Significant part of the operations is at the respective sites. Therefore, the need for proper control procedures need not be over emphasized.
- (vi) Requires high level of planning and execution to prevent escalation of costs, timely completion of projects thereby building brand.
- (vii) In case, construction companies provide services outside India, they have to comply with foreign laws and regulations.
- (viii) Considering that this is a capital intense industry, and money is received from client only on completion of a certain percentage of work, in most cases, a high working capital is required for proper functioning of the industry.
- (ix) The entity sub-contracts most part of its work such as, welding, carpentry, transportation, plumbing etc. to external parties thereby ensuring professional involvement in the performance of work, timely completion and also limiting the liability for the entity.

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- (x) Certain projects such as, construction of highways, bridges are provided by construction entities on a long term basis and are in the nature of Build, Own and Transfer (BOT) or Build, Own, Lease and Transfer (BOLT) basis. The entity post constructing the said infrastructure collects charges (toll) from the users of the facility to cover its cost over a long period of time, say 20 years. During the period, they are responsible to maintain them too. Post completion of the tenure, they are required to transfer ownership to concerned government department.

(b) Contracts

In general, contracts are entered for the work to be performed to ensure proper determination of scope of work, nature of work, fixation of responsibility, payment terms, escalation clauses, and so on. Some important aspects are as follows:

- (i) Different processes are handled for different clients and billed as agreed specifically between parties. Contracts are custom made and could be fixed price contracts or cost plus contract.
- (ii) Agreements are entered into between the client and the entity as regards the scope of work to be performed, the legalities involved, scheduled period of completion, billing details, escalation clauses, penalties and other charges.
- (iii) Billing is done in accordance with the work completed and as agreed between parties.

(c) Employee Related

The employee related area in a construction industry is usually need based and the industry is also labour intense. Some special features are as follows:

- (i) Apart from being capital intensive, the industry is also predominantly labour dependant. Cheap and experienced labour is an important prerequisite for the success of the industry.
- (ii) Most workers who are involved in the construction activity are not highly educated. Only the supervisors are educated.
- (iii) The requirement of labour for the construction site is not constant and it keeps varying with level of specialisation, deadlines, nature of work, percentage of completion amongst other factors. In general, workers involved in the construction activity are paid on the basis of per day wages.

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(d) Others

Data Security, reliance on external conditions are amongst the other peculiar features of the construction industry:

- (i) The level of construction activity is related to the government policy towards construction industry, importance given to infrastructure development, economic activity and schemes providing benefit for both individuals and entities.
- (ii) The importance of data security need not be over-emphasized. Critical data such as plans, profitability ratios, designs and unique strategies should be sufficiently safeguarded.

It is, therefore, extremely important for an internal auditor to understand these special features for conducting the internal audit of the entity.

Major Operational Challenges Faced by Entities

2.9 The construction industry is a delivery based Industry. The construction industry in India is not yet completely organised. These service providers have unique challenges faced by the industry and also the risks are unique in nature. This section is intended to highlight some of the significant challenges that the construction industry faces so as to enable the internal auditor to plan and perform the internal audit accordingly.

2.10 The internal auditor is required to perform such audit procedures specific to the entity as deemed necessary to ensure systematic evaluation of risk management, control and governance processes. Some of these challenges are given below:

- (i) Challenges of meeting time schedules, cost schedules and compliance with the scope of work has been key for success and, thus, meeting them has been the greatest challenge for any entity operating in the construction industry.

The internal auditor can assess the business risk, and also brand and reputation risk of not complying with deadlines. The effectiveness of controls can also be assessed by the internal auditor.

- (ii) The biggest challenge faced by an entity operating in the construction industry is availability of adequate manpower with appropriate skill sets at a reasonable cost. This is the most important factor to control for sustained growth of the entity. The internal auditor might analyse

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and assess the prospects of the business in future, apart from business risk.

- (iii) The client's capacity to make payments as per the contract agreed also poses a big challenge considering that the funds get blocked up, increasing the working capital requirements significantly. The management also faces the challenge of managing the working capital requirements for the projects considering that some clients make the schedule payment only post completion of certain percentage of work. It is the management effectiveness in keeping the cost of borrowed funds as low as possible thereby ensuring that the profitability is not significantly affected. The internal auditor can assess the effectiveness of management in assessing clients and managing cost of borrowed funds before selecting them.
- (iv) The challenge of fair recognition of revenue and profit ever exists in the construction industry owing to the difficulty in estimating the exact percentage of work completed. The internal auditor can assess financial risk of recognition of revenue and incorrect billing apart from the effectiveness of the accounting process.
- (v) Material handling has been a major problem for the industry. Improper handling and storage of materials lead to significant storage costs, wastage, and non-availability of critical materials at the appropriate time. The internal auditor needs to assess the efficiency of management with regards to handling of inventory.
- (vi) The construction industry is more prone to accidents than any other industry. Safety precautions of workers are extremely important and have been extremely difficult to achieve by most entities. The internal auditor has to assess such types of risks and precautions taken by management to avoid them.
- (vii) The costs of materials at the time of contract are significantly different compared to cost at the time of performance of the work. In cases where the cost of materials required has escalated, the management might be finding it difficult to maintain profitability. The internal auditor should assess the process of making budgets and whether management is effective in determining the future costs.
- (viii) Legal Compliance has been relatively high considering many other Industries. Every contract entered by the entity has unique terms and conditions to be complied with, failing which may lead to penalties

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and other arbitration. The internal auditor can assess operational risks of business.

- (ix) Some projects require minimum criteria such as Minimum Turnover requirement/Minimum Net Worth requirement/ Minimum quantities executed requirement for bidding of clients. If the entity does not meet these criteria, they are not qualified to bid, thereby hindering their growth. The internal auditor can assess such types of business risk also.
- (x) Certain regulatory requirements mandate the submission of specific financial statements. For e.g., an entity might be operating in SEZ and non-SEZ unit. In such a case, it is required to maintain separate books of accounts in order to ensure proper determination of profit for claiming of deduction/exemption with respect to units from these respective units from the perspective of Income Tax and Service Tax. The internal auditor can assess sufficiency of legal compliance.
- (xi) As an entity grows, the balance between machinery and manpower should be maintained at the optimum level. In general, greater level of mechanizing is required as the entity grows to sustain volumes and manage professionally and cost effectively. The Internal auditor can verify whether sufficient controls are in place for ensuring sustained development and growth.
- (xii) Even the risks of Force Majeure such as Natural calamities/ labour unrest etc needs to be factored into at the time of taking up the project.

Chapter 3

Legal Framework

3.1 This chapter details the various acts applicable, and also organisations that supervise and regulate the construction industry in India.

Ministry of Commerce and Industry, GOI

3.2 The mandate of the Department of Commerce is regulation, development and promotion of India's international trade and commerce through formulation of appropriate international trade and commercial policy and implementation of various provisions thereof. This Ministry formulates the regulatory provisions pertaining to the Special Economic Zones and EXIM Policy in India.

3.3 The Department of Industrial Policy and Promotion, set-up under the Ministry of Commerce and Industry is responsible for Intellectual Property Rights relating to Patents (including construction aid charts), Designs, Trade Marks and Geographical Indication of Goods and oversees the initiative relating to their promotion and protection. This Department also formulates, promotes, approves and facilitates the Foreign Direct Investment (FDI) Policy.

3.4 Director General of Foreign Trade (DGFT) is a government organization in India responsible for the formulation of Export – Import guidelines and principles for Indian importers and Indian exporters of the country. The basic role of the Department is to facilitate the creation of an enabling environment and infrastructure for accelerated growth of international trade.

Ministry of Finance, GOI

3.5 The Ministry of Finance, India looks after the various financial affairs of the state of India. The Ministry of Finance, India is responsible for monitoring the various aspects of the Indian economy and it operates through various departments:

- Department of Economic Affairs
- Department of Disinvestment

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- Department of Expenditure
- Department of Financial Services
- Department of Revenue

Various statutes, such as, Customs Act, 1962, Foreign Exchange Management Act, 1999, Income Tax, 1961 to name the significant ones, as applicable to the construction industry are formulated and governed by this Ministry.

Applicable Important Regulations

The Transfer of Property Act, 1882

3.6 The Transfer of Property Act, 1882 has been enacted for

- Enacting provision for transfer of property between living persons;
- Supplementary to Law of Contract; and
- To support and compliment succession Laws.

The scope of the act deals with transfer of immovable property. It does not include transfer operational by law.

The Special Economic Zones Act, 2005

3.7 A Special Economic Zone (SEZ) is a trade capacity development tool, with the goal to promote rapid economic growth by using tax and business incentives to attract foreign investment and technology. The Central Government has framed the policy framework for SEZs through the SEZ Act. The State Governments play a significant lead role in the development of SEZs in their respective States by stipulating the conditions to be adhered to by an SEZ and granting the necessary approvals. These supporting procedures are laid down in SEZ Rules as framed by the State Governments.

The Minimum Wages Act, 1948

3.8 The Minimum Wages Act, 1948, extends to the whole of India and applies to scheduled employments in respect of which minimum rates of wages have been fixed under this act. The objective of this Act is to fix minimum rates of wages in certain employments. The appropriate government (State Government or Central Government as the case may be) shall fix the minimum rates of wages payable to employees employed in a scheduled employment.

The Factories Act, 1948

3.9 The Factories Act, 1948 is a social legislation which deals with following aspects:

- (i) Health;
- (ii) Safety;
- (iii) Welfare facilities;
- (iv) Working hours;
- (v) Employment of young persons;
- (vi) Annual leave with wages;
- (vii) Contract employees and so on.

It requires compliance for enterprises which employ more than 10 employees.

The Industrial Disputes Act, 1947

3.10 The Industrial Disputes Act, 1947, extends to whole of India and applies to every industrial establishment carrying on any business, trade, manufacture or distribution of goods and services irrespective of the number of workmen employed therein. Every person employed in an establishment for hire or reward including contract labour, apprentices and part time employees to do any manual, clerical, skilled, unskilled, technical, operational or supervisory work, is covered by the Act. The objective of the Act is to secure industrial peace and harmony by providing machinery and procedure for the investigation and settlement of industrial disputes by negotiations.

3.11 The Industrial Disputes Act, 1947 also lays down following:

- (i) The provision for payment of compensation to the Workman on account of closure or lay off or retrenchment.
- (ii) The procedure for prior permission of appropriate Government for laying off or retrenching the workers or closing down industrial establishments.
- (iii) Unfair labour practices on part of an employer or a trade union or workers.

Worker's Cess

3.12 The Building and Other Construction Workers' Welfare Cess Act, 1996 is a levy by the Central Government which is enforced by the State Government. It is currently prevailing at 1% of total work order value to be deposited in the Labour Department by the client.

Other Applicable Indian Acts to Construction Industry

Governance Laws

3.13 The various acts enacted by the Government to govern any industry and so also applicable to the construction industry are as follows:

- (i) The Companies Act, 1956
- (ii) The Partnership Act, 1932
- (iii) The Benami Transactions (Prohibition) Act, 1988
- (iv) The General Clauses Act, 1897
- (v) The Land Acquisition Act, 1894
- (vi) The Indian Easements Act, 1882
- (vii) The Indian Stamp Act, 1899
- (viii) The Negotiable Instruments Act, 1881
- (ix) Land Reform Regulation of the respective states.
- (x) The Indian Penal Code.

Economics Laws

3.14 The various economic laws to which the construction industry may be subject to include:

- (i) The Income Tax Act, 1961
- (ii) Central Excise Act, 1944
- (iii) The Customs Act, 1965
- (iv) Chapter V of the Finance Act, 1994 relating to Service Tax
- (v) Value Added Tax and Sales Tax Act
- (vi) Prevention of Money-laundering Act, 2002

Contract Laws

3.15 The various contract laws to which the construction industry may be subject to include:

- (i) The Indian Contract Act, 1872
- (ii) Securities Contracts Regulation Act, 1956

Labour Laws

3.16 There are a number of labour laws governing the construction industry. A few of the important ones are as follows:

- (i) Employees Provident Fund Scheme, 1952
- (ii) Employee State Insurance Act, 1948
- (iii) Payment of Gratuity Act, 1972
- (iv) Payment of Bonus Act, 1965
- (v) Professional Tax enacted by the respective states
- (vi) Shops and Establishment Act enacted by the respective states
- (vii) The Trade Union Act, 1926
- (viii) The Inter-state Migrant Workmen (Regulation of Employment and conditions of service) Act, 1979
- (ix) Factory Rules of respective states.
- (x) Children (Pledging of Labour) Act, 1938
- (xi) Employment of Children Act, 1938
- (xii) Workmen's Compensation Act, 1923
- (xiii) Contract Labour (Regulation and Abolition) Act, 1970
- (xiv) The Building and Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996

Other Laws as Applicable to the Industry

- (i) Securities Exchange Board of India Act, 1992
- (ii) Foreign Exchange Management Act, 1999
- (iii) Arbitration and Conciliation Act, 1996

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(iv) Mines Act, 1952

The internal auditor is also expected to be aware of various circulars issued by the RBI towards foreign currency transactions.

Other Applicable International Acts to Construction Industry

3.17 Apart from the above, regulations of the respective country in which construction and related services are provided by the entity are also applicable to the entity. In such cases the agreement between the parties specifies the jurisdiction in case of arbitration, if any. In cases where the entity is listed in a stock exchange other than India, there might be regulatory requirements from the respective governing body of the company.

Chapter 4

Indirect Taxes

Brief Overview of the Concept of Deemed Sales and Related Indirect Tax Aspects

4.1 It has been seen in the past few years that indirect taxes namely VAT and Service Tax have troubled one and all in the construction sector. The contracting firms have made a lot of blunders at various stages of the project as far as these taxes are concerned.

Say, at the stage of tendering the cost estimate did not correctly factor in the components of these taxes resulting in an incorrect bid price. At the billing stage, the bills raised were not in compliance with the applicable rules, hence it lead to procedural lapses. Further at the tax payment and return filing stage, there were a lot of interpretational issues which lead to underpayment of taxes.

Under these circumstances, the contractor is bound to face the music from the tax authorities. It may even at times get very difficult to focus on the project due to severity and financial implications of the tax issues involved in the business. Hence it is in the best interests of the organisation to understand some of the finer aspects of these indirect taxes and get in touch with right consultants to comply and live safely.

This section is intended to provide broad guidelines of VAT and Service tax related to the construction sector, to give a broad understanding even from an internal audit perspective. The internal auditor should refer to bare act of these laws and regulations and study the different cases and judgements by competent authorities.

Considering that these regulations undergo frequent amendment/changes, a detailed checklist has not been prepared. The internal auditor must update himself with the amendments, pronouncements and any new regulations enacted from time to time to ensure effective performance of internal audit. Further the position as mentioned represents the current state of affairs when this guide is drafted. Hence, actual position may vary in the future especially considering that we have GST in the hindsight.

VAT and the Construction Sector

4.2 Out of various Indirect Taxes levied by the State Government, probably the most important revenue gathering mechanism that exists is Value Added Tax. We normally associate charge of VAT to movable goods and thus many feel that the construction sector should not be subjected to charge of VAT.

To touch upon the history of VAT or more popularly the Sales Tax, let's take a look at some of the past happenings:

Supreme Court in the year 1958 in the case of State of Madras v. Gannon Dunkerley & Co, held that – “No tax can be levied on Works Contract as there is No sale of goods involved in movable form”. This judgement resulted in many dealers using the disguise of Works Contract to avoid Sales Tax.

Then came the 46th Constitutional Amendment from February 2, 1983 which permitted the States to levy tax on the Sale of goods involved in execution of all works contract. It is after this amendment that all the states incorporated the necessary provisions for charge of VAT on the property transferred in the execution of Works Contract.

46th amendment to the constitution does not provide any definition of works contract. Works Contract is generally defined under CST and various State Acts, as: “a contract for carrying out any work which includes assembling, constructing, building, altering, manufacturing, processing, erection, installation, fitting out, improvement, repair or commissioning of any movable or immovable property.” Predominant intention of the parties to the contract is not to sale or purchase the goods but to carry out certain work for a lump sum price.

i) Concept of Deemed Sales

It may be noted at this point in time that works contracts are not normal sales but deemed sales. For example, At the site of construction of a building, before the Construction (works contract) commences, the goods like cement, steel, sand etc. are lying but after the Construction, a building (immovable goods) comes to an existence. Thus the property gets transferred on an ongoing basis as per the theory of accretion. Since the land belongs to the contractee, the ownership in cement and steel gets transferred to the contractee by inference and not by way of sale as it is not possible to remove the materials from the land once consumed during the activity of construction. This is the concept of deemed sales.

ii) Turnover Threshold for Registration under VAT

The question arises is that, when the businessman engaged in the construction sector is required to register himself with the VAT department? Let's take an example of Gujarat VAT which lays down following criteria for registration:

Casual dealer or auctioneer - Turnover of taxable sales exceeding ₹10,000.

All Others - Total Sales or Purchase turnover of more than ₹ 5,00,000 and turnover of taxable Goods exceeding ₹10,000.

Thus, the criteria for registration gets activated even upon making purchases beyond the specified limit. Even the real estate builders who are transferring the flats only upon completion of construction are required to register with the VAT dept as per above rules even if the turnover is not taxable.

Further, upon registration, even if the turnover is not taxable, but if the dealer makes unregistered dealer purchases, then purchase tax needs to be paid on the same.

iii) Which Type of Works Contracts are Subjected to Charge of VAT

The works contract can be classified as below:

- (a) Supply of Materials and Labour – Works Contract (e.g. Construction of a building, roads, bridges, dams etc.).
- (b) Supply of labour and where supply of materials is incidental to the contract – Whether a Works contract? (e.g. Cleaning, overhauling, lubricating, greasing of an old machinery etc.).
- (c) Pure Labour Contract – Not a Works contract (e.g. Semi-finished material supplied to Job-worker for further processing, tailor doing stitching work).

For category (a) above, VAT is applicable, For category (c), VAT is not applicable.

Category (b) is subject to a lot of litigations in the court of law and goes by the theory of dominant intention. Those going by the theory of dominant intention take support of following judgments:

- R.M.D.C. Press (112 STC 30)
- M/s. Rainbow Colour Lab & Others (118 STC 9 S.C.)

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Department however has stopped giving regard to this theory as per below judgements:

- Sarvodaya Printing Press *vs.* State of Maharashtra (93 STC 387) as approved by the Supreme Court — There is transfer of property in ink.
- Associated Cement Companies Ltd. *vs.* Commr. of Customs (124 STC 59) — Rainbow Colour Lab is no more good law as the same is over ruled by this judgment.
- Matushree Textiles Ltd. (132 STC 539) — Transfer of property in colours and chemicals.

Thus, the matter hangs in a lot of confusion as on date. But according to us to be on the safer side, it is advisable to identify even smallest of items getting transferred in the course of execution of works contract and VAT needs to be paid on the same to ensure a smooth assessment.

iv) VAT Basics

There are different acts for different states. Hence, rules and registration undertaken in one state are of no use in the other state. But the basic concept of levability of VAT on Works Contract, in principle, remains the same across the country. Since, the value of the Contract is indivisible, various issues are involved with respect to offering the VAT liability on the deemed portion of material sales in the contract.

Since, the identification is not simple, the VAT law, normally, offers three modes of computation of the deemed elements of material sales for computation of VAT liability on the same. The availability of options as below may differ from state to state.

The available valuation options under Works Contract are as follows:

- Actual labour deduction
- Standard labour deduction
- Composition Scheme

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To explain the same in a simple way, let us take a small example using certain financial figures from a project:

Particulars	Income in ₹	Expense in ₹
Sales	1,000	
Purchase		300
Labour Exp		100
Sub-contractor Exp		300
Admin Exp		75
Finance Charges		10
Depreciation – Plant and Machinery		50
Depreciation – Others		10
		845

If VAT is to be paid for the above project on sales of ₹ 1000/- we can opt for following:

a) Actual Labour Deduction Method

For the definition of labour, refer to one of the Landmark Judgements of Gannon Dunkerley & Co. and Ors. *vs* State Of Rajasthan And Ors. on 17 November, 1992. Which considers following expenses for eligibility of claim of deduction:

Analysis of prescribed deductions:

- **Labour charges for execution of Works Contract:** The value consists of mobilisation of men and material and establishment of site office etc. As these are preliminary expenses not involving value goods cannot be subjected to tax.
- **Amount paid to sub-contractor for labour and services:** Value relatable to sub-contractors turnover where sub-contractor is engaged only for labour and services not involving supply of goods, deduction is available only for amount paid to registered sub-contractor if contract involves usage of material.
- **Charges for planning, designing and Architect's fees:** Value for planning, designing and architects fees relating to construction of building or plant. As the expenses are in the nature of services, hence eligible for deduction

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- **Charges for acquiring machines, tools, etc. on hire or otherwise:** These goods are either taken on hire or purchased as assets for use in the process of execution of works contract. However, since the goods are neither incorporated in works contract nor sold to the customer, there is no transfer of property in them and hence excluded for the levy of VAT. Claim of Depreciation on Plant and Machinery is debatable, however allowed in the case of L&T - 34 VST 53.
- **Cost of consumable in which property does not pass to contractee:** These are the items such as water, electricity, fuel, lubricating oils, electrodes etc, which are getting consumed in the process of execution of works contract and hence the property therein is not transferred to the contractee and hence are excluded for the purpose of levy of tax.
- **Cost of establishment relating to supply of labour and services:** This cost is relatable to facility given to labour such accommodation and other facilities to make them available at job site for purpose of carrying out labour and rendering of services in connection with execution of works contract.
- **Other expenses relating to supply of labour and services:** These are expenses in the nature of overheads, rent, salary, electricity, telephone charges expended relating to works contract job.
- **Profit of contractor relating to labour and services:** This is the profit earned by the contractor over the cost of labour and services expended by him i.e. difference between the value recovered from the employer and the cost incurred by the contractor.

Another area of confusion which exists is allowability of office overheads, like, rent, electricity, office expenses, interest etc. As per the Para 45 of the judgement, the words used for such expenses were as follows:

“These relate to the various expenses which form part of the cost of establishment of the contractor. Ordinarily, the cost of establishment is included in the sale price charged by a dealer from the customer for the goods sold. Since, a composite works contract involves supply of materials as well as supply of labour and services, the cost of establishment of the contractor would have to be apportioned between the part of the contract involving supply of materials and the part involving supply of labour and services. The cost of establishment of the contractor which is relatable to supply of labour and services cannot be included in the value of the goods

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involved in the execution of a contract and the cost of establishment which is relatable to supply of material involved in the execution of the works contract only can be included in the value of the goods.

Similar, apportionment will have to be made in respect of profits. The profits which are relatable to the supply of materials can be included in the value of the goods and the profits which are relatable to supply of labour and services will have to be excluded."

Thus, as per above even office overheads need to be considered for the purpose of taking deductions under the above method, however, proportionately.

Thus, all expenses that fit the classification as above are permissible to be claimed for determining the taxable turnover under VAT.

Particulars	Income in ₹	Eligible Expense in ₹
Sales	1,000	
Labour Exp		100
Sub-contractor Exp		300
Depreciation – Plant and Machinery		50
Admin Exp relatable to supply of Labour		40
Finance Expenses relatable to supply of Labour		10
Profit on Labour (As per reasonable management estimate)		75
Total Eligible Expenses		575
Deemed Sales/ Taxable turnover		425

Thus, as per above working, it is presumed that the material purchased for ₹ 300/- has been sold for ₹ 425/-. Now, the purchases have to be broken up into the rates to arrive at the final VAT liability as below:

Particulars	Amount	%	Bifurcation of deemed turnover in the said ratio	VAT Payable
Purchases @ 4%	200	66.67%	283	11 (₹283*4%)
Purchases @ 12.5%	100	33.33%	142	18 (₹142*12.5%)
	300		425	29

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One may, thus, take VAT Input Credit paid on the purchases and balance needs to be paid by way of challan.

b) Standard Labour deduction Method

For those contractors who do not maintain proper books of accounts, or where the standard deductions as specified under the act match the actual deductions, it is advisable to take standard deduction. This is so because under such a scheme the department does not ask for any details to be maintained by the dealer.

Under the standard deduction method, rates are prescribed by the VAT department to the extent of which labour deduction is available. For e.g. following has been notified under the Maharashtra VAT:

S.N.	Nature of Contract	% of deduction
1	Installation of Plant and Machinery	15
2	Installation of Air Conditioner and cooler	10
3	Installation of Elevators	15
4	Fixing of marble slabs, granite & tiles	25
5	Civil works like construction of Bldg. Roads, etc.	30
6	Construction of Railway Coaches, etc.	30
7	Ship and Boat building, etc.	20
8	Sanitary Fittings, Plumbing, Drainage, etc.	15
9	Painting and Polishing	20
10	Construction of Bodies of Motor Vehicles and Trucks	20
11	Laying of Pipes	20
12	Tyre re-treading	40
13	Dyeing and printing of Textile	40
14	Annual Maintenance Contract	40
15	Any Other Works Contract	25

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Thus if the job is of Civil Construction, then the available rate is 30%. Hence the deemed turnover is worked out as below:

Particulars	Amount (₹)	Remark
Sales	1,000	
Amount paid to registered subcontractor	150	This is available as deduction if the amounts are paid to sub-contractors registered under VAT.
Net Sales	850	
Std Deduction at 30%	255	(30% of ₹850)
Taxable turnover	595	

Particulars	Amount (₹)	%	Bifurcation of deemed turnover	VAT Payable
Purchases @4%	200	66.67%	397	16 (₹397*4%)
Purchases @12.5%	100	33.33%	198	25 (₹198*12.5%)
	300		595	41

One may, thus, take VAT Input Credit paid on the purchases and balance needs to be paid by way of challan.

c) Composition Method:

(i) Calculation of Sale Price of Works Contract under Composition Scheme:

Basics of the method – For contractors who wish to avail of a very simplified scheme for payment of VAT, composition scheme is the answer. However, it may be noted that the rate of composition differs from state to state and thus before exercising the option, it may be well advised to evaluate the tax liability under other options. For E.g. the rate of composition available under various states is different like:

Rate for Civil contracts – 0.6% in Gujarat, 2% in Madhya Pradesh, 1.5% in Rajasthan, 4% in Orissa.

However, the composition scheme under Works Contracts always needs certain conditions to be complied.

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(ii) Some of the typical conditions could be as follows:

A. *Basic – A dealer under the composition scheme:*

- Cannot import goods on interstate basis or branch transfer basis
- Contractor not eligible to issue VAT Invoice and also can not charge tax in the invoice
- No ITC is available to the employer
- ITC not available on purchases to the dealer.

B. *Types of composition:*

- For complete contract – Application to be made within 30 days of commencement of Work
- For Complete year – Application to be made within 30 days before commencement of year
- For New Registered Dealer – Within 90 Days from the effective date of registration. If you are applying for a fresh registration, then it is advisable to apply for composition at the same time. (Permissible period of 90 days is likely to lapse)
- OGS items can be used but only as a Free Supply from the contractee.
- No condonation of delay – Matter Pending before Tribunal
- If application is made, then non receipt of written confirmation from the department is assumed as granted.
- Once Application for composition is made and is not rejected by the department, the acceptance is presumed. Option shall be final and is IRREVOCABLE. (Rule 28(8)(i))

These are just the sample conditions. Each state would have its own set of conditions and thus one needs to refer to the individual VAT act for practical implementation.

C. *Composition for Turnkey Contracts:*

- Composition for Certain Sections - The contract is awarded containing three divisions – A) for Supply of Equipment, B) For civil Construction of the equipment foundation, C) For erectioning and commissioning (no material involved).

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In such a case, the contractor may only go for composition of Division B, as Division A is pure supply of material and Division C is pure supply of labour.

- Composition for Certain Line Items – The contract does not contain clear divisions of the activity, then it may be difficult to obtain composition for certain line items. Although the same may be argued before the departmental authorities. Hence it is well advised to discuss with the client well in advance as to the manner in which contract shall be issued.

D. Deduction in composition scheme:

Deduction of amount of entire sub-contract shall be made. Although some of the statet VAT rules do not restrict deduction of amounts paid to unregistered sub-contractors, but the same may be avoided for the sake of litigation free assessments.

The working of Tax and Taxable turnover for the above example is as below as per both Gujarat and Maharashtra VAT Act:

Particulars	Under Gujarat VAT (in ₹ Lacs)	Under Maharashtra VAT (in ₹ Lacs)
Total Billing for Civil Jobs	1,000	1,000
Less: Paid to Registered Sub-contractor	150	150
Net	850	850
Composition Rate	0.6%	5%
Tax Payable	5.10	42.5
Input Credit	-	15.00 (Tax paid in excess of 4%)
Net Tax to be Paid	5.10	27.5

This was a very simple working presuming that all details as desired are easily available with the contractor. However, things are different in the real world.

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(iii) Practical Scenario, In case, option of “Actual Deductions” is availed:

The practical scenario is not so easy. In an unorganised sector, it is very difficult to obtain the relevant details. Since, the Sales Invoices are raised on a progressive basis, the VAT liability also has to be discharged on a progressive basis. Identification of material transferred in each of the sales invoices is required. But that is a big task if the inventory has not been maintained in order. Further if one is working with a big client when you have 10-12 orders from 10-12 different group companies for the same plant, the situation can be very tricky. Now, as per the common logic, the figure of deemed sales can be arrived by two methods:

- (a) By taking appropriate labour deductions from the total sales value.
- (b) By marking up the purchases with normal gross profit rate

Looking into the fact that the VAT returns have to be filed on a monthly basis, the method at b) above may be more feasible at the month end. No doubt the turnover offered as per this method needs to be cross checked with the working as per the formula proposed by the Honourable Supreme Court in the judgement of Gannon Dunkerley Ltd at the year end.

Marking up the Purchases with the GP Rate

4.3 In this method, one need to first bifurcate all the purchases made into following categories:

- Transferable Purchases or Raw Materials
- Non-Transferable Purchases or Stores and Spares
- Capital goods

Bifurcation of material into transferable and non-transferable may not be easy. Basic Step is to sit with the Site Engineer and bifurcate all the purchases into Transferable and Non-Transferable. For Ex-Wooden Materials which are used for Shuttering activity, are not transferred to the client and are consumed and booked as “Consumables, Stores and Spares”.

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Next step is to mark up the cost of Transferable items with the GP rate and offer the relevant rate on a monthly basis illustrated as below:

S N.	Periodic Consumption of	Basic Cost In ₹ Lacs	VAT Input in ₹ Lacs	Whether T/NT	GP @ 20% = 25% on Purchases	Deemed Sales	VAT Rate	VAT Payable
1	Binding Wire	100	10	T	25	125	10%	12.5
2	Wooden Ply	20	2	NT	-	-	-	-
3	Shalitex Board	50	5	T	12.5	62.5	10%	6.25
4	Nails	20	2	NT	-	-	-	-
5	Insert Plates SS	150	15	T	37.5	187.5	10%	18.75
	TOTAL	340	34			375		37.50
	Eligible Input Credit		30					37.5
	Pay Difference							7.50

Whether Sub-Contractors are Liable to VAT

4.4 The answer to this question would also depend on which state one is operating and under which scheme the main contractor is paying its VAT. For e.g., the main contractor is under composition scheme and the project is taking place in following different states:

State of Rajasthan	The sub-contractor is exempt from paying any VAT if the main contractor is under composition scheme.
State of Madhya Pradesh	The sub-contractor is exempt from paying any VAT if the main contractor is under composition scheme.
State of Gujarat	The sub-contractor is required to pay his own VAT. The main contractor in such a scenario can take a deduction for the amounts paid to registered sub-contractor.

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Thus it can be seen that if one is working as a sub-contractor in a state, then it is well advised to consult the local VAT practitioner to ascertain the status of sub-contractors under the local law.

Back to Back Contracts

4.5 Back to Back contracts are those contracts where the main contractor has subletted either the complete contract or distinct portion of the contract to another contractor on such terms that the main contractor is not required to deploy any resource in terms of man, material or machine at the construction site.

In light of this discussion it is very pertinent to note the facts of L&T Judgement by Andhra Pradesh High Court. The judgement was passed in the background of Back-to-Back contracts. As per the judgement, in case of Back-to-back contracts subletted by the main contractor to the sub-contractor, Property passes on from the Sub-contractor to the Client and contractor is just an agent. The impact of the said judgement can be seen as per example below:-

Impact

Mr X has awarded contract to Mr Y at ₹100 cr. Mr Y has subletted the complete job to Mr Z at ₹80 cr. Mr Y has not made any purchases in the contract on his own. He thus does not need to pay any tax on the portion of ₹20 cr as there is no element of transfer of property as per Sale of goods Act.

Suggestion

Projects with huge margins can be subletted to any sister concerns to reduce VAT?

The said judgement is duly supported by Section 80 Determination, in the case of Paharpur Cooling Tower dated 15-4-2010 under Gujarat VAT.

Supply of Free Issue Material by the Client in the Project

4.6 Client or the Contractee can issue his material for use in execution of works contract awarded to the contractor on following basis:

- (i) Material can be issued as free supply not resulting in either recovery or sale to contractor

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- (ii) Material can be supplied on recovery basis or can be sold to the contractor.

As regards the taxability of (i) above, it may be noted that value of material supplied not resulting in either recovery or sale, is outside the scope of works contract turnover and, hence, not liable for tax.

And for (ii) above as the value of material supplied on recovery basis or sold to the contractor it will be included in the scope of works contract turnover and hence, liable to tax.

4.7 In all cases of supply of Free Issue Material to the client, it is advisable to have following terms in the Contract to avoid litigation and tax being levied on value of the clients material, the dealer should ensure to incorporate the following clauses in the contract.

- The employer to issue his material free of cost.
- The free issue material supplied by the employer shall be held in the custody of the contractor as bailee.
- Contractor to provide periodical statement of reconciliation.
- The material in possession of the contractor shall not be diverted for any other use.
- The cost of the free issue material supplied by employer will be outside the scope of contract and shall not be the part of consideration to be paid to the contractor.

4.8 A practical issue may arise under the situation when the client is debiting the material to the contractor, that is issuing the same on a chargeable basis. In such a case it is advised that proper sale invoice should be issued as per the applicable VAT laws. Simply raising a debit note would tantamount to default under the VAT procedures liable to penalty. More so, if the contractor is under the composition scheme where one of the conditions is purchase only from local state. Because in such a case the contractor would be required to produce all evidences for the purchases made in the execution of the works contract. If the client is also a dealer registered under the local VAT, it may be fine, but if he is not it may lead to cancellation of composition application of the contractor.

Availability of Input VAT Credit

4.9 During the course of works contract, various purchases are made. The classification has already been discussed earlier. Input Tax Credit is available on all transferable inputs used in works contract and thus as corollary the same is not available for purchases of non-transferable items namely consumables, stores and spares.

That is Input credit on consumable items should not be taken as deduction of consumables has been taken under the actual deduction method. Further there are additional conditions in each of the state which may be, general, in nature or specific to works contracts:

- CST purchases
- Capital goods used in works contract–Available in some states, but specifically denied in some of the states if used in the execution of works contracts.
- Tax Paid on Lease goods
- Goods purchased from Lump sum dealer
- Goods not connected with business – Vehicles etc.
- Fuel used in motor vehicles – Goods used as fuel in generation of electrical energy

Thus, input VAT needs to be claimed keeping the above restrictions in mind to ensure that the same does not get disallowed during the VAT audit/assessment.

Entry Tax Related Issues under VAT

4.10 Each of the state has its own Entry Tax norms under VAT. The same can be a big hurdle looking into the progress of the project. The steps to be kept in mind are as follows after obtaining registration under local VAT:

- (i) Firstly the contractor needs to ascertain the list of items which are subjected to Entry Tax payments.
- (ii) Whether the credit of Entry Tax shall be available against VAT liability.

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- (iii) What are the applicable forms for movement of goods in the state where project is being undertaken and movement of goods out of the home state of the contractor from where the goods are moving.
- (iv) Whether any special goods have been identified where pre-authenticated forms are required to be obtained from the VAT department in advance. All such purchases need to be planned well in advance to meet the procedural compliances at the check post.
- (v) Details of documents which need to be submitted at the checkpoint like Work Order, Branch Transfer Invoice, Delivery Challan, etc. Any carelessness at this stage can significantly affect the project progress.

Deduction of WCT TDS under VAT

4.11 Similar to the concept of TDS under Income Tax, there is a concept of TDS even under the VAT laws to ensure timely payment of VAT under Works Contracts. The rates again differ from state to state as below:

S.N	State	Rate of Deduction	Comment
1	Andhra Pradesh	2.80%	All categories of contracts not falling in sub-clauses (ii) mentioned below: 4% of 70% of the amount payable as consideration for the execution of work. Contracts for laying or repairing of roads and contracts for canal digging, lining and repairing : 2% of 70% of the amount payable as consideration for the execution of work;
2	Arunanchal Pradesh	No WCT deduction required	
3	Assam	No WCT deduction required	
4	Bihar	4%	NA

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5	Chhattisgarh	2%	Section 27 (2) of Chattisgarh VAT Act
6	Gujarat	0.6 - 2%	Applicable only in respect of contracts awarded to a sub contractor where the value of main contract in respect of which the sub contract is awarded exceeds ₹1 Crore.
7	Harayana	0%	If the awarder of the contract is deducting tax from contractor then no need to deduct from subcontractor as per our consultant's opinion
8	Himachal Pradesh	2%	Rule 38 (3) HP VAT Rules
9	Jharkhand	2%	NA

Normally, separate TAX deduction No. is to be obtained for deduction of WCT TDS.

However, utmost care needs to be taken to ensure proper compliance to these provisions as various issues may arise:-

(i) Issue I: Deduction to be made on which Value

Normally, there is a definition of the specified sales price within the act on which WCT TDS is required to be deducted.

Further, some of the states even give an option to give a declaration of value of labour involved in each of the bill by way of a separate form (For e.g. Form 702 under Gujarat VAT), as a result of which TDS is deducted only on the value of material involved in the project.

Another point to be noted is that the amounts are deducted at the time of making payment to the contractor and not at the time of entering the bill. Thus, even advance payments are normally subject to WCT TDS deduction.

(ii) Issue II: Threshold limit upon which WCT deduction is mandatory

The threshold limit is, normally, governed by the value of the contract and differs from state to state. For E.g. in the state of Gujarat, if a Work Order is issued having value of more than ₹ 1 crore, then the same is subject to WCT

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TDS deduction. The time duration for which the work order is issued is not to be seen.

(iii) Issue III: Time limit of furnishing the TDS certificate to the contractor

The time limit is, normally, within a month of payment of sums to the contractor. However, it is practically seen that in several cases the certificates are furnished with a lot of delay. In such a case the contractor needs to ensure that the certificates are received atleast before the VAT assessment.

Inter-State Works Contracts

4.12 People often confuse inter-state works contracts as those contracts which are carried out by a contractor having registered office in one state and taking up project in some another state. The contractor in such a case normally, always opts for VAT registration in the state where the work is being executed. Hence, the turnover for the contract is offered to the state where the work is being done.

To explain the same with the help of an example, If there is a contractor M/s XYZ, having registered office in the state of Maharashtra and they get a project in the state of Gujarat. As per the Gujarat VAT Act, it would be required to obtain registration under Gujarat VAT. And the turnover for the project would then be offered under Gujarat VAT.

Hence, the contract as mentioned above are not inter-state works contract.

4.13 The question then arises is, when does a contract become an inter-state works contract.

(i) Some of essential ingredients of an inter-state works contract are:

- There are two states involved, one where work is executed and one from where goods are being transferred to be used in works contract.
- The transfer of goods takes place in pursuance of contract for carrying out operations in Works contract.
- The goods as transferred from one state to another are used as in the same form or condition in the execution of works contract.
- The goods being tailor made and not catalogue items, can only be used for specific works contracts. (Although not a strict rule, but

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practically this point needs to be proved to the departmental authorities to prove the element of inter-state works contracts).

Taking ahead the above example, if M/s XYZ is transferring an equipment in the course of works contract from the state of Maharashtra to Gujarat to be transferred in the same form to the contractee in the state of Gujarat, then the turnover pertaining to the equipment would have to be shown as inter-state works contract. The same can-not be shown as a local sale in the state of Gujarat, after doing branch transfer from Maharashtra using F Form, which is a mistake often made.

The next important question that arises is - Why is it advisable to offer sale under Inter-state Works Contract rather than sale under local VAT in the state where the project is getting executed.

(ii) There are, primarily, two reasons:

- The goods that are being transferred must have been purchased by paying VAT or if manufactured, then the raw materials must have borne the VAT. And thus when CST is paid on such transactions, the input credit paid on purchase would be available for set off, thereby reducing the purchase cost to that extent.
- Rate of CST is 2% which would always be lesser as compared to local VAT rate of the state where the goods are being transferred. Sometime the difference is as large as 13%. And if VAT is in the scope of the contractor, which is normally the case, then it results in good amount of savings.

(iii) The only issue that arises is, whether the client would accept a separate invoice for sale occasioned in the course of the works contract, when there is a composite/ indivisible works contract :

- If the sale is foreseen in advance, then there can be a separate section for such a supply, which is advisable for better records.
- If not, then the answer still remains "yes", as the invoice is being issued to comply with the CST regulations, which are above the mutual terms decided by the parties to the contract.

(iv) From a works contract point of view, various transactions take place which can be summed up as under:

- Lumpsum transfer for various contracts to be executed in another state.

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For e.g. if there is a supplier in the activity of supply and installation of pollution control equipments, having the manufacturing plant in the state of Maharashtra and having a branch at Gujarat. The supplier is in the regular habit of supply of equipments for execution of jobs in the state of Gujarat. The goods are received by the Gujarat branch in the regular course and not specifically for any of the jobs. In such a case no CST would be levied and the supplier would have to pay local VAT in the state of Gujarat.

- Transfer for use in manufacture of goods to be used in execution of works contract.

In the above example, if assembling/ manufacturing is also carried in Gujarat State and raw materials are received in the state of Gujarat from Maharashtra. Since the delivery is taken in Gujarat for further action, the same would not be liable to CST but local Gujarat VAT.e.g. If contractor A brings wooden slides to Gujarat from his branch office at Mumbai and from the wooden slide contractor manufactured window and door and used the same in execution of works contract then contractor A is liable to pay local Guj VAT on window and door.

- Transfer of goods for specific works contract in pursuance of contract received.

Further to above, where a customer gives his own specification for the pollution control equipments which thus become tailor made items and which can only be installed at that customer's premises. In this case the sale would be deemed to have occasioned in the course of inter-state trade and commerce works contract, even if delivery is taken by the Gujarat branch and kept at its premises for some days. In such a case, local Gujarat VAT can-not be paid.

(v) Further to above, there can be a separate category of transactions where the contractor is resident in the same state where works contract is being executed and purchases goods from other state :

- Purchase of Raw material/ Component for use in manufacture of goods to be used in the execution of works contract

In such a case, both CST and local VAT would be levied as the goods have changed the form.

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- Purchase of goods, where delivery is taken by contractor for use in execution of works contract in the same form.
- Here only CST would be levied as the goods are being used in the same form.

(vi) Purchase of goods under Section 6(2) for use in execution of works contract in the same form. To explain this in the form of an example. If there is a contractor with head office in New Delhi and having received the works contract in Gujarat and pursuant to works contract some purchases are intended to be made from Rajasthan to be used as it is in the works contract. Now in such a case, there can be various ways of carrying out this transaction:

- Order is placed by the Gujarat Branch on the Rajasthan dealer and delivery is taken in Gujarat and then sold to the client in Gujarat, in such a case both CST to Rajasthan dealer and local VAT in Gujarat would have to be paid.
- Order is placed by the Delhi HO to Rajasthan dealer and in transit sale is made under Section 6(2) directly to the client in Gujarat, hence not involving the Gujarat Branch at all. In such a case only CST would have to be paid and local VAT can be avoided. The material as received by the client in Gujarat would be issued to the client as Free Issue Material. However Under this scenario, in the normal course, the contract for supply of goods and services may be entered into between the parties separately. Accordingly, this transaction for supply of goods may be structured as an E-I/E-II transaction, provided the owner is willing to issue form C.

4.14 However, it is now seen that the VAT departments in several states have started denying the benefit of such transactions to the dealers on two counts:

- (i) Section 6(2) sales can-not be made when the subsequent sale is pre-determined even before the commencement of movement of the goods.
- (ii) Section 6(2) sales can-not be made in case of works contracts, where the contractual rates are composite. Hence the rates can-not be broken up so as to bill towards the material component for the sake of taking benefit of these provisions.

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However, at the same time it is important to note the significant judgement of M/s. State of Gujarat vs. Haridas Mulji Thakker (84 STC 317)(Guj):- In this case the facts are that the Gujarat dealer received order from another dealer in Gujarat. For supplying the said goods, the vendor dealer in Gujarat placed order on Maharashtra dealer and instructed to send the goods directly to the Gujarat purchasing party. Gujarat High Court held that the sale by Maharashtra dealer to Gujarat vendor dealer is first interstate sale and the one by Gujarat vendor dealer to Gujarat purchasing dealer is second interstate sale. Gujarat High Court also held that the second interstate sale is exempt u/s. 6(2) being effected by transfer of documents of title to goods. In this case though there was no physical transfer of L.R. etc. Gujarat High Court held that there is constructive transfer by instruction and hence duly covered by section 6(2). This judgment duly covers both issues, that there is no need for physical transfer and also that having predetermined parties do not affect the claim.

Service Tax and the Construction Sector

4.15 The better half of VAT as far as a transactional value in the construction sector is concerned is Service Tax. The problem is that the proportion of this better half keeps on changing on a case to case basis. And what is most challenging is that the law itself is changing each year, thereby ensuring that the settled positions are never settled. Let's look at some of the crucial issues as far as service tax is concerned:

(i) Centralised Registration

Although the construction sites at which the civil contractors normally work are temporary locations and are not required to be registered as branches under the centralized registration scheme. But if invoices of materials/ services where excise/service tax is being charged are received at those sites, without a mention of the Head office address then the same may not be an eligible document for claiming the cenvat credit against the service tax liability. If the discipline in this regard can-not be maintained for the major sites, then its advisable to get these sites registered as branches.

One more point to be noted is to intimate the department about the closure of the construction site, if the same has been registered as a branch under the centralized registration scheme.

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(ii) Definition of Works Contract

As per Section 65B(54) "*works contract*" means a contract wherein transfer of property in goods involved in the execution of such contract is leviable to tax as sale of goods and such contract is for the purpose of carrying out construction, erection, commissioning, installation, completion, fitting out, repair, maintenance, renovation, alteration of any moveable or immovable property or for carrying out any other similar activity or a part thereof in relation to such property.

a) Rule 2A of the Service Tax (Determination of Value) Amendment Rules, 2012 (w. e. f. 01.07.2012)

• **Determination of Value under clause (i)**

(i) Value of Service portion in the execution of works contract service shall be equivalent to the gross amount charged for the works contract less the value of transfer of property in goods.

Gross Amount includes	Gross Amount does not include
<ul style="list-style-type: none">• Labour charges for execution of the Works• Amount paid to a sub-contractor for labour and services• Charges for planning, designing and architect's fees• Charges for obtaining on hire or otherwise, machinery and tools used for the execution of the works contract• Cost of consumables such as water, electricity, fuel, used in the execution of the works contract• Cost of establishment of the contractor relatable to supply of labour and services and other similar expenses relatable to	<ul style="list-style-type: none">• Value of transfer of property in goods involved in the execution of the said works contract. <p>Note: Where Value Added Tax has been paid or is payable on the actual value of transfer of property in goods involved in the execution of the works contract, then such value adopted for the purposes of payment of Value Added Tax, shall be taken as the value of transfer of property in goods involved in the execution of the said Works Contract.</p> <ul style="list-style-type: none">• Value Added Tax (VAT) or sales tax, as the case may be, paid, if any, on transfer of property in goods involved in the execution of the said works contract

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supply of labour and services • Profit earned by the service provider relatable to supply of labour and Services	
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• Determination of Value under Clause (ii)

(ii) Where the value has not been determined as per clause (i), the same shall be determined in the manner explained in the table below:

Where works contract is for...	Value of the service portion shall be...
(i) execution of original works	40% of the total amount charged
(ii) maintenance or repair or reconditioning or restoration or servicing of any goods	70% of the total amount charged
(iii) in case of other works contract not covered by (A) and (B), including maintenance, repair, completion and finishing services such as glazing, plastering, floor and wall tiling, installation of electrical fittings of an immovable property	60 % of the total amount charged

Notes:

A. "Original works" means (i) all new constructions (ii) all types of additions and alternations to abandoned or damaged structures on land that are required to make them workable (iii) erection, commissioning or installation of plant, machinery or equipment or structures, whether pre-fabricated or otherwise.

B. CENVAT credit of any input goods used in or in relation to the works contracts is not available, whereas, CENVAT credit of input services and duties on capital goods used is available. (Under Abatement Scheme of Notification 1/2006, Cenvat credit on Input goods as well as Input Services & duties on capital goods was not available).

3) 'Total Amount' referred to in the second column of the table above would be the sum total of gross amount charged for the works contract and

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the fair market value of all goods and services supplied in or in relation to the execution of works contract, whether or not supplied under the same contract or any other contract, after deducting : (i) the amount charged for such goods or services, if any and (ii) the value added tax or sales tax, if any, levied thereon.

b) Service Tax Rate w.e.f. 01.04.2012

- Works Contract composite Rate increased from 4% (effective rate 4.12%) to 4.8% (effective rate 4.944%) : (only applicable in case of Composition Scheme)

Particulars	Rate upto 31.03.2012				Rate from 01.04.2012			
	ST	EC @ 2%	SHE @ 1%	Effective Rate	ST	EC @ 2%	SHE @ 1%	Effective Rate
General	10.00%	2%	1%	10.30%	12.00%	2%	1%	12.36%
Works Contract	4.00%	2%	1%	4.12%	4.8%	2%	1%	4.944%

c) Reverse Charge Mechanism (w.e.f. 01.07.2012)

- For the specified three services where service provider is either an individual or a firm or LLP and service recipient is a body corporate, both service provider and service recipient shall be liable for service tax on specified amount as under:

S.N.	Description of Service	Service Recipient	Service Provider
1	Hiring of a motor vehicle designed to carry passengers: (a) With abatement (b) Without abatement	100% 40%	Nil 60%
2	Supply of Manpower for any purpose	75%	25%
3	Works Contract Service	50%	50%

Crux

4.16 Section 65B has been inserted by Finance Act 2012 which gives new definition of “works contract”.

Rule 2A of Service Tax (Determination of Value) Second Amendment Rules, 2012 which comes into force on 1st July, 2012 gives two clauses under which

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Value of Service portion of Works Contract may be determined. According to this valuation rule, Cenvat Credit of Input goods should not have been taken; however, Cenvat Credit of service tax paid on Input services and duty paid on capital goods can be availed.

Rule 2C has been inserted in Service Tax (Determination of Value) Second Amendment Rules, 2012 which comes into force on 1st July, 2012 for determination of value of service portion involved in supply of food or any other article of human consumption or any drink in a restaurant or as outdoor catering. According to explanation added to this sub-rule, Cenvat Credit of duties or cess paid on goods classifiable under chapters 1 to 22 of the Central Tariff Act, 1985 should not have been taken; however, Cenvat Credit of service tax paid on Input services and duty paid on capital goods can be availed.

Chapter 5

Internal Audit

5.1 Internal audit as the word describes itself is an audit which is meant for the management of the organisation. Since the management cannot be in physical touch with each and every happening related to their company, they appoint internal auditors who serve as eyes and ears of the Board.

Internal audit may be carried out by an in-house team or external firms. However, internal audit plan would differ from organisation to organisation. One plan cannot fit all. That is why, it is imperative for auditor to understand that he may have to play a different role depending on the type of organisation. There are certain organisations where skilled persons may not be available in the accounts, finance, stores and HR department, even though the organisation may be having some very good technical manpower. This can make the life of an internal auditor very difficult, as the technical persons may not understand the importance of internal controls and may not take things seriously when control lapses are brought to their notice. In all such cases the internal auditors are required to share a greater responsibility in terms of getting their points implemented till the last mile.

Thus, the process of internal audit is not complete upon raising the report and drawing praises from the management for preparing a good report. It goes beyond to see that the audit recommendations are implemented and being followed by the departments down the line on a consistent basis. So as to say that the implementations get injected into the blood of the organisation. The role of internal auditor thus encompasses a major responsibility.

5.2 From an internal auditor's perspective, it is important to understand two critical issues.

- Firstly, the flow of operations right from tendering till the completion of project which is represented by completion of defect liability period for a project resulting into encashment of retention monies and return of performance/ advance bank guarantees, if given.
- Secondly, it is also important to know the various functions which are required to be performed by an organisation to run smoothly and achieve its objectives. So from a functional perspective the

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organisation operating as a civil contracting unit can have following relevant functions:

- a) Board/ Top Management
 - b) Engineering (Tendering/ Purchase/ Planning/ Execution/ Quality)
 - c) Accounts and Finance
 - d) Stores
 - e) Human Resource.
- As chartered accountants, we normally belong to the account and finance domain. This does not mean that our interaction of internal auditor during the course of audit should not be restricted to finance domain only. The interaction with the other functions can only lead to a comprehensive approach towards internal audit.

5.3 This guide, predominantly, takes a functional approach in explaining the control related issues, in addition, to taking the operational flow into consideration wherever felt necessary. Basic understanding of the nature of contracts entered into by the civil contracting firms are as follows:

- EPC – In this case, engineering, procurement and construction all the activities are in the scope of the contractor. However, the client has given all the specifications to facilitate estimation of cost.
- Concept based EPC – In all cases, where the client is not technically equipped, he may not be in a position to give the required specifications and may therefore, be very crude in his requirements. In all such cases the contractor has also to play a role in evolution of the project concept. Hence, the cost of evaluating the tender is also high. Also once bid, the risk involved are also high.
- E&C – In these contracts, the client keeps procurement of equipments in its scope and contractor is only to create design and drawings and then to carry out the construction accordingly.
- Construction – In this case, the contractor is only involved in the construction activity. For rest of the activities the client may involve other specialised agencies.

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All the above contracts can be with steel and cement and without steel and cement, where client chooses to issue these materials as Free Issue Material.

Further, the above contracts can either be lumpsum or item rate contracts or both. When we say lumpsum, we mean the values are fixed unless there is any major deviation in specifications and these contracts are, thus, more risky to execute. Item rate contracts are those contracts where the total work is broken down into various activities and a rate being specific per unit execution of that activity, say, concreting per cum, reinforcement per MT, etc.

Chapter 6

Engineering Controls

6.1 Civil engineers are the most key persons in the construction industry. They also hold key positions in the organisation in the areas of Tendering/ Purchase/ Planning/ Site Execution/ Quality Assurance/ Technical Audit, etc. Let us discuss the various activities under the Engineering domain right from the starts:

Tendering

6.2 Incredibly, many construction projects are initiated without even the most basic cost-benefit analysis or feasibility study. Documented evidence justifying the project should be submitted, even though proceeding with a project that will not result in an increase in revenue or financial position can be acceptable in some instances. Sometimes, projects are undertaken to maintain market share in a competitive industry or to provide a service or product line that will complement another.

Internal auditors should determine whether the project has been evaluated before being accepted by the entity, appropriate approvals have been obtained and ensure that the risk on accepting the project has been properly evaluated by the management.

A few analytical procedures that can be performed by the internal auditor include:

- Evaluation of project wise profitability ratio of projects completed during the period.
- Evaluation of budgeted profitability of all new projects approved.

These ratios should be compared to the previous periods and explanations for any significant fluctuations needs to be obtained. The following is a model checklist related to bidding and selection of a project:

S. No.	Particulars	Yes	No	N/A
1	Is there a written policy with the entity as regards its bidding process?			
2	Is the policy complete in all regards including obtaining bid bonds and performance bonds?			

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3	Is the written policy updated at frequent intervals by the entity based on its previous experience?			
4	Has the entity performed site investigation before entering the bidding process?			
5	Has the entity obtained sufficient approvals at the appropriate level of authority before accepting the process?			
6	Has the entity prepared budgets of the estimated cost of the project in detail with respect to all costs and considered the escalation of costs on a reasonable basis in the case of fixed price contracts?			
7	Are the bids approved by the appropriate level of authority?			
8	Are there written policies/processes for placing bids by the entity?			
9	Does the entity enter into contracts for all parties? Are the terms of the contract complete in all aspects such as term of the contract, specifications if any, escalation clauses as agreed, responsibilities, penalties, etc?			
10	Does the entity ensure compliance with the terms of the contract?			
11	Is the agreement entered into with clients signed by both the parties at the appropriate level before commencement of work?			
12	Does the entity provide services to Related Parties?			
13	Are there proper systems in place to ensure that there is unbiased pricing in the case of Related Parties so as to ensure that the pricing is done at arm's length price?			

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14	Does the entity have the process of evaluating the credit worthiness of the customer?			
15	Does the entity request for a bid bond? If a bid bond is not obtained, does the written policy specifies alternative procedures?			
16	On a sample basis, has the internal auditor verified the compliance of this policy?			
17	Does the internal auditor need to verify the risk involved if the entity does not obtain performance bonds?			
18	Is the minimum limit to obtain these bonds fixed in relation to the risk taking ability by the entity and is it frequently reviewed?			
19	Are there any exceptions in complying with the procedures related to performance bonds? Has appropriate approvals for such cases obtained and what are the reasons for not obtaining performance bonds?			
20	Is the base orientation of the project clear? For e.g. client has to give the plinth level with respect to which the total structure is to be constructed.			

6.3 After this basic checklist, lets dive deep into some closer aspects related to the contract. Tender is the first document which a client normally floats which contains the scope of work desired for a project. The tendering team is supposed to analyse all aspects related to the tender, be it understanding the technical requirements/ construction methodology/ doing rate analysis of the scheduled items to be executed/ understanding the tax terms/ carry out site investigation and other several issues. A basic understanding of the tender terms and conditions can be carried out as follows:

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S. N	Tender/ Contract Clauses	
1	Work order Value – Permissible Variation/ Liquidity Damage (LD) Clause	<p>Since the value of tender is based on estimated engineering quantities which are always subject to variation, so there has to be a variation limit as the site mobilisation of men and machine by the contractor would depend on the scale of the project. Thus Variation Limits should not be more than 25%.</p> <p>Further to ensure that the work gets completed on time, the client normally insists on a LD clause which enables him to levy a penalty if the work is not completed on time. The LD is fixed normally at 0.50% per week (or part thereof) of delay. In all such cases the contractor should insist on an upper cap of 8-10% for the same. If there is no upper cap, it exposes the contractor to several uncertainties.</p> <p>Further as a corollary to an LD clause, contractor can insist upon an Incentive Clause for timely or early completion with a specified percentage so that he is motivated to complete the project in time.</p>
2	FIM - RMC/ Cement/ Steel?	<p>A majority of construction projects are awarded with Cement and Steel supplied as a Free Issue material (FIM) by the client to ensure that there is no compromise on construction quality on these grounds. Since the cost of these materials falls directly in the scope of the client, there are chances that the contractor may indulge in wastage of these FIM's. To ensure proper utilisation, standard consumption norms are decided as per IS standards, beyond which the consumption is deducted from contractor bills at certain rates. It is important to decide the rates at which debit would be made and also</p>

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		the wastage norms which should normally be based on IS.
3	Work completion period	Every Contract when allotted would contain a work commencement date based on which work closure date is determined by adding the time duration required to complete the work. Contractor may insist that the future work completion date would be subject to timely availability of drawings/ Free Issue Material and work front which fall in the client's domain. At times the client may even issue a separate communication by way of notice to proceed which is considered as the work commencement date.
4	Facilities from the Client - Labour colony, Land, Power & Water supply.	The tender should also clearly spell out the availability of ancillary support services available from the client in terms of water/ electricity (whether Free/ Chargeable) and whether available at Single Point/ Multiple Points)/ Land for labour colony. If the same are in the scope of the contractor, then appropriate cost needs to be considered at the time of tendering.
5	Billing period cycle, Bill certification period and payment terms	The normal billing cycle is 30 days. When the client appoints a Third Party as consultant for supervision and quantity Certification, then there are chances that payments would usually get delayed because of stringent verification. So there should be a clause for release of 60-70% adhoc amount against uncertified bill which shall ease out the working capital requirements. Thus there can be a provision of issuance of an Interim certificate from the certification agency.

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6	Check whether any prescribed format for client bill?	Client normally insists preparation of running bills as per their prescribed formats, but Compliance with laws mainly vat and service tax should not be ignored in such cases.
7	Whether the job is new or left over one?	The cost of execution of a job which is a left over may normally be higher than a new job. Hence proper Investigation is required so as to have clarity on the reasons why the earlier agency could not complete the project. Such projects may even be avoided looking in to the market conditions and work availability.
8	Safety/ Quality Norms	Ideally an organisation has to have a basic safety policy as human life is the most important asset. It is practically seen that different clients and contractors respond very differently to safety norms. Some are very stringent as far as safety is concerned even at the cost of delay of the project. So the contractor should also have a fair assessment of the reputation of the client in this regard. Impact on Time and Money should be considered while giving the overall quote.
9	What are the requirements with each RA bill?	Normally for release of full payment against the bill, certain requirements of the client need to be complied with. The requirements should not be such that they act as a barrier towards release of timely money. That is the bill should not be held for petty/ cosmetic issues.
10	What are the rates of principal items (like Excavation, RMC supply, Shuttering etc.)	Tendency of the client to keep higher margins in finishing items should not be accepted. Infact from a contractor's perspective, higher Margins are required in some of the initial items to take care of initial cost of set up. Under an ideal scenario margins may be spread out equally across all the items.

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11	What deductions shall be made by client from RA bill	Only those agreed as per WO. Adhoc deductions should not be entertained and clearly objected by way of written communication.
12	Service tax/ VAT/ WCT extra or inclusive?	Many a times client may mention that all the components of taxation be it service tax/ VAT/ WCT shall be paid extra. In all such cases the contractor should raise proper invoices taking into consideration the tax rules. If WCT which is a form of TDS under VAT is paid extra, then it may be claimed in the abstract sheet itself.
13	Whether running plant expansion or construction of new plant building?	Cost of doing a job in an already running plant i.e. plant expansion may be higher due to scarcity of space available for work execution. A proper site investigation may help in this regard.
14	Site Investigation by Physical visit of the work locations	This is necessary to understand Local Material Rates/ Terrain for Equipments/ Labour colony area/ Distance from the city. Site Investigation Report (SIR) may be required to be prepared for the same. A format of SIR is appended as Appendix 1 .
15	Internal Logistics	If the Location of Porta Cabin where the office set up is to be done vis-a-vis Client office/ Labour Colony/ Batching Plant/ Store is far away, this will also have an impact on the overall cost of execution. Advance discussion on these aspects would make the life easy during the project.
16	Bank Guarantee	Bank Guarantee may be required to be issued for Mob Advance/ Performance. However as far as possible if the contractor has a good track record and experience, issuance of a performance bank guarantee may be avoided.
17	Mobilisation	Normally 5-10% of the value is released as Mobilisation advance. The same is recovered

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	Advance	subsequently over the duration of the project. However the mode of advance recovery should not be in equal instalments but in proportion to the monthly bills. Further, sometimes bank guarantee format is such that the issuing banker of the contractor may raise some objections. Hence in effect the contractor is not able to avail the advance facility from the client if the banker has refused to issue the bank guarantee. So such issues need to be verbally discussed with the client at the tender stage.
18	Escalation clause	Escalation clause may be kept if job duration is more than 9 months. For example tender can be filled with the assumption of basic rates clearly spelled out. Hence if the basic rates change over the period, then escalation claims can be raised appropriately. This is a very useful risk management technique but subject to hard negotiation with the client. But under any circumstances Steel and Cement if in the scope of the contractor are always subject to escalation based on the basic rate. RBI cost index forms the basis in all such cases although practically same may not be enough to cover the cost.
19	Future changes in IS codes	Tender rates are submitted always subject to changes in IS codes. Because if in the intermittent period the specifications in IS codes are changed by the government, resulting into higher cost of execution, then the burden needs to be passed on the client.
20	Work Descriptions and material specifications	Instead of specifications like best material or best quality, it is always advisable to specify the make or brand or give full specifications in the work order to avoid any dispute at a later stage.

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21	Fabrication Activity	Sometimes we may find that even preparation of fabrication is a part of the drawings and has to be done at no extra cost. So appropriate loading is required to be done.
22	Guarantees and Warranties	If any guarantee against any risk or damage is accepted, its better to find out if the risk is insurable. And if yes, then the cost needs to be factored into at the time of rate finalisation.
23	Testing	If the same is in contractor's scope, appropriate cost should be considered.

6.4 In addition to the above points, if the contractor is not directly working under the client but as a sub-contractor to another agency, then some additional issues to be kept in mind are as follows:

- Ensure to avoid the Tendency of the main contractor to pass on all the scope to the sub-contractors without proper rates. That is if the rates are substantially less, then certain activities like water/ electricity/ PF compliances/ other regulatory approvals may be kept in the scope of the main contractor.
- Linking the payment for the extra work with the corresponding payment to the main contractor is a pitfall. Thus if the contractor is not able to correspond properly with the client for extra items, then the sub-contractor also has to suffer.
- If job extends beyond schedule for reasons/delay attributable to client or the main contractor, it is advisable to demand compensation for the same.
- Preferably he should also have a direct contact with the client to know about the happenings like certification of bills, release of payment, passing extra claims etc.

Specific Issues Faced in EPC Contracts other than Those Faced in Construction Contracts

6.5 EPC contracts are those contracts where in addition to the construction capability, one also has to possess necessary expertise in the

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area of Engineering & Design of structure and Procurement of Equipments. Normally EPC contracts are taken on a lumpsum basis instead of item rate basis. Thus the challenges and the risk involved in an EPC contracts are much higher as compared to a pure construction contract. As an auditor one needs to have a basic understanding of the challenges in EPC contracts which can be summed up as under:

- (a) Requirement of Design capability – Separate team is required for taking care of design and drawing aspects. If not in-house, then the same is to be outsourced to some reliable consultant. Further for Concept based EPC projects where the contractor himself has to envision the project, he might need services of some expert for proper design which may have an impact on the overall cost of the facility intended to be built. Thus there are costs to be incurred even at the tendering stage, and if the project is not received, then these would be sunk costs. Long term tie up's with engineering consultants can be of great help in this regard.
- (b) Considering that procurement is also in the scope of the contractor, he has to have clarity in supply schedule and also a network of approved stable vendors for various jobs.
- (c) Since a lot of working capital is required in these contracts, one has to have adequate cash reserves to meet tough times. For e.g. there may be instances when there are last minute changes which delay the dispatch of equipments at the site. So the contractor should be in a position to absorb all such events in his working capital cycle.
- (d) The contractor would be doing both construction as well as procurement, installation and commissioning of equipments, hence the construction team has to carry out the work in such a manner, that the other teams are able to carry out the next stages very smoothly and with proper co-ordination.
- (e) One has to be ready for stringent third party checks at various points. As the client can only exercise controls by appointing third party quality consultants in various areas, so the contractor would have to satisfy the pre-certification requirements of these consultants.
- (f) There may also be a case when procurement has to be made from overseas markets. In such cases the voyage time, marine insurance, custom formalities need to be complied with. Further in case of imports, the contractor has to ensure that the equipment represents

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latest technology and should not be dumped machineries by the developed nations.

- (g) Since various nature of services and goods are being provided under EPC contracts, even the direct and indirect taxation at multiple points pose an extra challenge.
- (h) The contractor also has to have proper logistics arrangements, as loading and unloading of heavy goods would be required at various places from the purchase location to the destinations where the equipments are to be installed. Thus planning for heavy trailers/ cranes/ forklifts needs to be proper.
- (i) Normally it is considered that when the project is finalized on a lumpsum basis, it may not be possible to claim any extra items. However even in a lumpsum contract the contractor has to document all the specifications based on which the contract price has been finalized. Thus if any deviation from the specifications is required during the course of the project, the same may be claimed as an extra item.

Kick off Meeting

6.6 Kick off meeting is generally being held just before mobilization and start of a project basically a meeting with client and consultant, the basic requirements and general aspects connecting the project will be discussed.

The various points that should be raised and documented during this process are as follows:

- (a) Space for labour colony, shuttering and fabrication yards nearest to site, area required for the work as well as appurtenance to work areas will be discussed.
- (b) Location for temporary structure, *viz.*, site camp/ site offices, underground tank, electrical grid, water grid etc. are to be decided on site plan in consultation with client/ consultant so that it is not disturbed during tenure of project.
- (c) Discussions regarding the priority areas of works to be executed will help in proper planning of activities.
- (d) Matters connecting handing over of site for construction. All pre-project approvals should have been obtained by the client. These

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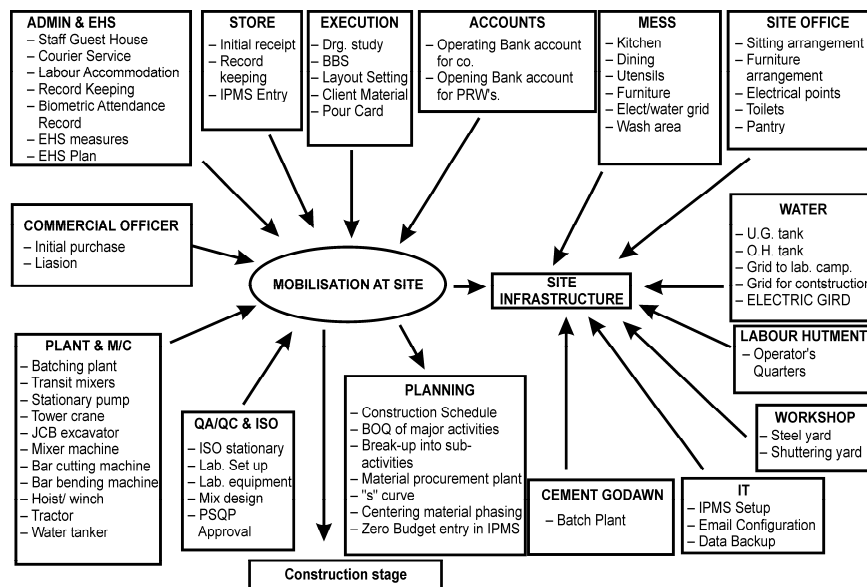
days its seen that a lot of environmental clearances are pending to be obtained and even before that the contractor is asked to mobilise at the site. This even results in a scenario when the courts halt the project totally, leading to several issues at the contractor's end.

- (e) Adequate water supply requirement from client - give requirement to client if water supply is under client's scope. If not, arrangement for water from outside and terms and conditions for reimbursement of actual charges for the same.
- (f) Adequate power supply requirement - requirement to be submitted to client considering the maximum power consumption for various activities viz. structural works, lighting, machineries, etc. If the power supply is not under client's scope, arrangements for bringing and establishing DG sets at site is to be worked out with various terms and conditions for reimbursement, etc.
- (g) Supply of materials under client's scope viz., cement, steel, matters connecting giving requirement to client as well as supply time to be discussed.
- (h) To decide procedures to be followed for indenting materials under client's scope indent to be submitted to whom, time required for delivery once identity is placed.
- (i) Contact person for the project from client/ consultant side for various aspects connecting project such as purchase, personnel matters, supply of water/ power, etc. Name of persons for addressing correspondence and copies to be sent - to know the names from client's side as well as consultants.
- (j) Day of weekly and bi-weekly progress review meetings to be fixed.
- (k) Procedure for submission of bill indents adhoc and final certification of RA bills, etc.
- (l) Regarding minimum cement stock required.
- (m) Reinforcement steel stock required.
- (n) Schedule of release of drawings from consultant side which is required for preparing Bar chart and release of layout plan, architectural plans, elevations, sections etc.
- (o) Joint records of existing ground levels and B.Ms.

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- (p) Date of start of project - this has to be decided based on handing over of complete site, availability of water, power, supply of materials in client scope and availability of basic construction drawings.
- (q) Requirement of reinforcement category wise for works up to plinth for procurement to be submitted to client/ consultants.
- (r) Foundation drawings & drawings up to plinth level to be obtained for start of work & other drawings viz. architectural drawings, structural drawings etc to be obtained for detailed planning purposes.
- (s) Sequential progress of bldgs required area wise is to be decided for further planning.

6.7 The chart below summarises a basic understanding on resource planning at the construction site and other ancillary infrastructure



Documentation for Day to Day Monitoring

6.8 The documents to be maintained for day-to-day monitoring are as follows:

- (a) Tender File
- (b) Daily Progress Report
- (c) Contractual File

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- (d) Minutes of Meeting (Client/internal)
- (e) Material Requirement
- (f) Client Correspondence (In/Out)
- (g) Construction Schedule
- (h) Budget
- (i) Reconciliation Statements
- (j) Resource Monitoring File
- (k) Correspondence - In/Out
- (l) Weekly Achievement
- (m) Purchase/ Work Order
- (n) Project Performance Review
- (o) Quotation File

6.9 File system is established at site to monitor the project from start to finish. PM has to make sure that the files are maintained and up dated by the respective file in charge. These are the record control files. These records can be useful for monitoring, planning, as history file, etc.

Additionally, other records and registers to be maintained at sites:

- (a) Correspondence
- (b) Hold up & Hindrance Register
- (c) Drawing Receipt Register
- (d) 'S' curves – Plan vs. Achievement
- (e) Sketch files
- (f) Literature file- category wise
- (g) Purchase matters
- (h) Extra items file
- (i) R.A. Bill file
- (j) Labour Bill file
- (k) Circular file

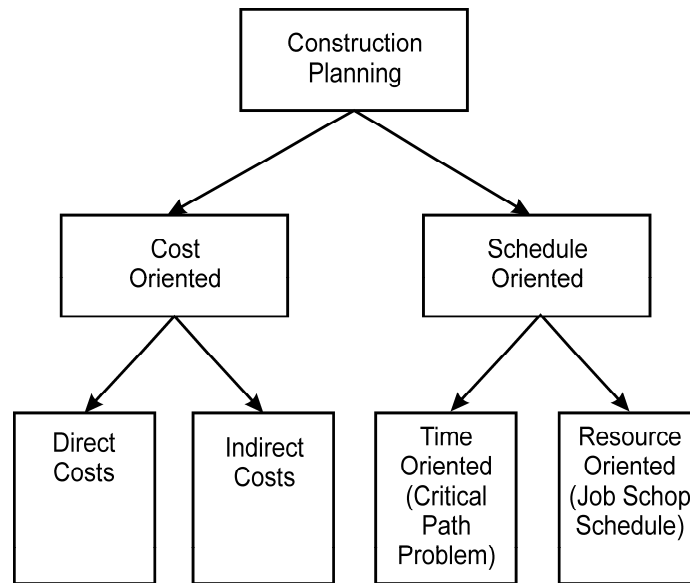
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6.10 It may be noted that sketches are issued on a temporary basis (say Steel specifications are changed from 8mm to 10mm) as an alternative to drawings, as the same may take some time. However in all such cases the contractor should insist on obtaining the modified drawings as a part of proper documentation. These are thus some of the basics as far as site mobilisation is concerned. The chapters on HR/ Stores and Quality control also mention in detail the responsibilities of the respective departments as far as mobilisation is concerned.

Budgeting and Site Mobilisation Planning

6.11 On award of contract, the tender file is handed over by the contracts department to the construction department.

- (i) Normally, the planning may start at the stage of receipt of a Letter of Intent (LOI) but a full blown mobilisation should only be done after receipt of the Work order unless there are exceptional circumstances. Tendering team should be made responsible for the study of the work order terms, so as to ensure compliance with the points decided at the tendering stage between the contractor and the client. Any deviation needs to be brought to the notice of the client before the mobilisation activity has begun.
- (ii) Once an approved Work order is received, Project Budget is required to be prepared. This is very challenging due to variability of the engineering quantities when actual execution is carried out.
- (iii) However several challenges are faced at the time of preparation of budget when there are several uncertainties hovering over the project.
- (iv) The functional head construction studies the tender file, attends the kick off meeting with the client/ consultant and prepares an action plan for Mobilization of the site.
- (v) The functional head construction reviews the contract and estimates the resources required.
- (vi) Thus monthly material and labour requirement over the next few months is arrived at and depending on the lead time, the orders are placed.



Cost Oriented Planning

6.12 Convincing the Project Manager to prepare the budgets is the biggest task. Because the forces are so dynamic, actual scenario is expected to be different from the work orders, hence he is not in a position to do so. Most of the times he would argue that because of delay in submission of drawings by the client, planning is not very easy.

But to meet the Project Deadline/ it is in the best interests of the client to break the work order quantities into monthly quantities.

An overall cap is required to be kept on the total quantities both material and labour to be consumed for the project. Monthly requirements can then be prepared on the basis of monthly budgets.

6.13 The budget for the construction site has to primarily consider following cost estimates:

- (i) Direct Labour Cost
- (ii) Indirect Labour Cost
- (iii) Direct Material Cost
- (iv) Indirect Material Cost
- (v) Equipments whether on hire or owned

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- (vi) Fuel
- (vii) Salary
- (viii) Site Overheads
- (ix) Taxes
- (x) Allocation from Head office

6.14 In order to explain each of these heads following illustration is being assumed:

Project X (Assumed)
Project Value – ₹20 Lacs
Duration – 5.5 Months

Work Items as per Work Order	Qty as per W.O.	Rates as per Client Work Orders (in ₹)	Amount (in ₹)
Excavation (Cum)	1,000	1,000	10,00,000
Reinforcement (MT)	50	14,000	7,00,000
Shuttering (sqft)	250	1,200	3,00,000
		Total	20,00,000

(Note – Pls see that the rates are taken only to ease mathematical calculations and may thus have no bearing on the actual rates prevailing as per market)

(i) Material Consumption Ratios

Binding Wire @ 2 Kg per Mt of Reinforcement

Wooden Material @ 0.4 sq ft per unit of shuttering

(ii) Labour

It is presumed that all the labour portion of the jobs have been outsourced to various sub-contractors at pre-determined rates.

In addition 2 skilled and 2 unskilled labour are required for cleaning and maintenance work at site for four months.

(iii) Equipment

One Trailer and one crane required for 5 Months

Company owns a crane.

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(iv) Salary and Overheads

6.14 Salary and other overheads need to be assumed for 5-6 months.

VAT to be paid under composition @ 0.6%

Work Items as per Work Order	Qty as per W.O.	Sub-Contractor Rate (in ₹ Per Unit)	Amount in ₹
Excavation Cum	1000	40	40000
Reinforcement MT	50	1000	50000
Shuttering sqft	250	200	50000
(1) Direct Labour Cost			140000
Departmental Labour (No.s)			
Skilled	2	4 Months (1500 per labour)	12000
Unskilled	2	4 Months (1000 per labour)	8000
(2) Indirect Labour Cost			20000
Item	Qty	Material Consumed	
Steel work MT	50	Binding Wire 100Kg @ Rs50	5000
Shuttering sqft	250	Wooden Mat 100 sq ft @ ₹250	25000
(3) Direct Material Cost			20000
Other Materials			
Safety Items		5 Months @ ₹2,000	10000
Tools		5 Months @ ₹3,000	15000
(4) Indirect Material Cost			25000
Equipment	No.s		
Trailer (Rented)	1	5 Months @ ₹10000 per month	50000
Crane (Owned)	1	Dep for 5 Months @ 2000 per month	10000
(5) Equipment Cost			60000
(6) Fuel Cost	6	₹20,000 per month	120000
Salary			
Project Manager	1	6 Months @ Rs10000	60000
Engineer	1	5 Months @ Rs7000	35000

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Supervisors	2	4 Months @ Rs6000	48000
Other Staff	5	6 Months @ Rs5000	150000
(7) Salary			378000
O/H			
Site Guest House		5 Months @ ₹5000	25000
Mess Exp		5 Months @ ₹3000	15000
Communication		5 Months @ ₹2000	10000
Admin Vehicles		5 Months @ ₹4000	20000
Site Mobilisation and Demob Exp		5000 + 5000	10000
(8) Total Overheads			80000
Taxes			
VAT Composition		0.6% of project value	12000
Labour Laws		License and others	15000
(9) Total Taxes			27000
(10) Allocation from HO		₹10000 per month	60000

6.15 Project Master Budget can be summarized as follows:

Particulars	Amount in ₹Lacs	% to Sales
<u>Project Value</u>	20.00	
(1) Direct Labour Cost	1.40	7%
(2) Indirect Labour Cost	0.20	1%
(3) Direct Material Cost	0.20	1%
(4) Indirect Material Cost	0.25	1%
(5) Equipment Cost	0.60	3%
(6) Fuel Cost	1.20	6%
(7) Salary	3.78	19%
(8) Total Overheads	0.80	4%
(9) Total Taxes	0.27	1%
(10) Allocation from HO	0.60	3%
Contingencies	1.50	8%
Total Cost	10.80	54%
Profit	9.20	46%

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Once the above budget has been made, it is important to lay down the targets for each month in terms of engineering quantities in the following manner:

		Month wise Targets					
Work Items as per Work Order	Project Qty	I	II	III	IV	V	VI
Excavation Cum	1,000	500	400	100			
Reinforcement MT	50	5	10	15	12	10	3
Shuttering sqft	250	25	50	75	60	50	15

6.16 Once Month wise targets are defined, it is then important to break up the master budget into monthly budgets for monitoring on a monthly basis. On the basis of these quantities skilled labour wise histogram can be prepared to define the peak and non-peak environment. Softwares like Primavera can also be used.

In addition cash budgeting also needs to be done keeping in the mind the payment terms with the client. A project may need some support from the Head office at the start, but once its running at peak, it can then be self sufficient in terms of the cash requirements and can start giving a portion of its funds to Head office as per the projected profit margins.

6.17 It is best felt that for budgetary controls to be properly implemented, the organisation should feed the budget in the ERP system so that proper alarms are raised in case of deviations. Any deviation whether in terms of quantities or in terms of rates needs to be properly approved. This is the first level of control as far as project management is concerned and the most crucial one. If the organisation misses this control, then it may get very difficult to track the financial progress of the project.

6.18 Budget shall be revised in case of change in scope of work, change in time duration, changes in methodology of execution of the project, changes in material or labour cost, etc.

6.19 Ideally budget shall be revised at least six monthly basis to match initial projections with actual execution. However Rolling Plan may be revised on a Quarterly basis to match the future projections.

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6.20 At initial stage, Zero budget (i.e. Initial budget/estimate) shall be prepared by project in-charge with help of Project Monitoring Group (PMG) which shall be approved by the head office. If the project duration as per the original Zero Budget is completed, budget shall be revised for the extended period. The revised budget shall be prepared and approved by all concerned personnel as per workflow before expiry of last month of original zero budget.

6.21 However a budget is only useful when it is tracked on a monthly basis. As an internal auditor one needs to have an understanding of all areas which an organisation would face to implement the project budgetary controls. Some of the challenges are:

(a) Project Quantities change very often based on revision in engineering estimates: Organisations, depending on their size of operations, may either use some software to track the budget or simple tools like MS Excel for preparation of project budget. If its a specialised software, it may take variations into consideration. But even in excel, the budget file should be made by linking all the cost factors to either project quantities or project duration. Thus by making one Change, all consequent changes in cost would be made automatically. Hence non-existence of a software cannot be made an excuse for non-preparation of a software.

(b) Sub-contractors not willing to work on piece rate but time basis: Normally when we prepare budgets, it is best to have sub-contractors who are willing to work on measurement basis i.e. whose billing is linked to execution of project quantities. However if in real life it is seen that labour is available only on supply basis, even then the budget still needs to be made assuming the piece rate as a benchmark. The idea is that under any circumstances the budget costing should not increase as compared to the piece rate.

(c) Staff attrition results in deployment of manpower from Head office: Head Office needs to be asked to raise an Internal debit note to the Site cost centre for salary pertaining to such staff while working the actual salary cost.

(d) Project Material is transferred from some other site: In such case also there is to be a practise of raising a debit note from one site to another at the expected Net realisable value of the materials.

(e) Re-assessment of Site Overheads: Site overheads need to be reassessed after two-three months of site becoming fully operational. This is so because it may be difficult to make the correct estimates at the start.

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(f) **Inventory Valuation:** Cost of material for the purpose of budget evaluation is actually the consumption and not purchases. Hence to work out the consumption, the most relevant figure is closing inventory as at the period end. The challenges are multifold because:-

- Heavy Materials which can-not be kept at site stores and are lying dispersed at various site work locations
- Wooden items in use in shuttering process, where the consumption would be based on the number of repetitions
- Items issued to sub-contractors as Free Issue and lying at site – Aggregate/ Binding Wire
- Assessment of unbilled work

(g) **Impact of any major rework claims:** of which are lying pending with the client for approval, may lead to increase in costs without any matching billing. Such costs should normally be billed in separate accounting heads

(h) **Resources issued by client with no debits on monthly basis:** If the systems at the client place are not strong enough, then there are chances that all recoveries related to resources – material/ machinery given by client during the project, may be done at the project end. For budget assessment, an estimate needs to be taken for such instances.

(i) **Unaccounted loss of material like scaffolding/ shuttering as well as damage to Plant and Machinery** which may only be known when the project ends and the next project starts.

Project Execution at the Site

6.22 After the mobilisation, the project manager is required to ensure that all the resources are utilised properly and progress of the project goes on smoothly as per plan. However, some of the issues to be taken care of are as below:

Understanding the Rules and Norms in the Client Environment

6.23 Since, the construction activity is always at the client place, it is advisable to have the idea of basic controls in place. Each of the client has his own typical set of requirements which the contractor is required to abide by. It is very important to understand the procedures and requirements to perform work in client locations, like:-

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- What are the norms for entry of material in and out of client place?
- How are the procedures for entry of contractual labour in the premises? If entry pass is required to be issued, then all details and documents required for the same?
- Whether work location is required to be inspected by client's safety department? Details of Personal protection equipments (PPE) required.
- What are the other safety norms to be taken care of? Client may have a mechanism of raising safety debit notes for safety violations. As a matter of control if the violation pertains to negligence by any of the sub-contracting agencies, then the debit should be passed on to the sub-contractors.
- Whether test or certified agency certificates are required to use Tools or equipments?

Thus, as internal auditor one has to see whether the Project Manager is aware of the norms at client place. This can also be cross-checked by monitoring instances of violations.

Availability of Drawing, Front for Work

6.24 After the site mobilization, the project manager needs to strongly follow up for drawings and work front from the client. Many a times work is started without availability of drawings as a result of which the work could be delayed affecting the work performance and profit margins adversely. For any delay, client needs to be communicated accordingly. All such communications prove useful at the end of the project to either claim idling charges or to negate the client's idea of levying Liquidity damages.

Work Planning: Daily/ Weekly/ Monthly & DPR

6.25 Without goals and planning, the work can never be completed within the agreed time frame, i.e., *"Where there is no goal and planning, there is no achievement"*. Goals need to be set on Daily/ Weekly and Monthly basis after discussion with the staff and then every resource – man, machine and material has to go after that to achieve the same. If the Work is being carried out without effective goal and planning, no effective output can be achieved. Again whenever the plans are made, the same need to be checked with the actual execution. So against plan, for reporting the actual execution we have

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Daily Progress Report (DPR), Weekly Progress Report (WPR) & Monthly Progress Report (MPR).

6.26 The DPR may not contain all the items that are executed at the site, but only basic items with their quantities, like, excavation, concreting, reinforcement, shuttering, brick work, etc. An internal auditor may have to see that every project has a basic break-up even qty to be executed per day in terms of concreting and reinforcement, and if the bare minimum quantity for a day is not achieved then it's an alarm to the management. Although under or over achievement in one single day can-not decide the profit and loss for a site, but this is how projects are managed by giving importance to each and every day. Because if underperformance in a day is taken lightly by the project manager, then it may not be a good sign for the management.

6.27 DPR is very relevant report from control perspective also. Summation of all the DPR's in a month can be cross checked with the monthly client billing. Also any item which is not found in the original scope of work should also be a part of DPR as an Extra Item. Thus apart from Joint Measurement Report (JMR), DPR is also a document from which extra items can be tracked. Subsequently the project managers may even be questioned if such claims are not made on the client. If the Project Manager is found to be irregular in preparation and reporting of DPR to Head office, then serious follow up has to be done, so as to ensure that the DPR is taken very seriously at the site. Ultimately as a matter of last resort it may also be linked to release of day-to-day cash at the site by the Head office.

Extra Items and Joint Measurement Report (JMR) – Work Completion & Extra Work

6.28 Normally, all quantities as mentioned in the Work order are executed and claimed on the basis of drawings furnished by the clients from time to time. However, in case of deviation from drawings, a Joint measurement report (JMR) is prepared which is to be signed by Client/ Consultant as well as the contractor after completion of work. The deviation can be of following nature:

- (a) Change in Qty - Quantity beyond the Work order Quantities in an Item rate contract.
- (b) Change in Specifications – For e.g. Specification of Tiles Flooring changed from Normal Tiles to Marble.

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- (c) Change of Work Method – For e.g. if the client insists on Wooden shuttering instead of Metal shuttering, where the contractor had only estimated the cost of metal shuttering as per tender.
- (d) Change of IS codes – Change in the standards issued by BIS, can also severely impact the costs involved.
- (e) New Items – Upon execution of those items which are not at all part of the original contract.

If extra items are being executed by the sub-contractor, then the details of extra items need to be prepared sub contractor wise so that monthly quantity as per bills raised to client and those received from sub contractors can be matched from control perspective. Many a times it may be management discretion whether to pass the claim of extra items to the sub-contractors or not? As auditor one may see that required management approvals are taken by the Project Manager in this regard.

Further, the nature of contract whether Item rate or Lumpsum shall also have a major impact in identification of extra items.

Sub-Contractor Work Order

6.29 Sub-Contractor work orders should be prepared with original at HO and a copy at site. Item codes and language should be the same as per client work order so that Client vs. Sub-contractor Qty reconciliation is made easy. If rate is revised, the amendment paper should be prepared to avoid any dispute later on. Project Manager and Project Commercial Head/ Project Director need to jointly approve any such amendment.

Item Code	As per	Item description	Qty	UOM	Rate in ₹
1234	Client Work Order	Providing reinforcement including cutting, bending, binding, fixing in position including the cost of channels, bars (Binding Wire is in your scope).	200	MT	4500
	<i>FIM or Raw Material shall be provided to contractor for work by Company:</i>				
1234	Sub-contractor Work	Providing reinforcement including cutting, bending, binding, fixing in position including the cost of	200	MT	2700

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	Order	channels, bars (Binding Wire is in your scope).			
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For example:

Many a times it may so happen that work allotted to the sub-contractors are broken down into various components. In such cases one may say that it is difficult to track the comparison between client qty and sub-contractor qty by giving same codes. Following example would make things clear:

For example:

Item Code	As per	Item description	UOM	Rate in ₹
1234	Client	Providing reinforcement including cutting, bending, binding, fixing in position including the cost of channels, bars (Binding Wire is in your scope).	MT	4500
<i>FIM or Raw Material shall be provided to contractor for work by Company:</i>				
1234-A	Contractor	Reinforcement Cutting	MT	700
1234-B	Contractor	Reinforcement Bending	MT	800
1234-C	Contractor	Reinforcement Fixing	MT	1200
	Contractor	Total Rate in ₹ of <u>item code- 1234</u> is ---->	MT	2700

Thus, as can be seen that for revenue earned under Item Code 1234, the various costs incurred can be identified by giving similar codes to the items to be executed by different sub-contractors.

The various items as per the work orders issued to the contractors can be bifurcated into three broad categories say – Billable & Non-billable. All non-billable items are basically the project Overheads which need to be distributed across all the project items in a uniform manner.

Client and Sub Contractor Billing and Certification

6.30 Billing period/ Frequency should be same for client and the sub-contractor so that quantity reconciliation can be done at periodic intervals.

Client Running Accounting (RA) bill should be prepared and submitted in time frame so that its certification is done in time and funds are released

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timely otherwise once the cycle is disturbed, then it shall affect fund management adversely throughout the project. Thus many organisations instead of keeping the cut-off date as the last date of the month, keep it 5-6 days prior to that, so that the bills can be placed at the month end itself. For e.g., instead of 30th as the cut off date, we may keep 25th as the cut off date.

Delayed client billing in turn shall affect sub-contractor billing and quantity comparison of client with sub contractor. Many a times as a result of this delay excess quantity is given to sub contractor as compared to client billing which shall adversely impact the project profitability.

Back to Back Sub-contracting

6.31 Every civil contracting company has got its own limitations as far as capacity is concerned. Hence many a times, the works received are sublet on a back-to-back basis. This means that the total scope of work is outsourced. Hence all procurement, whether material or labour is done by the appointed sub-contractor or known as the Back to Back sub-contractor (BBS).

Back to back sub-contracting may be resorted to under following scenario: -

- (i) When the organization has already exhausted its capacity in existing projects in terms of manpower and machinery and thus it can-not take up any project on its own.
- (ii) When the organization due to several cash flow related issues is not able to execute any project on its own. To turnaround, it still has to keep executing projects to remain in the good books of the client. In such a scenario the organization may resort to the BBS policy for a temporary period, till it restores normalcy.
- (iii) When the organizations lacks the related expertise for a project. As a part of risk management policy it may have to appoint a BBS.
- (iv) When a project is received from a regular client, but where the margins are very low or the size is so small that the organization may not be able to execute it profitably. It may, thus, engage a BBS who is much smaller and with his low overheads may be able to execute the project profitably.
- (v) As part of overall risk management, if the organization wishes to freeze the margins for a project. That is when a sub-contracting agency is appointed on a back-to-back basis, then the total scope is sublet after keeping some fixed margin of say 10-20%. Thus as far as

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the sub-contractor is able to execute the project, the main contractor can enjoy a fixed margin and just focus on communication with the main client on time to time basis.

6.32 However, back to back sub-contracting whenever resorted to, needs following precautions to be taken by the management which an auditor may be required to highlight in his reporting from time to time:

- (i) Only those agencies where complete trust can be exercised can be appointed for BBS. Further if the agency is appointed without past experience of working with it, it may not be successful as utmost confidentiality is required to be maintained. If the main client clearly understands the arrangement, he may give the next project directly to the subcontractor itself, to save on costs.
- (ii) Despite having a BBS arrangement, the contractor would still have to deploy his Project Manager and Senior Co-ordinator for interaction with the client and for performance monitoring. They would also have to closely watch and approve the quality of work from time to time.
- (iii) Since the BBS is responsible for preparing the quantity abstract for client certification, the contractor has to ensure through his Project staff, that the bill is kept on time and is vetted properly so as not to miss claim of any extra items in the project.
- (iv) It is advisable to have a backup plan ready if the BBS fails in execution. Thus the contractor should be in touch with another agency either in the same locality or someone who would be interested to move to that location. If no other agency can be lined up, then he might have to move his own team and resources to complete the project, which is actually the biggest risk in BBS arrangements.
- (v) Care should be taken to avoid any receipt of monies from the BBS by the staff deployed by the contractor. Such a situation may arise if the salary payments by contractor are being delayed. This will weaken the maker checker controls.
- (vi) It is advisable to be very fair and transparent with the BBS, in a way that any extra claim as received should be passed to them. This will ensure that if any deduction is made by the client, then BBS would never object to accepting the same as per the sharing terms.

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- (vii) Under pure BBS arrangement, Head office has to very closely monitor flow of resources to the BBS. As normally any transfer of resources by way of manpower, machinery should be charged to BBS at market rates. A physical site visit from the auditor can be useful to check this.

It is also seen that under this arrangement, the BBS may also be given the responsibility of preparation of client bills on behalf of the main contractor. In all such cases the BBS may not issue his invoices to the main contractor on regular basis. Thus payments to BBS should only be made against his invoices.

Controls when we operate in an environment when multiple agencies are working in the same premises

6.33 Normally, for projects of huge size say power plants or cement plants, the client may not want to depend on one contractor for execution of the project, instead different contractors are appointed as per their specialization. Whenever the contractor receives a project in such an environment where multiple agencies are working, then following issues are of relevance as far as controls are concerned:

- (i) The contractor should be advised to enter into an inter-party understanding at the site with the other contracting firms that during the course of the project, they shall not indulge in poaching of staff and labour amongst them. As it is, normally, seen that employees as well as labour keep changing and drawing higher salaries and wages by taking advantage of being in touch with various companies working in the same premises.
- (ii) Free Issue Material (FIM) is another area of concern. Many a times the client instead of issuing FIM from their own stores may instruct say Contractor A to issue some steel and Cement to Contractor B. In such a case proper Batch Transfer Note (BTN) should be prepared by the issuing contractor for updation in the system of the client. If such documents are not updated then it might prove very costly at the time of preparation of final reconciliation of FIM.
- (iii) One also comes across a lot of theft of material in such an environment, hence proper security arrangements need to be made at the site at different work and store locations.

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- (iv) Sharing of resources is another thing which is normally witnessed. For e.g. Batching Plant of Contractor A is under breakdown, and he may thus for two days use the plant of Contractor B. This is very much acceptable but there should be a proper approval based on a management policy for such sharing.

Role of Billing Engineer

6.34 Billing Engineer is the one who is primarily responsible for submission of bill to the client in a timely manner. Now depending on the nature and size of the project, it is decided who shall play this role. If the size of the project is small and the margins do not permit, then the Project Manager, himself may be made responsible for billing to the client. In other cases the management may keep a separate person as incharge of client and sub-contractor billing. Further to this the location of the billing engineer also is very critical from control view point. That is if he is handling multiple sites, he may be sitting at Head office, and if handling one site then he may be deployed at the site itself.

Whenever the Billing Engineer sits at the Head office, then, as an internal auditor, one may keep a check on following:

- (a) Documentation supplied from Site to HO for generation of Billing - Such documentation would normally include drawings, Joint Measurement Reports (JMR) for certification of extra items and other claims not certified by the client.
- (b) Copies of Drawings as sent at the month end for client billing preparation should normally have a standard colouring pattern so as to indicate the level of construction, say red colour for shuttering/ grey colour for reinforcement/ green colour for concreting etc. This is relevant as at the period end, there would be several drawings where certain proportion of work would be pending completion, but still bill would be raised for whatever work completion is achieved.
- (c) One may also interact with the billing engineer so as to understand the number of times he is able to visit the construction sites. This is so, as its very crucial to visit the construction sites and to personally interact with the site engineers and supervisors to understand the progress, understand if any work is being done which might not form part of the original scope as defined by the client.

- (d) As far as possible, the billing engineer also needs to be made responsible for preparation of bills of the sub-contractors. Normally a quantity cross check report is prepared, wherein the client quantity is compared with the sum total of quantities claimed by all the sub-contractors.

Reconciliation of Free Issue Material

6.35 FIM means the Free Issue Material received from the client. As the word denotes, free, so is not the case in the real life as far as accountability of the same is concerned. The contractor is normally required to furnish reconciliation of such material against work done on a monthly basis.

- Wherever running accounting bill is prepared for the client, one needs to prepare reconciliation statements to match balance quantity of FIM to avoid discrepancies and revenue loss. The only issue here is the assessment of physical quantities lying at the site especially in case of steel, for which an experienced supervisor is required. In some of the cases the client may even insist on returning empty cement bags as part of proof of consumption of cement, if issued as FIM.
- Further the contractor may also return unusable FIM. For eg. if Steel 6mm is not going to be used in the project further, the same may be returned to the client.

In addition the client would have in the work order defined what would be considered as serviceable steel say a particular length of 2 meters may be defined as serviceable. Thus the contractor needs to maintain the steel yard accordingly so that all pieces above this length are kept separately and scrap steel i.e. below the specified length are kept separately. The return of this material shall be very easy if proper segregation is maintained.

- The contractor may thus have to track the consumption of FIM when issued to his own sub-contractors. Because if any wastage is done beyond the standard norms, then the contractor may be required to debit the same to the sub-contractors working under him depending on the proportion in which each of them is responsible for the wastage. However for this, material issue mechanism and the controls have to be set accordingly, right from the start of the project. The only challenge that remains is regarding transfer of material from

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one contractor to another at the site, for which an experienced stores personnel is required.

As internal auditor, thus, one has to ensure that the reconciliation is prepared on timely basis. Further the project needs to have a dedicated gang at the site for miscellaneous work, like, segregation of scrap/ ensuring that the scaffolding and other materials do not go under the debris or sand at the time of back filling.

Project Completion

Final Bill Preparation and Certification

6.36 When we refer to the Final bill, we mean the last running account bill to be raised for the project and hence containing details of cumulative executed quantities for the project including extra claims which were not forming part of the work order. Many a times the final bill gets very delayed due to reasons from both sides. Like, if the actual quantity execution is more than the Work order (W.O.) quantities, then W.O. needs to be first amended. Further during the course of project there are several instances where the client must have kept some quantities on hold, all such quantities need to be released in the final bill. This process may not be as simple as raising any other bill as the client may seek NOC from its various departments, say, Quality/ Safety/ HR/ Tax/ Contract Cell before it may go ahead with the process of certification and payment against final bill.

Thus, some of the critical issues are as below:

- (i) **Final FIM and Raw Material Reconciliation with bill and balance qty.**

Formula:

Total Material Inward

Less: Material Returned/ Transferred

Less: Standard Consumption

Less: Standard Scrap Generation

= Balance Quantity at Site/ Store

- In case this quantity is not available at site/ store, there could be various possibilities:-
 - Excess consumption as compared to standard

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- Theft/ Pilferage during the project
- Under-billing due to some reason
- In case of excess consumption, some portion can be recovered from the measurement contractor, if not recovered till date.
- Proper justifications are required from the project manager and appropriate action should be taken in case of abnormal difference between actual and standard balance
- Balance FIM material which shall not be used should be returned with proper sign and stamp from the client.

(ii) Fulfillment of client work completion procedure

In case of project completion, ideally the contractor should ask a checklist from client so that there is proper clarity at both ends.

(iii) Receivable and Liability Status Clearance

At the time of preparation of final bill, the site should also close project liability with break up of nature of creditor and special remark for local creditors. It is best suited if ledger confirmations for the same are obtained.

- Follow up for payment receivable from client after bill certification
- Clear local liabilities in priority to avoid any demobilization harassment from them.

(iv) Statutory compliance:

- Follow up and get pending WCT & TDS receivable certificates from client.
- Give all necessary details for VAT return filing to local sales tax consultant and other details, if any required for audit. As far as possible it may also be advisable to request the department for early vat assessment.
- Get any pending forms like C & F from the department, also reconcile with the forms issued till date.
- Clear other local pending statutory liabilities like Road tax, Entry Tax, Employee Professional Tax etc.

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(v) Possible reasons for delayed submission of Final bill:

S. N.	Issues	Corrective Action
1	Non updation of FIM data with client stores.	Physical verification of FIM with client stores records.
2	Reconciliation of FIM	Required with each RA Bill.
3	Work order Amendment	Some foresightedness and Strong Follow up with the client.
4	Change in Project Manager/ Billing Engg.	Regular documentation Proper Back up practice at HO Process Checklist
5	Proper compilation of Hard and soft copies of all the Running Bills	Data Control and Regular Audit.
6	Insistence to satisfy requirements of Labour Inspector	Clarity in Work Order Terms
7	Quality compliance after defect liability	One may fix failures of client to maintain the property to argue on this count
8	Idling Claims depending on locations like Orissa/ Kerela - Local problems	Record/ Emails to client on regular basis
9	Direct Payments by the client to vendors	To be accepted only upon confirmations obtained from vendors
10	Approval of Extra Items	Whenever extra items are created, rate analysis needs to be finalized at regular intervals, rather than waiting for the project to come to finalization stages.
11	Statutory Matters	Various compliances need to be ensured like PF/ Labour License/ Worker's cess/ Royalty/ No due certificates from Mining Dept if

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		there is own quarry. If there is a non-compliance then the organization would face several issues at the time of project closure.
12	Handing over of site	Once the project is finished the site needs to be handed over to the client, free from any debris/ scrap/ concrete waste, otherwise the client may not approve the final bill on a timely basis.

(vi) **Site Demobilisation Plan**

Just like, the mobilisation, site de-mobilisation also needs proper planning and foresightedness. The organisation has to transfer the staff and equipments to another site. The actual transfer would have to start well before the complete closure of the site. That is when the site is tapering off, the need for manpower and equipments would be on a decreasing scale. As long as the organisation gets a new project when the old is about to close, it would be easy to manage the task of demobilisation. But if that is not the case, the equipment may have to be sent to the Central Godown and staff would also have to be sent to different sites, if any other site has reported any shortfall.

Many a times the organisation because of projects expected in the nearby region, may not choose to move the equipments from the client place, even after the project is complete because of cost of logistics involved. In such cases no compromise with the security can be done, as during such a stage, it may be very easy for other contractors working in the premises, to indulge in theft or other malpractices.

All premises/ vehicles/ equipments taken on hire need to be de-hired with proper planning. Also if any deposits have been paid to the lessors, the same should be recovered before returning the asset.

From an audit perspective, the most crucial issue here is that the Project Manager has to do a complete reconciliation of the closing stock of equipments, scaffolding and shuttering materials (where lot of shortages are expected) and other raw materials and only then move the material to other sites with proper documentation.

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Project Manager should also ensure that all the machineries and equipments that are lying at the site are in the working condition. If any of the machineries are damaged, then the same need to be repaired and then should be sent to other sites. Thus a certificate should ideally be obtained from the Project Manager regarding running condition of all the equipments and machineries.

Further the site needs to ensure that records in the form of drawings/ correspondence/ Testing report/ Measurement sheets are sent to Head office where they may be stored at a central documentation warehouse till the closure of project by all means, that is after realisation of all dues, and receipt of project completion certificate and expiry of defect liability period. At the instance of complete closure, the documents may be destroyed. However if the project goes in litigation, then the records may even have to be preserved for a period upto 10 years looking to the speed at which matters are disposed in the Indian environment.

(vii) Release of Retention Money upon completion of defect liability period

Proper follow up is required in this regard by obtaining following compliances

- Certification of Final bill
- Completion of work upto Defect liability period
- No local liability
- Site and area clearance
- Return of all FIM

Further if the BG limit is lying unutilised then one may consider premature release of retention money against Bank Gaurantee for duration covering the defect Liability period.

(viii) Engineering MIS formats as below are enclosed as per Appendix 2

Report Code	Name of Report	Period	Advantage
<u>A) Labour Supply Work:</u>			
Engg01	Rate for Labour work	Monthly	Useful to calculate cost of contractor related expenses and verify the bills of contractor for Management/ Auditor/ HO.

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Engg02	Manpower Utilization <i>Quantity</i> Report - In Hours	Weekly	Useful to reconcile the claimed client bill quantity and output taken from supply/ departmental labours.
Engg03	Manpower Utilization Report - In <i>Value</i>	Weekly	It is useful to know item wise cost. If costing goes beyond the standard, preventive action can be taken.
B) Measurement Work:			
Engg04	Work Executed for Client - Qty. & Value	Weekly	a) It is to ascertain work done in quantity and in value for the period. b) Helpful to meet budget/ projection targets, and to review work progress and also to calculate funds expected to be generated in next month on basis of this bill.
Engg05	Qty. Break up of Contractor & Material Consumption	Weekly	a) Client executed quantity break up of measurement contractor wise to monitor contractors work performance and to follow up for increasing the manpower & progress. b) Check on material quantity consumed for the client and thereby excess consumption.
Engg06	Work Quantity Reconciliation	Weekly	a) Quantity reconciliation report. b) Report shows short quantity given to measurement contractor, it means that quantity has been executed by employing departmental labours.
Engg07	Rates for Measurement Work	Monthly	It is for information. It is useful to calculate any cost of contractor related expense and verify bills of contractor for Management/ Auditor/ HO.
Engg08	Value Report	Weekly	a) It is useful to know what cost has been incurred towards measurement contractor and major materials consumed in the project. b) It is useful for comparison of revenue with expense and liability

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			incurred and a rough idea on profitability.
Engg09	Comparison of Production Targets	Weekly	This report is helpful to know whether budget/ projections have been achieved or not? Difference in percentage for under achievement? Reasons? Action to be taken and its progress to avoid under achievement in up coming period?
Engg10	Site Overview Report	Weekly	a) This is review report for the reporting period. It summarises all the pending points at a single stage. b) Any pending earning and expenses can be taken from this report by Accounts/ HO/ Management.
Engg11	Fund Planning	Monthly	a) Useful for fund planning. b) Helpful for demanding the Cheque/ DD from HO.

Chapter 7

Commercial Procurement

7.1 Goods and services should be available at the right time in right quantity at the site to ensure smooth progress of the job.

Purchase Department

Goods

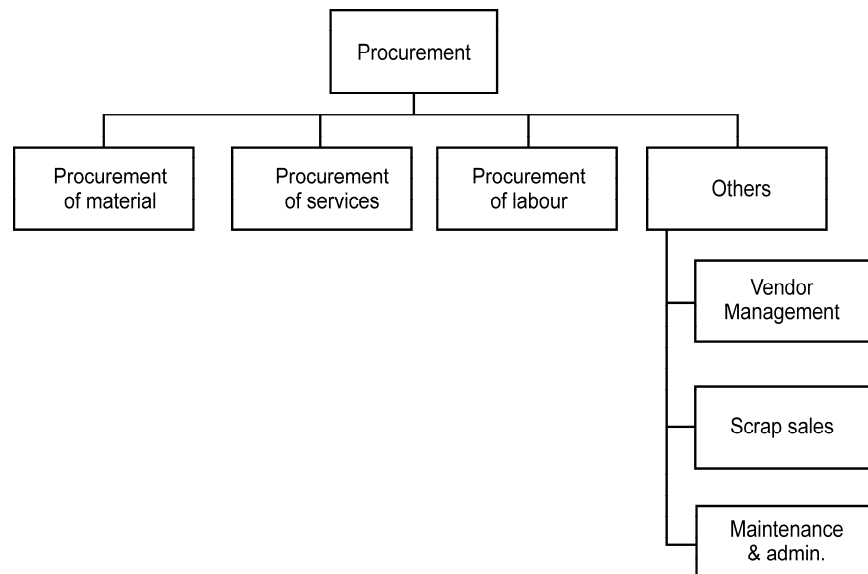
7.2 Purchases can be made either from site or HO. Normal practice is that Raw Materials/ Bulk Materials and Capital goods are ordered from HO and other items may be purchased at site if available on competitive rates. Purchases should be made economically with strict adherence to quality specifications.

Procurement

7.3 Procurement is the most essential part of an entity operating in the construction industry. It refers to the items/services procured by the concern in order to enable it to provide its services. For the construction industry, procurement usually consists of cement, iron, steel, sand, bricks and gravel. Apart from the above, purchases also include purchase of services and procurement of labour.

In general, the entity enters into contracts for supply of materials used for its construction. This ensures procurement of factors of production at the right time. The process of procurement can be shown as below:

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7.4 A brief of each of the factors of productions is given below:

(i) **Material:** Purchase of material in a construction industry is as important as for any other manufacturing industry. Hence, proper planning is required for the purchase and storing of such material. These include stores and spares purchased by the entity. A simple ABC analysis can help in this regard i.e. categorisation of material as per their value. So materials with high value are grouped into the A category and so on. Thus, major controls can be established as far as procurement of A category items is considered.

(ii) **Services:** As compared to other industries, construction industry cannot survive merely on material. Procurement of services from service providers and sub-contractors are highly required. Services may include soothing of wood, electrical contracting, etc.

(iii) **Labour:** Construction industry cannot have the same number of employees at all time. With time and contracts more or less people may be required on site. Hence, the industry mainly relies on contract labourers. They are supplied by the sub-contractors as and when required.

(iv) **Vendor Management:** The first and foremost activity in the procurement department would be identifying and selecting vendors. The whole process is covered under vendor management. The decisions taken regarding vendors have a huge bearing on the enterprise. They affect the cost, quality and even timing aspects. Hence, it is very important to manage this particular section. This section involves a series of activities like, calling

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for quotations, screening the vendors, selection of vendor, maintaining the vendor manual, entering into contracts with vendors, renewing the contracts, etc.

Vendor Manual is a document which contains the details of all the vendors called for, and those who have been short listed. Apart from this the enterprise can also resort to means such as, internet, yellow pages, business magazines, trade journals, etc. But vendor manual is important since it saves efforts on the quotation calls each time. Vendors can be assigned codes based on their priority, location, quality or a combination of all.

In a construction industry certain purchases like, purchase of sand, cement and steel is very common and frequent. The enterprise can enter into agreement with the vendors for such purchases. The process involved in the management of vendors will mainly constitute of recognizing the prospective sellers, calling for quotations from them, negotiations with the vendor, screening the list and selecting the vendor, updating of the vendor details in the vendor manual, entering into a contract if required, periodic review of the functioning of the vendor, etc.

(v) **Material Provided by the Client:** In some cases, the client provides materials for construction purposes. In such cases, the internal auditor needs to verify whether the contract with the client provides for the same. In general, the entity provides controls either as accounting for the materials and the client account.

(vi) **Scrap Sales:** It is very common in an industry that the inventory becomes obsolete before it is put to use or it is damaged in some process. In that case the enterprise has to scrap the inventory and dispose it. In most cases

it will fetch a nominal amount for such disposal. Generally, this process also is taken care of by the Procurement department.

The process consists of intimating the head of the team, project and department about the scrap generated, submission of the report regarding the scrap, approvals by the respective heads, disposing off the scrap, making the necessary accounting entries, updating the stock register, planning for the re-procurement of such inventory, etc. The enterprise must evaluate the scrap generation and take necessary steps to reduce the scrap in case the percentage of scrap is high. A report regarding the same may be sent to the head of the department who will take necessary steps over the enquiry.

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Sales of scrap through online portals is another medium which has developed a lot in the past few years. This ensures that the scrap fetches the best available price in the market at any given point of time.

(vii) **Maintenance and Administration:** The importance of maintenance and administration process need not be over-emphasized. Without proper maintenance of materials procured and proper administration and management of employees and contractors, the enterprise cannot optimize its efficiency. Adequate controls should be created to ensure proper maintenance of materials and proper administration.

7.4 Internal auditor shall review the following processes and make the observations, if any:

(i) Vendor Management

- Vendor selection process
- Vendor database
- Vendor coding system
- Annual contracts for main raw material like, steel, cement, sand and aggregates
- Periodic evaluation of vendor. How often enterprise is doing its vendor evaluation with regard to cost, quality of material supplied and timing of supply
- Periodic review of vendor selection policy- How often enterprise is reviewing its vendor selection policy

(ii) Material/ Service Requisition Process

- Process of identifying the requirement of material
- Whether it is included within limits of budget, if not then obtain planning department approvals
- Whether it is raised by an authorized person.

(iii) Placement of Order (PO)

Purchase order being the last document of procurement process, so it is necessary to take care before placing the order. If the supplier fails or delays to deliver material, it can affect work execution and ultimately overall financial performance. Purchase order is required for all purchases including cash purchases for control and transparency. Purchase order should have

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following check list:

- Date of PO
- PO unique sequence number
- Name of supplier and Address
- Reference of Supplier Quotation/ Price list
- Material Description
- Quantity with Unit of measurement
- Rate per unit/ Location wise rate of the last procurement of the similar item.
- Discount
- Escalation terms
- Time of Delivery
- Place of Delivery
- Terms of Payment
- Transit Insurance in case of costly/ valuable material and long distance and Type of transportation
- Condition for packing of material, like single or double/ internal or external, seasonable Winter/ Monsoon and Summer, valuable and maintain materials design form & alignment
- Material certificate, Damages, Quantity and Quality Inspection/ Verification and rejection clause
- Warranty/ Guarantee would be required for high value material. In case of failure to deliver the material or delay or bad quality, warranty can be invoked.
- Condition on Excise duty with Gate Pass and Service tax number, Consignee name and Address of HO and Delivery name and Address of Site/ Branch to claim MODVAT.
- Condition on VAT with Tax/ Retail Invoice with company TIN number, in triplicate with two copy of challan/ Packing list with necessary check post/ government forms.
- Invoice should be as per PO say item code and description, rate, discount etc.

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- Condition on Freight – Free of Cost (FOR)/ Paid by supplier (Pre paid) or To Pay with LR in duplicate copy and condition for demurrage/ detention charges clause.
- Condition on Insurance.
- Jurisdiction “_____” only.
- All Purchase orders should be signed by officer duly authorized by the management except Capital goods which should be signed only after written approval of Top management (Like – Project Director, MD, Chairman).
- PO should be in triplicate copy – One for supplier, Second for Accounts and Third for Purchase department.
- Order confirmation should be obtained from the seller.

In case of supplier failing to deliver material in time, action for alternate source of supply should be taken urgently besides claiming compensation from the party who failed to supply the materials.

It should be reviewed with respect to following aspects:

- Vendor: Whether vendor is out of approved vendor list.
- Requisition: Whether requisition is approved.
- Whether cost comparison statement is made and approved with respect to accepted cost estimate.
- Whether the payment terms and delivery terms are as per approval and according to policy.
- Whether the purchase order format includes the information relating to:
 - Date and location of delivery,
 - requisition number,
 - material code with detailed description and quantity,
 - agreed rate and total amount,
 - payment terms,
 - other terms and conditions.

(iv) Receipt of Material

- Review of procedure on receipt of material.
- Material received is in match with purchase order raised.
- Ensuring whether goods received note (GRN) is issued only after receipt of material acceptance from quality department and store-in-charge.

(v) Supply Chain Management

- Verify the steps followed by the enterprise to ensure the availability of material at all the times.
- Generally, the enterprise shall cover the following in its supply chain management:
 - Identify materials with high price volatility.
 - Identify materials with seasonal nature.
 - Identify alternative products.

(vi) Cash Purchases at Site

- Review the company policy and controls for cash purchases at the site. Generally, the enterprises provide cash at the site to meet any immediate requirement or unplanned material. Normally a cash ceiling needs to be defined for the site based purchases.

(viii) Other Services

- Review the procedure adopted by the enterprise to acquire services such as, Security service, Consultancy services, Travel Services and Courier services.
- Identification of suitable service and vendor shall be done by procurement department
- A contract shall be entered with the vendor which provides for:
 - Date of commencement and completion of work
 - Exact outcome expected
 - Any conditions and recommendations specifically offered
 - Monitoring and evaluation of arrangements

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- Support and supervision arrangement
- Penal clauses
- Financial arrangement - payment methods and timing
- The copy of agreement will be provided to accounts and administration departments
- Procurement department shall review performance of vendors periodically.

(viii) Scrap Identification and Disposal

- Review the procedure to identify scrap material
- Procedure of disposal of sale/ return to client
- Periodic interval of scrap sale.

7.5 Internal auditor shall review the following MIS reports and verify that the top management is reviewing these reports as per the enterprise's standard procedures or not:

- Purchase order track sheet
- Project cost analysis – variance report
- Cash purchase report
- Quotation tracker vs. Estimate

Purchase Related Issues of Specific Items

7.6 Specific items are as follows:

- (i) Purchase of Infrastructure Material, like, GI Sheet, Containers, Office furniture, etc
- For each new project location, Requirement is received from the site in prescribed format.
- As per the requirement, CENTRAL STORE transfers available materials to site and balance material is purchased by the Functional Head - Purchase at Regional Office or Head office. He will identify and approve the brands of above materials based on the past experience regarding performance of the product.

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(ii) Purchase of Building Material like Sand, Bricks, Aggregate

- For each new project location, Functional Head Purchases/ Construction, identifies the source for above mentioned natural building materials based on quarry visits with QA/QC Engineer and quality reports from quality control laboratory.
- The Kilns (Identification marks) and/ or locality are identified and approved for purchase of Bricks.
- The addition/ deletion of sources of building material are made based on periodical checking of material in quality control laboratory. The final approval is given by Functional Head Construction/ Purchase.

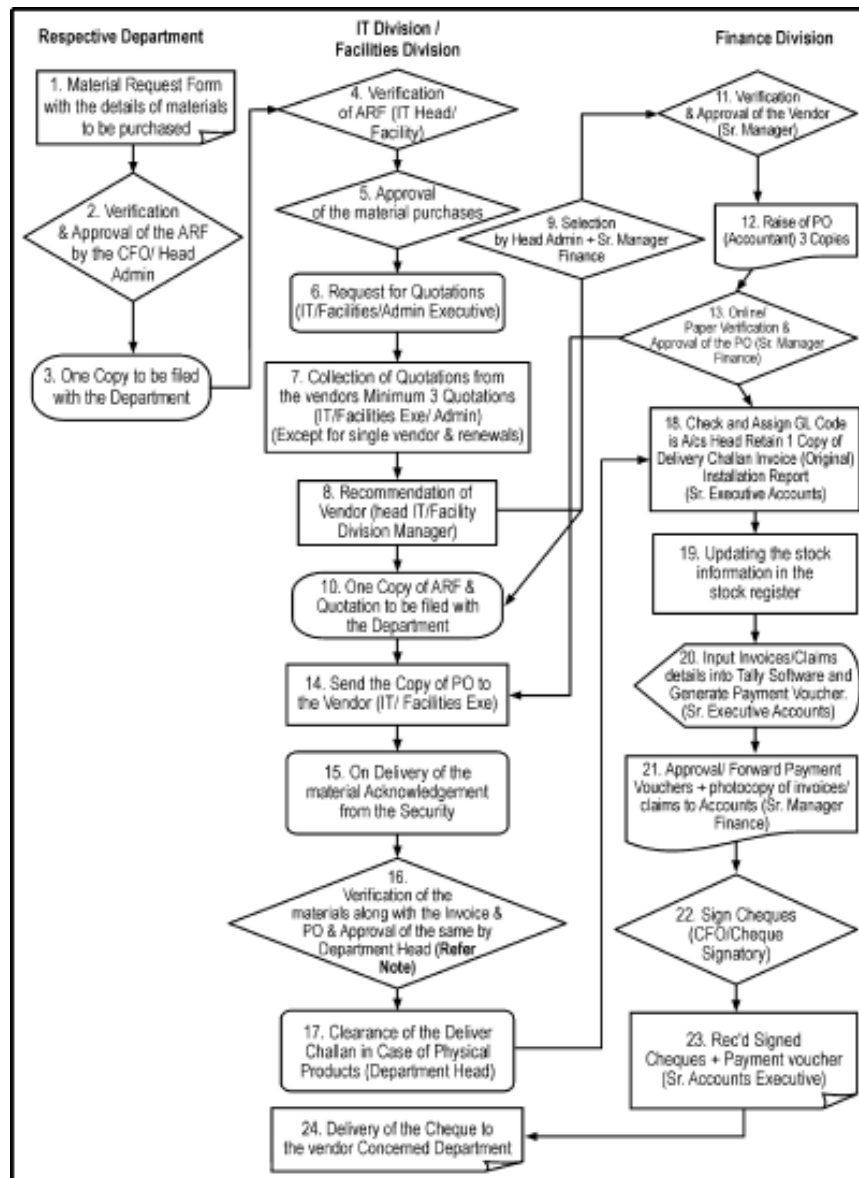
(iii) Purchase of Building material like Cement, Steel

- Functional Head Purchases will identify and approve the brands of above materials based on the past experience regarding performance of the product. A list of such approved brands is maintained at HO/ RO.
- However, specific brands suggested by Client/ Consultants in the contract, which is not included in the list, will supercede the approved brand list for purchase of the materials.
- However, this super cession will be applicable to that specific contract only.
- All POs/ LOIs raised by Central Material Purchase Dept (CMPD) at HO are signed by the Head of Purchase Dept or by the person authorized on his behalf.
- For feeding the batching plant, the organisation may decide to purchase the cement in bulk as the same may be cost effective as compared to cement bags.
- Further as far as steel is concerned, many a times steel of lower dia may not be available with the supplier. In such case the same may have to be sent to some approved re-roller.

Process Flow Chart For Procurement Of Material And Services

7.7 A typical process for the procurement of materials and services for an entity operating in the construction industry are given below.

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Services

7.8 For a construction site to execute work, various equipments are generally required. Either the same is newly purchased or taken on hire is a decision to be taken by the Management. It will depend on period of requirement and hire charges v/s cost impact if a new one is purchased.

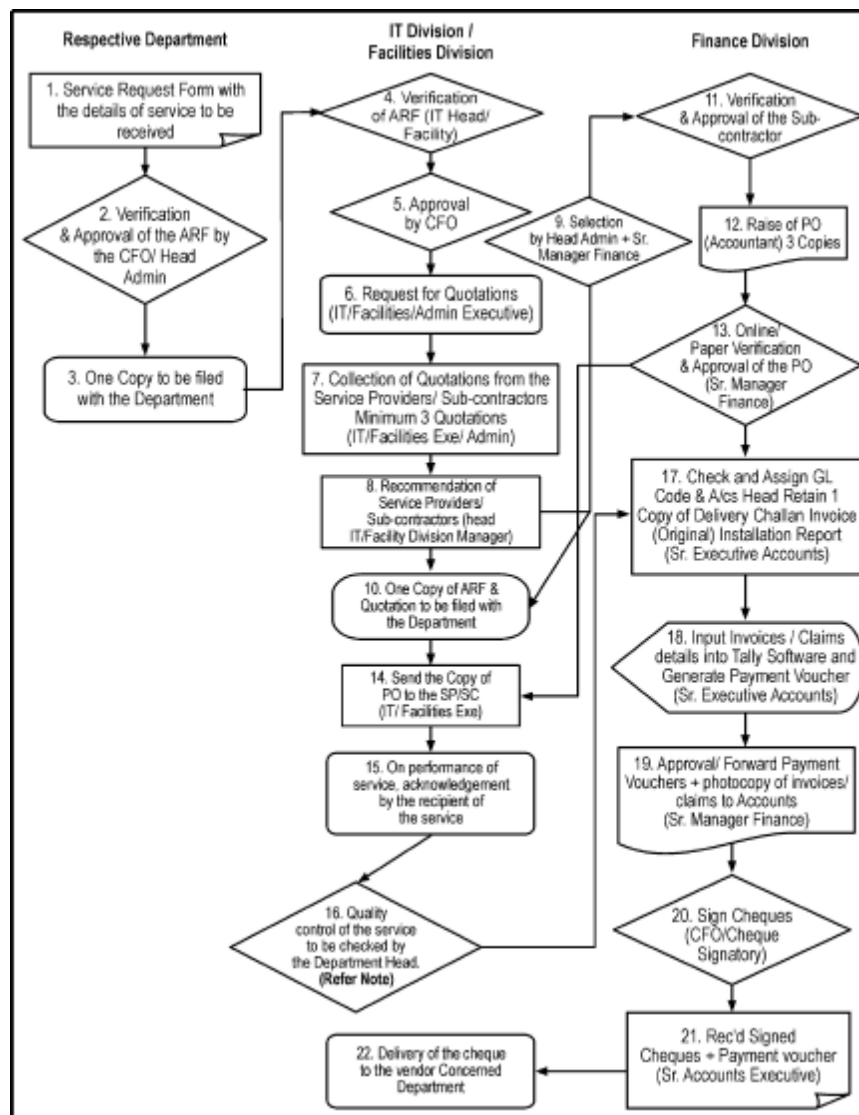
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Such decisions should be taken on urgent basis but should be taken after considering all relevant points.

(i) Hiring Sub-contractors

The hiring process of sub-contractors can be explained by way of this chart:

Process Flow for Procurement of Services/ Subcontractors



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(ii) Equipment/ Machinery/ Plant/ Tools

In case, all plant/ equipment/ machinery/ tools, etc. are to be provided by the client, then total contract value would be much lower as compared to a scenario when all equipments are in contractor's scope.

But this will lead to total dependence on the client and the client then should be in a position to meet the requirement of equipments in time.

However as an organisation grows, it starts getting projects where the client would not be willing to supply any equipments. Hence the decision of buy or hire is to be taken after regard to various financial parameters like the debt equity ratio/ Fixed Assets Turnover ratio, instead of taking instinctive decisions to buy to save the hiring cost.

Advantages of Buying

- Cost effective, if the organisation has got the right projects whereby it is able to achieve a fixed assets turnover ratio of more than four.
- Normally the equipments on hire prove very costly if the usage is more than the normal hours where the overtime payment is required to be made. No issue of such overtime payments arises in case of own equipment.
- No dependency on outsiders. It may be seen that if the lessor does not maintain the equipment, chances of break down during site use increases. In case of own equipment, the owner can very well plan the maintenance schedule.
- Company's status and capacity as a contractor will be rated high by prospective clients.
- Equipment can be moved from place to place as per requirement, which may not be possible when it is hired.
- An equipment normally consumes a lot of Fuel during its operation. Fuel consumption controls are much better in case of owned equipments rather than a hired equipment.

Disadvantages of Buying

- Working capital gets blocked due to down payment and EMI repayment even when there is no utilisation of the equipment.

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- If the organisation due to cash flow issues does not get proper projects, then Non-Repayment of EMI in time leads to bad reputation in banking circle.
- Resell value is normally very less, if the organisation decides to dispose the equipment due to non-usage.
- Maintenance cost and expertise will be required to run the equipment smoothly.
- Even when the organisation does not have right projects for proper utilisation of equipments, it may not be in a position to rent out the same due to future expectancy of usage.
- In case of non-performance of the hired equipment, the organisation can very well debit the lessor for the loss incurred due to non-operation. No such recoveries can be made in case of non-operation of owned equipment.
- Risk of ownership needs to be covered adequately, hence an extra cost by way of insurance.

Looking into the different nature of equipments, a checklist is attached herewith for ready reference as Appendix 3.

Equipment

Specific Issues related to Hiring

7.9 There are various equipments which run at the construction sites. Size of the project would determine the capacity of equipments which are required to run at the site. Any wrong decision can be a big blow to the project profitability. This can be explained by way of one small example of concreting.

For concrete making, following are used:

- Mixer Machine, or
- a mini batching plant, or
- a Mobile Batching Plant, or
- a Large Batching Plant.

For movement of concrete from manufacturing location to the pouring locations, organisation may depend on multiple equipments like:

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- Transit Miller
- Concert Pump
- Boom Placer
- Concrete Bucket with Crane
- Lift.

An organisation may now some of these equipments and depending on the requirements and deployment may have to hire these equipments from outside.

Now an organisation may choose to hire a batching plant and a Transit Miller for the site. If the requirement of the site is around 2000 – 3000 Cum of Concrete per month, then the project would be able to bear the burden of the rental payments towards these equipments, if not then it may be advisable to go with a mobile batching plant or concrete mixers. Hence the choice of equipments has a very important role to play as far maintaining the project costs under control is concerned.

The basic checklist of control issues when some of the specific equipments are hired is as per **Appendix 4**.

Scaffolding Material

7.10 Construction workers use temporary supports called scaffolding to work on buildings. Scaffolding is basically a temporary platform, created around the Structure, on which workers stand when performing tasks at heights above the ground level. Construction jobs may require several kinds of scaffoldings for ease and safety.

Various Types of scaffolding material can be - Scaffolding MS Pipe/ Cup lock/ H-Frame/ Coupler/ Adjustable Props/ Steel Culp/ Plat Form /Walk Way Jali/ Plate etc. But the main challenge lies in ensuring proper control over these materials whether owned or hired. A basic checklist has been enclosed as **Appendix 5**.

Chapter 8

Stores Controls

8.1 Stores is a very important link in the organizational chain. Normally at a manufacturing location, since the location of stores and the area where the material is issued is pretty well defined, implementation of controls is relatively very easy. But that is not the case in the Construction Sector with a very different scenario.

- a) Location where the material is lying is not defined?
- b) Locations where the material is to be issued changes every now and then?
- c) There are different organizations working in the same location?
- d) Single Material is lying at multiple locations.
- e) Cost of maintaining the systems is sometimes felt higher than the value of materials involved.

In such a scenario, the whole dynamics of stores management change drastically. And precisely this is what happens at a construction site. Thus implementation of controls at stores of a construction site is that much more challenging and needs careful watch.

Store Team with Experience

8.2 Store manpower depends on size of project, volume of material movement and stock.

But minimum store team required at site with experience of construction site, Computer literate and basic knowledge of item identification, UOM & procedure of material movement –

- Store Incharge 1 = Master Degree/ Specialization of store course and 5years work Experience
- Store Assistant 2 = B. Com/ 12th passed and 2years work Experience (For Material Chasing)
- Data Entry 1 = Bachelor/ Certified Computer Course degree and 2years work Experience

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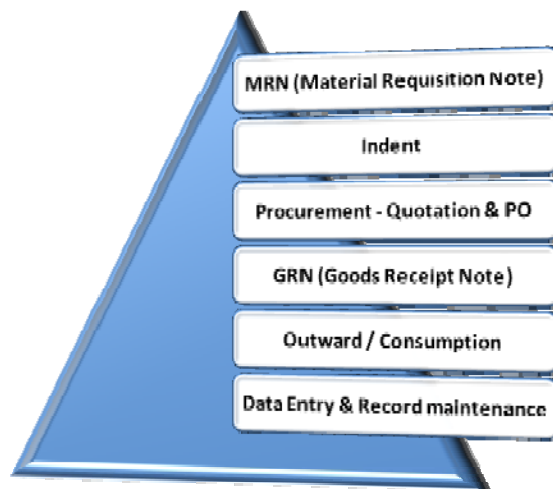
- Labour/Helper 5 = Material loading & Un loading, Cleaning & maintenance

Work Area

8.3 Store person should not be used for other works rather than store like procurement, market survey, creditor payment, Involving in HR/ Admin activity, Engineering work – take measurement/ work execution

Store Cycle

8.4 The following are mobilization state activities:



- (i) Store officer and small team consisting EDP personnel and adequate experienced staff should be identified and deputed to site.
- (ii) Store In charge/Keeper with a computer loaded with iPMS software should be deputed at the earliest to avoid lapses in record keeping.
- (iii) Central Store has an entire set of store registers and other stationery to be maintained at new site. The storekeeper should examine and study it, if there is any doubt, clarify it with Regional Store In charge. Ensure that the preprinted stationery required for Material receipt and Issue are available.
- (iv) Officer should closely interact with Project Manager and Planning Manager regarding location and layout of stores along with manpower requirement.

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- (v) The storekeeper should know various shuttering materials, assets, building material and hardware items and mode of measuring and verifying their general quality. The store keeper must verify the capacity of cement store and location of steel stock yard, stores. He should verify them for leakage, pilferage etc. and get it rectified in consultation with Project Incharge.
- (vi) Other buildings can be constructed as per size of project and quantum of material to be stored. Proper safeguard measures should be taken as mentioned/ recommended as per Safety data being provided by respective manufacturers for storage of material.
- (vii) Obtain storage licenses with the help of Liaison Officer for Diesel Pump, explosives etc.,
- (viii) Prepare the stickers or identifying boards for various items.
- (ix) The store keeper should procure measuring tools like weight scale, weights, measuring tapes, gauge meter, measuring device for liquid, calculators, marking chalk, etc.
- (x) He should decide the staff for the stores in terms of Store Assistant, labourers, helpers etc. in phased manner in consultation with Project In charge.
- (xi) If such staff is not readily available, then local person with relevant experience and desirable characteristics should be taken on muster/ card in consultation with Project Incharge. Their total details like address, previous employer, reference should be verified and maintained.
- (xii) Prepare/obtain a list of persons who would be signing documents such as issue slips, indents etc. as authorized signatories.
- (xiii) All Store Persons should read and study the store manual to understand desired systems & procedures.
- (xiv) Initiative steps for setup the computerized system and obtain the user manual.
- (xv) Manual records in the approved format shall be maintained till computer system is established or both can be maintained for data safety purpose.

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- (xvi) Store keeper may take out the copies of flow chart from store manual as shown below & place it on table or display at relevant places for ready reference.
- (xvii) Further as far as proper material management is concerned the material codes can be defined in the following fashion which shall not only facilitate proper controls but also ensure proper accounting:

Sr. No.	Category Code	Category Name
1.	TR	Material say Steel/Cement/Sand/Binding Wire
2.	SP	Spares say machinery spares/Tools
3.	FE	Fuel say Petrol/Diesel/Oil
4.	NT	Consumable Asset say Wooden Shuttering/GI Sheets
5.	AT	Asset say Equipments/Vehicles/Containers

A very significant use of the material codes can be for the accounts department. For e.g. Category TR may consist of all materials which may get physically transferred to the client and would thus be covered in the definition of deemed sales. The other categories can be those items which are not transferred. Thus the calculation of materials transferred in the execution of works contract can be clearly identified with proper audit trail being made available during the external audits and assessments.

Stores - Physical Controls

8.5 As mentioned above, and looking to the control points, the need is felt to give regard to the following physical controls to be implemented at the stores of a construction site:

Store Location

8.6 Ideally, two store godowns are required - One for Cement storage and the second for items other than cement. Cement Store should ideally be built by Block/ Brick work & Cement sheet or GI sheet with support of scaffolding pipes/wooden bamboo. The surface should be made even by laying PCC on the same. Further following resources are required to be maintained at these godowns:

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- Doors and Windows for Lights & Ventilation,
- House keeping (cleanliness),
- Fire extinguisher
- Rack for proper stacking of material.

The rack should ideally be made either of Iron/ Plywood & Bamboo/ Pipe

- Weighing machine to weigh materials upto 100kg (This may depend on site to site)
- Power connection
- Computer system with keyboard, mouse, Printer & UPS.

8.7 Location of the stores is an important factor which determines efficiency and working. As far as possible it should be near to the user departments and should have easy accessibility to modes of transportation. This minimizes handling and ensures timely dispatches.

We should have different stores/ location for different varieties of items, like Cement, Steel, POL, Gases, Admixture, and Explosives etc. Layout should be such that, it should facilitate for easy movement of materials, good housekeeping sufficient space for men and material, optimum utilization of stores space and proper preservation.

Security Agency/ Guard

8.8 Store has either self or hire security agency for security of material.

- At least two guards deployed who has impressive with uniform, stick & torch at store in two shifts. Duty register/ Card duly signed by store Incharge
- Incident register (In case of theft)
- Surprised visit should be carried out by HR incharge, specially during the night duty
- Also external security agency should provide surprised visit report with monthly bill.
- As far as possible one gate entry should be preferred.
- Security register is a standard form, which is to be maintained at every site for all types of material and equipment movement happening through any vehicle/mode of transport. This system will be

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useful for proper control over the incoming & out going material at site.

- The register would be maintained by the gatekeeper/ security guard.
- All incoming and outgoing materials must be recorded in separate registers, i.e. material inward register and material outward register.
- Security shall also keep a track of movement of vehicles.

Setup of Stores

8.9 It is critical to identify the location of stores at the site. Following are some of the factors to be considered:

- Batching plant, Store, Steel Yard, own offices and client store should be nearest
- There should not be any logistics related issues.
- Store Location should have proper space considering the future construction activity of the project
- It should also have provision for parking of Equipment and Vehicles.

Stacking and Labeling

8.10 All Items should be stacked properly to ensure availability. Following points are required to be taken care of:

- Material should be kept at least 1ft above the ground surface, properly covered in order to avoid spoilage/ wastage due to Weather conditions (For example – Cement Bags, Plywood, Battan etc.);
- Safety to be ensured; (e.g. Heavy material to be kept on ground & light weighted material either in rack and or on top of the rack);
- It should be easily moveable;
- Arrangement should be made based on frequency of usage;
- Single item to be kept at one defined location rather than multiple locations;
- If stacking is proper the material is easily countable;
- Labels should be affixed on the rack of each item with Material code (Additionally mention of item description is also desirable).

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- Stores should obtain sufficient number of racks, wooden planks, barrels, necessary table, chairs etc. & decide their arrangement.
- Storage Racks should always be of reusable nature and easily transportable to next site without any damage or cutting of racks. Depending upon requirement, Standard readymade Racks can be used for storing small items and heavy duty racks can also be fabricated at site with angles, sheets/ planks, but with Bolt & Nut arrangement. Remember that no material should ever be kept directly on floor. Always try to adopt dedicated Racks for V Belts, Hoses, Gases, etc. Expensive Items like Bearing, Critical spares and expensive
- Gauges should always be kept under lock and key.

Props/ Pipe Stacking

Couplers Stacking



8.11 After completion of work/ use, unutilized material should be taken back in store and should be kept at its place or at a secured place at work area with proper stacking.

Inventory Level and Local Procurement

8.12 Inventory minimum and maximum level should be defined as per monthly Budget quantity, mainly for principle raw material. Store should not be allowed local procurement in exceptional cases for better material control and avoid malfunction. Almost purchases should be from HO or local procurement department after approval from HO.

Relationship with Supplier

8.13 Ensure and check time to time that how relation of store personnel with supplier:

- To avoid any direct deal with supplier
- Surprise physical verification should be made on sample basis of inward material by another person to check any malfunction
- Material delivery would be during day instead of night
- Quantity should not be blank in challan/ Packing list.

Material Inward Verification and Posting

8.14 To explain the issues here, we have assumed that the contractor is doing a project, where Steel, Cement and RMC are Free Issue Materials and other major purchases are in the form of Sand, Aggregate, Binding Wire, Wooden Items:

I) **FIM Material Inward:** Generally, Steel and Cement or RMC issued as FIM by Client:

A) **Steel: (*FIM Material*)**

- Challan should have the indent number, date & quantity in weight along with weight slip.
- Weight should be carried out when vehicle reached at your premises (Gross weight) and after unloading, to get vehicle also weighted to get net weight which we got from client. This net quantity should be mentioned as received in challan and same would be conveyed to client/ supplier store.
- Store needs to verify and mention dia wise quantity in nos., both in our record as well as on client challan for ensuring dia wise reconciliation
- Dia wise weight can be derived through number inward quantity and dia wise weight per number as per Indian Standard
- Client should inform about the dispatch of FIM in advance
- Test Certificate



B) **Cement : (*FIM Material*)**

- Challan should have both the Units of Measurement i.e. Bags and Weight in MT
- Gross Weight should be carried out when vehicle reaches the premises. Net weight ay be carried out for the first time in the presence of the stores manager.

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- If damaged bags are received, the quantity of such damaged bags should be mentioned in challan and the same should be conveyed to client/ supplier store.
- If the vehicle carrying the cement bags does not have the plastic covers during the rainy seasons, chances are that the bags may subsequently get damaged during use. Such remarks may also be mentioned on the challan
- Store needs to verify numbers of cement bags and ensure proper stacking at time of unloading in store. Stacking should be such that it ensures FIFO basis consumption
- Control on Empty bags is required as the same may be required to be returned to the client as per the contractual terms.

C) RMC (Ready Mix Concrete): *(FIM Material)*

- Physical received and challan quantity should be the same and if there is a difference, then short fall should be communicated to client on a regular basis. Such shortfall may be a regular phenomena when client has outsourced RMC production.
- Further monthly reconciliation should be done to resolve the dispute, if any. If we wait till the end of the project, then it may be too late.
- Testing may again be required at the time of concrete pouring if distance between batching plant and site is considerably high.
- Special focus on all the documentations required if multiple agencies are working at the client location.
- Volume of RMC can also be cross checked by taking the weight of RMC



If physical RMC quantity can not be verified, then you have to ask monthly reconciliation from the client and no any dispute accepted later on regarding RMC.

Procured Material Inward

8.15 It is, normally, seen that client may keep Steel and Cement in their scope as FIM, and may ask the contractor to purchase other materials which are required to make concrete like sand & aggregate. Thus under such circumstances, these items become the principal items and major control focus is diverted at the point when these are accepted by the site for consumption. If the inward point is strong, then most of the issues can be taken care of:

A) Sand and Aggregate/ Boulder and Rubble:

- Sand & Aggregate may be purchased on CFT as the unit of measurement instead of MT as the vendor may play mischief by making the same wet with water to increase its weight. Further if the purchase is on volumetric basis i.e. CFT, the same may also facilitate the reconciliation with the since the consumption of such items may.
- However if it is felt that the site stores personnel is not a very experienced one, then the purchase in CFT may not be the right option if he is not able to physically inspect the vehicle every time it arrives.
- But for Boulder & Rubble one may purchase on MT basis due to voids and due to the fact that even water can-not make much difference to these items
- These items should be delivered by supplier with advance intimation.
- Materials should normally be delivered during day only and night delivery may only be allowed in exceptional circumstances
- To measure the volume, the same should be measured by measuring the height at three different points in the vehicle and then volume may be calculated by considering average and this volume may be mentioned as received in the challan.
- Royalty Slips are compulsorily required in all such cases as all are natural minerals extracted from earth.

B) Binding Wire should always be weighed at the time of inward movement in the stores and its gage should be matched as per order. Bundle and weight should be mentioned in the challan as well as the inward record.

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C) Conplast/ Admixture should always be verified by checking the manufacturing & expiry date which should be clearly visible from distance. Even Test certificate should be made available by the supplier.

D) **Wooden Material**

- Plywood = This should be as per specification given in PO like thickness, weight per sheet, regular or water proof, size, qty. in numbers and sq.ft
- Batten = Batten size should be as per the specifications of PO like thickness & length, Abnormal damage & short pieces should not be allowed and its quantity mentioned as received in CFT in challan

II) **Returnable Material Entry**

If any inward material, equipment or items could be out in future, then all client procedure and documents should be followed and keep all records properly to avoid any harassment/ delayed from client at time of outward.

- Material entry gate pass/
- Inward stamp with date and time and sign of authorized person
- Material description with quantity etc..
- No any short cut should be allowed which can be costly for company in future.

III) **Loan Transaction**

In construction business/ site, lot of contingencies exist which can hamper the progress of the project. For e.g. if there is only one batching plant at the site and if the same is under breakdown then the whole output on the days of breakdown would be significantly low. Instead if there are other agencies working in the same premises, the project manager may use the resources of the other agency on loan basis and in future when the need arises may return the favour. Some issues to be kept in mind in such cases are as follows:

- This type of transactions should be done by site Project Manager in emergency case only and get approval from his higher authority.
- Even concurrence of the owners of the contracting unit should be taken before entering into such transactions.

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- This is on returnable basis and so should not be outstanding for more days and take place as routine practice.
- Quantitative document should be generated and kept in record at time inward and returned with receiver sign.

IV) Basic Documents

- Documents - Challan/ Packing list/ Inter-site Transfer Memo/ Excise Gate pass/ LR/ Weight slip/ Royalty Challan/ Test certificates/ PO copy or PO references/ Tax Invoice/ Statutory forms (If any).
- Authorized sign required if overwriting available.
- Remark for short quantity & not matched as per specification of item as per PO should be communicated with supplier if any
- Material inward stamp & Entry in material inward register/ system & give Unique inward sequel number on documents
- No material shall be dumped without pre intimation to store and presence of store person. If possible avoid material inward in night
- Rejection Policy

Material Issue/ Outward and Posting

8.16 Material Issue at the construction site is an area prone to lot of control weaknesses. Various issues which arise in a practical scenario are as follows:

- a) Material is issued without filling the issue slip due to work pressure/ non-availability of stores personnel at the stores location.
- b) No records kept for materials issued on returnable basis like scaffolding pipes/ cube moulds/ testing equipments.
- c) Movement of material from one location at the construction site to another without any intimation to the stores personnel.
- d) Stocking of material at more than one location to facilitate the site operations.

8.17 Hence, similar to inwards process, the various conditions that needs to be fulfilled for all kinds of issues/ outwards like Material Sale, Client FIM return, Intersite and Loan basis materials are as follows:

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- Before issuing a returnable material, clear instructions should be given to receiver that he is responsible to return the material to store and also to complete the documentation/ clearance from store. In case of non-return of material, the cost shall be recovered from him.
- It is also seen that valuable items like Scaffolding pipes are cut at the site by the sub-contractors to suit their requirements. Such behaviour without authorization from the site incharge should not be entertained and should occasion recovery of damage charges from him. This should ideally be mentioned as one of the conditions in the work order.
- Documentation in the form of Challan/ Packing list/ Any specific format followed for Inter-site material movement/ LR/ Weight slip/ Test certificates (If any)/ Sales Order copy or references/ Tax Invoice/ Statutory forms (If any) should be available at the site along with the name & address of Consignee and Consignor, Transporter details etc.
- Unique reference numbers need to be allotted to all the issue slips.
- In respect of material quantity, it should be properly weighed and weight slip should be attached with the same with proper UOM.
- After verification of material and documents, Stores should put Material Dispatch stamp, Dispatch date, time and signature;
- In case of movement of material outside the security gate of the client, proper watch and authorization is required. In all such cases, normally client demands the date on which the said material was inwarded by the contractor, hence the relevant records need to be kept updated.
- Material dispatch posting should be done in system or manual register.
- Consumption entry for Cement, Reinforcement, Sand, Aggregate (All Grade), Boulder, Rubble, Admixture consumption and other such bulk materials should be passed along with the RA bill certification on fortnightly/ monthly basis depending on the frequency at which the RA bills are raised.
- In case of Inter-site transfer of material, one copy of Material received confirmation should be made available from the material carrier. It should be clearly informed to carrier/ customer/ Inter-site.

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- Proper policy should be designed to exercise Control over daily usage and returnable basis materials like – Tagada, Pavda with Handle, Tikkam with Handle, Hammer and Safety Full & Half Body Belt etc. For these items, separate manual register should be maintained, in which issued and received transactions entry should be done on a daily basis. In case of material not returned at the day end, a memorandum debit should be raised to the concerned party, reversible only upon return of material.
- In case of receipt of items issued on returnable basis, material document and its posting should be done with received sign/ stamp. Further a reference also needs to be mentioned for the original challan no. against which the material was issued and current balance lying with the party, if the total stock is not returned. In case it is confirmed that material shall not be returned, debit note should be raised on the concerned contractor/ party immediately.
- Store person should physically visit the site at least once in a day if the locations are limited and atleast once in two days if the no. of locations are more, for proper control by way of :
 - (i) Identifying material lying idle or scattered at site,
 - (ii) Verification of material is lying in mud or in excavated holes, before back filing,
 - (iii) All unused materials should be taken immediately from site to store after discussion with the concerned site engineer/ supervisor.

Non-Moving Material

8.18 Store should not allow those materials which are not required or excess quantity compare to required at site to avoid material lying idle at site or non movement. Disadvantage of non movement items are as follows :

- Staff engagement
- Cost of logistics & Block the money & Creditor payment liability
- Block Space of store
- Problem to Handling/ Take care

Physical Stock Verification

8.19 Again unlike an normal scenario, when physical verification can be carried out in a controlled environment, under proper covered structures in a time bound manner, the scenario at the construction site is exactly opposite because of various hurdles in the form of open environment, multiple locations, items lying at heights not ordinarily reachable, various points need to be taken care of when the physical stock verification is carried out namely:

- (i) Stock Records should be updated till the last inward and outward movement immediately before the stock taking;
- (ii) All audit queries related to Inward and outward vouchers should stand resolved especially the Quantitative and item code related ones.
- (iii) Negative items should be identified, reconciled and resolved.
- (iv) If one uses an ERP, then Clearance/ Reconciliation of various system generated Exceptional reports need to be done like:
 - Goods received but bills (Document) not received.
 - Bills (Document) received but goods not received.
 - Raw material/ Goods given for job work but finished goods not received.
- (v) Detailed printouts must be taken with mention of Opening, Inward, Outward and Closing Qty., with detailed Material groups along with Material code.
- (vi) To ensure proper and easy physical verification, material should be arranged/ stacked, thus prior instructions need to be given to the stores personnel through the project manager;
- (vii) Stock Verification must be commenced keeping ABC analysis in mind and thus A Class items must be verified first;
- (viii) Quantities need to be mentioned on items by chalk/ marker, column and row wise to facilitate recount and to avoid any confusion. Physical quantities should be mentioned beside the closing stock with exact location of rack/ site and break up of column & row should be counted to avoid any error.
- (ix) Identify discrepancies with suitable justification and reconciliation;

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- (x) Physical stock of A class principal items should be taken on quarterly basis and the rest need to be covered atleast once in six months on a random basis.

Control Over Fuel Consumption

8.20 It may be noted that Fuel drives not only the vehicles at the construction site but also certain very important equipments like JCB, Miller, Excavator, Cranes, DG Set (for Power), Tractors and other site Vehicles, hence it is also stocked at the construction site in good quantities. A good amount of working capital is required to be allocated for daily fuel purchases at the site. And since we can equate fuel with cash in terms of liquidity, hence it needs proper control for which following points need to be complied with:

- (i) Stores should have resources like:
 - Fuel pipe, Filter & pump to fill fuel from one to another can,
 - Two standard size Barrels of 200Ltrs, capacity,
 - Fuel small Can of 1ltr, 5Lts, 10Ltrs, and
 - Scale to measure stock.
- (ii) Lock and key of fuel tank should be in custody of store person
- (iii) All vehicle and equipment Meters should be in working condition.
- (iv) MRN or Authorisations are required in Log sheet of Project Manager and HR Incharge
- (v) Physical meter reading should be verified at the time of fuel issue.
- (vi) Meter reading should also be mentioned in log sheet at the time of fuel issue.
- (vii) Received and issued signs are required on the fuel issue document with registration number of the equipment/ vehicle.
- (viii) If fuel is issued for purposes other than vehicle/equipment usage then the purpose and name of location is to be compulsorily mentioned.
- (ix) Fuel issued summary should be given to HR and Project Manger for the period required.
- (x) Debit note should be issued to the concerned person/ party in cases of fuel given on chargeable basis.

Raw Material Analysis

8.21 Material is consumed at the construction sites on a progressive basis as the work gets completed. Normally, standards can be fixed for the material consumption in most of the cases, but adherence to those standards is of significant importance and is a periodic exercise. Material Reconciliation of Principal items should be prepared on the basis of sales bill vs. Inward and Issued quantity duly authorized by Site engineer/ Project Manager:-

- (i) Cement
- (ii) Steel
- (iii) Sand
- (iv) Aggregate
- (v) Admixture
- (vi) Binding Wire: i.e. 1Mt reinforcement work = 8 to 10kgs
- (vii) If any other (Specify Other Raw material):

Scrap Yard

8.22 Items in Scrap yard should be properly segregated as per nature and length to enable re-use. Frequent Disposal of scrap Items is required. To avoid theft of wooden scrap, management may have a policy to distribute Scrap wood amongst labour for better controls and to avoid theft.

Thus, the role of Stores Department at the construction site is very demanding. If the above points are properly complied with, then it would improve the overall performance of the site.

- Stores MIS cum reporting formats and advantage as per Appendix 6: are as follows:

Report Code	Name of Report	Period	Advantage
ST01	Material Movement	Daily / Weekly / Fort Night / Monthly	a) To ensure updated data entry. b) This report shows material inward, consumed and balance for Project Manager and HO. c) In case of any abnormal

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			consumption and balance it should be questioned to stores by the Project Manager and Head office.
ST02	Intersite Material Movement	Daily / Weekly / Fort Night / Monthly	<ul style="list-style-type: none"> a) What material is to be moved from one site to another site b) Cross confirmation of Qty and item. c) Preparing Site MIS.
ST03	Fuel Transactions	Daily / Weekly / Fort Night / Monthly	To cross check reports like vehicle and equipment. Management/ HO can know fuel cost for the period and analysis of abnormal fuel consumption for specific vehicle or equipment.
ST04	Safety Material	Daily / Weekly / Fort Night / Monthly	<ul style="list-style-type: none"> a) This report is useful to safety department to ensure proper care has been taken for safety by company. b) Reconciliation
ST05	Issued Mat. Debit Note	Monthly	No debit note will remain pending if report is reviewed as part of MIS from store
ST06	RMC Production & Principal items consumption	Daily / Weekly / Fort Night / Monthly	<ul style="list-style-type: none"> a) Summary of RMC production which can also be cross checked with client bill. b) Get principal raw material consumption like, Sand, Aggregate, Admixture etc. c) Even if exact closing stock cannot be verified, this report might provide an idea for principal raw material at site. d) Principal items can be kept for maximum stock for

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			upcoming month/ period especially for Sand in monsoon.
ST07	Physical Stock	Monthly	<ul style="list-style-type: none"> a) To ensure proper quantity/ stock is shown as per store records? b) Proper Stock statement to be submitted to Bank.
ST08	Non Moving Material	Daily / Weekly / Fort Night / Monthly	<ul style="list-style-type: none"> a) To create consciousness for utilization and new material requisition in future for Project Manager. b) HO/ Company management can know which Fixed Assets and Materials are lying as idle. c) Special watch on expirable items.

Chapter 9

Human Resources and Administration

9.1 Human Resource Department in a Construction company plays a very crucial role in the organization. Labour management arguably is one of the most important aspects in running this business. Various areas need to be kept in mind for the construction sites, some of which are enumerated below.

Normally, it is seen that the role of HR and Admin are allocated to a single team under one leader. They need to ensure proper set up of various facilities at the site. Admin In charge is required to take care of following in consultation with Project Manager: -

- i) Provision of Guest House or Staff colony for bachelor's along with Iron or wooden cot, mattress, pillow cover, blanket, bed sheet etc.
- ii) Mess Service is provided at site or Guest House and maintained by staff members.
- iii) Provision of Vehicle along with license holder driver at site as per requirement along with its maintenance. Records of utilization of vehicles like Log book are maintained by Operator & verified by Admin in-charge at site.
- iv) Periodical Cleaning of underground tank, Labour colony, site office etc.
- v) Communication facility like E-Mail, Courier facilities, telephone registration, etc.
- vi) Provision of Office furniture as per requirement.
- Planning of temporary site office, labour camp etc. Preparation of detailed construction program covering all major and minor activities and its duration with respect to tender quantities, cost and time limit.
- Planning & demarcation of Water supply Grid for Construction , Under Ground tank, Power Grid, Store, Laboratory, Cement Godown with adequate capacity, Batching Plant, Shuttering yard, Reinforcement yard , Scrap Yard, etc.

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9.2 Other activities of Administration Department during mobilization are as follows:

- (i) Security Arrangement.
- (ii) Stationery for different Departments.
- (iii) Provision of Biometric Attendance Machine.
- (iv) Provision of Electrical connection at Site.
- (v) Labour Laws
 - Labour License to be taken as per site in charge's instruction
 - Registers to be given as per labour laws
 - Person is to be taught about maintaining the register
 - about Camp - Either at Site or Outside
- (vi) Insurance
 - Workmen Compensation Policy
 - Any Other Insurance Policy as per Contract terms
 - Vehicle Insurance Policy & Xerox Should be available at site

Thus, any failure on the above counts needs to be discussed with the HR and Admin incharge.

Some of the points are statutory and thus mandatory in nature, while others fall under Internal control category and hence recommendatory in nature:

Contracted Labour Controls

(a) Labour License

9.3 Labour license is the first step while commencing a construction site, without which work can not be started. If however the work has already commenced, then Client as well as the contractee might have to face legal consequences from the labour department. Also one has to take care to ensure that labour does not work for hours beyond those specified in the labour license. And also actual no.s of labourers do not exceed the number as per labour license.

(b) Workman Compensation Policy

9.4 Workman compensation policy is required to be taken to safeguard against accidental risk for the labour. Also it is necessary to ensure that labour strength does not exceed beyond what is specified in the policy. If this policy is not taken, then to that extent the risk remains open and hence not advisable.

(c) Master Form – Sub Contractor

9.5 It is, normally seen, that a major part of construction activity is executed with the help of sub-contractors. Hence the organization needs to maintain proper records which would be of use for both internal control measure as well for presentation to statutory authorities during the course of IT/ Service Tax/ VAT assessments. Following details may be maintained with regard to the sub-contractors employed at the construction site which shall be kept in both hard and soft copy format:

- Two passport size color photographs.
- Full name as per PAN card with firm name required in case of proprietary concern.
- Photocopy of PAN card without which TDS liability shall be @ 20% as against regular rate of 1%/2%.
- Identity proof of Authorized person in case of Partnership firm, Pvt. Ltd or Ltd company (Driving License, Passport, PAN card, Election card).
- Address proof (Election Card, Latest light bill or Panchayat certified letter).
- Communication details (Like, Landline/ mobile with contact person & Fax number, mail ID, Web site).
- Bank Account details like Bank name, Branch address, Account type, Account number and RTGS (Real Time Gross Settlement) number (along with copy of a cancelled cheque/ photocopy of passbook/ declaration letter from the bank).
- Sub-contractor signature on the form.
- HR head signature on the form.

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- Specimen signature of authorized person who shall remain present in case of absence of main sub contractor at Site to ensure that the work does not suffer.

(d) Over time

Overtime is to be paid when any labour does work beyond the fixed hours. There should be proper system to record the duty hours. The following details should be maintained in the labour card:

- Contractor name and labour name
- In time and out time
- Company supervisor sign for allowing OT who shall also be responsible to reply why OT was allowed.
- Labour/ sub contractor sign required

(e) From human as well as from control perspective, those labourers who are involved in claiming overtime on a daily basis need to be warned about their practise.

(f) Daily Report and Control Labour

For management and Head Office control, HO/ Site Coordinator must ask for manpower report and work progress report from Site/ Branch on daily basis to assess the work performance and to compare the same with the budgeted cost.

From an internal audit perspective, this report is very critical for audit of supply labour bills. Monthly summation of this report can be checked with the month end bills received from the contractors and the differences can be questioned.

(g) Gate Pass (GP)/ Entry Card

Identity of labour is very important in the construction environment where the payments are made by head count. And it is practically observed that identity is best maintained by the system of Gate passes. Company must issue Gate Pass (GP)/ Entry card for control and security purpose to sub contractors, employees and labourers. The same can be cross checked with daily manpower report to catch discrepancy if any.

Following details are required to be mentioned in the gate pass:

- (i) Unique serial number

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- (ii) Name of labour
- (iii) Sub Contractor name
- (iv) Type of skill (Helper, Carpenter, Mason, Fitter)
- (v) Date of GP issued and validity (Validity would be three months)
- (vi) Renewal process would start one week before the expiry date of GP. Grace period is required for renewal of GP one week after the expiry date of GP
- (vii) Blood Group (If Possible)
- (viii) Color photograph through Web cam and color printer
- (ix) In case the GP is lost, Company may charge ₹200-₹500 per GP change from Sub contractor/ Worker. This is very critical control point in the sense that the labour contractor would ensure that his labourers do not leave the site without prior intimation.
- (x) If company is working at various identifiable locations in a single project, Gate pass should be issued location wise with each location identified by way of a different coloured gate pass.
- (xi) Signature of HR and sub contractor required on Gate Pass
- (xii) HR should have details of gate passes in the manual register where GP receiver signature is required along with GP wise status (Active, Cancel, Expired)
- (xiii) Penalty should be charged if Gate pass is lost, expired but not renewed or not returned at the time of leaving the job
- (xiv) All Gate Passes should be destroyed which have been returned by workers/ sub contractors after proper entry in the manual register or system
- (h) It may also mention details of some health related verification like HIV/ Height related Phobia any other disease.

(i) PF Records and Liability Payment

If the sub-contractor is running an organized business, then he would pay PF and keep proper records and just deliver paid challan with its break up for the record. But where the Sub contractor is unorganized, it is necessary to get sub contractor wise wages sheet to calculate the PF liability to make the payment.

(j) Labour Colony/ Water and Power Supply

Human Resource in the form of Labourers is a very big asset for a civil construction company. It is thus advisable to take proper care of basic necessities of labour. Normally the contractor is required to prepare a labour colony for keeping the labourers. It should be the responsibility of HR Executive at site to visit labour colony at fixed intervals to find out if their living condition is proper or not and to take required steps for things which are not upto the mark.

Basic aspects like PCC in flooring of room, Proper drinking & routine use Water, Clean toilets and bath rooms, uninterrupted power supply, cleaning colony for better hygiene, monthly medical check up etc. should be taken care of. One monthly visit and follow up action should be part of the system which will result in good performance in the labour output during the project.

There may also be a provision of some sports/entertainment/medical facility/Grocery Shop/Telecom facility etc. within the labour colony campus depending on the size of labour and project. Improper living conditions at colony is one of the reasons for labour attrition at site.

Employees

Salary Structure and Letter of Appointment

9.6 This is the responsibility of the HR deptt. to have proper salary structure with grades and designations. There should be annual review of performance and promotion to keep the employees fully motivated.

Ideal Salary Structure can be as below:

- Basic – 40% of total salary
- Other Allowances 60% of total Salary, like:
 - (i) HRA Allowance
 - (ii) Other Allowances
 - (iii) Bonus
 - (iv) Medical Allowance or Group Medclaim policy/ Medical Reimbursement
 - (v) Transportation/ Travel Allowance/ Leave Travel Concession
 - (vi) Child Education/ Hostel Allowance

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(vii) Education Allowance

- Deductions:

(i) PF employee contribution – 12% of Basic.

(ii) Professional Tax – Employee, as per salary slab.

(iii) Tax Deduction at Source (TDS) as per Government rules on taxable salary.

(iv) Staff Welfare Fund as per Government rules.

Master Form - Employee

This is again a function of HR dept to be performed either on central basis or location wise. This data needs to be kept updated and maintained in master forms of all employees in hard as well as soft copy containing mainly the following information:-

- Bio Data copy submitted at the time of interview for company record.
- Two passport size color photograph.
- Full name as per Identity proof (Driving License, Passport, PAN card, Election card).
- In case of TDS liability, Copy of PAN card.
- Permanent and Present living Address with proof document (Election Card, Latest light bill, telephone bill, bank pass book or Local authorized body/ Class One officer/ Panchayat certified letter).
- Certified photocopy of Qualification certificates.
- Communication details (Like, Landline/ mobile no., Fax number, e mail ID).
- Blood Group with photocopy of test certificate.
- Family details with two contact nos. to contact in case of any emergency.
- Bank a/c details in case the a/c is not opened in the company's bank together with copy of first page of pass book and one cancelled cheque.
- Employee signature on forms.
- HR head signature on forms.

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- Check list to ensure compliance of all requirements.
- Details of SC/ST looking into the government regulations in this regard.

Branch/ Site Transfer Letter

9.7 In case of a company operating at multiple locations, employees/ labour are subject to transfer as per site requirements. There should be a proper way of transfer by office order and that should be attached with employee's personal file to be sent to the new location. This document should have basic information like:

- Branch/ Site transfer letter in duplicate, one copy for each of them with specific mention about date of transfer.
- Name of Branch from where the employee is being transferred and the branch with address and contact details about the branch where he is joining.
- Designation/ Work Skill/ Positive points/ Qualification.
- Salary break up.
- Loan outstanding if any, with monthly installment or Advance taken from previous site, if any.
- Reporting date at New/ other branch.
- Last attendance date at previous branch.
- If employee has any company's asset like – mobile instrument & sim card, Data card or Laptop, Vehicle, Miscellaneous – Uniform & Shoes etc.
- No due certificate at the previous location duly signed by all concerned.
- Any other detail, if required.

Daily Attendance - Staff

9.8 Daily attendance can be marked by manual records like - Register or Daily Sheet or Card or by Auto systems like Punch card/ biometric devices at site. But the fact that people are working at distant locations should not be made an excuse for not marking the attendance. It is for HR to manage the issue in the best possible manner either by calling all the employees at one

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central place or by going to the respective location for the attendance signature as per the situation. But the practise of allowing attendance over telephone should be strictly banned.

Over Time

9.9 There should be well structured Policy to regulate and monitor the over time payment. In case daily attendance is maintained manually, over time control needs more care. There are two options to maintain OT records a) Either Out time to be mentioned in Daily manual attendance sheet/ Register or Attendance Card or b) Separate Sheet to be maintained for employees who work over time. HR needs to take sign from Project Manager on daily OT sheet or Daily attendance sheet. At the end of the month, OT hours should be calculated on the basis of this record. Overall cap should be kept on maximum number of hours for which individual can work keeping efficiency criteria in mind.

Overtime should not become a practise by default and should only be sanctioned with the prior approval of Project Manager. Further no overtime should be paid to the senior management employees like Engineers/ Accountants/ HR.

Leave Application Form

9.10 Leave policy needs to be defined clearly regarding various types of leave, total number of leaves, carry forward or lapse at the year end, encashment, maximum accumulation, etc. Following are required regarding the leave application form:

- Leave application format.
- Leave application vs. Daily/ Monthly Attendance sheet.
- Leave period and number of days.
- Applicant signature is required on form.
- Approving authority which would depend on number of days leave applied for.
- Leave utilized mentioning clearly the category (i.e. Paid Leave - PL, Casual Leave - CL & Medical Leave - ML).
- Category of leave balance.

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- To avoid misuse of sick leave, medical certificate is required when the employee resumes office.
- Absent should be marked for extension of leave beyond the sanctioned period.
- HR should verify the leave balance before final approval of application.

Leave Encashment

9.11 Policy should be well defined for leave encashment, say, maximum accumulation, encashment at any point of time, minimum PL at a time etc.

Bonus

9.12 There should be proper compliance of Bonus Act when bonus is to be declared. Proper calculation duly verified by the Auditors should be obtained.

Records for PF and Liability payment

9.13 PF records are the most sensitive from HR as well as statutory point of view. This work should be in the proper hands to be cross checked by the auditors from time to time.

Staff Appraisal

9.14 Staff appraisal exercise is very important to assess the performance and to decide a proper reward system. The form should have following points:

- Appraisal should have a gradation method (Best-A/ Good-B/ Fair-C/ Average-D) instead of a quantitative assessment by way of marks.
- Appraisal form should have various columns to consider the performance in a broader way so as to ensure that there is no bias in any way.
- Form should be appraised by HR (Basic information points), Department head & Finally project Manager (Field/ Work points).
 - a. Points to be filled by HR
 - Name of employee
 - Designation
 - Date of joining

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- Name of Sites/ Location where employee has worked/ working
- Punctuality
- Leave record during the year?
- Previous year performance and reward.
- Any other achievement or complaint
- b. Points to be filled by Department Head and Project Manger
 - Work performance
 - MIS preparation ability
 - Skill in communication/ response/ dealing with other staff and seniors?
 - Knowledge updates?
 - Time bound targets achievement
 - Compliance to safety and Quality norms
 - Relationship with the client, vendors and other employees
 - Compliance to Company, Client rules and regulations
 - Recommendations

HR needs to check whether all details in the form have been properly filled or not. HR needs to check that all concerned have signed the form. Financial Impact of increment needs to be presented before the top management for final approval. Finally increment letters need to be distributed in a dignified manner giving proper feedback to ensure better result in the future.

Hired Camp/ Mess/ Staff

9.15 Company needs to provide mess facility for staff and guests. It is better to award contract to outside agency at fixed rate subject to quality monitoring in the company hands. This would avoid hotel overheads and ensure time saving as well. Arrangement for the staff and officers should be as per management policy. The policy should also be defined for other facilities of stay and in house entertainment by way of TV, reading materials, sports and club activities etc. Proper record registers need to be maintained to record employee and Guest Attendance.

Group Employee Health Insurance Policy

9.16 HRD needs to evaluate between opting for a group mediclaim policy and giving medical allowance to employees. It may be advisable to go for a mediclaim Insurance for which the policy should be well defined. Accordingly all concerned employees and officers should be covered as per the policy which should be taken after proper negotiation with the insurer. One staff from the company should be made responsible for claim settlement to safeguard the employee interest.

It is seen that a lot of vehicles are deployed at the construction site, as they are required for movement within the site premises and also for to and fro from site to company guest house. The running and maintenance cost of these vehicles is a major overhead at the site. The same needs to be controlled by way of vehicle report to be prepared on a monthly basis.

Vehicle Report

9.17 Log sheet should be maintained for all the vehicles. Further there should be a system to review on a month to month basis to check the fuel and vehicle efficiency and all the drivers should be answerable so as to get the maximum efficiency. In construction Industry, various types of vehicles have to be used and accordingly their efficiency should be judged by the competent persons. The lesson of economy should be very clear to all the concerned persons.

(a) Log sheet: Log Sheet should ideally contain following details for proper monitoring and control:

- (i) Date of journey
- (ii) Opening Kilometer
- (iii) Closing Kilometer
- (iv) Vehicle Start & End Time
- (v) Fuel quantity in Litre either purchased or taken from the stores should match with the details available with the Accounts dept.
- (vi) Maintenance cost should be after approval in case of owned vehicles and in case of hired vehicles, it should be monitored that repair is done in time and vehicle is not run at less than normal efficiency.
- (vii) Any over writing should be counter signed by HR Incharge.

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- (viii) Driver name for each journey should be mentioned.
- (ix) Signature of staff who uses the vehicle for journey.
- (x) Personal usage assessment – This is pass debit to concerned employee if the usage is not as per company policy
- (b) Monthly Vehicle Report:** When HR prepares the vehicle report, following points have to be looked into and ensured that:
 - (i) Report period, Vehicle number, Type of Vehicle, Seating capacity, Driver name, Manufacturing year, Model color, Chassis & Engine number is mentioned,
 - (ii) Vehicle is Insured and Policy number and validity period is mentioned in the report
 - (iii) Pollution under control (PUC) is available in respect of all the vehicles and that is renewed in time.
 - (iv) Vehicle R.C. book should be available for each vehicle.
 - (v) All the drivers should have valid driving license.
 - (vi) There should be a system in place to verify periodically that every vehicle is in perfect condition in all respect.
 - (vii) Fuel average should not have abnormal variations and proper enquiry should be made if such variation is observed in MIS reports.
 - (viii) All vehicle reports should be duly signed by the HR Head and the Project Manager.

Equipment Report

9.18 In construction Industry, various types of equipments like – Batching Plant, Diesel Generator set, Transit Miller (TM), JCB, Loader, Tower Crane, Concrete pump etc are commonly used and there should be proper log book for every equipment for efficient functioning.

When equipment report is prepared, the following points should be taken care of:

- Insurance policy is taken and the same is not expired.
- Driver/ Operator license is not expired.
- Service and maintenance is done at regular intervals.
- Overwriting if any should be counter signed.

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- Fuel quantity should be mentioned in the log sheet/ record to ensure that there is no misuse.
- When equipment is working on time basis and no meter is available, then control is based on starting and ending time. In such case, equipment should not be started and closed without any Supervisor/ User/ HR. In log sheet/ record, both (Operator and Company's Supervisor/ User/ HR) signs should be compulsory each time.
- Analysis/ Comparison is required on Utilization/ Output of equipment.
- Signs are required of HR head and Project Manager on Equipment report.

Admin Assets and Control

9.19 HR should have complete control over admin assets like Laptop, Data Card, CUG Mobile connections with SIM card & Mobile Instrument, Furniture at Camp/ Guest House & Mess, Vehicles, Equipment etc. HR should have master data of details of all admin assets and this should be updated on regular basis (Monthly/ Quarterly/ Half yearly) like:

- Name of asset
- Asset user name
- Location
- Insurance period and Service provider, if applicable

Company can take undertaking from the employees to ensure proper usage and custody of the asset given for use. There should be a well designed policy in place to regulate the use of such assets.

Thus we see that the role of Human Resource Department at the construction site is very demanding. If the above points are properly complied with then it would improve the overall performance of the site.

HR & Admin MIS cum reporting formats and advantage as per **Appendix 7:**

Report Code	Name of Report	Period	Advantage
HR01	Daily Manpower Report	Daily	This report is helpful to know the daily manpower strength and for estimating the speed at which various projects are moving. In addition this may also facilitate comparison with the daily quantity

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			execution.
HR02	Employee Movement Summary	Monthly	a) This report is helpful to know what inter site movement of employees during the month for site and HO, and also current employee strength. b) If this type of report available with HO, excess staff can be transferred from one site to another site.
HR03	Gate Pass (GP)/ Entry Pass	Monthly	Information about GP holder is helpful to know the Active status and it would be compared with Actual manpower report which is a double control over manpower.
HR04	Vehicle Report	Monthly	c) To track vehicle mileage d) To create consciousness amongst the users
HR05	Equipment Report	Monthly	a) To track fuel consumption b) For proper analysis of equipment usage
HR06	Labour Colony (LC) Report	Weekly/ Fort Night	a) LC upkeep b) Indirect impact on project performance
HR07	Monthly Attendance Report	Monthly	a) Payroll Generation b) Overtime Control
HR08	Report on HR Forms	Monthly	Good Internal Control mechanism
HR09	Over Time (OT) Report	Daily	a) Control over payments b) Monitor supervisors authorizing a lot of overtime

Chapter 10

Quality Assurance/ Quality Control/ Safety and ISO Department

Quality Assurance/ Quality Control

10.1 Construction quality and safety are the two most important parameters which help in differentiating amongst the various entities involved in the execution of construction projects. By Quality Assurance (QA) we mean the focus on work methods adopted during the project execution and by Quality Control (QC) we mean the various testing methods adopted to confirm the quality of work done.

- (i) Standard IS Codes to be maintained at Site.

Some of the IS codes say IS 4/5/6 for concrete, IS 800 for steel, IS 1200 for method of measurement of items may be kept at the construction site for ready reference of the engineers working at the site. Additional project specific codes are issued from Regional/ Head Office as per requirement.

- (ii) Laboratory Equipments should be maintained as per the system.

- (iii) In addition, following may also be kept at the site as part of Standard PSQP (Project Specific Quality Plan)

Sr. No.	Contents
1	Quality Assurance Plan
2	Organization chart for site
3	Inspection & test plan
4	Frequency of test & checks for various material
5	Work Instruction for various activities (Methodology)
6	Procedure for Internal Audit
7	Inspection & Test Status
	A. Procedure for inspection & test status
	B. Inspection & test status records (Formats)
8	Procedure for control of Non Conforming Product

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9	Procedure for Corrective Actions
10	Procedure for Preventive Actions
11	Acceptance Criteria for Various Activity
12	Frequency of Calibration of laboratory & Measuring Equipments
	A. Procedure for control of inspection measuring & test equipment
	B. Frequency of calibration
	C. Calibration records (Formats)
13	Standard List of Laboratory equipments
14	Standard List of IS Codes
15	Control of Non Conforming Product
16	Formats

- (iv) Concrete Mix Design As Per IS:10262:2009 should be approved by the client/consultant as the case may be.
- (v) Quality Department may also keep a proper documentation of all instances of Non-conformity leading to rework. This would be useful at the time of raising the claims for extra items.

Safety

10.2 Following are important points in this regard:

- (i) Legal requirement as far as safety equipments should be clearly documented at the site. Ask and read Safety manual and safety policy at Site.
- (ii) Ensure that all requirements of Safety Induction & Orientation manual are followed.
- (iii) The Personal Protective Equipment (P.P.E.) should be purchased only from the approved vendors. Further PPE issue Register, should contain weekly basis summary of materials issued from stores sub-contractor wise.
- (iv) Check if any Accident had been reported, whether mentioned in safety register or not.
- (v) Monitor compliance of observations made in the Safety audit carried out by the Client.

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- (vi) Ascertain the Date on which tool box was conducted and check report of tool box. Weekly "Tool Box" means training, guidance, discussion with labour/employees.
- (vii) Inspection of Daily site observation register maintained by Auditee's Safety Officer. Check that what action has been taken against that observation and what is improvement.
- (viii) Awareness Programmes on site like Safety/ Defensive driving/ Family Planning/ Tobacco awareness/ Financial savings knowledge may be kept on a regular basis.

Chapter 11

Accounting Controls

11.1 Accounting has governed a lot of importance in the construction sector. This is so as the project can be monitored properly only if the accounts department is able to highlight the performance on a regular basis. As far as accounting of construction sector is concerned, there are four critical areas which need attention of the internal auditors:

- (i) Accounting challenges under AS – 7 on Construction Contracts.
- (ii) Evaluation of controls in Centralised and Decentralised Accounting environment.
- (iii) Documentation related controls.
- (iv) Project Performance report.

1. Accounting Standards Guidance Notes

The Accounting Sector applicable to this industry which works purely on contractual basis is AS-7 – Accounting for construction contracts. The standard emphasizes on Percentage Completion Method Accounting (POCM) as the sole method to be adopted for revenue recognition.

Let us try and understand the accounting intricacies with a small example:

Theoretical Scenario

Factor 1 - Value of Work order is ₹100 cr.

Factor 2 - Estimated Completion Cost is ₹80 cr.

Factor 3 - Cost Incurred till date is ₹ 20 cr.

Solution - Percentage Completion is 25% (20/80)

Revenue to be booked is ₹ 25 cr. (Thus profit booked is ₹ 5 cr).

This calculation make the POCM look very simple. However things are not so in the real life scenario. Lets see the kind of issues that are faced under each of the factors as above:

Factor 1 - Value of Work order is ₹100 cr.

Although the client may on the basis of initial engineering estimates give a

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tentative work order value, but the same is bound to change when the actual execution takes place. Some of the typical issues which can lead to such a change are as follows:

- Value of Work order is tentative ₹ 100 cr in case of Hard rock/ ₹85 cr in case there is no hard rock.
- All items are not released at one go/ Work amendments are issued on a regular basis.
- Value is ₹ 120 cr. in case work is completed in 18 months/ 100 cr. if it is completed within the scheduled period say 24 months. That is incentive is given for earlier completion.
- The client has informally accepted the escalation, but is willing to release the same only upon successful completion of the job.
- Even the calculations at the client level can go absolutely wrong at times in terms of engineering estimates. There may even be a case when the requirements may be significantly modified during the course of the project.

Factor 2 - Estimated Completion Cost is ₹80 cr

Although on the basis of initial BOQ, the contractor may work out the estimated completion cost. However the same is also subject to several changes for reasons as below:

- Most of the times the contractor never has the data on expected costs. One has to go by the market, and work at the prevailing market rates. Hence practically speaking no prior exercise is done to work out the estimated cost.
- The expected costs fluctuate every moment. If the output in terms of concrete is 100 cum per day the cost would be 65 cr if it is 60 cum per day the same is 110 cr.
- Situations like labour unrest, accidents at the site, equipment damage can change the whole scenario of the site.
- At times confusion prevails with regard to the Indirect taxes, resulting into increase in the contract costs.
- Several extra items are expected to be executed in the course of the job.

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Factor 3 - Cost Incurred till date is ₹ 20 cr. (25%)

- Cost of Extra items at times is significant and needs to be excluded while calculating the cost incurred against the original work order.
- Liability to pay the subcontractor has arisen, but the bills have not been certified as the rates have not been finalized. Only after an overview of their work after some time that the actual rates are finalized
- Free Issue Materials supplied by the client are reconciled/ returned at the end of the project. Sometimes these may have a heavy impact. Online monitoring is thus required.
- Certain costs were although necessary but were not anticipated at the start of the work.
- Various sites are running. Capital goods and materials from one site are transferred to another site, and no financial effect is taken care of, hence the same are not considered while working out the cost.
- Determining a base for allocation of common costs among the projects is very difficult and most of the times very subjective as we have to depend on the management for that.
- Need to provide for Contingencies, like liquidated damages from the client/ similar claims on the sub-contractors would reduce the cost.

How do we then recognize the revenue in such a scenario?

Solution

- Contractors normally have the system of raising RA bills. Those bills which have been duly certified by the client need to be recognized as part of Contract revenues.
- At times certain items are certified without execution to show the progress of the work, which should be suitably adjusted.
- Field survey is required to be carried out with the billing engineer to ascertain the status of works carried out but not billed or if billed but lying uncertified. Care for extra works executed not forming part of the original order to be taken. A certificate needs to be taken with regard to the same backed by informal communication with the sub-contractors.
- Stock of Unutilised material lying at the site and stock of scrap needs

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to be physically verified. Care should be taken to ensure that no Free Issue Material is taken into consideration.

- All conservative stands need to be taken i.e. escalations need to be taken into account only after complete assurance from the client, time based incentives to be considered only after substantial completion.
- Cross verification of findings with the technical auditor, if any.

Centralised and Decentralised Accounting Controls

11.2 Operations of a Construction company are spread over various remote locations and not restricted merely to couple of factories and branches as is normally seen in a manufacturing sector. Not only that, the locations are not stable and keep changing every few months.

Out of the various challenges that emerge in the construction sector, one of them is Accounting. Because of multiple and remote locations, it presents all together a new ball game to those involved. But since timely accounting has a very important role to play in a construction company, management needs to implement proper systems. Management thus have to make either of the two choices:

- a. Centralised Accounting
- b. Decentralised Accounting - This option can have various models which we shall discuss in detail.

Both these options have their merits and demerits and decision to opt for one over another is not automatic but would depend on a case to case basis. Lets review both the models in detail.

Centralised Accounting

11.3 Under this model the accounting team of the company sits at one location say Head office and all the sites are expected to send their documents at regular intervals to Head office. All the payments are released from Head office only. The sites may have a junior cashier to handle the cash and who may serve multiple purposes at the site. Now to ensure proper co-ordination, accountants at Head office need to be given proper responsibility distribution so that some-one is looking after each of the sites, depending on the size of the project. Further, this shall also ensure that a particular accountant at HO can be made responsible for poor document inflow from a particular site.

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This model may be advisable when the number of sites are limited and are not far off from the Head office. Thus the frequency with which the documents are to flow from the construction sites to the Head office needs to be decided in advance with strict compliance. Since the HO is totally disconnected from the sites, it is required to lay down the base documentation required for booking of an expense in each of the cases.

Lets say for booking a Purchase Bill the Head office may specify some pre-requirements to the site say Purchase Bills should:

- (a) Be duly authenticated by the Project Manager
- (b) Have a Goods Receipt Note from the stores department
- (c) Have a Supplier Challan
- (d) Comply with the Cenvat Rules requirement if Cenvat is to be availed

This and more depending on the nature of expense. Such a process ensures that before a liability is confirmed by booking the same in accounts, the basic controls have been met. Accounts department also has to be given strict guidelines that the party payments are made only after booking the liability in books. Many a times a situation may arise where the party payments are to be made and invoices lie with the accounts, but since all the documentation criteria have not been met, the same are not booked as liability. In such cases proper balance needs to be maintained by the accounts department as far as release of payment is concerned. That is payment in such cases should only be released where the progress of the site seems to be getting affected with strict warning to the site.

Lets, now see the merits and demerits of Centralised Accounting

Merits of Centralised Accounting

- (i) Overhead Cost as well as administrative burden for recruitment of accountants at each location is minimal in this model as compared to Decentralised. Number of accountants required under this model is far lesser as compared to the decentralised model.
- (ii) Since the flow of documents to Head office is at regular intervals, the filing and documentation is proper and even the audit can be carried out at Head office at timely intervals.
- (iii) Monitoring and Budgeting controls can be properly exercised in this model.

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- (iv) Branch Reconciliation issues do not arise in this model.
- (v) Back dated entries can be properly tracked in this model as the complete data entry work is entrusted in the hands of Head office accounting personnel.
- (vi) All expenses which are received with considerable time lag may be scrutinised properly.

Demerits of Centralised Accounting

- (i) May lead to Poor documentation as the site personnel might not be technically sound to ensure compliances instructed from Head office.
- (ii) Site is not in the possession of the documents as it has to submit the same to Head office on a regular basis. Hence tracing any issues for earlier periods would consume avoidable time of HO personnel. Further many a times there may be a loss of documents in transit.
- (iii) Even if the site wants to retain the documents, it needs to get the same copied leading to duplication of documents at the site.
- (iv) There may be certain cases where the site wishes to withhold payment for deficient service/ supply, in all such cases it may have to retain the original documents, for required modification. This shall lead to delay in preparation of monthly accounts at Head office.
- (v) HO is not in a position to physically cross verify the documents as it would not challenge them as long as the documents carry proper authorisations as per the agreed procedure.
- (vi) Since the physical contact with the site personnel is poor, they normally tend to ignore HO instructions under the excuse of excess work loads or poor site infrastructure.
- (vii) Manual records might increase under this model to give more discomfort to Head office. Further lot of co-ordination and follow up required from Head office to clear the pending issues.
- (viii) Physical control over cash is poor as cash keeps changing hands. So if the site has the tendency to pay a lot of cash to sub-contractors, then this model may not be advisable.
- (ix) Accountants at HO more or less become data entry operators as they may not understand the business model.

Decentralised Accounting

11.4 Under this model the accounting team of the company sits at multiple locations, i.e., at Head office as well as all the remote sites. All vouchers, documents are prepared and filed at the Site. Accounting is also done at the site itself. Regular backups of the accounts are being sent to HO for review and queries.

Many a times, site also uses a local bank account for making some payments directly if any of the site incharges has been given the authority to operate the bank account. However such a power should be delegated only in selective cases and with proper monetary limits. The main advantage of opening a separate bank account for a site helps in financial mangement and fund flow analysis. This is because, HO can always intimate the site to get the funds first before any liability is released towards the site. This management is so simple that even a technical project manager at the site can understand the same.

These days with advancement of technology, this model is also being operated with a slight variation. That is the accounting software is installed in a central server with the accounts team dispersed at sites. Only issue which remains is that if the construction sites are at distant locations where the internet connectivity is poor, the solution may not work properly and the site would not be in a position to update its accounts on a regular basis. Thus, this may be used with proper verification about the net connectivity.

Merits of Decentralised Accounting

- (i) The site accountant is better equipped to understand the site concerns and is able to interact with the employees and vendors.
- (ii) Because of direct interaction with the site employees, the accountant is properly aware of the various internal control weaknesses at the site and he can thus up the ante from his end to put pressure on the site.
- (iii) There are various additional factors to be considered at the time of preparation of Site MIS. If the accountant is based at site, he can consider all such issues to arrive correctly at the unbilled work and unbooked expenses.
- (iv) Client and Local Supplier Reconciliation is eased to a great extent if the accounts department is based at the site itself.

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- (v) Site based statutory compliances can be better because of a dedicated accountant. Thus VAT/ Entry Tax/ Forms Management (C,F)/ Labour Laws can be regularly complied to.
- (vi) Because of presence of a watchdog in the form of a site accountant, overall expenditure in the form of overheads can be curtailed provided the accountant is strong enough to resist the spend thrift staff and is aware of the variability of expenses as compared to the volume of work executed.
- (vii) It is normally seen that the cash turnover at the construction sites is remarkably higher as compared to other businesses. Hence the site accountant is able to exercise proper control over Physical Cash.
- (viii) Document related deficiencies can be resolved in a proper and timely manner due to direct physical contact between accounts and other concerned persons say client/ vendors.
- (ix) Invoice Controls like serial number/ taxation can be properly maintained as the accountant would oversee such issue unlike in a centralised model where even the technical engineers get involved in invoicing.
- (x) Site accountant because of regular interaction with the technical staff is in a better position to educate them on various issues like finance, relevance of documents, impact of statutory non-compliances.
- (xi) Timely billing of client and sub-contractor billing can be ensured.

Demerits of Decentralised Accounting

- (i) Cost of the accounting function would increase if proper site accountants are to be kept with reasonable qualification.
- (ii) Many a times due to distant locations when the site accountant is not available, then the organisation has to follow mixed pattern i.e. decentralised accounting at some sites and centralised at others. Thus a state of chaos may emerge when the decision of going with centralised accounting is taken for a site after much delay.
- (iii) If the site accountant is inexperienced or if morally not sound, the vendors may indulge in unfair practices.
- (iv) Many a times the unity of command of the accounts function is in jeopardy. As the site accountant may not be sure as to whom to report to, whether to HO or the Site Project manager.

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- (v) If some of the sites are very remotely located, then availability of quality manpower for the site would lead to control issues.
- (vi) Under this model many a times due to inability of HO to appoint the accounts personnel, Site Project Manager may appoint a Local person as accountant or he may bring some one from his reference. Both the cases bring a fundamental weakness in the internal controls by violating the maker checker concept.
- (vii) At construction sites, it is seen that since the staff is working on all the seven days of week at the site, they normally go on leave for 15-20 days. So in case of absence of the accountant the back up arrangements need to be strong otherwise there are chances of theft/fraud in that period.
- (viii) If the site accountant is given multiple functions which results in shifting his focus from the core accounting function, then this model would not function properly.

In view of both the models, one may say that neither is correct or incorrect, but needs to be implemented after looking at the client, kind of projects, staff involved at the site and other relevant factors etc.

However, an internal auditor first needs to have a clear understanding of the pros and cons of the model being adopted by the client. He may then have to evaluate its success and if things are running smoothly then accept the same and focus on the control weaknesses that can creep in this system. If however it is felt that the accounts department is not able to give the MIS in time from the books, and is required to do a lot of adjustments in the excel sheet to make up for pending accounting, then one may have to review the model and take appropriate decisions.

Documentation Requirements

11.5 In addition to above, whether the organization chooses centralized or decentralized model, it needs to design the documentation requirements accordingly. In any case all the documents that are received from the site, can-not be accepted as it is for the purpose of booking the same in the accounts department unless they carry the correct ancillary documents with proper authentication from the site personnel wherever required.

Accounts

- (A) Sales Register

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- (B) Purchase Register
- (C) Cash Book (Various)
- (D) Bank Book
- (E) Journal Register

Sales

(a) ***Bills raised:*** Following documents are required with Sales bill for its data entry:

- (i) Sales bill to comply with the following points and to obtain acceptance sign with seal of responsible person from the client on bill after certification. ***(Taking into consideration any amendment in the rules or guidelines given by the client)***
 - (a) Original/ Duplicate Invoice (mark on Original invoice)
 - (b) Company's "site billing" and "HO address"
 - (c) Company's Local TIN number
 - (d) Nature of Invoice like Tax Invoice or Retail Invoice
 - (e) Consistency of VAT Invoice number in Tax Invoice & Retail Invoice
 - (f) Invoice Date
 - (g) Buyer's Name and site address
 - (h) Buyer's Local TIN number
 - (i) Work order number
 - (j) Reference number as Running Account bill number (RA-01, Ra-02 etc.)
 - (k) Invoice Period
 - (l) Company's Central service tax/Service Tax number
 - (m) Tax Invoice with proper Transferable material item wise Quantity, Material Rate including transportation and labour\loading\unloading\packing charges with purchase data, profit margin & VAT rate wise (4%, 12.50% 16% etc.), Labour and Service tax bifurcation

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- (n) Sales bill should be signed by our authorized person whose sign is available with local sales tax department as Authorized.
- (ii) Abstract sheet should contain quantity and value "This bill", "Previous bill" and "Cumulative bill" with sign of project manager and client's responsible person.
- (iii) Working documents like joint measurement and detailed bifurcation of quantity as mentioned in Abstract sheet with signs for quantity approved by client engineering department and our engineer on each working page.
- (iv) Reconciliation statement of "*Free Issue Material (FIM)*" duly approved by client and our Engineers.
- (v) Reconciliation statement of "*OUR Own Material*" (*Transferable and Non transferable*) consumed during the work execution period with approved sign by Project Manager for our internal purpose and consumption details as per this working should match with Tax invoice quantity.
- (vi) Credit note *if any* raised by the client:
 - (a) Required physical credit note (Original copy)
 - (b) Uniform credit note number in sequence
 - (c) Credit Note date
 - (d) Name of company with Address,
 - (e) Local TIN number,
 - (f) Reason for credit note, against which invoice & date. Details required if it is for material like Name of item, quantity, rate and value.
 - (g) Credit note with VAT rate wise (4%, 12.50%, 16% + Additional VAT if any etc.) Basic amount, VAT amount and Gross amount.
- (vii) Details of Uncertified sales invoices, like Invoice date, submission date, value of uncertified bill, specific reasons for more than 30days uncertified sales invoices.
- (viii) List of items with quantity as executed but pending to be billed due to excess quantity execution and No rate available for new items and amendment in the Work order.

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- (ix) Reasons required in case of short and excess certification from the Project Manager.
- (b) ***Payment received against sales bills:*** Payment advice's hard copy required either system generated or duly signed by authorized person from client and its accounting duly done in our books of accounts. Following points are required in payment advice:
 - (i) Payment break up Running Accounting (RA) bill wise.
 - (ii) Deduction details like TDS, Mobilization Advance recovery, WCT and Retention if any separately.
 - (iii) Details of debit note, if any, as raised by the client like HR gatepasses, accident fine, misuse of FIM material etc.with details and supportings.

Purchases

Following documents are required with data entry:

- (i) Material Indent Note (MRN).
- (ii) Quotations or Price List from at least two suppliers.
- (iii) Purchase Order/ price list duly approved by Manager and Project Director and it should be reviewed on quarterly basis.
- (iv) Material Inward Stamp with Cost center, Quantity, date and stores incharge sign with specific remarks for short quantity, damage material etc. if any.
- (v) Material Receipt Note/ Goods Received Note (GRN) printout after data entry by stores incharge in the books of accounts.
- (vi) Quantity checked report, either ok or with discrepancy if any
- (vii) Approval sign of Project Manager on Bill and specific remarks with sign, if any.
- (viii) Original Purchase Tax Invoice and challan with readable like Name of Item, quantity, rate, VAT Rate, VAT amount and authorized sign of supplier on bill.
- (ix) Lorry receipt (LR/ GRN) copy, if any, required with purchase bill.
- (x) Other supporting documents with details from supplier (Royalty Challan and Trip slip in case of Sand, Aggregate, Boulder etc.).

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- (xi) Printout of data entry voucher with bill duly signed by data entry person.
- (xii) Credit notes required in cases of excess purchase rate, short quantity, damaged material etc. from supplier in proper format (Format like Tax Invoice).

Cash Book

Following documents or other requirements for cash payment and receipt vouchers:

- (i) Required cash payment and receipt vouchers with site name/ cost center.
- (ii) Proper supporting required against expenses.
- (iii) Receiver, Approved (PM), HR (Wherever required) and Site cashier signs are required on all payment and receipt vouchers or on supportings.
- (iv) Revenue stamp required when cash paid is above ₹5,000 on cash voucher with receiver sign.
- (v) Proper supporting and details for General expenses.
- (vi) Insurance policy photocopy and receipt are required with cash payment voucher.
- (vii) Advances, Angadia, Cash transfer charges and employee withdrawal payment voucher required with receiver & approved (HR and Project Manager) signs in the Form & Formats wherever HR has designed.
- (viii) Policy is required for conveyance, mess, camp expenses from HR and payments should be made accordingly.
- (ix) Reference of bill number, date, proper cost center, Account head and work details should be narrated clearly in data entry.
- (x) Surprise physical cash verification report at least once in a week is required from the site Project Manger.
- (xi) Policy on double cash payment should be clarified by PM.
- (xii) Negative cash balance, Temp and Suspense account should not be created in first place.

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Bank

Following documents and records are required for data entry:

- (i) Payment and receipt vouchers required with authorized signature.
- (ii) Payment schedule with bifurcation of principle, interest, balance and interest rate and its data entry is also required on monthly basis.
- (iii) All details and supportings from Bank are required like bank charges, cheque book issue or cheque return charges, process fees, stock and Debtors statement delayed or non submission charges, cash transaction tax (CTT) etc.
- (iv) Cheque number and reference required against payment.
- (v) Cheque cancelled entry, Cancelled Cheque should be enclosed with voucher.
- (vi) All entries to be passed in books on cheque written date instead of cheque issue date.
- (vii) All Cheque counter foils required.
- (viii) All cheques deposited slip counters required with bank stamp.
- (ix) Bank reconciliation statement is required either on daily or on monthly basis.
- (x) Bank statement is required either daily or on monthly basis.

Accounts under Payment:

Payment Advice Format

Further, the organisations who have not deployed an ERP system can have following vouchers in place for the purpose of approving the payments:

				Site : _____ Date : _____	
S. N.	A) Supplier of Material	B) Supplier of Capital Goods	C) Sub-Contractors	D) Rent (Labour Colony/ Room/ House)	(E) Vehicle Hire/ Petroleum Suppliers
1	Purchase Order	Purchase Order	Work Order	Rent Agreement	Log sheet
2	Tax Invoice	Tax/Retail	RA Bill	L.C. visiting	Auth.-

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		Invoice		Reports - HR	Commercial/H.R.
3	Authorization from Site EIC	Authorization from Project Director	Authorization from Commercial Dept.	Authorization from H.R.	Authorization from Site Incharge
4	Authorization from Project Director	Authorization from Commercial Dept.	Authorization from Project Director	Authorization from Commercial Dept.	Authorization from Project Director
5	Authorization from Commercial Dept.	Stamp of Quality & Installation from Site Incharge	Authorization from Site Incharge	Authorization from Project Director	Bill Entry in books of accounts with Deduction (maintenance /spare parts...)
6	Stamp of Quality & Qty. verification from stores	Bill Entry in books of accounts with all deduction (TDS/ VAT & Other)	Debit notes received & entered from Stores (Safety material) & H.R.D. (G.P.'s)	Bill Entry in books of accounts with Deduction (TDS)	Bill/ Voucher/ Supporting Proper filing
7	Reconciliation of Material against Client Billing	Bill/ Voucher/ Supporting Proper filing	Bill Entry in books of accounts with all deduction (TDS/ Retention)	Bill/ Voucher/ Supporting Proper filing	Monthly Vehicle Report of payment month
8	Bill Entry in books of accounts with all deduction (TDS/VAT & Other)	Receive party's Confirmation Statement	Bill/ Voucher/ Supporting Proper filing	Supplier master form	Supplier master form
9	Receive party's Confirmation Statement with Reco.	Status of excise credit	Client vs. Subcontractor Qty.	Authorization from Internal Auditor	Authorization from Internal Auditor
10	Whether Against "C"	Whether Against "C"	EIC Performance		

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	<u>Form</u>	<u>Form</u>	Report for the site		
13	Remarks required if On Account or Advance: -				
For H. O. use	Amount Released				
	Details of Payment (chq no. etc.)				
	Remarks				

Journals

Following Documents/ Supporting are required with Journal Register:

- (i) Proper supporting bills are required with voucher.
- (ii) Approval, Data entry “made by” and “verified by” signatures are required either on JV or on Bill.
- (iii) Photo copy required for whole set with Capitalization of fixed assets entry.
- (iv) Agreement/ contract copy (with terms and conditions) is required with first voucher of rent for building or vehicle etc. with signs of owner and witness.
- (v) Work orders to Sub Contractors with clear terms and conditions and amendment document wherever changes are made.
- (vi) Sub-contractor bills are required:
 - (a) on his letter head, duly signed and dated,
 - (b) with approved sign of Project manager,
 - (c) along with labour supply slips and
 - (d) other working documents with abstract sheet in cases of measurement bill,
 - (e) details of debit note for material, HR, for safety material or any other liquidity damages if any,
 - (f) Reconciliation statement of principal materials.
- (vii) Policy regarding expenses is required in case of non availability of supporting.
- (viii) Salary sheet copy prepared and approved by HR is required for monthly salary booking and department attendance card duly verified

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by HR and approved by Project Manager with OT bills.

- (ix) TDS deduction entry should be passed at the time of Payment or bill entry whichever is earlier.
- (x) Reference of bill number, date, proper cost center, Account head and expense details need to be mentioned in narration while doing data entry.

Project Performance Report

11.7 Preparation of the monthly or quarterly performance report should not be a very tough task under normal circumstances. However Construction field is different as compared to Manufacturing, Trading and Other services activities. Here the works are getting executed at more than one location, and accounts department is interacting with all these locations who may themselves not be capable to account for themselves.

Biggest hurdle which the top management has to face is “Where do they stand” in terms of profitability when they are in the middle of the project, to assess if things are on the right path. Without the performance report, the project manager would never be in a position to judge his value addition to the company's overall performance.

Things can be very challenging for organisations in the Small and Medium sector, who do not spend much on their accounts department. And they are never in a position to judge the financial performance does not matter how good they would be in terms of execution.

Any company may have a basic policy which defines its controls in various spheres of the project life cycle, which also determines the level of its fixed expenses. If the management gets the right inputs at regular intervals, it may be in a position to realign the work methods keeping profitability as an important criteria. In lieu of this the timely work execution normally remains the only criteria and that is where the organisations fail.

Now as auditor, one needs to have a clear understanding of the challenges faced by companies and the likely mistakes that one would incur at the time of making the performance report. Some of them are:

S.No.	Issue Faced	Measures to be taken
1	Site Accountant and Cashier are required to handle various administrative works and is not	Accountant at site should be made to report to the Head office – Accounts instead of Site Project

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	able to complete the accounting on time.	Manager in the organisational hierarchy.
2	<p>Lot of cash transactions take place for which proper vouchers are not generated at the site, hence there is always some accounting backlog. Now the cash transactions take place at the construction site due to following issues: -</p> <p>A) Labour Contractors do not have any bank account</p> <p>B) Even if they have Bank account, it is at a great distance from the site due to remote location</p> <p>C) Weekly payment policy towards food expenses, when the bill payments are irregular</p> <p>D) Due to regular dishonour of cheques, as a matter of policy the contractors refuse to take payments by cheque</p> <p>E) Due to mismanagement in fund flow management, many a times cash loans are resorted at local level by staff to meet the pressure of running the site.</p>	<p>Company needs to take following care to minimize the cash transactions: -</p> <p>A) Release 25% of payment by cheque of those contractors who resist opening a bank account.</p> <p>B) Arrange proper logistics for visit to nearby bank once or twice a week for all the parties.</p> <p>C) Hire contractors who are able to sustain delays in payment, that is those who are financially strong.</p> <p>D) Instead of making weekly kharachi payments on the last day of week, a cheque payment can also be made for kharachi two days before the weekend, so that contractor has the necessary time to withdraw cash.</p>
3	Different books creation or Cost Center wise accounting	The accounting software in use should be such that it permits cost centre accounting. Many a times organisations also maintain a separate book for each project, which can create a lot of problems in inter-branch reco and consolidation. With advancement, there are various tools available

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		for project wise accounting.
4	Weak Payment systems - If the organisation is in the habit of releasing payments without ensuring proper documentation, then that is a major blow to systematic accounting.	No payments should be allowed without booking the liability otherwise than in exceptional circumstances.
5	Value of WIP & Closing Stock	Value of WIP and closing stock are a must for correct performance report of site. Project Manager and Site Stores need to be educated about the relevance of closing stock valuation for performance report. Further HO also needs to carry out surprise physical verification in this regard.
6	Depreciation	Company may have to decide the expected useful life of various equipments and need to charge to the respective project based on the actual usage. Idling cost in Central Warehouse would also have to be allocated to all the projects
7	Debit notes for recoveries – Store & HR a) Client b) contractor	a) Whenever any payments are deducted by the client, site accounts needs to get proper documentation for the same to decide the account head for booking. b) Further for recoveries to be made from sub-contractors, Site Stores and HR need to furnish the reports on time for raising the debit note.
8	HO overhead allocation	This is one aspect, which most tend to miss. HO overheads need to be again bifurcated into two –

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		One is Project specific which should be charged to the specific project and the second are common which need to be allocated to all the projects based on certain criteria like turnover or number of employees etc.
9	Damage/ Scrape	Assessment of scrap valuation on a quarterly basis is a good internal control measure. Ideally after such an assessment, the organisation should go on to dispose the same in a timely manner, so that its value automatically gets accounted by way of sale.
10	Contingent liability	Some contingency charges should be considered for uncertain costs like labour accidents/ FIM over usage/ LD charges/ Other Misc Exp
11	Transportation cost for mobilization or material shifting from one project to another.	Transportation cost should be accounted at the project where the plant and materials have been shifted.
12	Delay in Preparation and Movement of Documents like Purchase Order, Work Order, Bills, Payment advice etc.	Top management needs to take any such violation very seriously.
13	Delay in Work order Amendment, where the client has agreed to some rate escalation informally	All such escalations should normally be accounted based on actual documentation or if its a regular client, then based on the past history and experience
14	Bill Certification process – a) Client b) Contractors	Delay on both the counts needs to be avoided by fixing a schedule for billing and by stopping payment to sub-contractors where the bills have not been booked by the accounts department

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15	Delay in receipt of Payment advice from client	Without payment advise the proper accounting of the client ledger is not clear, hence the actual certification by the client is in the dark, hence strong follow up required with the client.
16	Clarity - Statutory issues and its local registration	Absolute clarity is required and any dispute with the client as far as charge of taxes is concerned need to be resolved by seeking intervention from top management at both the ends.

Accounts MIS cum reporting formats is given as Appendix 8

Process Flow Chart for Recognition of Construction Revenue, Service Revenue and Recognition of Work in Progress

A typical process for recognition of construction revenue, service revenue and recognition of work in progress of an entity operating in the construction industry are given below.

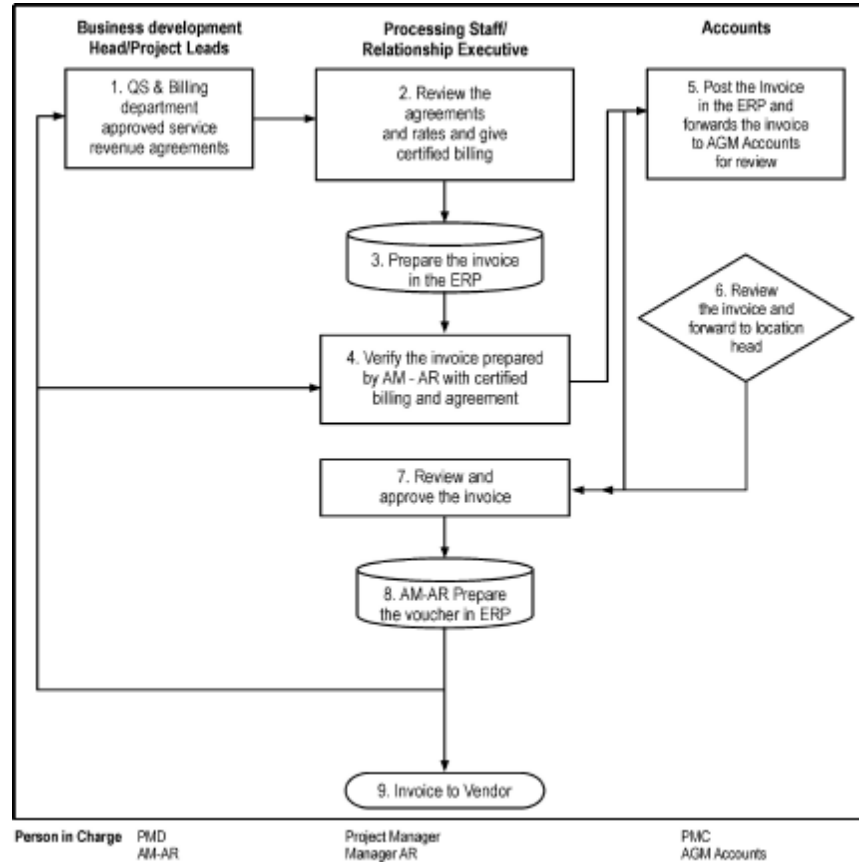
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Process Flow for Recognising Construction Revenue

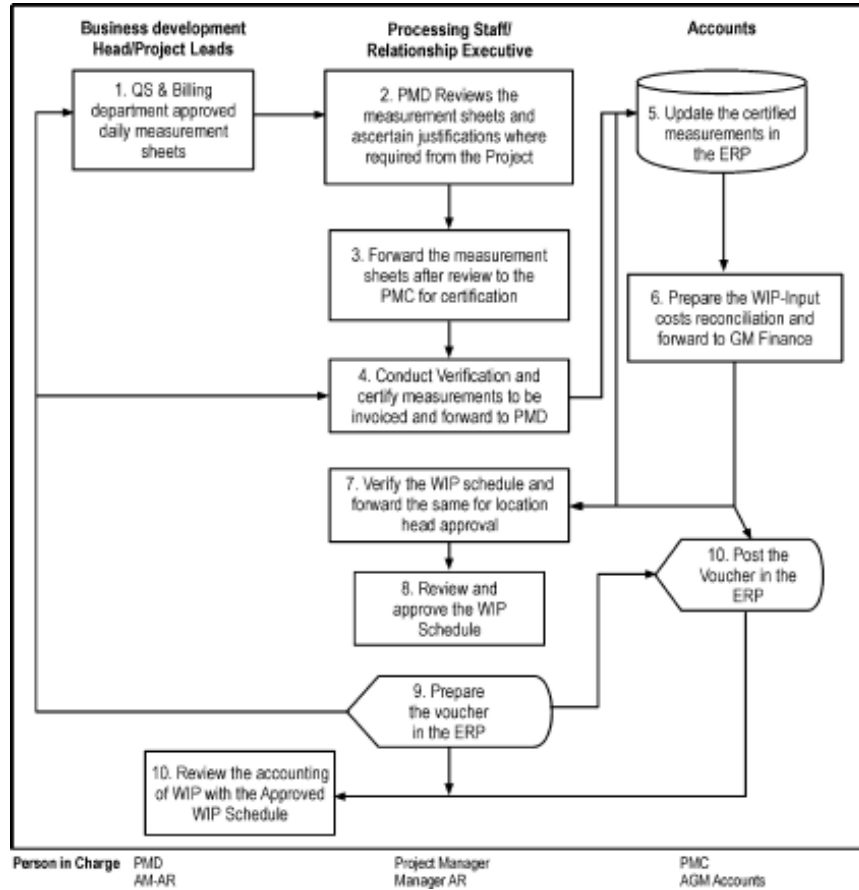


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Process Flow for Recognising Services Revenue



Process Flow for Recognising WIP



Appendix 1

Site Investigation Report

Date:

1. Date of Visit
2. Name of Investigator's
3. Name of the project
4. Name of Consultant & Address
5. Name of PMC/ Designation & Address
6. Location Details:
 - A) Site Location & State
 - B) Major cities around (In Kilometers)
 - C) Connectivity Routes –
 - i. By Road _____
 - ii. By Rail _____
 - iii. By Air _____
 - iv. By Water _____
 - D) Interstate Roads connectivity map for transport
7. Transport:
 - A) Hire Charges on Taxi
 - B) Hire Charges on Truck (6 Ton, 9 Ton & 16Ton)
 - C) Hire Charges on Tractor with Trolley
 - D) Hire Charges on Bus (Seating capacity – 56, 42, 30 & 18)
 - E) Hire Charges on Trailers (20Ton & 40Ton) with Flat Bed or Semi Bed

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8. Material:

Item Name	Rate – Per UOM	Royalty (per Metric Ton)	Rate – Material	Rate – Carting (with paid Toll Tax Receipts)/ Handling Charges	Taxes (If any)	Name of nearest Supplier/ Dealer with Address of Factory/ Depo/ Source & Distance in km from site/ Distance from refinery
Sand	TON					
Aggregate/ Metal (40mm, 20mm & 10mm)	MT					
Dust (Aggregate/ Metal)	MT					
Boulders	TON					
Bricks (Class – I, II & III)	Per 1000					
Concret Blocks (Rate Size wise so specified)	No					
Murum	M3					
Bitumin (Grage _____)	MT					
Soil (With soil Investigation report)	M3/ MT					
Steel Reinforcement (Brand Name_____)	MT					
Cement (Brand Name_____)	Ton					
Plywood (with Make_____)	Sq. Ft.					
Water (with Quality						

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Test Report):						
a) Hire cost	Per 1000 Ltrs.					
b) Tube Well (with Ground Water Level)	Per 100ft Depth					
Oil & Lubricants:						
a) High Speed Diesel (HSD)	Ltr.					
b) Petrol	Ltr.					
c) Grease	Kg.					
d) Light Density Oil (LDO)	Ltr./ MT					
<u>Other material Suppliers</u> list with time limit and rate (More than three in each category) like: - Hardware Material - Safety Material - Plumbing Material - Tools & Tackles - Other Consumables	Various					

9. Natural Terrain: Hilly/ Plain/ Desert/ Urban/ Rural/ Seashore/ Marshy
10. Area of site Installation:
11. Area of labour accommodation:

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12. Location Details:

S. N.	Particulars	UOM Per	Amount/ Remark
A)	Land free hold by Client	-	
B)	On Rental	Hector	
C)	Ready made Labour Colony Room (Size - 3mtrs. X 4mtrs.)	Room	
D)	Distance from Site	Km.	
E)	Electric arrangement at Colony	-	DG/ Temporary Board Connection

13. Rental for Staff:

S. N.	Particulars	Advance/ Deposit	Amount/ Remark
A)	2 Bed Set per month		
B)	3 Bed Set per month		
C)	Bachelor Accommodation per month		
D)	Distance from site in Kilo meters	-	

14. Plant hire availability and Rent

15. Any other agencies working at site?

Name of Agencies	Address	Scope of work

16. Available of labours on daily rate basis: (like - Traders/ Mason/ Carpenter/ Electrician/ Mechanic/ Driver)

Particulars	Rate as per State Govt.	Rate as per Central Govt.
Highly Skilled		
Skilled		
Unskilled		
Semi Skilled		

17. Brief details about site:

18. Any Nuisance values/ Dacoits/ Flood

Appendix 2

Engineering MIS Format Measurement

Engg10 - Site Overview Report

(Weekly)

WO No: ABC12345678

Date: 05.02.2011

SITE: XYZ, Gujarat

Period: 24.01.2011 to 30.01.2011

Checklist

A) Whether previous certification/ Hold pending to clear/ release - Client and Sub-contractors?

If, yes give the details and the excepted dates when the same shall be clear?

Ans.

Particulars	Bill No.	Bill Date	Item Code, Description & UOM	Qty.	Value on Hold	Reason for Hold or non certification
XYZ Infr. Ltd.	RA-01	05.01.2011	123456 - Exc (Cu Mt)	100.00	100,000	Excess excavated and claim instead of actual specification and mark given by client
ABC Contractor	RA-01	07.01.2011	123456 - Exc (Cu Mt)	50.00	40,000	Excess excavated and claim instead of actual specification and mark given by client
PQR Contractor	RA-01	07.01.2011	123456 - Exc	50.0	40,00	Excess excavated

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			(Cu Mt)	0	0	and claim instead of actual specification and mark given by client
--	--	--	---------	---	---	--

B) Whether all the client and sub-contractors bills for the period concerned have been prepared?

If, no give the excepted dates when the same shall be prepared?

Ans. Yes, prepared for all except M/s ABC contractor - by ____/____/____

C) Whether all the FIM and Principle Raw Material reconciliation have been prepared/ submitted ?

If, no give the excepted dates when the same shall be prepared & Submit?

Ans. _____

D) Whether there were any safety violations at the site during this report period?

Give brief remarks in case if any. What action taken as Project Manger/ Site Incharge & Safety Officer?

Ans. _____

E) What were the points scored in the last Quality and other audits conducted by Client

Also what action has been taken against non conformance. Is any point pending, give details if any.

Ans. _____

F) Any other remarks.

Ans. _____

Appendix 3

Additional points in case of Equipment Procurement/ Owned

S. N.	Particulars	Transit Mixture	Batching Plant	Concrete Pump	Tower Crane	Generator	JCB - Excavator
I)	<u>New Procurement of Equipment:</u>						
1	Decision making - Own or Buy	Depends on case to case.	Depends on case to case.	Depends on case to case.	Depends on case to case.	Depends on case to case.	Depends on case to case.
2	Specifications - Make, Size/ Capacity & other if any	Assessment of requirements to be very clear	Assessment of requirements to be very clear	Assessment of requirements to be very clear	Assessment of requirements to be very clear	Assessment of requirements to be very clear	Assessment of requirements to be very clear
3	Market Survey/ Inquiry & Quotation	Tax Benefits/ Transportation/ RTO Taxes to be kept in mind	Tax Benefits/ Transportation/ RTO Taxes to be kept in mind	Tax Benefits/ Transportation/ RTO Taxes to be kept in mind	Tax Benefits/ Transportation/ RTO Taxes to be kept in mind	Tax Benefits/ Transportation/ RTO Taxes to be kept in mind	Tax Benefits/ Transportation/ RTO Taxes to be kept in mind
4	Third party Comment/ Review of the Equipment/ Machinery	Advisable	Advisable	Advisable	Advisable	Advisable	Advisable
5	Quote the Rate	After cost benefit analysis the correct rate to be quoted.	After cost benefit analysis the correct rate to be quoted.	After cost benefit analysis the correct rate to be quoted.	After cost benefit analysis the correct rate to be quoted.	After cost benefit analysis the correct rate to be quoted.	After cost benefit analysis the correct rate to be quoted.
6	PO terms & Conditions	a) <u>Basic conditions</u> = PO date, number, Name of supplier with address, Reference of Quotation, Material description	a) <u>Basic conditions</u> = PO date, number, Name of supplier with address, Reference of Quotation, Material description	a) <u>Basic conditions</u> = PO date, number, Name of supplier with address, Reference of Quotation, Material description	a) <u>Basic conditions</u> = PO date, number, Name of supplier with address, Reference of Quotation, Material description	a) <u>Basic conditions</u> = PO date, number, Name of supplier with address, Reference of Quotation, Material description	a) <u>Basic conditions</u> = PO date, number, Name of supplier with address, Reference of Quotation, Material description

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S. N.	Particulars	Transit Mixture	Batching Plant	Concrete Pump	Tower Crane	Generator	JCB - Excavator
		& specifications, Quantity & UOM, Rate per Unit,	& specifications, Quantity & UOM, Rate per Unit,	& specifications, Quantity & UOM, Rate per Unit,	& specifications, Quantity & UOM, Rate per Unit,	& specifications, Quantity & UOM, Rate per Unit,	& specifications, Quantity & UOM, Rate per Unit,
		<u>b) Statutory</u> = Excise duty, Discount, VAT/ CST with percentage, Type of Invoice (Tax or Retail). To be mentioned our Excise/ service tax, Local & CST TIN registration numbers.	<u>b) Statutory</u> = Excise duty, Discount, VAT/ CST with percentage, Type of Invoice (Tax or Retail). To be mentioned our Excise/ service tax, Local & CST TIN registration numbers.	<u>b) Statutory</u> = Excise duty, Discount, VAT/ CST with percentage, Type of Invoice (Tax or Retail). To be mentioned our Excise/ service tax, Local & CST TIN registration numbers.	<u>b) Statutory</u> = Excise duty, Discount, VAT/ CST with percentage, Type of Invoice (Tax or Retail). To be mentioned our Excise/ service tax, Local & CST TIN registration numbers.	<u>b) Statutory</u> = Excise duty, Discount, VAT/ CST with percentage, Type of Invoice (Tax or Retail). To be mentioned our Excise/ service tax, Local & CST TIN registration numbers.	<u>b) Statutory</u> = Excise duty, Discount, VAT/ CST with percentage, Type of Invoice (Tax or Retail). To be mentioned our Excise/ service tax, Local & CST TIN registration numbers.
		<u>c) Packing & Transportation & Insurance</u> = Packing specification n like - single or double/ internal or external, seasonable Winter/ Monsoon & Summer, Mode of Transportation & Transit Insurance. Its all cost shall be in your scope.	<u>c) Packing & Transportation & Insurance</u> = Packing specification n like - single or double/ internal or external, seasonable Winter/ Monsoon & Summer, Mode of Transportation & Transit Insurance. Its all cost shall be in your scope.	<u>c) Packing & Transportation & Insurance</u> = Packing specification n like - single or double/ internal or external, seasonable Winter/ Monsoon & Summer, Mode of Transportation & Transit Insurance. Its all cost shall be in your scope.	<u>c) Packing & Transportation & Insurance</u> = Packing specification n like - single or double/ internal or external, seasonable Winter/ Monsoon & Summer, Mode of Transportation & Transit Insurance. Its all cost shall be in your scope.	<u>c) Packing & Transportation & Insurance</u> = Packing specification n like - single or double/ internal or external, seasonable Winter/ Monsoon & Summer, Mode of Transportation & Transit Insurance. Its all cost shall be in your scope.	<u>c) Packing & Transportation & Insurance</u> = Packing specification n like - single or double/ internal or external, seasonable Winter/ Monsoon & Summer, Mode of Transportation & Transit Insurance. Its all cost shall be in your scope.
		<u>d) Delivery</u> = Time/ Days of Delivery, Place of	<u>d) Delivery</u> = Time/ Days of Delivery, Place of	<u>d) Delivery</u> = Time/ Days of Delivery, Place of	<u>d) Delivery</u> = Time/ Days of Delivery, Place of	<u>d) Delivery</u> = Time/ Days of Delivery, Place of	<u>d) Delivery</u> = Time/ Days of Delivery, Place of

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S. N.	Particulars	Transit Mixture	Batching Plant	Concrete Pump	Tower Crane	Generator	JCB - Excavator
		Delivery with contact person,	Delivery with contact person,	Delivery with contact person,	Delivery with contact person,	Delivery with contact person,	Delivery with contact person,
		<u>e) Document</u> = The Invoice should contain both Head Office and Site Address. Other docs like PO/Challan /Packing List/LR/Weight Slip/Statutory Forms/Insurance Policy.	<u>e) Document</u> = The Invoice should contain both Head Office and Site Address. Other docs like PO/Challan /Packing List/LR/Weight Slip/Statutory Forms/Insurance Policy.	<u>e) Document</u> = The Invoice should contain both Head Office and Site Address. Other docs like PO/Challan /Packing List/LR/Weight Slip/Statutory Forms/Insurance Policy.	<u>e) Document</u> = The Invoice should contain both Head Office and Site Address. Other docs like PO/Challan /Packing List/LR/Weight Slip/Statutory Forms/Insurance Policy.	<u>e) Document</u> = The Invoice should contain both Head Office and Site Address. Other docs like PO/Challan /Packing List/LR/Weight Slip/Statutory Forms/Insurance Policy.	<u>e) Document</u> = The Invoice should contain both Head Office and Site Address. Other docs like PO/Challan /Packing List/LR/Weight Slip/Statutory Forms/Insurance Policy.
		<u>f) Payment</u> = Terms of payment & Mode of Payment	<u>f) Payment</u> = Terms of payment & Mode of Payment	<u>f) Payment</u> = Terms of payment & Mode of Payment	<u>f) Payment</u> = Terms of payment & Mode of Payment	<u>f) Payment</u> = Terms of payment & Mode of Payment	<u>f) Payment</u> = Terms of payment & Mode of Payment
		<u>g) Warranty/ Guarantee</u> = Against which parts the warranty & Guarantee is required ?	<u>g) Warranty/ Guarantee</u> = Against which parts the warranty & Guarantee is required ?	<u>g) Warranty/ Guarantee</u> = Against which parts the warranty & Guarantee is required ?	<u>g) Warranty/ Guarantee</u> = Against which parts the warranty & Guarantee is required ?	<u>g) Warranty/ Guarantee</u> = Against which parts the warranty & Guarantee is required ?	<u>g) Warranty/ Guarantee</u> = Against which parts the warranty & Guarantee is required ?
		<u>h) Free Maintenance & Service</u> = This clause should be clearly mentioned in the PO	<u>h) Free Maintenance & Service</u> = This clause should be clearly mentioned in the PO	<u>h) Free Maintenance & Service</u> = This clause should be clearly mentioned in the PO	<u>h) Free Maintenance & Service</u> = This clause should be clearly mentioned in the PO	<u>h) Free Maintenance & Service</u> = This clause should be clearly mentioned in the PO	<u>h) Free Maintenance & Service</u> = This clause should be clearly mentioned in the PO
		<u>i) Test Certificate</u> = Equipment test certificate	<u>i) Test Certificate</u> = Equipment test certificate	<u>i) Test Certificate</u> = Equipment test certificate	<u>i) Test Certificate</u> = Equipment test certificate	<u>i) Test Certificate</u> = Equipment test certificate	<u>i) Test Certificate</u> = Equipment test certificate

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S. N.	Particulars	Transit Mixture	Batching Plant	Concrete Pump	Tower Crane	Generator	JCB - Excavator
		required from supplier before dispatch the material.	required from supplier before dispatch the material.	required from supplier before dispatch the material.	required from supplier before dispatch the material.	required from supplier before dispatch the material.	required from supplier before dispatch the material.
		<u>j) Inspection & Rejection</u> = If found improper the equipment may be rejected.	<u>j) Inspection & Rejection</u> = If found improper the equipment may be rejected.	<u>j) Inspection & Rejection</u> = If found improper the equipment may be rejected.	<u>j) Inspection & Rejection</u> = If found improper the equipment may be rejected.	<u>j) Inspection & Rejection</u> = If found improper the equipment may be rejected.	<u>j) Inspection & Rejection</u> = If found improper the equipment may be rejected.
		<u>k) PO signed</u> = PO should be issued from Head Office ideally by Purchase Incharge. Copy should be available at site for proper quality check.	<u>k) PO signed</u> = PO should be issued from Head Office ideally by Purchase Incharge. Copy should be available at site for proper quality check.	<u>k) PO signed</u> = PO should be issued from Head Office ideally by Purchase Incharge. Copy should be available at site for proper quality check.	<u>k) PO signed</u> = PO should be issued from Head Office ideally by Purchase Incharge. Copy should be available at site for proper quality check.	<u>k) PO signed</u> = PO should be issued from Head Office ideally by Purchase Incharge. Copy should be available at site for proper quality check.	<u>k) PO signed</u> = PO should be issued from Head Office ideally by Purchase Incharge. Copy should be available at site for proper quality check.
7	Installation & Commission/ Testing & Calibration certificate	YES	YES	YES	YES	YES	YES
8	RTO registration of Equipment/ Machinery	First RTO registration may be obtained from Head office, to avoid any VAT liability of other states.	NA	NA	First RTO registration may be obtained from Head office, to avoid any VAT liability of other states.	NA	First RTO registration may be obtained from Head office, to avoid any VAT liability of other states.
9	GPS System	GPS system would be install on TM	NA	NA	NA	NA	NA
10	Equipment	Hours &	Computer	Control	Control	Control	Hours &

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S. N.	Particulars	Transit Mixture	Batching Plant	Concrete Pump	Tower Crane	Generator	JCB - Excavator
	with Basic things	Kms meters in working condition, Proper number Plate/ identification mark, Front, Break lights in working condition with Mirrors, night radium plate/ colors, First aid, Tools & tackles	& Printer set, Control panel in working condition with lock & key, Proper identification mark, night radium colors, First aid, Tools & tackles and Guidelines/ Manual for user	panel/ Meters (Hours, Pressure etc) in working condition with lock & key, Proper identification mark, night radium colors, First aid, Tools & tackles and Guidelines/ Manual for user	panel/ Hours & Power Meters in working condition with lock & key, Proper identification mark, night radium colors, First aid, Tools & tackles and Guidelines/ Manual for user	panel/ Hours & Power Meters in working condition with lock & key, Proper identification mark, night radium colors, First aid, Tools & tackles and Guidelines/ Manual for user	Kms meters in working condition, Proper number Plate/ identification mark, Front, Break lights in working condition with Mirrors, night radium plate/ colors, First aid, Tools & tackles
II)	<u>Take Care of Owned Equipment:</u>						
11	Whether Operator/ Driver/ Maintenance team - Company Employee or hired?	a) Operator/ Driver should be company employee with proper experience to operate the equipment and having knowledge of maintenance.	a) Operator/ Driver should be company employee with proper experience to operate the equipment and having knowledge of maintenance.	a) Operator/ Driver should be company employee with proper experience to operate the equipment and having knowledge of maintenance.	a) Operator/ Driver should be company employee with proper experience to operate the equipment and having knowledge of maintenance.	a) Operator/ Driver should be company employee with proper experience to operate the equipment and having knowledge of maintenance.	a) Operator/ Driver should be company employee with proper experience to operate the equipment and having knowledge of maintenance.
		b) Maintenance team can be hired. Better is to approach to equipment supplier.	b) Maintenance team can be hired. Better is to approach to equipment supplier.	b) Maintenance team can be hired. Better is to approach to equipment supplier.	b) Maintenance team can be hired. Better is to approach to equipment supplier.	b) Maintenance team can be hired. Better is to approach to equipment supplier.	b) Maintenance team can be hired. Better is to approach to equipment supplier.
12	Operation Staff/ Team Insurance	Personal Accident/ Comprehensive insurance should be	Personal Accident/ Comprehensive insurance should be	Personal Accident/ Comprehensive insurance should be	Personal Accident/ Comprehensive insurance should be	Personal Accident/ Comprehensive insurance should be	Personal Accident/ Comprehensive insurance should be

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S. N.	Particulars	Transit Mixture	Batching Plant	Concrete Pump	Tower Crane	Generator	JCB - Excavator
		taken by company for operator/ team members and third party to avoid any major future liability.	taken by company for operator/ team members and third party to avoid any major future liability.	taken by company for operator/ team members and third party to avoid any major future liability.	taken by company for operator/ team members and third party to avoid any major future liability.	taken by company for operator/ team members and third party to avoid any major future liability.	taken by company for operator/ team members and third party to avoid any major future liability.
13	Daily Log Book/ Records Maintain	Needs to be compulsorily maintained	Needs to be compulsorily maintained	Needs to be compulsorily maintained	Needs to be compulsorily maintained	Needs to be compulsorily maintained	Needs to be compulsorily maintained
14	Fuel & Power Record	Fuel should be mentioned in log sheet/ record with received by sign.	Power consumption should be mentioned in log sheet/ record with B. Plant operator sign.	Fuel should be mentioned in log sheet/ record with received by sign.	Power consumption/ Fuel should be mentioned in log sheet/ record with received by sign.	Fuel should be mentioned in log sheet/ record with received by sign.	Fuel should be mentioned in log sheet/ record with received by sign.
15	Lock & key & Daily Records custody?	Fuel tank should be lock and key and log sheet/ records also in custody of HR/ Store.	Power supply point should be lock and key and log sheet/ records also in custody of HR/ Store.	Fuel tank should be lock and key and log sheet/ records also in custody of HR/ Store.	Power supply point/ Fuel should be lock and key and log sheet/ records also in custody of HR/ Store.	Fuel tank should be lock and key and log sheet/ records also in custody of HR/ Store.	Fuel tank should be lock and key and log sheet/ records also in custody of HR/ Store.
16	Authorization of daily records	Daily records should be maintained and signed by both side - operator and authorized person.	Daily records should be maintained and signed by both side - operator and authorized person.	Daily records should be maintained and signed by both side - operator and authorized person.	Daily records should be maintained and signed by both side - operator and authorized person.	Daily records should be maintained and signed by both side - operator and authorized person.	Daily records should be maintained and signed by both side - operator and authorized person.
17	Minimum output/ average against fuel/ power	a) Minimum concrete casting would be more than <u>12M3 per</u>	a) Minimum concrete Production would be more than <u>30M3 per</u>	a) Minimum concrete casting would be more than <u>46M3 per</u>	a) Minimum concrete casting would be more than <u>20M3 per</u>	a) Minimum power generation would be more than <u>30KVA</u>	a) Minimum excavation of area Depends on capacity of

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S. N.	Particulars	Transit Mixture	Batching Plant	Concrete Pump	Tower Crane	Generator	JCB - Excavator
	consumption	<u>Hour.</u> (Depends on batching plant setup & destination of structure)	<u>Hour.</u> (Depends on capacity of equipment)	<u>Hour.</u> (Depends on capacity of equipment)	<u>Hour.</u> (Depends on capacity of equipment)	<u>Unit per Hour.</u> (Depends on capacity of equipment)	equipment
		b) Fuel consumption per hour (Per Hour average consumption decide after monitor two days working)	b) Power consumption per hour (Per Hour average consumption decide after monitor two days working)	b) Fuel consumption per hour (Per Hour average consumption decide after monitor two days working)	b) Fuel/Power consumption per hour (Depends on nature of structure)	b) Fuel consumption per hour (Per Hour average consumption decide after monitor two days working)	b) Fuel consumption per hour (Per Hour average consumption depends on land)
18	Incentive	Incentive should be given in fix amount or percentage basis to operator. In case of equipment shall perform without any break down or archive minimum output/ average consumption of fuel. It is helpful for better performance and avoid any malfunction.	Incentive would be given in fix amount or percentage basis on monthly to operator. In case of equipment shall perform without any break down or archive minimum output/ average consumption of fuel. It is helpful for better performance and avoid any malfunction.	Incentive would be given in fix amount or percentage basis on monthly to operator. In case of equipment shall perform without any break down or archive minimum output/ average consumption of fuel. It is helpful for better performance and avoid any malfunction.	Incentive would be given in fix amount or percentage basis on monthly to operator. In case of equipment shall perform without any break down or archive minimum output/ average consumption of fuel. It is helpful for better performance and avoid any malfunction.	Incentive would be given in fix amount or percentage basis on monthly to operator. In case of equipment shall perform without any break down or archive minimum output/ average consumption of fuel. It is helpful for better performance and avoid any malfunction.	Incentive would be given in fix amount or percentage basis on monthly to operator. In case of equipment shall perform without any break down or archive minimum output/ average consumption of fuel. It is helpful for better performance and avoid any malfunction.
19	Equipment maintenance Period Chart (Free & Chargeable services)	Maintenance Schedule - Major and Minor should be affixed on the equipment itself for	Maintenance Schedule - Major and Minor should be affixed on the equipment itself for	Maintenance Schedule - Major and Minor should be affixed on the equipment itself for	Maintenance Schedule - Major and Minor should be affixed on the equipment itself for	Maintenance Schedule - Major and Minor should be affixed on the equipment itself for	Maintenance Schedule - Major and Minor should be affixed on the equipment itself for

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S. N.	Particulars	Transit Mixture	Batching Plant	Concrete Pump	Tower Crane	Generator	JCB - Excavator
		clear visibility.	clear visibility.	clear visibility.	clear visibility.	clear visibility.	clear visibility.
20	Local Tax	Take care and payment should be made on timely of local state taxes.	NA	NA	NA	NA	Take care and payment should be made on timely of local state taxes.
21	Safety rules & regulation, violence & Penalty	In case of any Violence of safety policy, rules & regulation of client or company, penalty shall passed on operator.	In case of any Violence of safety policy, rules & regulation of client or company, penalty shall passed on operator.	In case of any Violence of safety policy, rules & regulation of client or company, penalty shall passed on operator.	In case of any Violence of safety policy, rules & regulation of client or company, penalty shall passed on operator.	In case of any Violence of safety policy, rules & regulation of client or company, penalty shall passed on operator.	In case of any Violence of safety policy, rules & regulation of client or company, penalty shall passed on operator.

Appendix 4

Equipment Control Points in case of Hired

S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
1)	<u>Hired Equipment points to be checked by lessee:</u>						
1	Make, Size/ Capacity & other specification if any	<u>Example:</u> a) Make - Schwing Setter, b) Capacity - 6 M3,	<u>Example:</u> a) Make - Schwing Setter, b) CP-18 (Production Capacity - 16 M3 per hour) OR CP-30 (Production Capacity - 30 M3 per hour)	<u>Example:</u> a) Make - Schwing Setter, b) BP 350 D Portable Trailer Pump (Max. Concrete output 46 M3 per hour) with 100mtrs pipe line	<u>Example:</u> a) Make - Alpha, b) SP 453 (23.9mtr height, Weight 1500kgs) (With DG set mount on vehicle)	<u>Example:</u> a) Make - Omega, b) 65KVA Diesel Silent Type	<u>Example:</u> JCB 3DX
2	Age of equipment	Should be in running condition with life of less than 5 years	Should be in running condition with life of less than 5 years	Should be in running condition with life of less than 5 years	Should be in running condition with life of less than 5 years	Should be in running condition with life of less than 5 years	Should be in running condition with life of less than 5 years
3	Operating and Maintenance Team	Team: Qualified Operator / Driver - 1, Helper - 1 & Mechanic for Maintenance - 2	Team: Qualified Operator - 2, Labours for Cement Loading & Unloading - 5nos. & Electrician - 1, For Maintenance	Team: Qualified Operator - 1, Helper - 1 & Mechanic for Maintenance - 1	Team: Qualified Operator - 1, Helper - 2, Mechanic for Maintenance - 1 & Electrician - 1	Team: Qualified Operator - 1, & Electrician for Maintenance - 1	Team: Qualified Operator - 1, Helper - 1 & Mechanic for Maintenance - 1

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
			Operator: Mechanic - 1 & Helper - 1				
4	Whether Testing/ Calibration/ Commission certificate required from third party/ Govt. approved person/ agency?	No, But Water Pump should be in working condition with water tank	YES	Physical verification should be done for pipes (no bend/ damage or with proper nut & bolt & hole for joint/ fix with each other)	YES	Mainly to be check that Supporting base and silencer for zero vibration	YES
5	Insurance of Equipment/ Chassis/ Vehicle/ Operational team & Third party	YES	YES	YES	YES	YES	YES
6	Guidelines/ Manual for user with Equipment	YES, Optional	YES, Optional	YES, Optional	YES, Optional	YES, Optional	YES, Optional
7	Self certified photocopies of RTO documents of Equipment	YES	NA	NA	YES	NA	YES
8	GPS System	Recommendatory, However required if more than two millers at the site with wide area.	NA	NA	NA	NA	YES
9	Equipment with Basic things	Hours & Kms meters in working condition , Proper number Plate/ identification	Computer & Printer set, Control panel in working condition with lock & key,	Control panel/ Meters (Hours, Pressure etc) in working condition with lock & key,	Control panel/ Hours & Power Meters in working condition with lock & key, Proper	Control panel/ Hours & Power Meters in working condition with lock & key, Proper	Hours & Kms meters in working condition , Proper number Plate/ identification

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
		mark, Front, Break lights in working condition with Mirrors, night radium plate/ colors, First aid, Tools & tackles, Reverse Horn.	Proper identification mark, night radium colors, First aid, Tools & tackles and Guidelines/ Manual for user	Proper identification mark, night radium colors, First aid, Tools & tackles and Guidelines/ Manual for user	identification mark, night radium colors, First aid, Tools & tackles and Guidelines/ Manual for user	identification mark, night radium colors, First aid, Tools & tackles and Guidelines/ Manual for user	mark, Front, Break lights in working condition with Mirrors, night radium plate/ colors, First aid, Tools & tackles, Reverse Horn, Front Guard, Wheel Guard.
10	Minimum Expected Output per month	Needs to be decided for each and every project - Suggestible Qty - 2000 CUM	Needs to be decided for each and every project - Suggestible Qty - 2000 CUM	Needs to be decided for each and every project - Suggestible Qty - 2000 CUM	Needs to be decided for each and every project	Needs to be decided for each and every project	Needs to be decided for each and every project
II)	<u>Hired Conditions:</u>						
11	Hiring approx. amount.	Monthly Basis - Rs.1.25 Lacs (Excluding Fuel)	Monthly Basis - Rs.1.75 Lacs (CP-18) onwards (Excluding Power)	Monthly Basis - Rs.1 Lac (Excluding Fuel including operator cost)	Monthly Basis - Rs.75K (Excluding Fuel and Power) Boom Height 25 Mtrs	Monthly Basis - Rs.60K (65KVA - Excluding Fuel)	Fix Monthly Basis - Rs.80K (Excluding Fuel). May even be linked to volume excavated.
12	Minimum Working Duration in a month	Flexible 260hrs in a month (Note 3)	Flexible 260hrs in a month (Note 3)	Flexible 260hrs in a month (Note 3)	Flexible 260hrs in a month (Note 3)	26days (Note 1 & Note 2)	26days (Note 1 & Note 2)
13	Fuel & Power, Oil & Lubricants	a) Its advisable to ask	a) Power needs to be	a) Its advisable to ask	a) Power needs to be	a) Its advisable to ask	a) Its advisable to ask

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
		the supplier to quote his rate with Fuel. Oil and Lubricant should always be in supplier scope.	provided free of cost But Oil & Lubricants are in the scope of supplier	the supplier to quote his rate with Fuel. Oil and Lubricant should always be in supplier scope.	provided but if the same works on fuel then the same may be kept in supplier scope. Oil & Lubricants in scope of supplier.	the supplier to quote his rate with Fuel. Oil and Lubricant should always be in supplier scope.	the supplier to quote his rate with Fuel. Oil and Lubricant should always be in supplier scope.
		b) If fuel is in our scope then avg consumption norms may be fixed. Fuel consumption per hour as per site experience.	b) Power consumption per hour (Per Hour average consumption may be decided after monitoring for two days)	b) If fuel is in our scope then avg consumption norms may be fixed. Fuel consumption per hour as per site experience.	b) If fuel is in our scope then avg consumption norms may be fixed. However fuel consumption would change from structure to structure.	b) If fuel is in our scope then avg consumption norms may be fixed. Fuel consumption per hour as per site experience.	b) If fuel is in our scope then fuel consumption per hour would depend on land.
14	Daily Log Book/ Records	Supplier to maintain daily log book/ records with sign of both - operator and Company authorized person.	Supplier to maintain daily log book/ Production records with Sand, Aggregate, Admixture etc. Also maintain one hard copy of concrete dispatch	Supplier to maintain daily log book/ records, joint meter reading, RMC wise casting quantity duly signed by both - operator and authorized person	Supplier to maintain daily log book/ records, joint meter reading, RMC wise casting quantity duly signed by both - operator and authorized person	Supplier to maintain daily log book/ records, joint meter reading duly signed by both operator and authorized person from company side.	Supplier to maintain daily log book/ records, joint meter reading duly signed by both operator and authorized person from company side.

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
			slip with TM number, RMC grade and dispatched qty., date, time & received qty. with receiver sign	from company side.	from company side.		
15	Lock & key & Daily Records custody?	If fuel is in the scope of company, Fuel Tank Key and Records should lie with the company.	It would be in custody of company.	If fuel is in the scope of company, Fuel Tank Key and Records should lie with the company.	If fuel is in the scope of company, Fuel Tank Key and Records should lie with the company.	If fuel is in the scope of company, Fuel Tank Key and Records should lie with the company.	If fuel is in the scope of company, Fuel Tank Key and Records should lie with the company.
16	Minimum Output performance clause of equipment	Depends on batching plant setup & destination of structure. For e.g. 18 M3 casting per hour. If TM takes 20min for one trip. Then 3 trips in one hour = 6 M3 per TM x 3 trip in one hour.	Production per hour as per Plant/ Equipment capacity	46 M3 RMC casting per hour (As per Plant/ Equipment capacity)	RMC casting per hour as per Plant/ Equipment capacity and structure of height	Power generation per hour as per Plant/ Equipment capacity	Excavation per hour as per Plant/ Equipment capacity
17	Attendance	The operating team	The operating team	The operating team	The operating team	The operating team	The operating team

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
		should be available at the site during the working days. The bill shall be reduced proportionately in case of absence. (Monthly Billing Amt/ 26 * Absent Days).	should be available at the site during the working days. The bill shall be reduced proportionately in case of absence. (Monthly Billing Amt/ 26 * Absent Days).	should be available at the site during the working days. The bill shall be reduced proportionately in case of absence. (Monthly Billing Amt/ 26 * Absent Days).	should be available at the site during the working days. The bill shall be reduced proportionately in case of absence. (Monthly Billing Amt/ 26 * Absent Days).	should be available at the site during the working days. The bill shall be reduced proportionately in case of absence. (Monthly Billing Amt/ 26 * Absent Days).	should be available at the site during the working days. The bill shall be reduced proportionately in case of absence. (Monthly Billing Amt/ 26 * Absent Days).
18	Overtime clause	OT shall start after expiry of flexible hours limit in the month and shall be calculated on pro rata basis (Monthly Rate/ 260 Hours).	OT shall start after expiry of flexible hours limit in the month and shall be calculated on pro rata basis (Monthly Rate/ 260 Hours).	OT shall start after expiry of flexible hours limit in the month and shall be calculated on pro rata basis (Monthly Rate/ 260 Hours).	OT shall start after expiry of flexible hours limit in the month and shall be calculated on pro rata basis (Monthly Rate/ 260 Hours).	i) OT Should not be paid. <u>OR</u> ii) Instead of OT, it is better to fix rent in excess of regular market rent.	i) OT Should not be paid. <u>OR</u> ii) Instead of OT, it is better to fix rent in excess of regular market rent.
19	Incentive clause	Volume based and other points like - lower break down, Safety during the work etc.	Volume based and other points like - lower break down, Safety during the work etc.	Volume based and other points like - lower break down, Safety during the work etc.	Volume based and other points like - lower break down, Safety during the work etc.	Volume based and other points like - lower break down, Safety during the work etc.	Volume based and other points like - lower break down, Safety during the work etc.

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
20	Equipment maintenance/ Break down clause	Permission for maintenance on <u>any 4 half days</u> in a month or as and when it is free after discussion with site PM.	Permission for maintenance on <u>any 4 half days</u> in a month or as and when it is free after discussion with site PM.	i) Regular cleaning on daily basis after use. ii) Permission for maintenance on <u>any 4 half days</u> in a month or as and when it is free after discussion with site PM.	Permission for maintenance on <u>any 4 half days</u> in a month or as and when it is free after discussion with site PM.	Permission for maintenance on <u>any 4 half days</u> in a month or as and when it is free after discussion with site PM.	Permission for maintenance on <u>any 4 half days</u> in a month or as and when it is free after discussion with site PM.
21	Staff/ Team Accommodation & Fooding clause	Staff/ team accommodation shall be provided by us But Food shall be in your scope	Staff/ team accommodation shall be provided by us But Food shall be in your scope	Staff/ team accommodation shall be provided by us But Food shall be in your scope	Staff/ team accommodation shall be provided by us But Food shall be in your scope	Staff/ team accommodation shall be provided by us But Food shall be in your scope	Staff/ team accommodation shall be provided by us But Food shall be in your scope
22	De Hiring Notice Period	7days on both sides to avoid any dispute.	15 days on both sides to avoid any dispute.	7days on both sides to avoid any dispute.	7days on both sides to avoid any dispute.	7days on both sides to avoid any dispute.	7days on both sides to avoid any dispute.
III.)	<u>Billing & Payment:</u>						
23	Mobilization & Demobilization clause	a) <u>Mobilization = i)</u> Within 10days from date of WO (mail or hardcopy) with all required resource	a) <u>Mobilization = i)</u> Within 15 days from date of WO (mail or hardcopy) with all required resource	a) <u>Mobilization = i)</u> Within 10days from date of WO (mail or hardcopy) with all required resource	a) <u>Mobilization = i)</u> Within 15 days from date of WO (mail or hardcopy) with all required resource	a) <u>Mobilization = i)</u> Within 10days from date of WO (mail or hardcopy) with all required resource	a) <u>Mobilization = i)</u> Within 10days from date of WO (mail or hardcopy) with all required resource

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
		s. ii) One month mobilization advance to be recovered in six equal monthly installment.	s. ii) One month mobilization advance to be recovered in six equal monthly installment.	s. ii) One month mobilization advance to be recovered in six equal monthly installment.	s. ii) One month mobilization advance to be recovered in six equal monthly installment.	s. ii) One month mobilization advance to be recovered in six equal monthly installment.	s. ii) One month mobilization advance to be recovered in six equal monthly installment.
		<u>b) De Mob. Cost</u> = If Contract is more than six months than in lessor's scope.	<u>b) De Mob. Cost</u> = If Contract is more than six months than in lessor's scope.	<u>b) De Mob. Cost</u> = If Contract is more than six months than in lessor's scope.	<u>b) De Mob. Cost</u> = If Contract is more than six months than in lessor's scope.	<u>b) De Mob. Cost</u> = If Contract is more than six months than in lessor's scope.	<u>b) De Mob. Cost</u> = If Contract is more than six months than in lessor's scope.
24	Billing & Certification cycle	a) <u>Bill Submission</u> = Billing on monthly basis. to site PM within 5days of previous month with sign, stamp & inward date from company . In case of failure to get inward stamp or received sign, Accounts shall not accept the same.	a) <u>Bill Submission</u> = Billing on monthly basis. to site PM within 5days of previous month with sign, stamp & inward date from company . In case of failure to get inward stamp or received sign, Accounts shall not accept the same.	a) <u>Bill Submission</u> = Billing on monthly basis. to site PM within 5days of previous month with sign, stamp & inward date from company . In case of failure to get inward stamp or received sign, Accounts shall not accept the same.	a) <u>Bill Submission</u> = Billing on monthly basis. to site PM within 5days of previous month with sign, stamp & inward date from company . In case of failure to get inward stamp or received sign, Accounts shall not accept the same.	a) <u>Bill Submission</u> = Billing on monthly basis. to site PM within 5days of previous month with sign, stamp & inward date from company . In case of failure to get inward stamp or received sign, Accounts shall not accept the same.	a) <u>Bill Submission</u> = Billing on monthly basis. to site PM within 5days of previous month with sign, stamp & inward date from company . In case of failure to get inward stamp or received sign, Accounts shall not accept the same.
		<u>b) Bill/Supporting</u> =	<u>b) Bill/Supporting</u> =	<u>b) Bill/Supporting</u> =	<u>b) Bill/Supporting</u> =	<u>b) Bill/Supporting</u> =	<u>b) Bill/Supporting</u> =

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
		Main bill in triplicate copy with company name, address & site, WO number, Bill date, period, name & make of equipment. All statutory numbers, break up of taxes, OT with proper calculation, incentive if any. Original Log sheet (Duplicate copy must for your records).	Main bill in triplicate copy with company name, address & site, WO number, Bill date, period, name & make of equipment. All statutory numbers, break up of taxes, OT with proper calculation, incentive if any. Original Log sheet (Duplicate copy must for your records).	Main bill in triplicate copy with company name, address & site, WO number, Bill date, period, name & make of equipment. All statutory numbers, break up of taxes, OT with proper calculation, incentive if any. Original Log sheet (Duplicate copy must for your records).	Main bill in triplicate copy with company name, address & site, WO number, Bill date, period, name & make of equipment. All statutory numbers, break up of taxes, OT with proper calculation, incentive if any. Original Log sheet (Duplicate copy must for your records).	Main bill in triplicate copy with company name, address & site, WO number, Bill date, period, name & make of equipment. All statutory numbers, break up of taxes, OT with proper calculation, incentive if any. Original Log sheet (Duplicate copy must for your records).	Main bill in triplicate copy with company name, address & site, WO number, Bill date, period, name & make of equipment. All statutory numbers, break up of taxes, OT with proper calculation, incentive if any. Original Log sheet (Duplicate copy must for your records).
		c) <u>Bill Certification</u> = Bill shall be certified within a week from the date of invoice/ inward with stamp and authorized sign & name by company.	c) <u>Bill Certification</u> = Bill shall be certified within a week from the date of invoice/ inward with stamp and authorized sign & name by company.	c) <u>Bill Certification</u> = Bill shall be certified within a week from the date of invoice/ inward with stamp and authorized sign & name by company.	c) <u>Bill Certification</u> = Bill shall be certified within a week from the date of invoice/ inward with stamp and authorized sign & name by company.	c) <u>Bill Certification</u> = Bill shall be certified within a week from the date of invoice/ inward with stamp and authorized sign & name by company.	c) <u>Bill Certification</u> = Bill shall be certified within a week from the date of invoice/ inward with stamp and authorized sign & name by company.
25	Payment cycle	Payment	Payment	Payment	Payment	Payment	Payment

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
		shall be made within 20days from the date of bill certification	shall be made within 20days from date of bill certification	shall be made within 20days from date of bill certification	shall be made within 20days from date of bill certification	shall be made within 20days from date of bill certification	shall be made within 20days from date of bill certification
26	Debit/ Recovery clause in case of break down or non performance/ Any other damage	Normally at time of certification or separately if issued by any other department or client for any non-compliance.	Normally at time of certification or separately if issued by any other department or client for any non-compliance.	Normally at time of certification or separately if issued by any other department or client for any non-compliance.	Normally at time of certification or separately if issued by any other department or client for any non-compliance.	Normally at time of certification or separately if issued by any other department or client for any non-compliance.	Normally at time of certification or separately if issued by any other department or client for any non-compliance.
27	Local/ RTO tax in scope of supplier	All statutory (local/ RTO etc.) liabilities in your scope, inclusive of rate. Service tax shall be paid extra.	All statutory (local/ RTO etc.) liabilities in your scope, inclusive of rate. Service tax shall be paid extra.	All statutory (local/ RTO etc.) liabilities in your scope, inclusive of rate. Service tax shall be paid extra.	All statutory (local/ RTO etc.) liabilities in your scope, inclusive of rate. Service tax shall be paid extra.	All statutory (local/ RTO etc.) liabilities in your scope, inclusive of rate. Service tax shall be paid extra.	All statutory (local/ RTO etc.) liabilities in your scope, inclusive of rate. Service tax shall be paid extra.
28	TDS & any other Statutory deduction if any	TDS or any other statutory deductions as applicable shall be deducted	TDS or any other non compliance of statutory shall be deducted	TDS or any other non compliance of statutory shall be deducted	TDS or any other non compliance of statutory shall be deducted	TDS or any other non compliance of statutory shall be deducted	TDS or any other non compliance of statutory shall be deducted
D)	<u>Safety:</u>						
29	Clearance and data for Gate/ Entry Pass	Requirement of the	Requirement of the	Requirement of the	Requirement of the	Requirement of the	Requirement of the

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S. N.	Particulars	Mixture	Batching Plant	Concrete Pump	Mobile Tower Crane	Generator	JCB (Excavator)
		principal client may be mentioned here.	principal client may be mentioned here.	principal client may be mentioned here.	principal client may be mentioned here.	principal client may be mentioned here.	principal client may be mentioned here.
30	Safety rules & regulation, violence & Penalty	Requirement of the principal client may be mentioned here with the penal clauses, if any.	Requirement of the principal client may be mentioned here with the penal clauses, if any.	Requirement of the principal client may be mentioned here with the penal clauses, if any.	Requirement of the principal client may be mentioned here with the penal clauses, if any.	Requirement of the principal client may be mentioned here with the penal clauses, if any.	Requirement of the principal client may be mentioned here with the penal clauses, if any.
IV)	<u>Legal:</u>						
31	Clause - Child labour	Strict Compliance	Strict Compliance	Strict Compliance	Strict Compliance	Strict Compliance	Strict Compliance
32	Clause - Termination of Contract	In case of non compliance of any condition and delay in work performance, contract shall be terminated immediately without any cost.	In case of non compliance of any condition and delay in work performance, contract shall be terminated immediately without any cost.	In case of non compliance of any condition and delay in work performance, contract shall be terminated immediately without any cost.	In case of non compliance of any condition and delay in work performance, contract shall be terminated immediately without any cost.	In case of non compliance of any condition and delay in work performance, contract shall be terminated immediately without any cost.	In case of non compliance of any condition and delay in work performance, contract shall be terminated immediately without any cost.
33	Jurisdiction	Jurisdiction is Ahmedabad only	Jurisdiction is Ahmedabad only	Jurisdiction is Ahmedabad only	Jurisdiction is Ahmedabad only	Jurisdiction is Ahmedabad only	Jurisdiction is Ahmedabad only

*** Notes: -**

*1 One Month = 26days (Excluding Sundays only)

2 One Day = 10 hours (10working hours including 1hr Lunch/ Dinner)

*3 Flexible Hours = Any hours in a day or a month but not over 22hours in single day

Appendix 5

Scaffolding Materials Control Points

What is Scaffolding Material/ Pipe: - Scaffolding Material is a temporary platform, supported from ground level or Structure, on which workers stand when performing tasks at heights above the ground level. Construction jobs may require several kinds of scaffolds to permit easy working procedures. (Types of scaffolding material for example - Scaffolding MS Pipe, Cup lock, H-Frame, Coupler, Adjustable Props, Steel Culp, Plat Form /Walk Way Jali/ Plate etc.. But main challenge is how to control over volume of pipes, Joints, Props or couplers?)

S. N.	Particulars	Hired	Procurement/ Owned
		Scaffolding Pipe/ MS Joints/ Props/ Coupler	Scaffolding Pipe/ MS Joints/ Props/ Coupler
1	Quantity projection of Qty. with period for Hired & De hired OR Branch Transfer/ Procurement	Scaffolding material Quantity & month wise projection break up should be taken for hire and dehire from site project manager.	Scaffolding material Quantity & month wise break up should be taken from site project manager for Site/ Branch transfer or procurement .
2	Make, Size/ Weight of Material & other specification if any	<i>Example:</i> Scaffolding pipe = a) Make - Bhushan, b) Type - MS Black ERW c) Thickness & Length - 40mm & 6 Rmtrs, d) Weight per Pipe - 20 to 21kgs (Approx) B Class, e) Indian Standard should be followed for these specification	<i>Example:</i> Scaffolding pipe = a) Make - Bhushan, b) Type - MS Black ERW c) Thickness & Length - 40mm & 6 Rmtrs, d) Weight per Pipe - 20 to 21kgs (Approx) B Class, e) Indian Standard should be followed for these specification
3	Requirement clause in WO - Quantity & Period	Material Quantity and period should be mentioned . That is a schedule of when and how much qty is required. This is	NA

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S. N.	Particulars	Hired	Procurement/ Owned
		Scaffolding Pipe/ MS Joints/ Props/ Coupler	Scaffolding Pipe/ MS Joints/ Props/ Coupler
		required for both hire and De hire Cost.	
4	Billing conditions for hire & new procurement	Hired material billing cycle should be on monthly basis & Rate to be decided per pipe & per day.	New procurement should be on MT basis with minimum unit, each pipe should be fixed Rmtr like 6.
5	Deliver of material & Other cost	Material should be dispatched within 10days from date of WO hard copy/ mail received. All Transportation/ Loading/ Packing cost shall in scope of supplier.	Material should be dispatched within 10days from date of PO hard copy/ mail received. All Transportation/ Loading/ Packing cost shall in scope of supplier.
6	Transit Insurance & Insurance of Asset at site	All insurance cost or requirement in supplier scope.	Transit insurance in supplier scope in case of new procurement. Site material risk coverage Insurance preferable but Claims might not get easily passed for theft/ loss.
7	Security Deposit	Returnable Security deposit shall 20% of material cost	NA
8	Identification mark	Materials should have common visible mark for identification of hired asset as compared to owned assets	Material have common visible mark for identification of Company asset. Different nature of items should carry different colors
9	Inspection & Rejection condition	Pipes not matching the specification may be rejected and no rental to be paid for such cases, even is the same are not lifted by the supplier.	Pipes not matching the specification may be rejected and no rental to be paid for such cases, even is the same are not lifted by the supplier.

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S. N.	Particulars	Hired	Procurement/ Owned
		Scaffolding Pipe/ MS Joints/ Props/ Coupler	Scaffolding Pipe/ MS Joints/ Props/ Coupler
10	Preventive Action/ Control over any future short fall of scaffolding material	<u>a) Physical Verification at Time of Material Inward</u> = Stores need to physically verify the inward stock quantity with size and numbers and weigh properly and any shortfall should be communicated immediately to the suppliers both on phone and also by marking on the Delivery Challan.	<u>a) Physical Verification at Time of Material Inward</u> = Stores need to physically verify the inward stock quantity with size and numbers and weigh properly and any shortfall should be communicated immediately to the suppliers both on phone and also by marking on the Delivery Challan.
		<u>b) Especially for pipes no cut piece shall be allowed other than that specified in WO.</u>	<u>b) Especially for pipes no cut piece shall be allowed other than that specified in WO.</u>
		<u>c) Stacking = Pipe/ Adju. Props</u> - Stacking in same numbers both horizontally as well as vertically, with a height of 4ft is proper and countable. <u>Coupler</u> - To be packed in Gunny Bags with same numbers say 100 no.s each.	<u>c) Stacking = Pipe/ Adju. Props</u> - Stacking in same numbers both horizontally as well as vertically, with a height of 4ft is proper and countable. <u>Coupler</u> - To be packed in Gunny Bags with same numbers say 100 no.s each.
		<u>d) Stock records</u> = Stores to update and maintain stock/ record register with date, receiver, size, quantity and location movement.	<u>d) Stock records</u> = Stores to update and maintain stock/ record register with date, receiver, size, quantity and location movement.
		<u>e) Site Visit</u> = Store Incharge/ Site Project Manager needs to visit the site on daily basis and observe the mis usage/	<u>e) Site Visit</u> = Store Incharge/ Site Project Manager needs to visit the site on daily basis and observe the mis

Business Control, Monitoring & Internal Audit of Construction Sector

S. N.	Particulars	Hired	Procurement/ Owned
		Scaffolding Pipe/ MS Joints/ Props/ Coupler	Scaffolding Pipe/ MS Joints/ Props/ Coupler
		material lying as idle or in the excavated area. Excess/ idle material should be take back to stores.	usage/ material lying as idle or in the excavated area. Excess/ idle material should be take back to stores.
		f) Return = Material Return Schedule should be decided by the Project Manager and communicated to the supplier after proper physical counting at the time of loading. It should be physically verified properly with mention of qty in the LR. If the qty is huge it is advisable to send a company employee to ensure proper delivery at the supplier premises to avoid the dispute. Also transporter should not be given the complete payment till the material reaches its destination.	f) Return = Material Return Schedule should be decided by the Project Manager and communicated to other site after proper physical counting at the time of loading. It should be physically verified properly with mention of qty in the LR. If the qty is huge it is advisable to send a company employee to ensure proper delivery at the other site to avoid internal dispute. Also transporter should not be given the complete payment till the material reaches its destination.
		g) Physical Stock Verification = Stock to be matched with the received qty at regular intervals. Investigation needs to be carried out in case of any major shortage.	g) Physical Stock Verification = Stock to be matched with the received qty at regular intervals. Investigation needs to be carried out in case of any major shortage.
11	Scaffolding material damage	Any debit note received from the supplier on account of shortage/ damaged material should be traced to the sub-	Any debit note received from the supplier on account of shortage/ damaged material should

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S. N.	Particulars	Hired	Procurement/ Owned
		Scaffolding Pipe/ MS Joints/ Props/ Coupler	Scaffolding Pipe/ MS Joints/ Props/ Coupler
		contractor down the line by keeping proper records.	be traced to the sub-contractor down the line by keeping proper records.
12	Maintenance of Material	After every round of usage, material to be cleaned and straightened with the help of Hydraulic Machines to ensure proper life.	After every round of usage, material to be cleaned and straightened with the help of Hydraulic Machines to ensure proper life.
13	Notice Period for Dehiring	How much pre period of De Hired before One Month and Document should be signed both side whenever it shall dehired to avoid any confusion and dispute of billing/ Claims	NA

Appendix 6

Store MIS Format

ST01 – Material Movement

(Monthly)

WO No: ABC12345678

Date: 05.07.2012

SITE : XYZ, Gujarat

Period: 01.06.12 To 30.06.

S. N.	Name of Item	Material Code	UOM	Opening	Inward	Outward	Closing	Remark
A)	Fixed Asset:							
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
B)	Other than Fixed Assets:							
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								

Appendix 7

HR01 – HR MIS Format

HR01 Daily Manpower Reprot

(Daily)

SITE: XYZ, Gujarat

Report of Date: 31.01.2011

i) Summary of Daily Manpower Report:

Labour Skill wise	Total	Truck loading Silo - 1 (TLS-1)	Truck loading Silo - 2 (TLS-2)	Wagon Loading Silo (WLS)	TG Bldg.	ACC Bldg.	Remark
Helper	60	15	16	16	3	10	
Carpenter	11	5	3	3	-	-	
Fitter	11	4	4	2	-	1	
Meson	16	4	3	3	2	4	
Supervisor	5	1	1	1	1	1	
				10	-	-	
Total	103	29	27	35	6	16	

ii) Detailed report:

A) Sub Contractorwise: (Measurement)

S. N.	Name of Sub Contractor	Total	Truck loading Silo - 1 (TLS-1)	Truck loading Silo - 2 (TLS-2)	Wagon Loading Silo (WLS)	TG Bldg.	ACC Bldg.	Remark
1	Con. ABC Contractor:	28						
a	Helper	9	7	-	-	1	1	
b	Carpenter	4	4	-	-	-	-	
c	Fitter	4	4	-	-	-	-	

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d	Meson	8	4	-	-	2	2	
e	Supervisor	3	1	-	-	1	1	
2	Con. PQR Contractor:	17						
a	Helper	7	-	7	-	-	-	
b	Carpenter	3	-	3	-	-	-	
c	Fitter	3	-	3	-	-	-	
d	Meson	3	-	3	-	-	-	
e	Supervisor	1	-	1	-	-	-	
3	Con. XYZ Contractor:	20						
a	Helper	9	-	-	7	-	2	
b	Carpenter	3	-	-	3	-	-	
c	Fitter	3	-	-	2	-	1	
d	Meson	4	-	-	2	-	2	
e	Supervisor	1	-	-	1	-	-	
	Total	65	20	17	15	4	9	

B) Sub Contractorwise on Labour supply:

S. N.	Name of Sub Contractor	Total	Truck loading Silo - 1 (TLS-1)	Truck loading Silo - 2 (TLS-2)	Wagon Loading Silo (WLS)	TG Bldg.	ACC Bldg.	Remark
1	Con. GHI Contractor:	12						
a	Helper	12	8	-	-	2	2	
b	Carpenter	-	-	-	-	-	-	
c	Fitter	-	-	-	-	-	-	
d	Meson	-	-	-	-	-	-	

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2	Con. JKL Contractor:	9						
a	Helper	9	-	9	-	-	-	
b	Carpenter	-	-	-	-	-	-	
c	Fitter	-	-	-	-	-	-	
d	Meson	-	-	-	-	-	-	
3	Con. MNO Contractor:	9						
a	Helper	9	-	-	6	-	3	
b	Carpenter	-	-	-	-	-	-	
c	Fitter	-	-	-	-	-	-	
d	Meson	-	-	-	-	-	-	
4	Con. STU Contractor	5						
a	Helper	5	-	-	3	-	2	
b	Carpenter	-	-	-	-	-	-	
c	Fitter	-	-	-	-	-	-	
d	Meson	-	-	-	-	-	-	
	Total	35	8	9	9	2	7	

C) Departmental Staff

S. N.	Name of Sub Contractor	Total	Truck loading Silo - 1 (TLS-1)	Truck loading Silo - 2 (TLS-2)	Wagon Loading Silo (WLS)	TG Bldg,	ACC Bldg.	Remark
1	Dept. - Mr. Ram Kumar							
	Carpenter		1	-	-	-	-	
2	Dept. - Mr. Jaye							

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	sh Singh							
	Fitter		-	1	-	-	-	
3	Dept. - Mr.Naya n Chaudha ry							
	Meson		-	-	1	-	-	
	Total		1	1	1	-	-	

Appendix 8

Accounts MIS

ACC01A – Cash Flow Statement

Budgeted

Cash Inflow & Outflow for the Month of January, 2011:-

(Amount in Rs. Lacs)

1- 7 th	8 - 15th	15 -	22 -
Jan	Jan	21st	31st
		Jan	Jan

Particulars	Week 1	Week 2	Week 3	Week 4	Total
Inflow					
Opening Balance as at 1st Jan, 2007	28.00	40.90	42.30	72.45	28.00
Contractual Receipts	50.00	50.00	50.00	50.00	200.00
Retention/ Mobilisation Advances	5.00	5.00	5.00	5.00	20.00
Gross Collection (A)	83.00	95.90	97.30	127.45	248.00
Expenditure					
<u>Operational Expenses (B)</u>					
Sub-Contractors	0.00	0.95	0.00	0.00	0.95
Material Supplier Payments	4.00	5.00	5.00	5.00	19.00
	4.00	5.95	5.00	5.00	19.95
<u>Administrative Expenses (C)</u>					
Conveyance, Petrol & Travelling Expenses	0.60	0.60	0.60	0.60	2.40
Electricity Expenses	0.75	0.75	0.75	0.75	3.00
Communication Expenses	0.40	0.40	0.40	0.40	1.60
Repairs & Maintenance Expenses	0.35	0.35	0.35	0.35	1.40

Business Control, Monitoring & Internal Audit of Construction Sector

Other Office Expenses	0.25	0.25	0.25	0.25	1.00
Remuneration and Allowances	1.50	28.70	1.50	1.50	33.20
Selling & Promotional Expenses	1.00	1.00	1.00	1.00	4.00
Finance Expenses	0.50	0.50	0.50	0.50	2.00
	5.35	32.55	5.35	5.35	48.60
FIXED EXPENSES [D = (B + C)]	9.35	38.50	10.35	10.35	68.55
BALANCE Remaining [E = A - D]	73.65	57.40	86.95	117.10	207.45
Capital Expenditures [F]	14.50	14.50	14.50	13.50	57.00
Repayment of Vehicle Loans	2.00	2.00	2.00	1.00	7.00
Equipments & Other Fixed Assets	5.00	5.00	5.00	5.00	20.00
Investments	7.50	7.50	7.50	7.50	30.00
Statutory Dues [G]	18.25	0.60	0.00	15.00	33.85
Service Tax	5.00	0.00	0.00	15.00	20.00
TDS	12.00	0.00	0.00	0.00	12.00
Entertainment Tax	1.25	0.00	0.00	0.00	1.25
Provident Fund & ESI & Professional Tax	0.00	0.60	0.00	0.00	0.60
Residual Head [H]	0.00	0.00	0.00	0.00	0.00
Other Expenditure [I = F+G+H]	32.75	15.10	14.50	28.50	90.85
CLOSING BALANCE [E - K]	40.90	42.30	72.45	88.60	88.60

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Actual

Cash Inflow & Outflow for the Month of January, 2011:

Amount in Rs. Lacs

	1- 7 th Jan	8 - 15th Jan	15 - 21st Jan	22 - 31st Jan	
Particulars	Week 1	Week 2	Week 3	Week 4	Total
Inflow					
Opening Balance as at 1st Jan, 2007	28.00	28.00	28.00	28.00	28.00
Contractual Receipts	0.00	0.00	0.00	0.00	0.00
Retention/ Mobilisation Advances	0.00	0.00	0.00	0.00	0.00
Gross Collection (A)	28.00	28.00	28.00	28.00	28.00
Expenditure					
<u>Operational Expenses (B)</u>					
Sub-Contractors	0.00	0.00	0.00	0.00	0.00
Material Supplier Payments	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00
<u>Administrative Expenses (C)</u>					
Conveyance, Petrol & Travelling Expenses	0.00	0.00	0.00	0.00	0.00
Electricity Expenses	0.00	0.00	0.00	0.00	0.00
Communication Expenses	0.00	0.00	0.00	0.00	0.00
Repairs & Maintenance Expenses	0.00	0.00	0.00	0.00	0.00
Other Office Expenses	0.00	0.00	0.00	0.00	0.00
Remuneration and Allowances	0.00	0.00	0.00	0.00	0.00
Selling & Promotional Expenses	0.00	0.00	0.00	0.00	0.00
Finance Expenses	0.00	0.00	0.00	0.00	0.00

Business Control, Monitoring & Internal Audit of Construction Sector

	0.00	0.00	0.00	0.00	0.00
FIXED EXPENSES [D = (B + C)]	0.00	0.00	0.00	0.00	0.00
BALANCE Remaining [E = A - D]	28.00	28.00	28.00	28.00	56.00
Capital Expenditures [F]	0.00	0.00	0.00	0.00	0.00
Repayment of Vehicle Loans	0.00	0.00	0.00	0.00	0.00
Equipments & Other Fixed Assets	0.00	0.00	0.00	0.00	0.00
Investments	0.00	0.00	0.00	0.00	0.00
Statutory Dues [G]	0.00	0.00	0.00	0.00	0.00
Service Tax	0.00	0.00	0.00	0.00	0.00
TDS	0.00	0.00	0.00	0.00	0.00
Entertainment Tax	0.00	0.00	0.00	0.00	0.00
Provident Fund & ESI & Professional Tax	0.00	0.00	0.00	0.00	0.00
Residual Head [H]	0.00	0.00	0.00	0.00	0.00
Other Expenditure [I = F+G+H]	0.00	0.00	0.00	0.00	0.00
CLOSING BALANCE [E - K]	28.00	28.00	28.00	28.00	28.00

I-16

**TECHNICAL GUIDE ON
INTERNAL AUDIT OF
TEXTILE INDUSTRY**

Foreword

The Indian Textile Industry is one of the leading textile industries in the world. It is a knowledge based research oriented industry and has been slowly but steadily gaining ground due to different reasons, such as, functional requirement, health and safety; cost effectiveness; durability; high strength; light weight; versatility; customization; user friendliness; eco friendliness; logistical convenience, etc.

For addressing these issues, the efforts to integrate numerous compliances and risk management requirements can be challenging for organizations operating in the textile industry. Internal auditor helps the organizations to address significant challenges and risks it faces. This surely demands that internal auditors understand the basic concepts and peculiarities of the textile industry and brace them up to newer challenges.

I am happy that the Internal Audit Standards Board has brought out this Technical Guide on Internal Audit of Textile Industry. This Technical Guide will provide the readers a crisp insight into various technicalities arising in the operations of this industry and covers the relevant issues which the internal auditors must be aware of.

I congratulate CA. Rajkumar S. Adukia, Chairman, Internal Audit Standards Board and the members of the Board on issuance of this Technical Guide. This Technical Guide comprehensively deals with the peculiar aspects of textile industry and provides a step-wise approach for internal audit.

I am sure that this Technical Guide will assist the members and others in efficiently discharging their responsibilities.

September 20, 2012
New Delhi

CA. Jaydeep Narendra Shah
President, ICAI

Preface

India's strong performance and growth in the textile sector is aided by several key advantages that the country enjoys, in terms of easy availability of labour and material, buoyant and large market demand, presence of supporting industries and supporting policy initiatives from the government. It has a unique position as a self-reliant industry, from the production of raw materials to the delivery of finished products, with substantial value-addition at each stage of processing; it is a major contribution to the country's economy. The industry is composed of handlooms, powerlooms and mills. The textile industry, being one of the most significant sectors in the Indian economy, has been a key focus area for the Government of India. A number of policies have been put in place to make the industry more competitive.

The textile industry in India has gone through significant changes in anticipation of increased international competition. Considering this, the Internal Audit Standards Board is issuing this publication "Technical Guide on Internal Audit of Textile Industry" to give an overview of the main activities of the textile industries, the way they work and a perspective from an internal audit viewpoint. This Guide has been divided into various chapters that provide guidance on structure, history, regulatory framework, SWOT analysis of the industry. This Guide, inter alia, provides guidance on aspects involved in various stages of textile industry, such as, spinning, weaving, apparels and also contains internal controls checklist for various processes. This Guide also describes risks associated with textiles industry and issues relating to cost ascertainment. This Guide also contains illustrative checklist for internal audit of major areas of textile industry.

At this juncture, I am grateful to CA. Harsha Mangtani for sharing her experience and knowledge with us and preparing the draft of the Technical Guide and CA. Guru Prasad M for reviewing the draft.

I also wish to thank CA. Jaydeep N. Shah, President, ICAI and CA. Subodh Kumar Agrawal, Vice President, ICAI for their continuous support and encouragement to the initiatives of the Board. I must also thank our colleagues from the Council at the Internal Audit Standards Board, viz., CA. Rajendra Kumar P., CA. Amarjit Chopra, CA. Shiwaji B. Zaware, CA. Ravi Holani, CA. Anuj Goyal, CA. Nilesh S. Vikamsey, CA. Atul C. Bheda, CA. Charanjot Singh Nanda, CA. Pankaj Tyagee, CA. G. Ramaswamy, CA. J. Venkateswarlu, CA. Abhijit Bandyopadhyay, CA. S.

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Santhanakrishnan, Shri Prithvi Haldea, Smt. Usha Narayanan, Shri Gautam Guha, Ms. Revathi Bedi, Shri Manoj Kumar ,Shri Sidharth Birla for their vision and support. I also wish to place on record my gratitude for the co-opted members on the Board viz., CA. Porus Doctor, CA. Masani Hormuzd Bhadur, CA. Ghia Tarun Jamnadas, CA. Deepjee A Singhal, CA. Nitin Alshi, CA. Narendra Aneja and CA. Guru Prasad M for their invaluable guidance and also their dedication and support to various initiatives of the Board. I also wish to express my thanks to CA. Jyoti Singh, Secretary, Internal Audit Standards Board and CA. Arti Bansal, Sr. Executive Officer for giving final shape to the Guide.

I firmly believe that this publication would serve as basic guide for the members and other readers interested in the subject.

September 20, 2012
Mumbai

CA. Rajkumar S. Adukia
Chairman
Internal Audit Standards Board

Glossary

ABRASION MARK

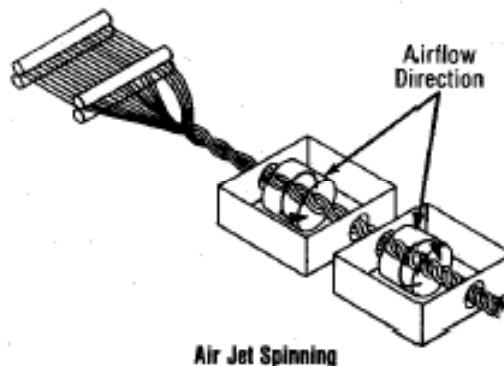
An area where a fabric has been damaged by friction.

ACRYLIC FIBER

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of acrylonitrile units $[-CH_2-CH(CN)-]$ (FTC definition). Acrylic fibers are produced by two basic methods of spinning (extrusion), dry and wet. In the dry spinning method, material to be spun is dissolved in a solvent. After extrusion through the spinneret, the solvent is evaporated, producing continuous filaments which later may be cut into staple, if desired. In wet spinning, the spinning solution is extruded into a liquid coagulating bath to form filaments, which are drawn, dried, and processed.

AIR JET SPINNING

A spinning system in which yarn is made by wrapping fibers around a core stream of fibers with compressed air. In this process, the fibers are drafted to appropriate sliver size, then fed to the air jet chambers where they are twisted, first in one direction, then in the reverse direction in a second chamber. They are stabilized after each twisting operation.



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BALE

A bag, sack, square or oblong box, or package into which silk, staple fibers, or tow are compressed. The common shipping and storage package for these fibers.

BALL WARP

Parallel threads in the form of a twistless rope wound into a large ball. When wound mechanically with quick traverse a ball warp may be made in the form of a large cylindrical package.

BAR CODE

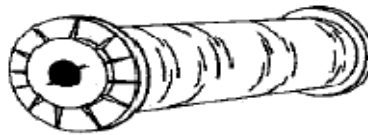
Adjacent stripes of varying width used to represent alpha-numeric characters. These permit rapid reading by means of electronic scanners.



Bar Code

BEAM

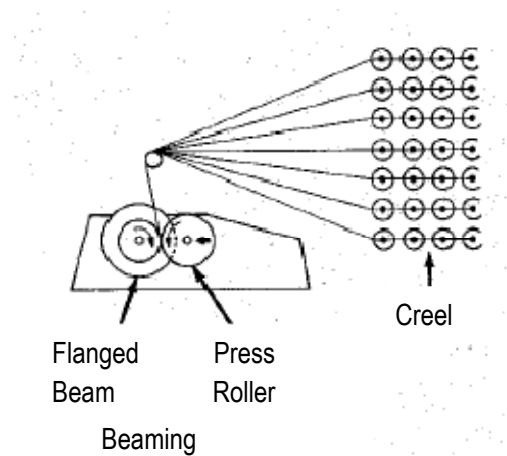
A cylinder of wood or metal, usually with a circular flange on each end, on which warp yarns are wound for slashing, weaving, and warp knitting.



Beam

BEAMING

The operation of winding warp yarns onto a beam usually in preparation for slashing, weaving, or warp knitting. It is also called warping.



BLEACHING

Any of several processes to remove the natural and artificial impurities in fabrics to obtain clear whites for finished fabric or in preparation for dyeing and finishing.

BLEND

- (i) A yarn obtained when two or more staple fibers are combined in a textile process for producing spun yarns (e.g., at opening, carding, or drawing).
- (ii) A fabric that contains a blended yarn (of the same fiber content) in the warp and filling.

BOBBIN

A cylindrical or slightly tapered barrel, with or without flanges, upon which yarn or thread is wound for holding slubbings, rovings, or yarns.

CALENDER

A machine used in finishing to impart a variety of surface effects to fabrics. A calendar, essentially, consists of two or more heavy rollers, sometimes heated, through which the fabric passes under heavy pressure.

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Normal Fabric



Calendered Fabric
Effect of Calendering

CAN	A cylindrical container, about 3 feet high and 10 to 12 inches in diameter, that is used to collect sliver delivered by a card, drawing frame, etc.
CARD	A machine used in the manufacture of staple yards. It's functions are to separate, align, and deliver the fibers in a sliver form and to remove impurities. The machine consists of a series of rolls, the surfaces of which are covered with many projecting wired or metal teeth. Short staple systems employ flat strips covered with card clothing rather than small rolls.
CARDED YARN	A cotton yarn that has been carded but not combed. Carded yarns contain a wider range of fiber lengths and, as a result, are not as uniform or as strong as combed yarns. They are considerably cheaper and are used in medium and course counts.
CARDING	A process in the manufacture of spun yarns whereby the staple is opened, cleaned, aligned, and formed into a continuous, untwisted strand called a sliver.
CHAIN BINDERS	Yarns running in the warp direction on the back of a woven carpet which hold construction yarns together.
CHEESE	A cylindrical package of yarn wound on a flangeless tube.

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CHEMICAL FINISHING	Processes in which additives are applied to change the aesthetic and functional properties of a material. Examples are the application of antioxidants, flame-retardant, wetting agents, and stain and water repellents.
CHIFFON	A plain weave, lightweight, sheer, transparent fabric made from fine, highly twisted yarns. It is usually a square fabric, i.e., having approximately the same number of ends and picks and the same count in both warp and filling.
CHROMATOGRAPHY	The generic name of a group of processes for separating and analyzing mixtures of chemical compounds. The separation depends on the redistribution of molecules of the mixture between phases, one of which is thin, often reaching molecular dimensions. For this reason, molecular size and shape are important in the separation, and extremely subtle separations are possible.
CLOTH	A generic term embracing all textile fabrics and felts. Cloth may be formed of any textile fiber, wire, or other material, and it includes any pliant fabric woven, knit, felted, needled, sewn, or otherwise formed.
COARSE THREAD	A yarn larger in diameter than other yarns being used in the fabric.
COATED FABRIC	A fabric to which a substance such as lacquer, plastic, resin, rubber, or varnish has been applied in firmly adhering layers to provide certain properties, such as water impermeability.
COATING	The application of a semi-liquid material such as, rubber, polyvinyl chloride, or polyurethane to one or both sides of a textile material. Once the coating has been dried (and cured, if necessary), it forms a bond with the fabric.
COMBED SLIVER	A continuous band of untwisted fiber, relatively

free of short fibers and trash, produced by combing card sliver.

COMBED YARN

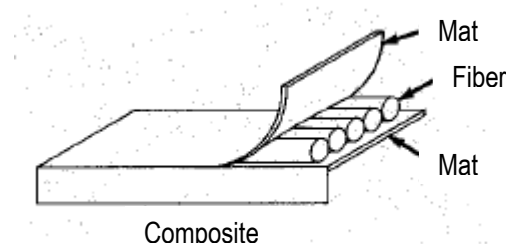
A yarn produced from combed sliver.

COMBING

A step subsequent to carding in cotton and worsted system processing which straightens the fibers and extracts neps, foreign matter, short fibers and other impurities. Combing produces a stronger, more even, more compact, finer, smoother yarn.

COMPOSITE

(i) An article or substance of two or more constituents, generally, with reinforcing elements dispersed in a matrix or continuous phase. (ii) Hard or soft constructions in which the fibers themselves are consolidated to form structures rather than being formed into yarns. Rigidity of these constructions is controlled by the density, the modulus of the load-bearing fibers, and the fraction of fusible fibers. Strength is controlled by adhesion and shear-yield strength of the matrix unless fibers are bonded in a load-transferring matrix. (iii) A structure made by laminating a non-woven fabric with another non-woven, with other materials, or by impregnating a non-woven fabric with resins.



COMPOSITE FIBERS

Fibers composed of two or more polymer types in a sheath-core or side-by-side (bilateral) relation.

CONDITIONING

A process of allowing textile materials (staple, tow, yarns, and fabrics) to reach hygroscopic

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equilibrium with the surrounding atmosphere. Materials may be conditioned in a standard atmosphere (65%RH,70°F) for testing purposes or in arbitrary conditions existing in manufacturing or processing areas.

CONE

A conical package of yarn, usually wound on a disposable paper core.

CONVERTED FABRIC

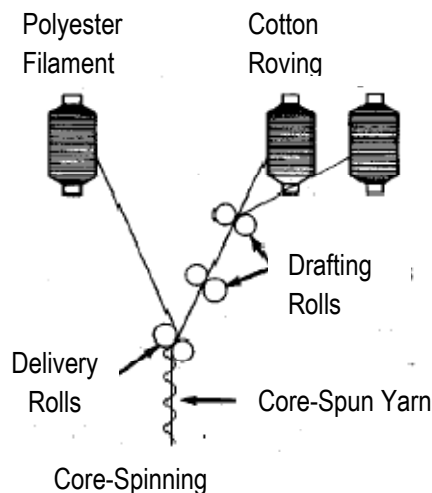
A finished fabric as distinguished from greige fabric.

CONVERTER

An individual or organization which buys greige fabrics and sells them as a finished product to cutters, wholesalers, retailers, and others. The converter arranges for the finishing of the fabric, namely bleaching, mercerizing, dyeing, printing, etc., to the buyers' specifications.

CORE SPINNING

The process of making a corespun yarn. It consists of feeding the core yarn (an elastomeric filament yarn, a regular filament yarn, a textured yarn, or a previously spun yarn) into the front delivery roll of the spinning frame and of covering the core yarn with a sheath of fibers during the spinning operation.



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CORE-SPUN YARN	A yarn made by twisting fibers around a filament or a previously spun yarn, thus concealing the core.
COTTON COUNT	The yarn numbering system based on length and weight originally used for cotton yarns and now employed for most staple yarns spun on the cotton, or short-staple, system. It is based on a unit length of 840 yards, and the count of the yarn is equal to the number of 840 yard skeins required to weigh 1 pound. Under this system, the higher the number, the finer the yarn.
COTTON FIBER	A unicellular, natural fiber composed of almost pure cellulose. As taken from plants, the fiber is found in lengths of 3/8 to 2 inches. For marketing, the fibers are graded and classified for length, strength, and color. Core yarns are used in sewing thread, blankets, and socks and also to obtain novelty effects in fabrics.
COUNT	(i) A numerical designation of yarn size indicating the relationship of length to weight. (ii) The number of warp yarns (ends) and filling yarns (picks) per inch in a woven fabric, or the number of wales and courses per inch in a knit fabric. For example, a fabric count of 68 x 52 indicates 68 ends per inch in the warp and 52 picks per inch in the filling.
COURSE	The row of loops or stitches running across a knit fabric, corresponding to the filling in woven fabrics.
COUNT	The number given to a yarn of any material, usually indicating the number of hanks per pound of that yarn. May also refer to the fineness to which a fleece may be spun.
COTTON COUNT	is another measure of linear density. It is the amount of skein material measured in hanks (840 yards) needed to create one pound. Under this system, the higher the number, the finer the

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	yarn. In the United States a cotton count between one and 20 are referred to as coarse counts. A regular single knit T-Shirt can be between 20 and 40 count, fine bed sheets are usually in the range of 40 to 80 count.
DEFECTS	A general term that refers to some flaw in a textile product that detracts from either performance or appearance properties.
DEGRADATION	The loss of desirable physical properties by a textile material as a result of some process or physical/ chemical phenomenon.
DENIM	A well-known basic cotton or blended fabric in a right- or left-hand woven twill. Generally, the warp is dyed blue with a weft. A firm 2 x 1 or 3 x 1 twill-weave fabric, often having a whitish tinge, obtained by using white filling yarns with colored warp yarns. Heavier weight denims, usually blue or brown, are used for dungarees, work clothes, and men's and women's sportswear. Lighter weight denims with softer finish are made in a variety of colors and patterns and are used for sportswear and draperies.
DENSITY	The mass per unit volume (usually expressed as grams per cubic centimeter).
DENT	On a loom, the space between the wires of a reed.
DIP	<ul style="list-style-type: none">(i) Immersion of a textile material in some processing liquid. The term is usually used in connection with a padding or slashing process.(ii) The rubber compound with which tire cords and other in-rubber textiles are treated to give improved adhesion to rubber.
DISPERSION	<ul style="list-style-type: none">(i) A system consisting of finely divided particles and the medium in which they are distributed.

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- (ii) Separation of light into colors by diffraction or refraction.
- (iii) A qualitative estimation of the separation and uniform distribution of fibers in the liquid during the production of a wet-formed non-woven fabric.

DOFF

A set of full bobbins produced by one machine (a roving frame, a spinning frame, or a manufactured filament-yarn extrusion machine).

DOFFER

- (i) The last or delivery cylinder of the card from which the sheet of fibers is removed by the doffer comb.
- (ii) An operator who removes full bobbins, spools, containers, or other packages from a machine and replaces them with empty ones.

DOFFER COMB

A reciprocating comb, the teeth of which oscillate close to the card clothing of the doffer to strip the web of fibers from the card.

DOFFING

The operation of removing full packages, bobbins, spools, roving cans, caps, etc., from a machine and replacing them with empty ones.

DOUBLE END

Two ends woven as one in a fabric. A double end may be intentional for fabric styling, or accidental, in which case a fabric defect results.

DOUBLING

- (i) A process for combining several strands of sliver, roving, or yarn in yarn manufacturing.
- (ii) The process of twisting together two or more singles or plied yarns, i.e., plying.
- (iii) A British term for twisting.
- (iv) The term doubling is sometimes used in a sense opposite to singling. This is unintentional plying.
- (v) A yarn, considerably heavier than normal,

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produced by a broken end becoming attached to and twisting into another end.

DOWNGRADE

In quality control, the lowering of the grade and/or value of a product due to the presence of defects.

DOWNTWISTER

A cap, ring, or flyer twisting frame.

DRAFT

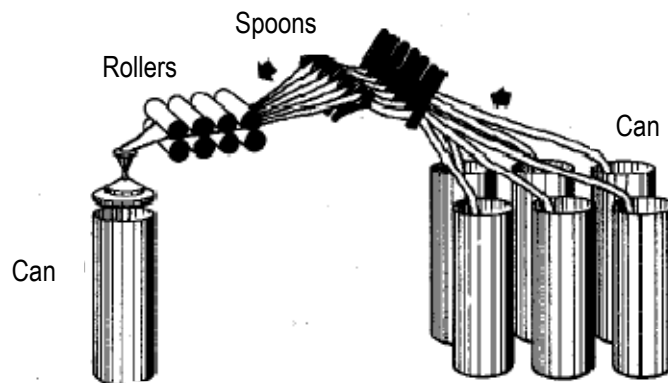
In weaving, a pattern or plan for drawing-in.

DRAW-FRAME BLENDS

Blends of fibers made at the draw frame by feeding in ends of appropriate card sliver. This method is used when blend uniformity is not a critical factor.

DRAWING

- (i) The process of attenuating or increasing the length per unit weight of laps, slivers, slubbings, or rovings.
- (ii) The hot or cold stretching of continuous filament yarn or tow to align and arrange the crystalline structure of the molecules to achieve improved tensile properties.



Courtesy of Bibb Manufacturing Company
Drawing Silver

DRY CLEANING

Removing dirt and stains from fabrics or garments by processing in organic solvents (chlorinated hydrocarbons or mineral spirits).

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DYEING	A process of coloring fibers, yarns, or fabrics with either natural or synthetic dyes.
DYES	Substances that add color to textiles. They are incorporated into the fiber by chemical reaction, absorption, or dispersion. Dyes differ in their resistance to sunlight, perspiration, washing, gas, alkalies, and other agents; their affinity for different fibers; their reaction to cleaning agents and methods; and their solubility and method of application.
EMBROIDERY	Ornamental designs worked on a fabric with threads. Embroidery may be done either by hand or by machine.
END	(i) An individual warp yarn. A warp is composed of a number of ends. (ii) An individual sliver, slubbing, roving, yarn, thread, or cord. (iii) A short length or remnant of fabric.
ENDS PER INCH (or E.P.I.)	is the number of warp threads per inch of woven fabric. In general, the higher the ends per inch, the finer the fabric is.
ENERGY ABSORPTION	The energy required to break or elongate a fiber to a certain point.
ENTERING	The process of threading each warp yarn on a loom beam through a separate drop wire, heddle, and reed space in preparation for weaving. This process may be done by hand or by a semi-automatic machine.
EXTRACTION	Removal of one substance from another, often accomplished by means of a solvent.
FABRIC	A planar textile structure produced by interlacing yarns, fibers, or filaments.
FIBER	A unit of matter, either natural or manufactured, that forms the basic element of fabrics and other textile structures. A fiber is characterized by

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having a length of at least 100 times its diameter or width. The term refers to units that can be spun into a yarn or made into a fabric by various methods including weaving, knitting, braiding, felting, and twisting. The essential requirements for fibers to be spun into yarn include a length of at least 5 millimeters, flexibility, cohesiveness, and sufficient strength. Other important properties include elasticity, fineness, uniformity, durability, and luster.

FILAMENT

A fiber of an indefinite or extreme length such as found naturally in silk. Manufactured fibers are extruded into filaments that are converted into filament yarn, staple, or tow.

FILAMENT YARN

A yarn composed of continuous filaments assembled with or without twist.

FINISHING

All the processes through which fabric is passed after bleaching, dyeing, or printing in preparation for the market or use. Finishing includes such operations as heat-setting, napping, embossing, pressing, calendering, and the application of chemicals that change the character of the fabric. The term finishing is also sometimes used to refer collectively to all processing operations above, including bleaching, dyeing, printing, etc.

FLAME RESISTANT

A term used to describe a material that burns slowly or is self-extinguishing after removal of an external source of ignition. A fabric or yarn can be flame resistance because of the innate properties of the fiber, the twist level of the yarn, the fabric construction, or the presence of flame retardants, or because of a combination of these factors.

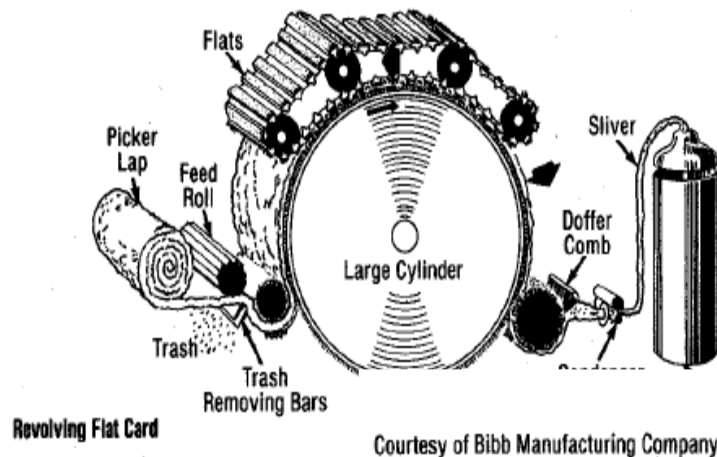
FLAT

In carding, one of the parts forming an endless chain that partially surrounds the upper portion of the cylinder and gives the name to a revolving flat card. Flats are made of cast iron, T-shaped in section, about 1 inch wide, and as long as the

width of the cylinder. One side of the flat is nearly covered with fine card clothing, and the flats are set close to the teeth of the cylinder so as to work point against point. A chain of flats contains approximately 110 flats and operates at a surface speed of about 3 inches per minute.

FLAT CARD

The type of card used for cotton fibers and for cotton-system processing. It is named for the flat wire brushes called flats that are assembled on an endless chain that partially surrounds the main cylinder. The staple is worked between the flats and cylinder, transferred to a doffer roll, and peeled off as a web that is condensed into a sliver.



FLY

The short, waste fibers that are released into the air in textile processing operations such as, picking, carding, spinning, and weaving.

GAUGE

- (i) A generic term for various measurement instruments such as pressure or thickness gauges.
- (ii) The number of needles per given distance in a knitting machine.

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- (iii) The thickness of the knitting needle in the shank and the hook.
- (iv) The number of wales per inch in a knit fabric.
- (v) On spinning or twisting frames, the distance from the center of one spindle to the center of the next spindle in the same row.

GREIGE FABRIC

An unfinished fabric just off the loom or knitting machine. The woven fabric may be dyed later after weaving, as in piece dyed fabrics.

HANK

- (i) A skein of yarn.
- (ii) A standard length of slubbing, roving, or yarn. The length is specified by the yarn numbering system in use; e.g., cotton hanks have a length of 840 yards.
- (iii) A term applied to slubbing or roving that indicates the yarn number (count); e.g., a 1.5 hank roving.

HARDNESS

- (i) When used in reference to water, hardness is the total parts per million (ppm) of calcium and CaCO_3 plus the magnesium expressed as equivalent CaCO_3 [ppm hardness (as CaCO_3) = (ppm Ca x 2.497 + ppm Mg x 4.116)].
- (ii) Used in reference to pulp to denote the degree of delignification.

HOLES (TOW)

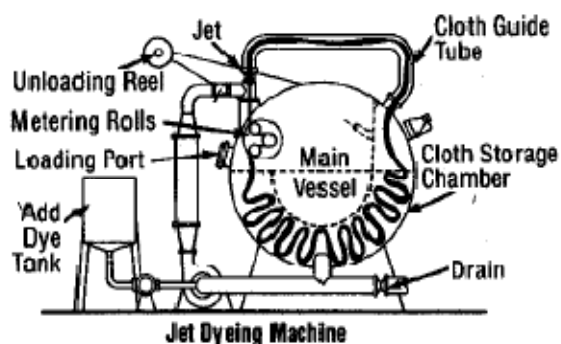
In tow opening processes, partial or complete filament breakage within a confined spread of tow, usually circular or oval in shape. Not to be confused with splitting or partial crimp deregistration, which are linear.

INDIGO

Originally, a natural blue vat dye extracted from plants, especially the *Indigofera tinctoria* plant. Most indigo dyes today are synthetic. They are frequently used on dungarees and denims.

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INSPECTION	The process of examining textiles for defects at any stage of manufacturing and finishing.
JACKET	<ul style="list-style-type: none">(i) A woven or felted tubular sleeve for covering and shrinking on a machine roll.(ii) A short coat.(iii) In polymer manufacture, an external shell around a reaction vessel. For example, jacketed vessels are used when heat-transfer medium is circulated around the vessel.
JACQUARD	A system of weaving that utilizes a highly versatile pattern mechanism to permit the production of large, intricate designs. The weave pattern is achieved by a series of punched cards. Each card perforation controls the action of one warp thread for the passage of one pick. The machine may carry a large number of cards, depending upon the design, because there is a separate card for each pick in the pattern. Jacquard weaving is used for tapestry, brocade, damask, brocatelle, figured necktie and dress fabrics, and some floor coverings. A similar device is used for the production of figured patterns on some knit goods.
JEAN	Cotton twill fabric, similar to denim, but lighter and finer, in a 2/1 weave for sportswear and linings.
JET	A device used to bulk yarns by introducing curls, coils, and loops that are formed by the action of a high velocity stream, usually of air or steam.
JET DYEING MACHINE	A high-temperature piece dyeing machine that circulates the dye liquor through a Venturi jet, thus imparting a driving force to move the fabric. The fabric, in rope form, is sewn together to form a loop.

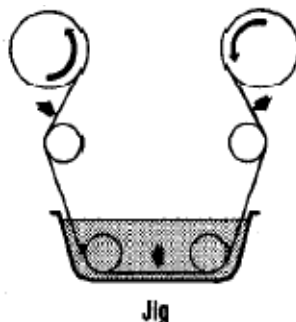


JET LOOM

A shuttleless loom that employs a jet of water or air to carry the filling yarn through the shed.

JIG

A machine in which fabric in open width-form is transferred repeatedly from one roller to another, passing each time through a bath of relatively small volume. Jigs are used for scouring, dyeing, bleaching, and finishing.



JUTE

A bast fiber used for sacking, burlap, and twine as a backing material for tufted carpets.

KAPOK

Short, lightweight cotton-like fibers from the seed pod of trees of the family *Bombacaceae*. A very brittle fiber, it is generally not spun. It is used for stuffing cushions, mattresses, etc., and for life jackets because of its buoyancy and moisture resistance.

KHAKI

- (i) A light yellowish brown.
- (ii) A khaki-colored cloth of cotton, wool, or combinations of these fibers with

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manufactured fibers used primarily in military uniforms and work-clothes.

KNITTING

A method of constructing fabric by interlocking series of loops of one or more yarns.

LAP

A continuous, considerably compressed sheet of fibers that is rolled under pressure into a cylindrical package, usually weighing between 40 and 50 pounds. The lap is used to supply the card.

LAPPING

A term describing the movement of yarn guides between needles, at right angles to the needle bar, or laterally in relation to the needle bar, or laterally in relation to the needle bar during warp knitting.

LEA

- (i) One-seventh of an 840-yard cotton hank, i.e., 120 yards.
- (ii) A standard skein with 80 revolutions of 1.5 yards each (total length of 120 yards). It is used for strength tests.
- (iii) A unit of measure, 300 yards, used to determine the yarn number of linen yarn. The number of leas in one pound is the yarn number.

LINEN

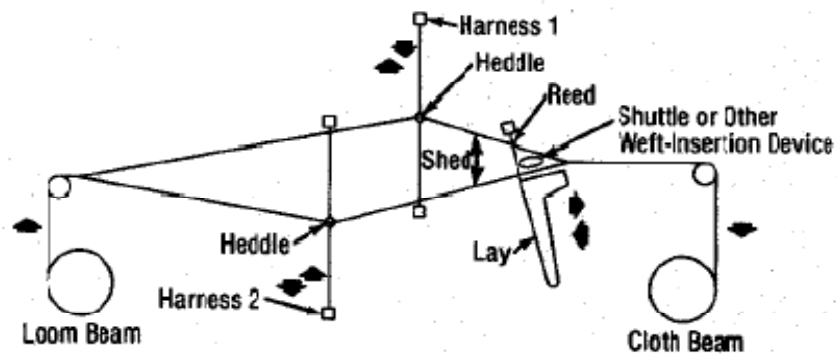
Cellulosic fibers derived from the stem of the flax plant or a fabric made from these fibers. Linen fibers are much stronger and more lustrous than cotton; they yield cool, absorbent fabrics that wrinkle easily. Fabrics with linen-like texture and coolness but with good wrinkle resistance can be produced from manufactured fibers and blends.

LOOM

A machine for weaving fabric by interlacing a series of vertical, parallel threads (the warp) with a series of horizontal, parallel threads (the filling). The warp yarns from a beam pass through the heddles and reed, and the filling is shot through the "shed" of warp threads by means of a shuttle or other device and is settled

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in place by the reed and lay. The woven fabric is then wound on a cloth beam. The primary distinction between different types of looms is the manner of filling insertion. The principal elements of any type of loom are the shedding, picking, and beating-up devices. In shedding, a path is formed for the filling by raising some warp threads while others are left down. Picking consists essentially of projecting the filling yarn from one side of the loom to the other. Beating-up forces the pick, that has just been left in the shed, up to the fell of the fabric. This is accomplished by the reed, which is brought forward with some force by the lay.



Elements of the Loom

LOOM-FINISHED	A term describing fabric that is sold in the condition in which it comes from the loom.
LOOM FLY	Waste fibers that are inadvertently woven into a fabric.
LOT	A unit of production or a group of other units or packages that is taken for sampling or statistical examination, having one or more common properties and being readily separable from other similar units.
LUBRICANT	An oil or emulsion finish applied to fibers to prevent damage during textile processing or to knitting yarns to make them more pliable.

**MANUFACTURED
(MAN-MADE) FIBER**

A class name for various genera of fibers (including filaments) produced from fiber-forming substances which may be:

- (i) polymers synthesized from chemical compounds, e.g., acrylic, nylon, polyester, polyethylene, polyurethane, and polyvinyl fibers;
- (ii) modified or transformed natural polymers, e.g., alginic and cellulose-based fibers such as acetates and rayons; and
- (iii) minerals, e.g., glasses. The term manufactured usually refers to all chemically produced fibers to distinguish them from the truly natural fibers such as, cotton, wool, silk, flax, etc.

MENDING

A process in woven fabric manufacture in which weaving imperfections, tears, broken yarns, and similar defects are repaired after weaving; especially on woolen and worsted fabrics to prepare them for dyeing, finishing, or other processing.

MERCERIZATION

A treatment of cotton yarn or fabric to increase its luster and affinity for dyes. The material is immersed under tension in a cold sodium hydroxide (caustic soda) solution in warp or skein form or in the piece, and is later neutralized in acid. The process causes a permanent swelling of the fiber and thus increases its luster.

MIXED END or FILLING

Warp or filling yarn differing from that normally used in the fabric, e.g., yarn with the incorrect twist or number of plies, yarn of the wrong color, or yarn from the wrong lot.

**MOISTURE-FREE
WEIGHT**

- (i) The constant weight of a specimen obtained by drying at a temperature of 105°C in a current of desiccated air.
- (ii). The weight of a dry substance calculated

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from an independent determination of moisture content (e.g., by distillation with an immiscible solvent or by titration with Fischer reagent).

**MOISTURE
PROPERTIES**

All fibers when exposed to the atmosphere pick up some moisture; the quantity varies with the fiber type, temperature, and relative humidity. Measurements are, generally, made at standard conditions, which are fixed at 65% RH and 70°F. Moisture content of a fiber or yarn is usually expressed in terms of percentage regain after partial drying.

MOISTURE REGAIN

The percentage of moisture in a textile material brought into equilibrium with a standard atmosphere after partial drying, calculated as a percentage of the moisture-free weight. (Also see STANDARD MOISTURE REGAIN.)

NAP

A downy surface given to a cloth when part of the fiber is raised from the basic structure.

NAPPING

A finishing process that raises the surface fibers of a fabric by means of passage over rapidly revolving cylinders covered with metal points or teasel burrs. Outing, flannel, and wool broadcloth derive their downy appearance from this finishing process. Napping is also used for certain knit goods, blankets, and other fabrics with a raised surface.

NATURAL FIBER

A class name for various genera of fibers (including filaments) of:

- (i) animal (i.e., silk and wool);
- (ii) mineral (i.e., asbestos); or
- (iii) vegetable origin (i.e., cotton, flax, jute, and ramie).

NEEDLE

- (i) A thin, metal device, usually with an eye at one end for inserting the thread, used in sewing to transport the thread.

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- (ii) The portion of a knitting machine used for intermeshing the loops. Several types of knitting needles are available. (Also see SPRING NEEDLE and LATCH NEEDLE.)
- (iii) In non-wovens manufacture, a barbed metal device used for punching the web's own fibers vertically through the web.

NEP A small knot of entangled fibers that usually will not straighten to a parallel position during carding or drafting.

NET An open fabric made by knotting the intersections of thread, cord, or wires to form meshes. Net can be made by hand or machine in a variety of mesh sizes and weights matched to varying end uses, i.e., veils, curtains, fish nets, and heavy cargo nets.

NOIL A short fiber that is rejected in the combing process of yarn manufacture.

- NOZZLE**
- (i) The spout through which something is discharged, i.e., oil in finish application or fibers in web laying.
 - (ii) A term sometimes used to refer to spinnerets.

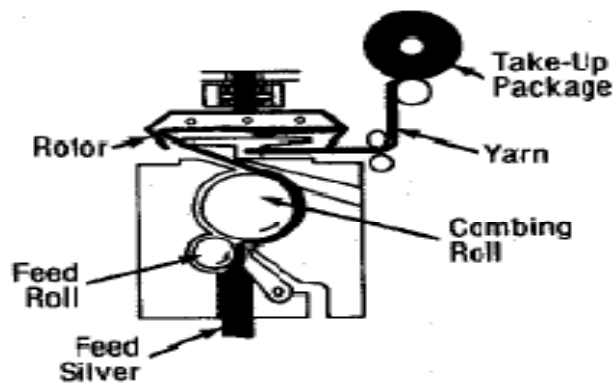
NYLON FIBER A manufactured fiber in which the fiber forming substance is any long chain synthetic polyamide having recurring amide groups (-NH-CO-) as an integral part of the polymer chain (FTC definition). The two principal nylons are nylon 66, which is polyhexamethylene adipamide, and nylon 6, which is polycaprolactam. Nylon 66 is so designated because each of the raw materials, hexamethylenediamine and adipic acid, contains six carbon atoms. In the manufacture of nylon 66 fiber, these materials are combined, and the resultant monomer is then polymerized. After polymerization, the material is hardened into a translucent ivory-white solid that is cut or broken into fine chips, flakes, or pellets.

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This material is melted and extruded through a spinneret while in the molten state to form filaments that solidify quickly as they reach the cooler air. The filaments are then drawn, or stretched, to orient the long molecules from a random arrangement to an orderly one in the direction of the fiber axis. This drawing process gives elasticity and strength to the filaments.

OPEN-END SPINNING

A system of spinning based on the concept of introducing twist into the yarn without package rotation by simply rotating the yarn end at a gap or break in the flow of the fibers between the delivery system and the yarn package. Because the twisting element can be compact and the mass of material to be rotated is small, very high twisting speeds can be attained. The process, in a sense combines the traditional processes of roving and spinning in one operation. Present work is directed toward incorporating the drafting operation into the process by using card sliver as the feedstock. This can facilitate process linking.



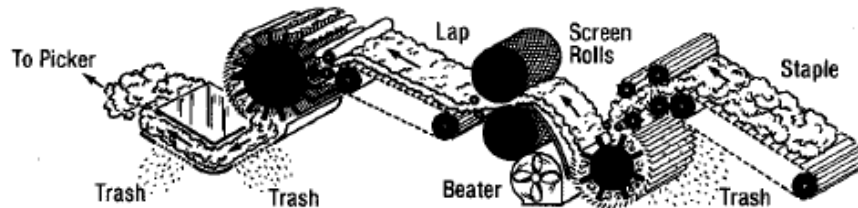
Open-End Spinning

OPENING

1. A preliminary operation in the processing of staple fiber. Opening separates the compressed masses of staple into loose tufts and removes the heavier impurities. 2. An operation in the

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processing of tow that substantially increases the bulk of the tow by separating the filaments and deregistering the crimp.



Opening Staple

PACKAGES

A large selection of forms for winding yarn is available to meet the requirements of existing machinery and a variety of package builds is used to ensure suitable unwinding in later stages of manufacturing. Since a package with flanges cannot be unwound easily and quickly by pulling the yarn off overend, most packages are flangeless with self-supporting edges. Some can be unwound at speeds up to 1500 yd/min. The accompanying diagram shows six common types of yarn packages.



Six Yarn Packages in Common Use

PATTERN

- (i) An arrangement of form; a design or decoration such as the design of woven or printed fabrics.
- (ii) A model, guide, or plan used in making things, such as a garment pattern.

pH

Value indicating the acidity or alkalinity of a material. It is the negative logarithm of the

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effective hydrogen ion concentration. A pH of 7.0 is neutral; less than 7.0 is acidic; and more than 7.0 is basic.

PICK

A single filling thread carried by one trip of the weft-insertion device across the loom. The picks interlace with the warp ends to form a woven fabric.

PICK COUNT

The number of filling yarns per inch or per centimeter of fabric.

POCK PER INCH (or P.P.I.)

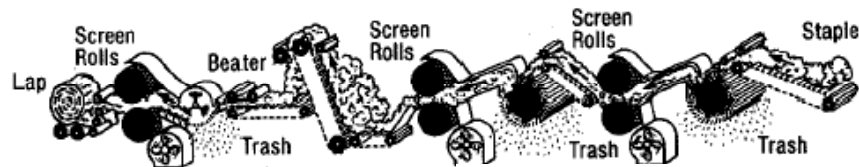
is the number of weft threads per inch of woven fabric. A pick is a single weft thread, hence the term. In general, the higher the picks per inch, the finer the fabric is.

PICK COUNTER

- (i) A mechanical device that counts the picks as they are inserted during weaving.
- (ii). A mechanical device equipped with a magnifying glass used for counting picks (and/or ends) in finished fabrics.

PICKER

- (i) A machine that opens staple fiber and forms a lap for the carding process used in the production of spun yarns.
- (ii) That part of the picking mechanism of the loom that actually strikes the shuttle.



Picker

PILE

- (i) A fabric effect formed by introducing tufts, loops, or other erect yarns on all or part of the fabric surface. Types are warp, filling, and knotted pile, or loops produced by weaving an extra set of yarns over wires that are then drawn out of the fabric. Plain

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wires leave uncut loops; wires with a razor-like blade produce a cut-pile surface. Pile fabric can also be made by producing a double-cloth structure woven face to face, with an extra set of yarn interlacing with each cloth alternately. The two fabrics are cut apart by a traversing knife, producing two fabrics with a cut-pile face. Pile should not be confused with nap. Corduroys are another type of pile fabric, where long filling floats on the surface are slit, causing the pile to stand erect.

- (ii) In carpets, pile refers to the face yarn, as opposed to backing or support yarn. Pile carpets are produced by either tufting or weaving.

PILL

A small accumulation of fibers on the surface of a fabric. Pills, which can develop during wear, are held to the fabric by an entanglement with surface fibers of the material, and are usually composed of the same fibers from which the fabric is made.

PILLING

The tendency of fibers to work loose from a fabric surface and form balled or matted particles of fiber that remain attached to the surface of the fabric.

PLUCKING

A condition found at the feed roll and lickerin section of the card when larger than normal clusters of fiber are pulled from the lap by the lickerin. This situation is normally caused by uneven laps or the inability of the feed rolls to hold the lap sheet while small clusters of fibers are being pulled from the lap by the lickerin. Plucking inevitably produces flaky webs.

PLY

- (i) The number of singles yarns twisted together to form a plied yarn, or the number of plied yarns twisted together to form cord.

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- (ii). An individual yarn in a plied yarn or cord.
- (iii) One of a number of layers of fabric (ASTM).
- (iv) The number of layers of fabric, as in a shirt collar, or of cord in a tire.

POLYESTER FIBER

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of an ester of dihydric alcohol and terephthalic acid (FTC definition). The polymer is produced by the reaction of ethylene glycol and terephthalic acid or its derivatives. Fiber forms produced are filament, staple, and tow. The process of production resembles that of nylon. Polymerization is accomplished at a high temperature, using a vacuum by one of two methods.

- (i) The glycol and a terephthalate ester react to form a polymer chain, releasing methanol; or
- (ii) the glycol and terephthalic acid react directly to form the polymer with water as the by-product. As with nylon, the filaments are spun in a melt-spinning process, then stretched several times their original length, which orients the long chain molecules and gives the fiber strength.

POPCORN

- (i) A special-effect yarn containing short, thick spots.
- (ii) In polymer manufacture a term used to describe oversize, deformed chip.

POPLIN

A plain-weave fabric of various fibers characterized by a rib effect in the filling direction.

POROSITY

The ratio of the volume of air or void contained within the boundaries of a material to the total volume (solid matter plus air or void) expressed as a percentage.

$$\% \text{ Porosity} = \frac{V_v \times 100}{V_t}$$

where: V_v = volume of voids
 V_t = total volume

PRESSURE DROP

- (i) A decrease in pressure that is caused by friction between a flowing liquid and a constricting container. The pressure drop is increased by a reduction in diameter of the container.

- (ii) The change in pressure across a filter.

QUALITY

See SECONDS and YARN QUALITY.

RAPIER LOOMS

Looms in which either a double or single rapier (thin metallic shaft with a yarn gripping device) carries the filament through the shed. In a single rapier machine, the yarn is carried completely across the fabric by the rapier. In the double machine, the yarn is passed from one rapier to the other in the middle of the shed.

RAW FIBER

A textile fiber in its natural state, such as silk "in the gum" and cotton as it comes from the bale.

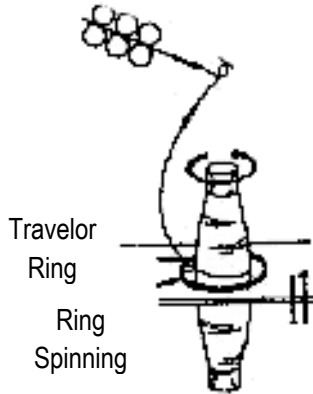
RING

- (i) A narrow band around hosiery appearing different from the rest of the hose. Principal causes: variations in yarn size, dye, absorption, or luster.
- (ii) The device that carries the traveler up and down the package in ring spinning.

RING-SPINNING

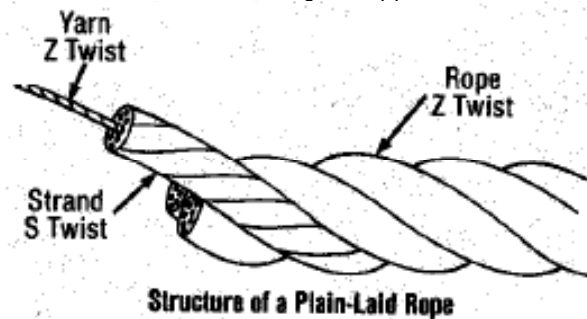
A system of spinning using a ring-and-traveler takeup wherein the drafting of the roving and twisting and winding of the yarn onto the bobbin proceed simultaneously and continuously. Ring frames are suitable for spinning all counts up to 150's, and they usually give a stronger yarn and are more productive than mule spinning frames. The latest innovation in ring spinning involves the use of a revolving ring to increase productivity. Ring spinning equipment is also widely used to take-up manufactured filament

yarns and insert producer-twist at extrusion.



ROPE

- (i) A heavy, strong cord, made from either natural or manufactured fibers or from wire, in a wide range of diameters. Yarns are twisted together to form strands. These strands are then twisted together in the opposite direction to form the rope. The fact that the twist directions alternate at different stages of rope assembly assures that the rope will be twist-stable and will not kink during use. Also called cord.
- (ii) Fabric in process without weft tension, thus having the appearance of a thick rope.



ROTOR SPINNING

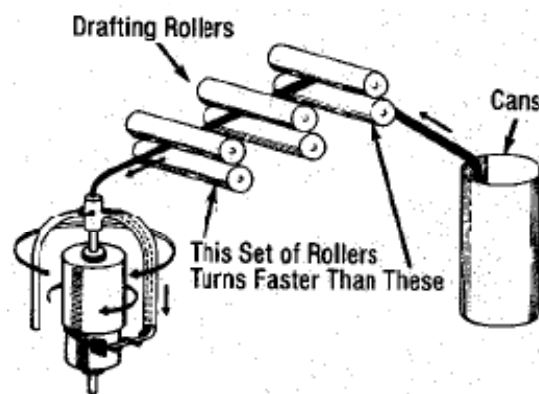
See OPEN-END SPINNING.

ROVING

- (i) In spun yarn production, an intermediate state between sliver and yarn. Roving is a condensed sliver that has been drafted, twisted, doubled, and redoubled. The product of the first roving operation is sometimes called slubbing.
- (ii) The operation of producing roving (see - 1).
- (iii) In the manufacture of composites, continuous strands of parallel filaments.

ROVING FRAME

A general name for all of the machines used to produce roving, different types of which are called slubber, intermediate, fine, and jack. Roving frames draft the stock by means of drafting rolls, twist it by means of a flyer, and wind it onto a bobbin.



The Roving Operation

SATURATION

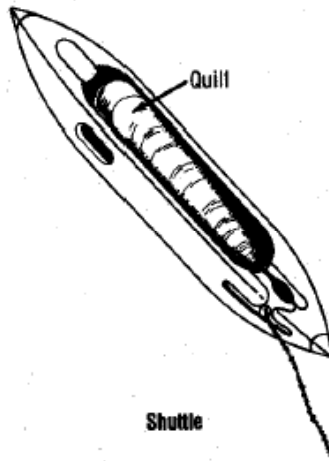
- (i) The maximum intensity or purity of a color. If the color is as brilliant as possible, it is at saturation; if the color is subdued or grayed, it is dull, weak, and low in intensity.
- (ii). The upper limit concentration of a solute in a solvent, i.e., no more solute can be dissolved at a fixed temperature and pressure.

SATURATION VALUE

The maximum amount of dye that can be

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	absorbed by a textile fiber under defined conditions.
SCORCHING	The tendering of a fiber surface by heat so as to change the color and texture of the surface.
SCOURING	An operation to remove the sizing and tint used on the warp yarn in weaving and, in general, to clean the fabric prior to dyeing.
SECONDS	(i) Imperfect fabrics (woven or knitted) containing flaws in the weave, finish, or dyeing, and sold as "seconds." (ii). See YARN QUALITY.
SHAFT	A term often used with reference to satins indicating the number of harnesses employed to produce the weave.
SHRINKAGE	Widthwise or lengthwise contraction of a fiber, yarn, or fabric, usually after wetting a re-drying or on exposure to elevated temperature.
SHUTTLE	A boat-shaped device, usually made of wood with a metal tip that carries filling yarns through the shed in the weaving process. It is the most common weft-insertion device. The shuttle holds a quill, or pirn, on which the filling yarn is wound. It is equipped with an eyelet at one end to control rate. The filling yarn is furnished during the weaving operation.



SINGEING

The process of burning off protruding fibers from yarn or fabric by passing it over a flame or heated copper plates. Singeing gives the fabric a smooth surface and is necessary for fabrics that are to be printed and for fabrics where smooth finishes are desired.

SINGLE-KNIT FABRIC

Also called plain knit, a fabric constructed with one needle bed and one set of needles.

SINGLES YARN

The simplest strand of textile material suitable for operations such as weaving and knitting. A singles yarn may be formed from fibers with more or less twist; from filaments with or without twist; from narrow strips of material such as paper, cellophane, or metal foil; or from monofilaments. When twist is present, it is all in the same direction.

SIZING

- (i) A generic term for compounds that are applied to warp yarn to bind the fiber together and stiffen the yarn to provide abrasion resistance during weaving. Starch, gelatin, oil, wax, and manufactured polymers such as polyvinyl alcohol, polystyrene, polyacrylic acid, and polyacetates are employed.
- (ii) The process of applying sizing compounds.

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	(iii) The process of weighing sample lengths of yarn to determine the count.
SLIVER	A continuous strand of loosely assembled fibers without twist. Sliver is delivered by the card, the comber, or the drawing frame. The production of sliver is the first step in the textile operation that brings staple fiber into a form that can be drawn (or reduced in bulk) and eventually twisted into a spun yarn.
SLUB	A yarn defect consisting of a lump or thick place on the yarn caused by lint or small lengths of yarn adhering to it. Generally, in filament yarn, a slub is the result of broken filaments that have stripped back from the end to which they are attached.
SLUB YARN	Any type of yarn that is irregular in diameter; the irregularity may be purposeful or the result of error.
SPINDLE	A slender, upright, rotating rod on a spinning frame, roving frame, twister, winder, or similar machine to twist into thread the fibers drawn from the mass on the distaff, and on which the thread is wound as it is spun.. A bobbin is placed on the spindle to receive the yarn as the spindle is rotated at high speed.
SPINNING	The process or processes used in the production of single yarns or of fabrics generated directly from polymer.
SPINNING FRAME	A machine used for spinning staple yarn. It drafts the roving to the desired size, inserts twist, and winds the yarn onto a bobbin. The term is, generally, used to indicate a ring spinning frame, although it does cover flyer spinning and cap spinning on the worsted system.
SPUN YARN	(i) A yarn consisting of staple fibers usually bound together by twist.

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	(ii) A meltspun fiber before it is drawn.
STITCHING	The process of passing a fiber or thread through the thickness of fabric layers to secure them. In composite manufacture, stitching is used to make preforms or to improve damage tolerance of complex-shaped parts.
TAKE-UP (TWIST	The change in length of a filament, yarn, or cord caused by twisting, expressed as a percentage of the original (untwisted) length.
TEX	(i) A unit for expressing linear density, equal to the weight in grams of 1 kilometer of yarn, filament, fiber, or other textile strand. (ii) The system of yarn numbering based on the use of tex units.
TEXTILE	Originally, a woven fabric; now applied generally to any one of the following (i) Staple fibers and filaments suitable for conversion to or use as yarns, or for the preparation of woven, knit, or non-woven fabrics. (ii) Yarns made from natural or manufactured fibers. (iii) Fabrics and other manufactured products made from fibers as defined above and from yarns.(iv) Garments and other articles fabricated from fibers, yarns, or fabrics when the products retain the characteristic flexibility and drape of the original fabrics.
TEXTILE MATERIAL	A general term for fibers, yarn intermediates, yarn, fabrics, and products made from fabrics that retain more or less completely the strength, flexibility, and other typical properties of the original fiber or filaments.
TEXTILE PROCESSING	Any mechanical operation used to translate a textile fiber or yarn to a fabric or other textile material. This includes operations such as opening, carding, spinning, plying, twisting, texturing, coning, quilling, beaming, slashing, weaving, and knitting.

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TEXTURE	A term describing the surface effect of a fabric, such as dull, lustrous, wooly, stiff, soft, fine, coarse, open, or closely woven, i.e., the structural quality of a fabric.
TEXTURED	An adjective used to describe continuous filament manufactured yarns (and woven and knit fabrics made therefrom) that have been crimped or have had random loops imparted, or that have been otherwise modified to create a different surface texture.
TEXTURED YARNS	Yarns that develop stretch and bulk on subsequent processing. When woven or knitted into fabric, the cover, hand, and other aesthetics of the finished fabric better resemble the properties of a fabric constructed from spun yarn.
TEXTURING	The process of crimping, imparting random loops, or otherwise modifying continuous filament yarn to increase cover, resilience, abrasion resistance, warmth, insulation, and moisture absorption or to provide a different surface texture. Texturing methods can be placed roughly into six groups.
THREAD	<ul style="list-style-type: none">(i) A slender, strong strand or cord, especially one designed for sewing or other needlework. Most threads are made by plying and twisting yarns. A wide variety of thread types are in use today, e.g., spun cotton and spun polyester, core-spun cotton with a polyester filament core, polyester or nylon filaments (often bonded), and monofilament threads.(ii) A general term for yarns used in weaving and knitting, as in “thread count” and “warp thread”.
THREAD COUNT	<ul style="list-style-type: none">(i) The number of ends and picks per inch in a woven cloth.

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	(ii) The number of wales and courses per inch in a knit fabric.
TINT	Coloration that produces a very pale shade. A tint usually represents the minimum amount of color that will give perceptible appearance of coloration. In yarn processing, fugitive tints are used for identification, then removed in wet processing.
TWIST	The number of turns about its axis per unit of length of a yarn or other textile strand. Twist is expressed as turns per inch (tpi), turns per meter (tpm), or turns per centimeter (tpcm).
TWO-FOR-ONE TWISTER	A twister that inserts twist at a rate of twice the spindle speed. For example, at a spindle speed of 2,000 rpm, 4,000 turns per minute are inserted in the yarn.
VEGETABLE FIBER	A textile fiber of vegetable origin, such as cotton, kapok, jute, ramie, and flax.
VISCOSE	A special form of rayon that is produced by putting wood pulp or cotton linters through a specialized spinning and chemical process. Viscose yarn is popular in high end upholstery fabrics, particularly viscose chenilles, because of the yarn's lustrous appearance and strength.
WARP	(i) The set of yarn in all woven fabrics, that runs lengthwise and parallel to the selvage and is interwoven with the filling. (ii) The sheet of yarns wound together on a beam for the purpose of weaving or warp knitting.
WARP BEAM	A large spool or flanged cylinder around which the warp threads, or ends, are wound in a uniform and parallel arrangement. (also see Beam.)
WASTE	By-products created in the manufacture of fibers, yarns, and fabrics.

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WEAVE

A system or pattern of intersecting warp and filling yarns. There are three basic two dimensional weaves: plain, twill, and satin. All other weaves are derived from one or more of these types.

WEAVING

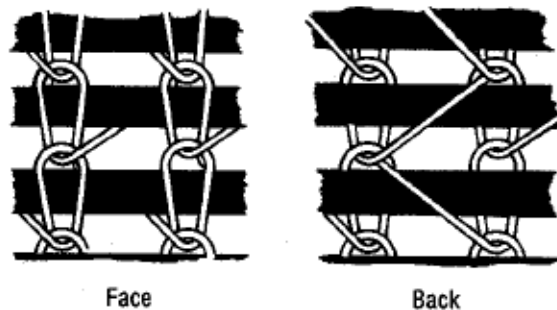
The method or process of interlacing two yarns of similar materials so that they cross each other at right angles to produce woven fabric. The warp yarns, or ends, run lengthwise in the fabric, and the filling threads (weft), or picks, run from side to side. Weaving can be done on a power or handloom or by several hand methods. (also see LOOM)

WEFT

See FILLING.

WEFT INSERTION

(i) Any one of the various methods, shuttle, rapier, water jet, etc., for making a pick during weaving. (ii) A marriage of warp knitting and weaving brought about by inserting a length of yarn across the width of the knitting elements and fastening the weft yarn between the needle loop and the underlap.



**Fabrics Produced by Weft Insertion
during Warp Knitting**

WARP

The yarns which run vertically or lengthwise in woven goods. The warp yarns are threaded through the loom before weaving begins. In upholstery fabrics, the warp yarns are typically finer than the fill or weft yarns, but not always.

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WEFT	The cross-wise or filling pick yarns in a woven cloth, as opposed to the warp yarns. This term is popular in hand weaving circles in the USA, while in the industry the term filling is more popular, however both words have the same meaning.
WIDTH	A horizontal measurement of a material. In woven fabric, it is the distance from selvage to selvage, and in flat-knit fabric, the distance from edge to edge.
WORKING LOSS	The irrecoverable loss of weight or yardage of a textile material that occurs during a textile process.
WINDING	This spinning term refers to winding the finished yarn onto a bobbin and secured to prevent unraveling.
YARDAGE	The amount or length of a fabric expressed in yards.
YARD GOODS	Fabric sold on a retail basis by the running yard.
YARN	A generic term for a continuous strand of textile fibers, filaments, or material in a form suitable for knitting, weaving, or otherwise intertwining to form a textile fabric. Yarn occurs in the following forms: (i) a number of fibers twisted together (spun yarn); (ii) a number of filaments laid together without twist (a zero-twist yarn); (iii) a number of filaments laid together with a degree of twist; (iv) a single filament with or without twist (a monofilament); or (v) a narrow strip of material, such as paper, plastic film, or metal foil, with or without twist, intended for use in a textile construction.
YARN NUMBER	A relative measure of the fineness of yarns. Two classes of systems are in use: (i) Direct yarn number (equal to linear density) is the mass per unit length of yarn. This system is used for silk and manufactured filament yarns. (ii) Indirect

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yarn number (equal to the reciprocal of linear density) is the length per unit mass of yarn. This system is used for cotton, linen, and wool-type spun yarns.

YARN COUNT

Cotton Count	c.c.
Jute Count	j.c.
Linen Lea	l.l.
Metric Count	m.c.
Tex	Tex
Wool Count	W
Woolen Count	w/c
Woolen Run	w.r.
Worsted Count	w.c.
Plied Yarn	Singles denier/number of plies, e.g., 70/3
Cable Yarn	Singles denier/number of plies/number of cabled plies, e.g., 70/3/2
Filament Yarn	Total denier/filament count, e.g., 70/36

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Overview of Technical Guide

Part I: Internal Audit Function – Theoretical Framework

For an internal auditor to effectively discharge his function, he must have a sound conceptual understanding of internal control framework applicable standards, audit risk, materiality and so on. While internal audit may be performed based on checklist and internal control questionnaires, a good understanding of underlying concepts helps the Internal auditor perform a qualitatively better job. It is expected that this part of Technical Guide would give those additional inputs to internal auditor that would make him aware of the theoretical underpinnings to what he is doing.

Part II: Introduction to Textile Industry

The textile industry includes agriculture (cotton), cloth, garments, merchandising, etc. in broad spectrum of industry. If we look into the macro of the industry then Spinning mills, Weaving mills, Process House, Garment Factories, etc. are various segments.

This part of technical guide deals with knowledge of the Textile Industry in depth and its regulatory framework and includes following:

- Overview and structure of Textile Industry in India;
- Regulations regarding textile in India;
- SWOT analysis of Indian Textile Industry;
- Process of spinning;
- Process of weaving including process house;
- Process of making apparels.

Part III: Practice Guide to Internal Audit

This section is divided into two major parts *viz.*, internal audit process and conducting phase, which are briefly discussed below:

- (i) **Internal Audit Process** – This section deals with various steps involved in planning like, from planning the annual internal audit programme to a more detailed plan for individual audits.

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- It also involves gaining:
 - Understanding of the organization and its operations,
 - Controls and management assertions,
 - Desk review including analytical review,
 - Identification of legal compliances to be made,
 - Assessment of inherent risk and controls risks,
 - Documentation internal.
 - At the end of this phase internal auditor determines the nature, timing and extent of internal audit procedures to be applied.
- (ii) **Conducting Phase** – In this phase the auditor goes through audit procedures in areas identified for audit, gathers evidence applying different techniques including sampling. A well documented internal audit program helps internal auditor to delegate and supervise internal audit project efficiently.

Part IV: Risk Assessment and Internal Audit Function in Textile

Value of any enterprises is *maximized* when management sets *strategy and objectives* to strike an *optimal balance* between growth and return goals and related risks, and efficiently and effectively deploys resources in pursuit of the entity's objectives.

Internal control is an integral part of enterprise risk management. This enterprise risk management framework encompasses internal control, forming a more robust conceptualization and tool for management.

This section includes:

- Enterprises Risk Management and Internal Audit (In view of SIA 13)
- Identification of 12 anticipated Risks areas in Textile Industry
- Standardized questionnaire/ Checklist for broad areas have been provided in this part.

Part V: Concluding the Audit and Reporting Audit Findings

Closing Phase — At closing phase of internal audit, an internal auditor must ensure whether:

- All areas of audit programme have been completed
- Review of field work done by the internal audit staff
- Review of analytical tests conducted by the internal audit staff
- Evaluation of internal audit evidence gathered
- Drafting of preliminary audit observation
- Discussion with HOD of Audited Department.

Reporting Phase — Final deliverable of internal audit process is the Audit Report. This chapter deals with contents, documentation and quality of audit report.

In today's environment, role of internal auditor does not ends after submission of his report of findings and suggestions for improvement but also includes follow-up of its compliance/action taken and also report the progress during next review.

Part I
Internal Audit Function –
Theoretical Framework

Chapter 1

Internal Control and Internal Audit

Internal Control

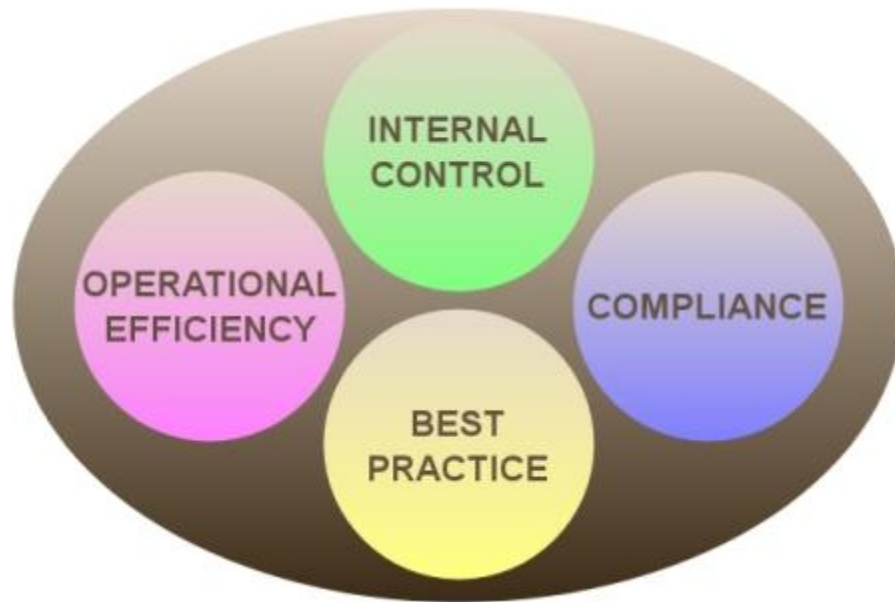
1.1 Internal control is an integral process that is operated by an organization's management and personnel and is designed to address risks and to provide reasonable assurance that in pursuit of organization's mission, the following general objectives are achieved:

- Executing orderly, ethical, economical efficient, and effective operations;
- Fulfilling accountability obligations;
- Complying with applicable laws and regulations;
- Safeguarding resources against loss, misuse and damage.

1.2 The Committee of Sponsoring Organizations (COSO) has developed an internal control framework that has come to be accepted as the standard all over the world. The key concepts of COSO framework include:

- Internal controls are an on-going process, a means to an end, and not an end in themselves;
- Internal controls are affected by people at all levels of an organization and not just policies and their documentation; and
- Internal controls will never eliminate risks but can provide a reasonable assurance that controls are in place to mitigate risks.

1.3 Internal control is not a single measure but a series of prescriptions of do's and don'ts that touch every activity of the organization. In that sense it is an integral part of the organization. Also, internal control is not something which is separate from the people who operate them. It is part of the roles and responsibilities of the persons working in the organization. As all organizations exist for a purpose, the basic objective of internal control is to ensure that the organization achieves its mission; in other words, it aims to minimize the risks that the organization may not be able to achieve its mission.



1.4 Any system of internal control can provide only reasonable assurance as it would not be economical to provide an absolute assurance. This recognizes the fact that there are costs associated with any internal control and such costs should not exceed benefit derived from it. Moreover, excessive controls may result in employees circumventing them and, this could also result in delays and inefficiencies in operations.

1.5 Apart from ensuring ethical, efficient, economical and effective operations, one of the main objectives of internal control in any sector is to safeguard resources which are acquired with invested money. With the extensive use of Information Technology in many organizations, internal controls related to IT have also assumed great deal of importance. Managers of organizations where IT is used should be aware of risks of poor controls in IT systems, particularly, where they deal with payroll, procurement, stores, etc.

1.6 Internal control system exists to help organizations to meet their goals and objectives. They enable management to deal with the changes in internal and external environments. They also promote efficiency, reduce risk of loss, and help ensure financial statement reliability and compliance with laws and regulations. COSO Framework for internal control system consists of five interrelated and equally important components:

- Control environment

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- Risk assessment
 - Control activities
 - Information and communication
 - Monitoring
- (i) *Control environment* sets the tone of an organization, influencing the control consciousness of its staff. It is the foundation for all other components of internal control, providing discipline and structure. This is, as already pointed out, determined by the management. Elements of control environment include:
- Personal and professional integrity and ethical values of the organization;
 - Commitment to competence;
 - The 'tone at the top';
 - Organizational structure; and
 - Human resource policies and practices;
- (ii) *Risk assessment* is the process of identifying and analyzing relevant risks to the achievement of organization's objectives and determining the appropriate response. Elements of risk assessment are:
- (a) *Risk identification*— The organization must identify risks that any of its stated objectives would not be achieved. To illustrate, an organization involved with conducting an examination, evaluating the answer papers and declaring results should assess the risk that any of these activities is not done properly. Once a risk (e.g., risk of breach of confidentiality of question paper) is identified, the organization should provide adequate internal control measures to reduce / eliminate the risk.
- (b) *Risk evaluation*— Risk evaluation involves assessing the significance of the risk (in terms of its gravity) and the possibility of the risk actually materializing. This requires the organization to categorize risks as high, medium or low based on some judgment. The idea is for the organization to address the high category risks. In the above example, significance and possibility of risk i.e., breach of confidentiality would be considered very high.
- (c) *Risk assessment*— Risk assessment requires the organization to understand how much risk it is able to take. This is important because any risk mitigation comes at a cost.

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- (d) *Developing a response*— After having identified the risks, evaluated and assessed them, the organization must develop a response to mitigate (reduce/ eliminate) the risk. Appropriate response could involve transfer, tolerate, terminate or treat the risk. Obtaining insurance is an example of transferring the risk. Sometimes, it may be better to live with a risk that is too expensive to treat. Where the risk is too big, it might be better to terminate the activity altogether. Lastly, which is in most cases, the organization would like to treat the risk by adopting suitable control activities. The table below gives some examples of risk handling:

Risk	Response	Action
Breach of confidentiality of any contract	Treat	(a) Handled by a very few selected individuals; and (b) roles and responsibilities clearly established.
Fire	Partly Treat	Ensure that (a) there are no combustible material in the premises; (b) the electrical wiring is proper;
	Partly Transfer	Take Fire Insurance
Financial risk in operating commercial infrastructure venture such as, a toll bridge	Transfer	Sign a Build Operate Transfer agreement which passes the risk to private partner.
Risk of use of official resources (stationery, etc) for personal use	Tolerate	Expenses on controlling this would be disproportionately large compared to corresponding benefit.

- (iii) *Control activities* are the policies and procedures established to address risks and to achieve the organization's objectives. There are two types of controls.

- *Preventive Control*: This type of internal control would prevent a risk from occurring. An example of this would be barring the physical access to cash chest or the place from where cashier operates.

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- *Detective Control:* Detective controls are measures that would point to misdeeds through reconciliation/ review. Any kind of reconciliation (bank reconciliation), post audit, etc. would fall under this category as they help detect if something had gone wrong.

No control system is complete unless there is corrective procedure implemented to avoid or minimize repetitive occurrence. As a general rule, preventive controls are more expensive than detective controls. Any good system of internal control should have good mixture of the two. Also, it would not be prudent to place excessive reliance on preventive control to the exclusion of detective control because once a prevent control is compromised, there is no way to detect that an illegal act has or is occurring.

To be effective control activities must be:

- a. Appropriate
- b. Function consistently
- c. Cost effective
- d. Comprehensive
- e. Directly relate to control objectives.

Some examples of control activities are:

- (i) *Authorizations and approvals:* Authorization is the principal means of ensuring that only valid transactions and events are initiated as intended by the management. Authorization procedures must be well documented and clearly communicated to managers and employees. These should include specific conditions and terms under which authorizations are to be made.
- (ii) *Segregation of duties:* To reduce the risk of error, waste, or wrongful acts and the risk of not detecting them, no single individual or team should control all key stages of transaction or event. Therefore, duties and responsibilities should be so assigned to a number of individuals that there are enough checks and balances. Notwithstanding separation of duties, collusion can still take place, which can reduce or destroy the effectiveness of this internal control.

Control over access to resources and records: Restricting access to resources to authorized individuals reduces the risk of loss or misuse of resources. All assets must be protected against loss and misuse by implementing this control. Facilities such as a photocopier, telephone, internet, vehicle, etc. also require protection against improper use.

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Verifications: Transactions or events (receipt of goods supplied or cash balance at the end of day) are verified to ensure correctness and validity. Personal records/ service books are periodically verified to ensure their correctness.

Reconciliations: This is one of the most commonly used and effective detect control measure in any organization. Reconciliation is done of one set of records with another.

Reviews and post audit play an important role in ensuring that activities have taken place in accordance with the intents and objects of management. A review of financial statements can reveal if there have been any discrepancies pointing to wrongdoing. A procurement process can be post audited to make sure that it complies with all the regulations.

Supervision: Supervision (assigning, reviewing, approving and guiding, training) is an important and high level internal control. This is something that is done at different levels of management periodically.

Information and communication are essential to realizing all internal control objectives. 'Management's ability to make appropriate decisions is affected by (appropriate, timely, current, accurate and accessible) information'. Effective communication should flow down, across and up the organization, through all components and the entire structure.

Internal control system should be monitored to assess the quality of the system's performance over time. Monitoring is accomplished through routine activities, separate evaluations or a combination of both.

Internal Audit

Internal audit is an independent management function, which involves a continuous and critical appraisal of the functioning of an entity with a view to suggest improvements thereto and add value to and strengthen the overall governance mechanism of the entity, including the entity's strategic risk management and internal control system.

It seeks to find out whether all other controls are satisfactorily working in practice by subjecting them to compliance tests. Where the compliance is either weak or absent, the internal audit conducts substantive checks in order to evaluate the impact of the non-compliance. Thus, it provides the management with a periodical assessment of the functioning of internal controls within the organization and recommends measures for strengthening them.

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1.8 Traditionally, internal audit was seen more as an inspection mechanism concerned with identifying and reporting compliance with rules and procedures. While this objective remains relevant even today, internal auditors are now looked upon more as assurance providers to endorse soundness of processes within the organization. While the establishment and monitoring of the internal controls is the primary responsibility of the management, internal auditor supplements by providing an independent and objective assessment on their adequacy and offers suggestions for improvement. The purpose of internal audit is to evaluate effectiveness of management control systems and procedures and to assess whether resources are managed in conformity with the laid down systems, principles and practices of financial control. Thus, internal audit is a key element of good governance.

1.9 While internal auditors are a part of overall internal control system, they are not responsible for implementing specific control procedures. The internal auditors' role is to audit organization's internal control policies, practices and procedures to ensure that controls are adequate to achieve organization's mission. It is the responsibility of management to establish an effective internal control environment in their organization. As part of internal controls the management is expected to plan, implement, supervise, and monitor the internal controls.

1.10 While as a principle internal audit should not be involved in any management functions, its services could be utilized in the following:

- participating in committees in an advisory (non-decision making) capacity;
- providing advice on internal controls; and
- answering technical questions; and providing training.

To sum up, the internal auditor should appreciate the role that internal controls play in minimizing the many risks the organization faces in its day to day operations. The risks are not necessarily always financial. There are risks to effective and efficient operations. While all of us are aware of internal controls intuitively, an internal auditor should specifically identify and document the internal controls in a given area so that he can test their effectiveness in operation.

Chapter 2

Internal Audit Charter and Standards

2.1 The internal audit charter is a formal document that establishes the nature, role and functioning of the internal audit in the organization. It sets out the internal audit's mandate. The mission of the internal audit function is to provide independent assurance that internal controls are functioning effectively so that the organization achieves its objectives and in doing so it also complies with all applicable laws. More specifically, internal auditor's objectives should include ensuring that the departments are:

- Carrying out their activities and programs as authorized by appropriate authority which yield results that are consistent with established goals and objectives;
- Using resources in an economical and efficient manner;
- Identifying, measuring, classifying and reporting financial and operating events in an accurate and timely manner in accordance with applicable codes, guidelines and government orders; and
- Safeguarding assets under their control.

In order to ensure effective functioning of the internal audit, it is absolutely important that it has:

- Access to all documents, records, books of accounts, computer systems, files, etc. as necessary for the performance of internal audit;
- Cooperation from all the key personnel and the staff of the department in providing the required information and explanations within the reasonable time;

2.2 Internal Audit Standard Board of Institute of Chartered Accountants of India has issued, till the date, seventeen Standards on Internal Audit. Certain relevant extract from the same on the various aspects of the Internal Audit and Internal Auditor have been given in below paragraph:

Integrity, Objectivity and Independence

2.3 The internal auditor should be straightforward, honest and sincere in his approach to his professional work. He must be fair and must not allow prejudice or bias to override his objectivity. He should maintain an impartial attitude. He should not only be independent in fact but also appear to be independent. The internal auditor should not, therefore, to the extent possible, undertake activities, which are or might appear to be incompatible with his independence and objectivity. For example, to avoid any conflict of interest, the internal auditor should not review an activity for which he was previously responsible. It is also expected from the management to take steps necessary for providing an environment conducive to enable the internal auditor to discharge his responsibilities independently and also report his findings without any management interference. **The internal auditor should immediately bring any actual or apparent conflict of interest to the attention of the appropriate level of management so that necessary corrective action may be taken.** (SIA 2 Basic Principles Governing Internal Audit)

2.4 The terms of internal audit engagement define the scope, authority, responsibility, confidentiality, limitations, reporting, compliance with standards and compensation of the internal auditors. The terms of internal audit engagement lay down clarity between the internal auditors and the users of their services for inculcating professionalism and avoiding misunderstanding as to any aspect of the engagement.

Standard on Internal Audit (SIA) 8 “Terms of Internal Audit Engagement” provides guidance in respect of terms of engagement of the internal audit activity whether carried out in house or by an external agency. SIA 8 requires that the terms of engagement should indicate areas where internal auditors are expected to make their recommendations and value added comments. It should also clearly mention the responsibility of the auditee vis-à-vis the internal auditor. Further, the management of the auditee is responsible for providing timely and accurate data, information, records, personnel, etc., and for extending co-operation to the internal audit team.

Role of the Internal Auditor in Evaluating Internal Controls

2.5 Internal auditor should examine the continued effectiveness of the internal control system through evaluation and make recommendations, if any, for improving that effectiveness. However, the internal auditor is not vested with management's primary responsibility for designing, implementing, maintaining and documenting internal control. Internal audit function adds value to an organization's internal control system by bringing a systematic, disciplined approach to the evaluation of risk and by making recommendations to strengthen the effectiveness of risk management efforts. The internal auditor should focus towards improving the internal control structure and promoting better corporate governance. (Para 8 of SIA12-Internal control evaluation)

The broad areas of review by the internal auditor in evaluating the internal control system, *inter alia*, are:

- Mission, vision, ethical and organizational value-system of the entity.
- Personnel allocation, appraisal system, and development policies.
- Accounting and financial reporting policies and compliance with applicable legal and regulatory standards.
- Objective of measurement and key performance indicators.
- Documentation standards.
- Risk management structure.
- Operational framework.
- Processes and procedures followed.
- Degree of management supervision.
- Information systems, communication channels.
- Business Continuity and Disaster Recovery Procedures.

2.6 The internal auditor would have to familiarize himself with the control procedures and systems in force in the areas selected for audit. Identification of key control areas and SWOT (strength, weakness, opportunity, threat) analysis, using data flow diagrams and appropriate systems flowchart, updated from year to year, would be extremely effective in gaining an insight into the production and revenue earning activities and would facilitate a regular feedback to the management on the weakness in existing systems.

The internal auditor would be required to satisfy himself as to the proper and satisfactory implementation of the policies, guidelines and goals laid down by

the management, apart from the internal controls and procedures examined by him. The internal auditor should also include a checklist of statutory provisions applicable to the enterprise under audit, which must be updated from time to time and checked for compliance. In particular, review of provisions applicable to enterprises which are incorporated under the Companies Act, 1956 is necessary. With this kind of a background in mind, the internal auditor would be in a position to compile a comprehensive internal audit plan which would yield result-oriented reports.

Review of Information Technology Environment

2.7 The use of ERP system to manage processes across various units is very common these days but due to this the overall objective and scope of an internal audit does not change. However, the use of computer changes the processing, storage, retrieval and communication of data and information and the interplay of processes, systems and control procedures. Thus, this would affect the internal control systems employed by the entity.

The internal auditor should review the robustness of the IT environment and consider any weakness or deficiency in the design and operation of any IT control within the entity, by reviewing:

- a) System Audit reports of the entity, conducted by independent Information System auditors;
- b) Reports of system breaches, unsuccessful login attempts, passwords compromised and other exception reports;
- c) Reports of network failures, virus attacks and threats to perimeter security, if any;
- d) General controls like, Segregation of duties, physical access records, logical access controls;
- e) Application controls like input, output, processing and run-to-run controls; and
- f) Excerpts from the IT policy of the entity relating to business continuity planning, crisis management and disaster recovery procedures.

Part II

Introduction to Textile Industry

Chapter 3

Overview and Structure of Textile Industry in India

Meaning of Textile

3.1 The term 'textile' is a Latin word originating from the word 'texere' which means 'to weave'. Textile refers to a flexible material comprising of a network of natural or artificial fibers, known as yarn. Textiles are formed by weaving, knitting, crocheting, knotting and pressing fibers together. Textile Museum is that specialized category of museum which primarily preserves different types of textile and textile products.

History of Textile Industry in India

3.2 India has been well known for textile goods since very ancient times. The traditional textile industry of India was virtually decayed during the colonial regime. However, the modern textile industry took birth in India in the early nineteenth century when the first textile mill in the country was established at fort gloster near Calcutta in 1818.

The cotton textile industry, however, made its real beginning in Bombay, in 1850s. The first cotton textile mill of Bombay was established in 1854 by a Parsi cotton merchant then engaged in overseas and internal trade. Indeed, the vast majority of the early mills were the handiwork of Parsi merchants engaged in yarn and cloth trade at home and Chinese and African markets.

The first cotton mill in Ahmedabad, which was eventually to emerge as a rival centre to Bombay, was established in 1861. The spread of the textile industry to Ahmedabad was largely due to the Gujarati trading class.

The cotton textile industry made rapid progress in the second half of the nineteenth century and by the end of the century there were 178 cotton textile mills; but during the year 1900 the cotton textile industry was in bad state due to the great famine and a number of mills of Bombay and Ahmedabad were to be closed down for long periods.

The two world War and the Swadeshi movement provided great stimulus to the Indian cotton textile industry. However, during the period 1922 to 1937 the industry was in doldrums and during this period a number of the

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Bombay mills changed hands. The second World War, during which textile import from Japan completely stopped, however, brought about an unprecedented growth of this industry. The number of mills increased from 178 with 4.05 lakh looms in 1901 to 249 mills with 13.35 lakh looms in 1921 and further to 396 mills with over 20 lakh looms in 1941. By 1945 there were 417 mills employing 5.10 lakh workers.

3.3 The cotton textile industry is rightly described as a Swadeshi industry because it was developed with indigenous entrepreneurship and capital and in the pre-independence era the Swadeshi movement stimulated demand for Indian textile in the country.

The partition of the country at the time of independence affected the cotton textile industry also. The Indian union got 409 out of the 423 textiles mills of the undivided India. 14 mills and 22 per cent of the land under cotton cultivation went to Pakistan. Some mills were closed down for some time. For a number of years since independence, Indian mills had to import cotton from Pakistan and other countries.

After independence, the cotton textile industry made rapid strides under the Plans. Between 1951 and 1982 the total number of spindles doubled from 11 million to 22 million. It increased further to well over 26 million by 1989-90.

Role of Indian Textile Industry in the Economy

3.4 The Indian textile industry has a significant presence in the economy as well as in the international textile economy. Its contribution to the Indian economy is manifested in terms of its contribution to the industrial production, employment generation and foreign exchange earnings. It contributes 20 percent of industrial production, 9 percent of excise collections, and 18 percent of employment in the industrial sector, nearly 20 percent to the country's total export earning and 4 percent to the Gross Domestic Product.

India is the world's second largest producer of textiles after China. It is the world's third largest producer of cotton – after China and the USA, – and the second largest cotton consumer after China. The textile industry in India is one of the oldest manufacturing sectors in the country and is currently its largest.

The textile sector also has a direct link with the rural economy and performance of major fibre crops and crafts such as, cotton, wool, silk, handicrafts and handlooms, which employ millions of farmers and crafts persons in rural and

semi-urban areas. It has been estimated that one out of every six households in the country depends directly or indirectly on this sector.

3.5 India has several advantages in the textile sector, including abundant availability of raw material and labour. It is the second largest player in the world cotton trade. It has the largest cotton acreage, of about nine million hectares and is the third largest producer of cotton fibre in the world. It ranks fourth in terms of staple fibre production and fourth in polyester yarn production. The textile industry is also labour intensive, thus, India has an advantage.

3.6 The key advantages of the Indian textile industry are as follows:

- India is the third largest producer of cotton with the largest area under cotton cultivation in the world. It has an edge in low cost cotton sourcing compared to other countries.
- Average wage rates in India are 50-60 per cent lower than that in developed countries, thus, enabling India to benefit from global outsourcing trends in labour intensive businesses such as, garments and home textiles.
- Design and fashion capabilities are key strengths that will enable Indian players to strengthen their relationships with global retailers and score over their Chinese competitors.
- Production facilities are available across the textile value chain, from spinning to garments manufacturing. The industry is investing in technology and increasing its capacities which should prove a major asset in the years to come.
- India has gathered experience in terms of working with global brands and this should benefit Indian vendors.

Size of Textile Industry in India

3.7 The textile industry in India covers a wide gamut of activities ranging from production of raw material like cotton, jute, silk and wool to providing high value-added products such as fabrics and garments to consumers. The industry uses a wide variety of fibres ranging from natural fibres like, cotton, jute, silk and wool to man made fibres like, polyester, viscose, acrylic and multiple blends of such fibres and filament yarn.

The textile industry plays a significant role in Indian economy by providing direct employment to an estimated 35 million people, by

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contributing 4 per cent of GDP and accounting for 35 per cent of gross export earnings. The textile sector contributes 14 per cent of the value-addition in the manufacturing sector. Estimates say that the textile sector might achieve about 15 to 18 per cent growth this year following dismantling of MFA.

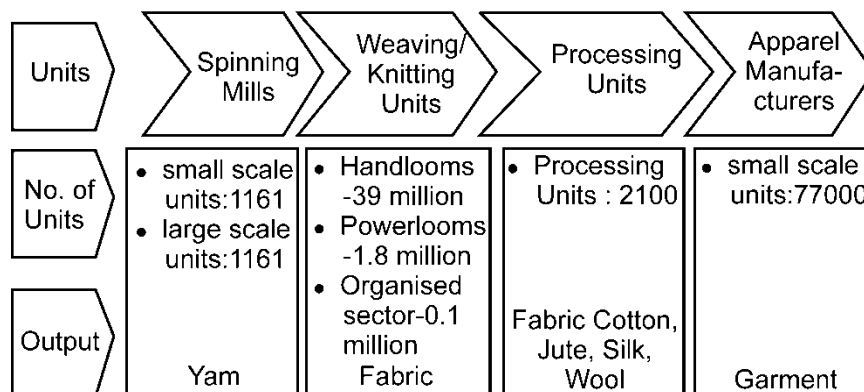
3.8 With the growing awareness in the industry of its strengths and weakness and the need for exploiting the opportunities and averting threats, the government has initiated many policy measures as follows:

- The Technology Up gradation Fund Scheme (TUFS) was launched in April 99 to provide easy access to capital for technological up gradation by various segments of the Industry.
- The Technology Mission on Cotton (TMC) was launched in February 2000 to address issues relating to the core fibre of cotton like, low productivity, contamination, obsolete ginning and pressing factories, lack of storage facilities and marketing infrastructure.
- A New Long Term Textiles and Garments Export Entitlement (Quota) Policies 2000-2004 was announced for a period of five years with effect from 1.1.2000 to 31.12.2004 covering the remaining period of the quota regime.

Segment Analysis

3.9 India's textile industry comprises mostly small-scale, non-integrated spinning, weaving, finishing, and apparel-making enterprises. The figure below depicts the overall value chain and the number and type of units within the industry.

Textile Sector – High Level Value Chain



Structure of Indian Textile Industry

3.10 The textile sector in India is one of the worlds largest. The textile industry today is divided into three segments:

1. Cotton Textiles
2. Synthetic Textiles
3. Other like Wool, Jute, Silk, Denim etc.

All segments have their own place but even today cotton textiles continue to dominate with 73% share. The structure of cotton textile industry is very complex with co-existence of oldest technologies of hand spinning and hand weaving with the most sophisticated automatic spindles and loom. The structure of the textile industry is extremely complex with the modern, sophisticated and highly mechanized mill sector on the one hand and hand spinning and hand weaving (handloom sector) on the other in between falls the decentralized small scale power loom sector.

Unlike other major textile-producing countries, India's textile industry is comprised mostly of small-scale, non-integrated spinning, weaving, finishing, and apparel-making enterprises. This unique industry structure is primarily a legacy of government policies that have promoted labor-intensive, small-scale operations and discriminated against larger scale firms.

Composite Mills

3.11 Relatively large-scale mills that integrate spinning, weaving and, sometimes, fabric finishing are common in other major textile-producing countries. In India, however, these types of mills now account for about only 3 percent of output in the textile sector. About 276 composite mills are now operating in India, most owned by the public sector and many deemed financially sick.

Spinning

3.12 Spinning is the process of converting cotton or man made fiber into yarn to be used for weaving and knitting. This mills are chiefly located in North India. Spinning sector is technology intensive and productivity is affected by the quality of cotton and the cleaning process used during ginning. Largely due to deregulation beginning in the mid-1980s, spinning is the most consolidated and technically efficient sector in India's textile

industry. Average plant size remains small, however, and technology outdated, relative to other major producers.

Weaving and Knitting

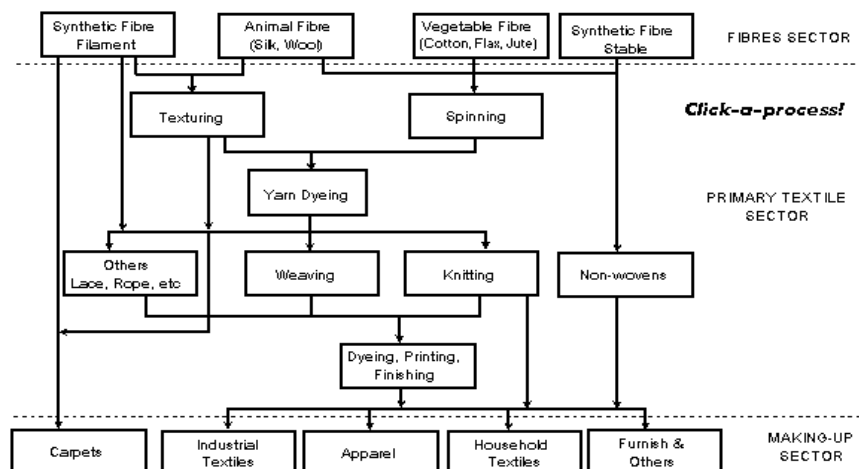
3.13 The weaving and knitting sector lies at the heart of the industry. In 2004-05, of the total production from the weaving sector, about 46 percent was cotton cloth, 41 percent was 100% non-cotton including khadi, wool and silk, and 13 percent was blended cloth. Three distinctive technologies are used in the sector handlooms, power looms and knitting machines. Weaving and knitting converts cotton, manmade, or blended yarns into woven or knitted fabrics. India's weaving and knitting sector remains highly fragmented, small-scale, and labour-intensive.

Fabric Finishing

3.14 Fabric finishing (also referred to as processing), which includes dyeing, printing, and other cloth preparation prior to the manufacture of clothing, is also dominated by a large number of independent, small-scale enterprises. Overall, about 2,300 processors are operating in India, including about 2,100 independent units and 200 units that are integrated with spinning, weaving, or knitting units.

Clothing

3.15 Apparel is produced by about 77,000 small-scale units classified as domestic manufacturers, manufacturer exporters, and fabricators (sub-contractors).



Chapter 4

Regulations Related to Textile Industry in India

Government Policies and Regulations relating to Textile Industry in India

4.1 The Indian textile industry is one of the largest industries in the world. As being one of the most significant sectors in the Indian economy, it has been a key focus area for the Government of India. The Ministry of Textiles in India has formulated numerous policies and schemes for the development of the textile industry in India. In this chapter major rules and regulation regarding textile industry have been explained in brief.

The Ministry of Textiles

4.2 The Ministry of Textiles is responsible for policy formulation, planning, and development export promotion and trade regulation in respect of the textile sector. This includes all natural and manmade cellulosic fibres that go into the making of textiles, clothing and handicrafts.

The Multi-Fibre Agreement (MFA)

4.3 The Multi-Fibre Agreement (MFA), that had governed the extent of textile trade between nations since 1962, expired on January 1, 2005. It is expected that, post-MFA, most tariff distortions would gradually disappear and firms with robust capabilities will gain in the global trade of textile and apparel.

National Textile Policy, 2000

4.4 Faced with new challenges and opportunities in a changing global trade environment, the GOI unveiled its National Textile Policy 2000 (NTP 2000) on November 2, 2000. The NTP 2000 aims to improve the competitiveness of the Indian textile industry. The NTP 2000 opens the country's apparel sector to large firms and allows up to 100 percent FDI in

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the sector without any export obligation. The National Textile Policy was formulated keeping in mind the following objectives:

- Development of the textile sector in India in order to nurture and maintain its position in the global arena as the leading manufacturer and exporter of clothing.
- Maintenance of a leading position in the domestic market by doing away with import penetration.
- Injecting competitive spirit by the liberalisation of stringent controls.
- Encouraging Foreign Direct Investment as well as research and development in this sector.
- Stressing on the diversification of production and its upgradation taking into consideration the environmental concerns.
- Development of a firm multi-fibre base along with the skill of the weavers and the craftsmen.

Export Promotion Capital Goods (EPCG) Scheme

4.5 To promote modernization of Indian industry, the Government of India set up the Export Promotion Capital Goods (EPCG) scheme, which permits a firm importing new or secondhand capital goods for production of articles for export to enter the capital goods at preferential tariffs, provided that the firm exports at least six times the C.I.F. value of the imported capital goods within 6 years. Any textile firm planning to modernize its operations had to import at least \$4.6 million worth of equipment to qualify for duty-free treatment under the EPCG scheme.

Export-Import Policy

4.6 The GOI's EXIM policy provides for a variety of largely export-related assistance to firms engaged in the manufacture and trade of textile products. This policy includes fiscal and other trade and investment incentives contained in various programs.

Duty Entitlement Passbook Scheme (DEPB)

4.7 DEPB is available to Indian export companies and traders on a pre- and post-export basis. The pre-export credit requires that the beneficiary firm has exported during the preceding 3-year period. The post-export credit is a transferable credit that exporters of finished goods can use to pay or

offset customs duties on subsequent imports of any unrestricted products. Now from 30th Sept 2011 the scheme of DEPB has been abolished and DDBK are taken place against the same.

Duty Drawback Scheme (DDBK)

4.8 Expansion of Duty Drawback Scheme from 2835 items to approximately 4000 items, adding 1100 from the DEPB schedule, will make Duty Drawback all encompassing without leaving any product from the existing DEPB Rates.

The Agreement on Textiles and Clothing (ATC)

4.9 The Agreement on Textiles and Clothing (ATC) promises abolition of all quota restrictions in international trade in textiles and clothing by the year 2005. This provides tremendous scope for export expansion from developing countries.

Guidelines of the revised Textile Centers Infrastructure Development Scheme (TCUDS)

4.10 TCIDS Scheme is a part of the drive to improve infrastructure facilities at potential Textile growth centres and therefore, aims at removing bottlenecks in exports.

Under the Scheme funds can be given to Central/ State Government Departments/ Public Sector Undertakings/ Other Central /State Governments agencies/or recognized industrial association or entrepreneur bodies for development of infrastructure directly benefiting the textile units. The fund would not be available for individual production units.

Technology Upgradation Fund Scheme (TUFS)

4.11 Recognizing that technology is the key to being competitive in the global market, the Government of India established the Technology Upgradation Fund Scheme (TUFS) to enable entities to access low-interest loans for technology upgradation. Under this scheme, the Government reimburses 5 per cent of the interest rates charged by the banks and financial institutions, thereby ensuring credit availability for upgradation of the technology at global rates. Under the TUF Scheme, launched on April 1, 1999, loans amounting to Rs. 149 billion have been disbursed to around 6,739 applicants.

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At present, this is the only scheme through which Government can assist the industry which provides for reimbursing 5% interest on the loans/finance raised from designated financial institutions for bench marked projects of modernization. IDBI, SIDBI, IFCI have been designed as nodal agencies for large and medium small scale industry and jute industry respectively. They have co-opted 148 leading commercial banks/cooperative banks and financial institutions like, State Finance Corporations and State Industrial Development Corporation, etc.

Handlooms will now be covered under the TUF scheme.

Scheme for Integrated Textile Parks (SITP)

4.12 Manufacturing is a thrust area for the government, as Indian industry and the government see foreign companies more as partners in building domestic manufacturing capabilities rather than a threat to Indian businesses. Following this through, the Central Government as well as various States has executed Schemes such as, Schemes for Integrated Textile and Apparel Parks.

To provide the industry with world-class infrastructure facilities for setting up their textile units, Government has launched the Scheme for Integrated Textile Parks (SITP) by merging the Scheme for Apparel Parks for Exports (APE) and Textile Centre Infrastructure Development Scheme (TCIDS). This scheme is based on Public-Private Partnership (PPP) and envisages engaging of a professional agency for project execution. The Ministry of Textiles (MOT) would implement the Scheme through Special Purpose Vehicles (SPVs).

Under the Scheme for Integrated Textiles Parks (SITP), 26 parks have been approved so far out of 30 sanctioned.

National Textile Corporation Ltd. (NTC)

4.13 National Textile Corporation Ltd. (NTC) is the single largest Textile Central Public Sector Enterprise under Ministry of Textiles managing 52 Textile Mills through its 9 Subsidiary Companies spread all over India. The headquarters of the Holding Company is at New Delhi. The strength of the group is around 22000 employees.

Cotton Corporation of India Ltd. (CCI)

4.14 The Cotton Corporation of India Ltd (CCI), Mumbai, is a profit-making Public Sector Undertaking under the Ministry of Textiles engaged in commercial trading of cotton. The CCI also undertakes Minimum Support Price Operation (MSP) on behalf of the Government of India.

Power Loom Development and Export Promotion Council

4.15 Power Loom Development and Export Promotion Council, set up by the Ministry of Textiles, Government of India. PDEXCIL provide some export assistance as follows:

- Exploration of overseas market.
- Identification of items with export potential.
- Market survey and up-to-date market intelligence.
- Contact with protective buyers to interest them in your products.
- Providing your company's profile to overseas buyers and vice-versa.
- Advice on international marketing.
- Display of selected product groups.

Cotton Textile Export Promotion Council (TEXPROCIL)

4.16 The Council looks after the export promotion of cotton fabrics, cotton yarn and cotton made-ups. It's activities include market studies for individual products, circulation of trade enquiries, participation in exhibitions, fairs and seminars at home and abroad in order to boost exports.

Hank Yarn Obligation

4.17 The Hank Yarn Obligation is a mechanism to ensure adequate availability of hank yarn to handloom weavers at reasonable prices. The existing Hank Yarn Packing Notification dated 17.04.2003 promulgated under Essential Commodities Act, 1955 prescribes that every producer of yarn, who packs yarn for civil consumption, shall pack at least 40% of yarn

packed for civil consumption in hank form on quarterly basis and not less than 80% of the hank yarn packed shall be of counts 80s and below. The Government of India is implementing the following schemes all over the country for overall development of handloom sector.

Integrated Handlooms Development Scheme (IHDS)

4.18 The Integrated Handlooms Development Scheme (IHDS) aims to focus on formation of Weavers Group as an entity, develop the Handlooms Weavers Groups to become self sustainable, inclusive approach to cover weavers both within and outside the cooperative fold, skill up gradation of handlooms weavers/workers to produce diversified product, etc.

Under the IHDS scheme, financial assistance is inter-alia provided for a group of weavers, who are in the clusters, having 300-500 handlooms per cluster and also, for a group of weavers who are outside the cluster under Group Approach Project having 10-100 weavers per group.

Under the cluster development programme, financial assistance is provided on need basis towards design development, formation of consortium, skill up gradation, basic inputs, construction of work sheds, corpus for yarn depot, setting up of Common Facility Centre/ Dye House, Publicity and Marketing etc.

Diversified Handloom Development Scheme

4.19 Under the scheme, Design Exhibition–cum Dyeing Workshops are being organized through existing 25 Weavers' Service Centres in the States concerned all over the country, including Karnataka to improve the productivity and earnings of the handloom weavers.

Quality Improvement

4.20 The Textile Commission, under the Ministry of Textiles, facilitates firms in the industry to improve their quality levels and also get recognized quality certifications. Out of 250 textile companies that have been taken up by the Commission, 136 are certified ISO 9001. The other two certifications that have been targeted by the Textile Commission are ISO 14000 Environmental Management Standards and SA 8000 Code of Conduct Management Standards.

Foreign Direct Investment (FDI) Policy

4.21 100% FDI is allowed in the textile sector under the automatic route. FDI in sectors to the extent permitted under automatic route does not require any prior approval either by the Government of India or Reserve Bank of India (RBI). The investors are only required to notify the Regional Office concerned of RBI within 30 days of receipt of in word remittance. Ministry of Textiles has set up FDI Cell to attract FDI in the textile sector in the country. The FDI cell will operate with the following objectives:

- To provide assistance and advisory support (including liaison with other organizations and State Governments)
- Assist foreign companies in finding out joint venture partners.
- To sort out operational problems
- Maintenance and monitoring of data pertaining to domestic textile production and foreign investment.

Other Legislations Regarding the Textile Sector

4.22 Ministry of Finance has added 165 new textile products under duty drawback schedule. The new products included wool tops, cotton yarn, acrylic yarn, viscose yarn, various blended yarn/ fabrics, fishing nets, etc. Further, the existing entries in the drawback schedule relating to garments have been expanded to create separate entries of garments made up of (1) cotton; (2) man made fibre blend and (3) MMF. Separate rates have been prescribed for these categories of garments on the basis of composition of textiles.

A five-pronged strategy aiming to attract FDI by making reforms in local market, replacement of existing indirect taxes with a single nationwide VAT, liberalization of contract norms for textile and garments units, elimination of restrictions that cause poor operational and organizational performance of manufacturers, was suggested.

4.23 Proposals for modernization of NTC mills have been made to the consultative committee members, including formation of a committee of experts to improve management of these mills. Even the present status of jute industry was under the scanner of the consultative committee.

The Government had announced change from the value-based drawback rate hitherto followed to a weight-based structure for textile exports that will

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discourage raw material exports and also curtail the scope for misusing the drawback claims by boosting invoice value of exports.

NCDEX has launched its silk contract (raw silk and cocoon). With this launch, the total number of products offered by NCDEX goes up to 27. The launch of the silk contract will offer the entire suite of fibres to the entire value chain ranging from farmers to textile mills.

With the objective of protecting the interests of those affected by the WTO agreements and globalisation process, Government of India jointly with NCDEX has adopted a policy of encouraging future contracts of silk.

4.24 Some of the major acts relating to textile industry includes:

- Central Silk Board Act, 1948
- The Textiles Committee Act, 1963
- The Handlooms Act, 1985
- Cotton Control Order, 1986
- The Textile Undertakings Act, 1995

Government of India is earnestly trying to provide all the relevant facilities for the textile industry to utilize its full potential and achieve the target. The textile industry is presently experiencing an average annual growth rate of 9-10% and is expected to grow at a rate of 16% in value, which will eventually reach the target of US \$ 115 billion by 2012.

Chapter 5

SWOT Analysis of Indian Textile Industry

5.1 **SWOT** is an acronym for Strengths, Weaknesses, Opportunities and Threats. By definition, Strengths (S) and Weaknesses (W) are considered to be internal factors over which you have some measure of control. Also, by definition, Opportunities (O) and Threats (T) are considered to be external factors over which you have essentially no control.

5.2 SWOT Analysis is the most renowned tool for audit and analysis of the overall strategic position of the business and its environment. Its key purpose is to identify the strategies that will create a firm specific business model that will best align an organization's resources and capabilities to the requirements of the environment in which the firm operates. In other words, it is the foundation for evaluating the internal potential and limitations and the probable/ likely opportunities and threats from the external environment. It views all positive and negative factors inside and outside the firm that affect the success. A consistent study of the environment in which the firm operates helps in forecasting/ predicting the changing trends and also helps in including them in the decision-making process of the organization.

SWOT analysis of Textile Industry in India

5.3 The following is a brief SWOT analysis of Textile Industry in India:

(i) Strengths

- (a) India has rich resources of raw materials of textile industry. It is one of the largest producers of cotton in the world and is also rich in resources of fibres like, polyester, silk, viscose, etc.
- (b) India is rich in highly trained manpower. The country has a huge advantage due to lower wage rates. Because of low labour rates the manufacturing cost in textile automatically comes down to very reasonable rates.
- (c) India is highly competitive in spinning sector and has presence in almost all processes of the value chain.

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- (d) Indian garment industry is very diverse in size, manufacturing facility, type of apparel produced, quantity and quality of output, cost, and requirement for fabric, etc. It comprises suppliers of ready-made garments for both, domestic or exports markets.
- (e) Manufacturing capacity present across the entire product range, enabling textile companies and garmenters to source their material locally and reduce lead-time.

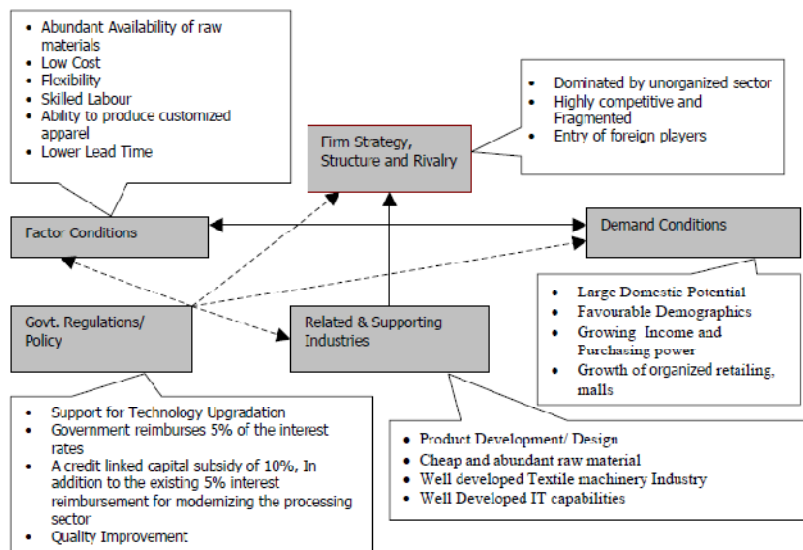
(ii) Weaknesses

- (a) **Fragmented industry:** Fragmented industry leading to lower ability to expand and emerge as world-class players. Huge unorganized and decentralized sector.
- (b) **Effect of Historical Government Policies:** Historical regulations thought relaxed continue to be an impediment to global competitiveness.
- (c) **Lower Productivity and Cost Competitiveness:**
 - (i) Labour force in India has a much lower productivity as compared to competing countries like china, Sri-lanka etc.
 - (ii) The Indian industry lacks adequate economies of scale and is therefore unable to compete with china, and other countries etc.
 - (iii) Cost like indirect taxes, power and interest are relatively high.
- (d) **Technological Obsolescence**
 - (i) Large portion of the processing capacity is obsolete
 - (ii) While state of the art integrated textile mills exists majority of the capacity lies currently with the power loom sector.
 - (iii) This has also resulted in low value addition in the industry.
- (e) Increased global competition in the post 2005 trade regime under WTO
- (f) Inadequate capacity of the domestic textile machinery manufacturing sector.
- (g) Big demand and supply gap in the training facilities in textile sector.

(iii) Opportunities

India's strong performance and growth in the textile sector is aided by several key advantages that the country enjoys, in terms of easy availability of labour and material, buoyant and large market demand, presence of supporting industries and supporting policy initiatives from the government. These advantages can be exhibited within the framework given in the figure below, and are further discussed in the subsequent sections.

Indian Textile Industry — Porter's Diamond Analysis



- (a) **Post 2011 challenges:** After the year 2011 is a huge opportunity that needs to be capitalized.
- (b) **Research and Development and Product Development**
- Indian companies need to increase focus on product development.
 - Newer specialized fabric- smart Fabrics, specialized treatment, etc.
 - Faster turnaround times for design samples.
 - Investing in design centers and sampling labs.
 - Increased use of CAD to develop designing capability in the Organization and developing greater options.

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- (vi) Investing in trend forecasting to enable growth of the industry in India.

(iv) Threats

- (a) Possibility of a global recession triggered by a weakening dollar.
- (b) Non-availability of indigenous textile machinery.
- (c) Lack of domestic capital and absence of appetite of domestic industries to invest in the quantities envisaged for 12 percent growth target.
- (d) Higher competition specially after 2008 when China cannot be restrained under WTO.
- (e) Sickness is widespread in the cotton textile industry. After the engineering industry, the cotton textile industry has the highest incidence of sickness. As many as 125 sick units have been taken over by the Central Government.

Miscellaneous

5.4 The industry faces a number of other problems like, power cuts, infrastructural problems, lack of finance, exorbitant rise in raw material prices and production costs, etc.

The Indian textile industry is currently one of the largest and most important sector in the economy in terms of output foreign exchange earnings and employment in India. The textile industry has the potential to scale new height in the globalized economy. The textile industry in India has gone through significant changes in anticipation of increased international competition. The industry is facing numerous problems and among them the most important ones are those of liquidity for many organized sector units, demand recession and insufficient price realization. The long range problems include the need for sufficient modernization and restructuring of the entire industry to cater more effectively to the demands of the domestic and foreign markets for textile as per the needs of today and tomorrow.

Chapter 6 Spinning

Spinning

6.1 **Spinning** is the process of creating yarn (or thread, rope, cable) from various raw fiber materials. Several fibers are twisted together to bind them into a strong, long yarn. Characteristics of the yarn vary based on the material used, fiber length and alignment, quantity of fiber used and degree of twist.

6.2 The process of spinning yarn falls into two distinct parts- Spinning Preparatory and Spinning Finishing. Preparatory processes involve mixing of raw material, cleaning and removal of waste, parallelization of sliver whereas finishing involves uniformation of yarn and insertion of twist.

Technical information and guidelines are given below based on the learning from personal experience and discussions with Technologists. This could be used as a guideline and can be implemented based on the trials taken at site. Some of this information can be disproved in some other applications, because many of the parameters are affected by so many variables. A same machine or raw material cannot perform in the same way in two different factories. This is because of the fact that no two factories can be identical. The individual processes are explained below in detail:

Blow Room - Removal of impurities and mixing

6.3 Basic operations in the Blow-room are as follows:

- Opening
- Cleaning
- Mixing or blending
- Micro-dust removal
- Uniform feed to the carding machine
- Recycling the waste

Fibre are drawn from the godown and in the given proportion fed into the bale breaker alongwith usable wastes if applicable. The raw material mix is passed through the beating points of the bale breaker which thrashes the

cotton and waste and removes impurities such as, sand leaves and seeds to be collected through a duct. The mixing then is taken to a separate room and fed into scutchers. The deliveries obtained from the scutcher are in the form of laps which look like, cotton sheets where these are weighed and dispatched to the card room.

Carding - Sliver formation in Rope Form

6.4 **Card** is the heart of the spinning mill" and "Well carded is half spun" are two proverbs of the experts. These proverbs inform the immense significance of carding in the spinning process. **High production** in carding to economise the process leads to reduction in yarn quality. Higher the **production**, the more sensitive becomes the **carding** operation and the greater danger of a negative influence on quality.

The following are purpose of carding:

- to open the flocks into individual fibres
- cleaning or elimination of impurities
- reduction of neps
- elimination of dust
- elimination of short fibres
- fibre blending
- fibre orientation or alignment
- sliver formation

In this process the laps are opened up to a stage where every fibre becomes individualized and the cotton is no more in an entangled state. The laps are processed by the card engines and the output obtained is in the form of a silver which is like a cotton rope. At this stage, three types of wastes known as (i) flat strips, (ii) cylinder and doffer strips and (iii) card fly are produced.

Draw Frame -Uniformation of Yarn

6.5 In this process, the fibres are straightened out and parallelized. A group of slivers are fed into draw frames twice and the delivery obtained at the second operation is ready to go to simplex frames. If combed yarn is to be spun, the carded silvers goes to combers and the output of the combers is fed into the draw frames twice.

6.6 Combing is an extra process introduced after carding and designed to parallelize the fibres and to remove the short fibres that are present in cotton so as to produce yarn which is more even, smoother, and freer from imperfection than carded yarn. Fine varieties are subjected to combing. The drawing operation is performed after this.

6.7 Drawframe is a very critical machine in the spinning process. It's influence on quality, especially on evenness is very big. If drawframe is not set properly, it will also result in drop in *yarn strength* and yarn elongation at break. The faults in the sliver that come out of drawframe *cannot* be corrected. It will pass into the yarn.

The factors that affect the **yarn quality** are as follows:

- the total draft
- number of drawframe passages
- break draft
- number of doublings
- grams/meter of sliver fed to the drawframe
- fibre length
- fibre fineness
- delivery speed
- type of drafting
- type of auto leveller
- auto leveller settings

The total draft depends upon following:

- material processed
- short fibre content
- fibre length.

6.8 Some facts derived from trials are as follows:

- Wider back roller setting will result in lower yarn strength.
- Wider back roller setting will affect yarn evenness.
- Wider back roller setting will increase imperfections.
- Higher back top roller loading will reduce yarn strength.

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- Higher back top roller loading will reduce end breakage rate.
- Wider front roller setting will improve yarn strength.

6.9 **Drafting wave** is caused primarily not by mechanical defects as such but by the uncontrolled fibre movement of a periodic type resulting from the defects. As the fibre-accelerating point moves towards the front rollers, the draft increases (and vice versa), so that a periodic variation in linear density inevitably results. With variable fibre-length distribution (with more short fibre content), the drafting irregularity be high.

More the number of doublings, lower the irregularity caused due to random variations. Doublings does not normally eliminate periodic faults. But it reduces the effects of random pulses. Doubling does not have any effect on index of irregularity also, since both the irregularities are reduced by square root of the number of doublings.

Fibre hooks influences the effective fibre length or fibre extent. This will affect the drafting performance. For carded material normally a draft 7.5 in both breaker and finisher drawframe is recommended. Seven of a draft can be tried in breaker, since it is a carded material. For combed material, if single passage is used, it is better to employ draft of 7.5 to 8. If combers with four doublings are used, it is better to use two drawframe passages after combing. This will reduce long thick places in the yarn.

In case of two drawframe passage, first drawframe passage will reduce the periodic variation due to piecing. Therefore, the life of servomotor and servo amplifier will be more, if two drawframe passage is used. Quality of sliver will also be good, because of less and stable feed variation.

Speed Frame

6.10 This forms the final stage in the spinning preparatory sequence of operations. The main object of this process is to reduce the silver bulkiness i.e. to attenuate it so as to be suitable for the yarn in the form of an attenuated strand of cotton with a little twist known as 'roving and is wound on bobbins'.

Roving machine is complicated, liable to faults, causes defects, adds to production costs and delivers a product that is sensitive in both winding and unwinding. The following parameters are very important in **SPEED FRAME**. They are as follows:

- Feed hank
- Delivery hank

- Roving tension
- Break draft
- Drafting system
- Bottom roller setting
- Top roller setting
- Condensers and spacers
- Twist in the roving
- Bobbin content
- flyer speed
- Creel and creel draft
- Drawframe sliver and cane
- Bobbin height
- Breakage rate
- Piecings.

Since modern Ringframes are capable of handling higher drafts in ringframe without quality deterioration, it is better to have coarser hanks in the speed frame. This helps to increase the production in speed frame.

Ring Frame - Ultimate Production

6.11 Spinning is the process of (i) continuing the drawings out of the roving so as to attain the desired degree of fitness; (ii) imparting sufficient twist to the emerging strands of fibres and forming continuous yarn; (iii) winding up the spun yarn into some convenient package form, usually on bobbins. The machine used for spinning yarn is known as ring frames. When the yarn has to be doubled either for weaving purpose or for sale, the requisite number of ply is first wound parallel and thereafter twisted on the doubling frame. The double yarn is obtained on bobbins and it is wound on cones.

6.12 Ringframe Technology is a simple and old technology, but the production and quality requirements at the present scenario puts in a lot of pressure on the Technologist to select the optimum process parameters and machine parameters, so that a good quality yarn can be produced at a lower manufacturing cost.

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Following are the points to be considered in a ringframe:

- Draft distribution and settings
- Ring and travellers
- spindle speed
- Twist
- lift of the machine
- creel type
- feed material
- length of the machine
- type of drive, above all.

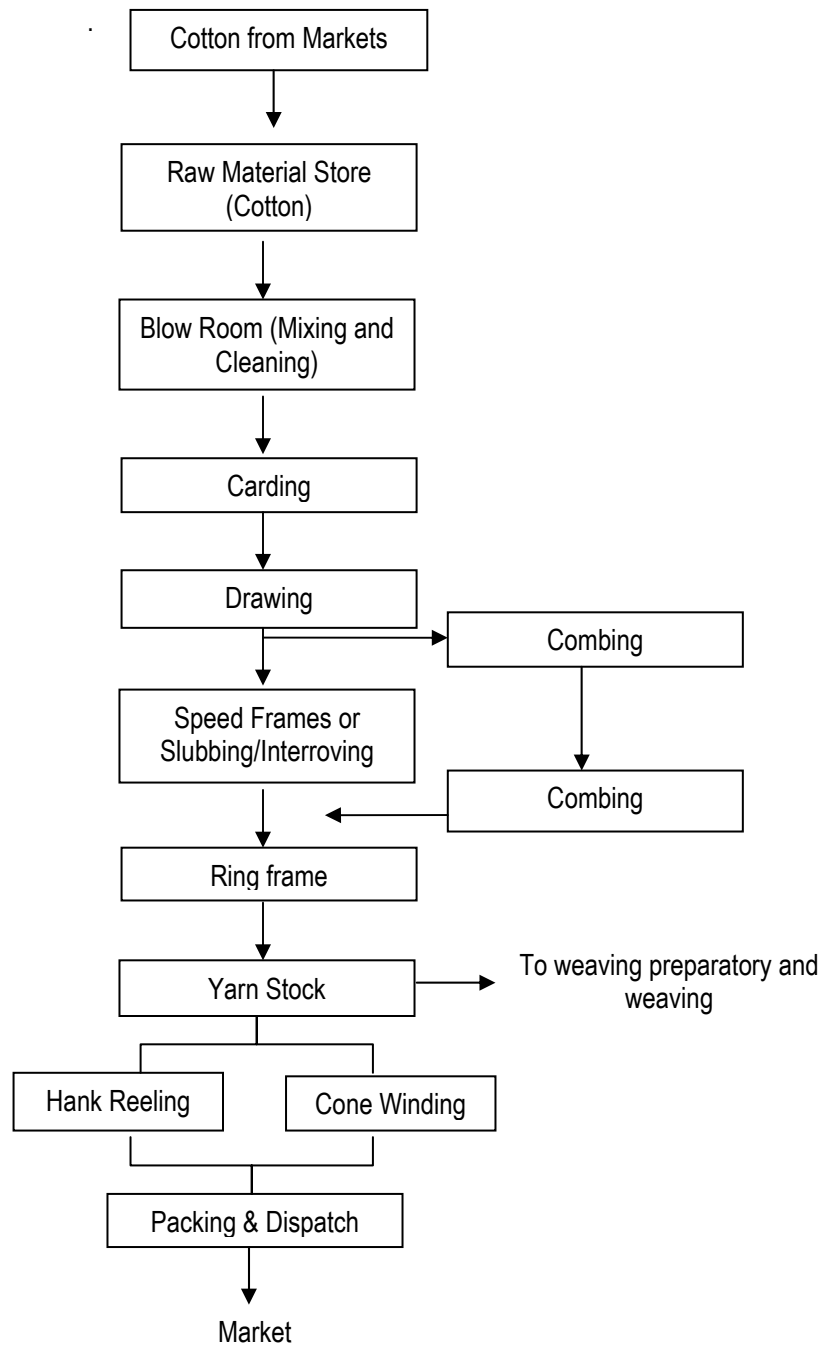
Cone Winding

6.13 The single or double yarn, as the case may be, intended for sale in hanks is reeled, bundled and baled. The yarn to be sold on cones is packed in bags or boxes after being wound on cones. The hard waste resulting from winding, doubling and reeling processes is collected and sent to the waste stores.

The yarn is measured in kilograms. The fitness of the yarn is determined on the basis of the counts, i.e., if 840 yards of the yards of yarn weigh 1lb it is 1s (s=count), if 2 x 840 yards weigh 1 lb, it is 2s and so on. Thus, under the count system, higher the number, finer is the yarn.

6.14 A flow chart showing the aforesaid processes is given in the following pages:

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Chapter 7

Weaving

Weaving

7.1 Weaving is an ancient textile art and craft that involves placing two threads or yarn made of fibre onto a warp and weft of a loom and turning them into cloth. The yarn for weaving is of two kinds namely, warp yarn and weft yarn. Warp yarn means the yarn running length-wise in the cloth, and the transverse threads in the cloth are called weft. The warp yarn should be stronger than weft yarn so as to withstand the stress and strain of shuttle movement at the time of weaving. This cloth can be plain (in one color or a simple pattern), or it can be woven in decorative or artistic designs, including tapestries.

Wrapping

7.2 The yarn is taken from number of cones, which are placed in a rack known as creel, and is drawn out in parallel on beams. This operation is called wrapping.

Sizing

7.3 In this process, sizing solution consisting of materials like, starch, maize, tallow, gum etc. is applied to give strength to the yarn and a bigger beam of more number of ends (threads) is made.

Drawing

7.4 The ends of the sized warp have to be drawn. The process of drawing-in-divides the warp into two sets of threads which are alternately moved up and down on the loom with each passage of the shuttle so as to result in the inter-lacing of the weft thread with the warp.

Loom

7.5 The section where the fabrics are woven is termed as 'loomshed'. Weaving is the process of interlacing of warp and weft threads on a loom. The weaving process consists of impelling a pirn of weft thread contained in a shuttle across the warp yarns from one side of the loom to another. The weft yarn laid down after each passage of the shuttle is beaten up against those previously laid down to form the fabric.

Looms may be either automatic or non-automatic. Plain cloth is woven on plain looms whereas drop-box looms are used for check weave, dobby looms for fancy cloth of limited choice and jacquard looms for patterns as in the case of furnishing fabrics.

In addition to warp and weft the construction of the cloth can also be expressed by specifying 'picks' and 'piece length'. 'Picks' refers to number of thread per inch in the weft yarn. 'Piece length' is the standard measure of cloth in metres.

Finishing/ Processing

7.6 Fabrics coming from the weaving department are seldom in a condition to be offered directly to the consumers. They may contain imperfections which give them a harsh lusterless and dis-coloured character; they may also be soiled and may have strains. The grey fabrics are subjected to wet processing in order to make it acceptable to the consumers. The successive stages in wet processing are briefly described below:

(i) **Batching**

The fabrics are first sewn so that continuous processing of large quantity of cloth can be carried out.

(ii) **Cropping and Shearing**

This process is employed to remove lint, dust, loose yarn, loops, hanging ends, etc.

(iii) **Singeing**

The fabrics are passed through a singeing machine with the object of burning off the fuzz or hairiness on the fabrics to obtain a smooth surface. After singeing, the fabric is led through a water trough to quench sparks which may have fallen on it.

(iv) **De-sizing/ Sourcing/ Bleaching**

The impurities in the fabrics such as, the sizing materials, fatty and oily substances, gums and mineral impurities are removed by employing the desizing process. Mineral impurities which are inherent in fibre are removed by sourcing. Bleaching helps to impart a white colour to the fabric. The bleached cloth may be sold as it is or after one or more of the followings processes.

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(v) Mercerizing

This process gives fabrics a high lustre more or less of permanent nature. The fabric is treated in a caustic soda solution of specific strength and temperature.

(vi) Dyeing

The dyeing process imparts colour to the whole of the fabric. Detailed process of textile dyeing is given in this chapter.

(vii) Printing

There are two methods of obtaining a coloured design or pattern on a piece of cloth, either by weaving coloured yarns or by printing. The latter method is more economical, faster and more versatile. Commonly employed methods for printings are roller printing and screen printings. In roller printing, the design is engraved on copper rollers. More than one colour printing is possible at a time by using as many as six copper rollers. The copper rollers are capable of being re-engraved a number of times. When the re-engraving becomes impossible, copper rollers are usually sold. Under the screen printings, screen or frames containing the design are manually pressed over the fabric repeatedly.

(viii) Finishing

After the process fabrics become distorted as they are stretched either in length or width, their surface may be rough and unattractive to the customers. Further, it may be necessary or desirable to give the fabrics some special characteristics such as, added resistance to shrinkage, high luster, etc., which they normally do not possess. Such treatments are carried out in the finishing department.

(ix) Folding, Packing and Bailing

The finished cloth is sent to the folding department where it is thoroughly inspected. It is then folded by a folding machine and stamped with specifications as required by the stamping regulations issued by the textile controller, and with brand name, trademark, etc. Finally, the cloth is packed in bales or cases which are then ready for dispatch to buyers.

7.7 In the course of packing grey or processed cloth cut piece of small length arise and these are grouped as under:

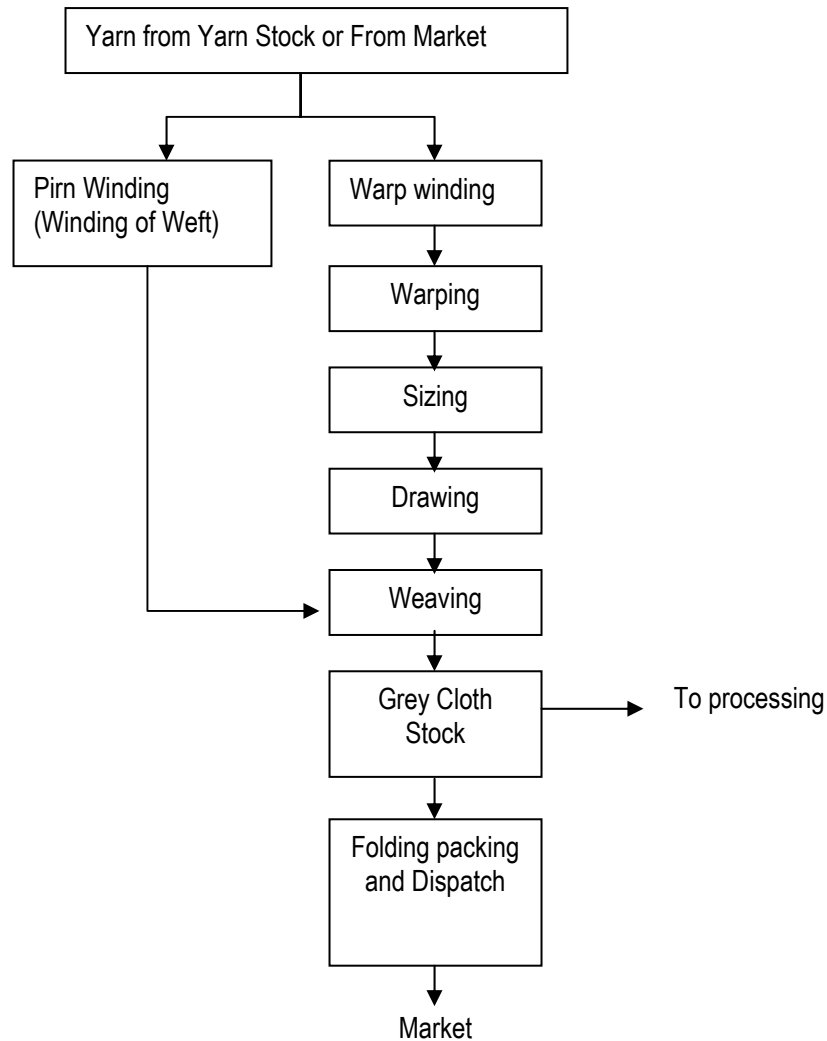
- (i) Fents: measuring a length of more than about 65 cm. but less than about 135 cm.

- (ii) Rags: measuring a length of more than about 23 cm and less than about 65 cm.
- (iii) Chindies: small cut pieces measuring less than 23 cm in length.

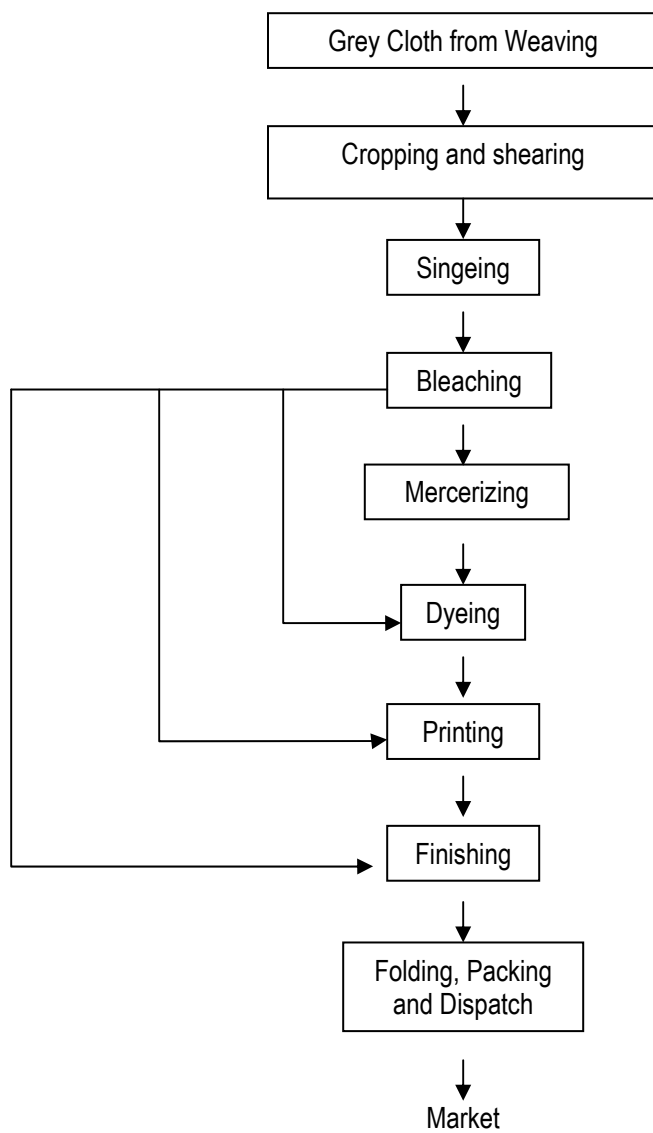
This classification, however, may vary according to the width of the cloth, and these materials are sold by weight.

Weaving Process

7.8 The following figure shows the steps in weaving process:



Processing



Textile Dyeing

Methods of Dyeing

7.9 In selecting the method of textile dyeing, the type of process used depends on several factors that include type of material like, fiber, yarn, fabric, fabric construction, garment, generic type of fibers, quality standards used in the dyed fabric, sizes of the dye lots, etc.

7.10 Batch Dyeing Process is the most popular and common method used for dyeing of textile materials. Batch dyeing is also sometimes referred to as *Exhaust dyeing*. This is because in this process, the dye gets slowly transferred from a comparatively large volume dye bath to the substrate or material that is to be dyed. The time taken is also longer. The dye is meant to 'exhaust' from dye bath to the substrate. In batch processes, textile substrates can be easily dyed at any stage of their assembly into the desired textile product. This includes fiber, yarn, fabric or garment. Some type of batch dyeing machines can function at temperatures only up to 1000°C. For example cotton, rayon, nylon, wool, etc. can be dyed at 1000°C or lower temperatures. While polyester and some other synthetic fibers are dyed at 1000 Centigrade or even higher temperatures.

7.11 There are three general types of batch dyeing machines which are:

- where there is circulation of fabric,
- where the dye bath gets circulated while the material that is being dyed remains stationary,
- where both the bath and material to be dyed gets circulated. Examples of dyeing machines that utilizes batch dyeing process are Beck, Jet, Jigs, Beam Package dyeing machines, etc.

Materials used in the Textile Dyeing Process

7.12 The materials that are used as inputs in textile dyeing and finishing process may include water, fibre, yarn or cloth. Examples are of wool, cotton, polyester, and a host of process chemicals that includes:

- Acids, e.g., acetic, formic.
- Alkalis- NaOH, potassium hydroxide, sodium carbonate.
- Bleaches- hydrogen peroxide, sodium hypochlorite, sodium chloride etc.
- Dyes, for example direct, disperse, pigment, vat.

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- Salts, e.g. NaCl.
- Size, e.g. PVA, starch.
- Stabilisers from sodium silicate, sodium nitrate also organic stabilizers.
- Surfactants
- Auxiliary finishes, like fire retardant, softeners.

Dyeing Process

7.13 Dyeing is the process in which a dye molecule gets thoroughly dissolved and dispersed in the carrier. It can be in water or some other carrier also, but it must be able to penetrate and colour the textile materials in the process. In the textile dyeing process, the dyeing is carried out at different stages like, polymer, yarn, fabric and garment or even at the product stage.

Optimizing the Batch Dyeing Process

7.14 For any dyers the ultimate dream is to get the maximum out of the process of dyeing, at minimal cost. For a batch dyeing process the following techniques can prove to be effective for optimum utilization:

- Use machinery that are fitted with latest state-of-the-art automatic controllers of fill volume, temperature and other dyeing cycle parameters, indirect system of cooling and heating, innovative hoods and doors that lessens vapor losses.
- Choosing the machinery that is exactly sized for the batch that needs to be processed. It should also be confirmed that it is operated exactly within the specified range of nominal liquor ratios for which it is designed. It has been seen that machines that are operated with a consistent liquor ratio while being loaded at 60% level of their nominal capacity gives optimum results. With yarn dyeing machines, this level can stretch to even 30% of the nominal capacity.
- Opting new machineries that adheres to the following requirements:
 - Liquor ratio that is low-or-ultra-low.
 - Complete in process separation of bath from substrate.
 - Mechanism that involves smooth internal separation of process liquor from the washing liquor.

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- Mechanical liquor extraction that brings the carry-over to minimum and improves washing efficiency.
- Reduced cycle duration.
- Replacement of conventional overflow-flood rinsing method with methods like drain and fill or other methods (for example, smart rinsing for fabric).
- Proper re-use of rinsed water for the next dyeing session.
- Re-use of the dye bath, if technical considerations allows.

Garment Manufacturing

8.1 Garment manufacturers are primarily engaged in the design, cutting and sewing of garments from fabric. Some manufacturers are contractors or sub-contractors, which generally manufacture apparel from materials owned by other firms. Some manufacturers are vertically integrated, producing the textiles from which they make garments, or even operating retail outlets too.

History of Garment Industry

8.2 First sewing machine was invented in the Victorian era, after the development of machine elite class use to have a seamstress who stitched the clothes for them on sewing machine. Before sewing machines everything was done by hand. The seamstresses went to the home of the woman who wanted to stitch the clothes. As industrial revolution started in the 19th century, garment too began to evolve but it was in its infancy and had no developed system for garment manufacturing. Seamstresses observed that they can develop standard patterns which can fit more than one woman. They developed a mathematical sizing system to accommodate most women with very few patterns. As businessmen, interested in lowering costs, they continued developing these patterns to become paper “information systems” engineered to control quantities of exact reproductions in cutting and stitching clothing in mass production systems.

8.3 The apparel industry grew from these tailors/ businessmen, as they built manufacturing factories for production, which pattern engineering accommodated. Pattern engineering grew a great industry in the early and mid-20th century. Pattern making was first taught to “apprentices” who were called “designers”. Creative designers of styles didn’t exist in the early 20th century. Paris was center of the developments in style and creation in garments at that time and many other countries copied from there. Later designers created booklets for teaching the pattern making systems mathematically – that came to be called “pattern drafting”. One disadvantage of mass production was that designers put little effort in bringing new designs and patterns but they either copied or else made very little changes. Even today the readymade garment industry does not brings too

many new ideas in the products rather it is creating mass garments to reduce cost. Garment industry has developed many new and time saving techniques, processes and machinery for the effective production today. The most important is the CAD/CAM which enables the designer, pattern maker, marker and grader to do their jobs precisely and effectively.

Organizational Areas in Garment Manufacturing

8.4 On industrial basis there are certain areas or sequence through which garments are manufactured. These are have been explained in detail is the following paragraphs.

Design/ Sketch

8.5 In the garment manufacturing the first step is designing the sketch for the dresses that have to be prepared. For this purpose, the designer first draw several rough sketches in the sketch book. The designer does not go for details at this moment but he rather lets his creativity flow on the paper and he draws many sketches. Later, these sketches are analyzed by a panel of designers. They finally select few out of them. These few sketches are rendered in detail separately or in the form of a single collection. The designer also draws working drawings along with the sketch. Working drawings are flat drawing of the sketch and it helps maker in understanding the patterns involved in the construction.

Pattern Design

8.6 The pattern maker now develop first pattern for the designs in any one standard size. This is made by pattern drafting method and the purpose of making this pattern is to create the sample garment for test fit.

Sample Making

8.7 The first patterns are sent to the sewing unit for assembling them into garment. This is usually stitched on calico or muslin which is an inferior quality of fabric and it reduces cost. This sample is constructed to analyze the pattern fit and design too. After the sample garment is stitched it is reviewed by a panel of designers, pattern makers and sewing specialists. If any changes have to be made they are made at this time.

Production Pattern

8.8 The pattern design is now taken for creating the production patterns. The production pattern is one which will be used for huge production of

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garments. The pattern maker makes the patterns on standard pattern making paper. These papers are made-up of various grades. The most important component, the tissue paper pattern, is made from the lightest and thinnest paper commercially available (it is not made at the pattern companies). It is called 7.5 lb (3.4 kg) basis paper, meaning that a ream of it (500 sheets) only weighs 7.5 lb (3.4 kg).

8.9 Garment patterns can be constructed by two means— manual method, or CAD/CAM method. Today many companies have developed CAD/CAM because of the ease of designing patterns, fluency and precision involved which cannot be guaranteed with the manual method. Investing once into the CAD/CAM unit is worth in itself. Many buyers around the world prefer manufacturers who are using CAD/CAM methods. The production patterns created in CAD/CAM can be stored easily and they can be modified at any point of time.

8.10 A garment sewing pattern or garment fabric and patterns draft is developed by calculating, taking account of the following measurements: -

- (i) Direct Sample.
- (ii) Specification Sheet/ Measurement Chart.
- (iii) Actual body size measurements
- (iv) Ease Allowances
- (v) Sewing Allowance.

These allowances are different for different type of fabrics and patterns.

Grading

8.11 The purpose of grading is to create patterns in different standard sizes. Grading a pattern is really scaling a pattern up or down in order to adjust it for multiple sizes. Pattern sizes can be large, medium and small or else there are standard patterns of size like, 10, 12, 14, 16 and so on for different figure and stature sizes. This is generally how we get S, M, L, XL and XXL sizing. Pattern grading by manual method is a cumbersome task because the grader has to alter the pattern on each and every point from armhole, to neckline, sleeve cap and wrist, etc. by using CAD it is much easier and faster.

Marker Making

8.12 The measuring department determines the fabric yardage needed for each style and size of garment. Computer software helps the technicians

to create the optimum fabric layout to suggest so that fabric can be used efficiently. Markers, made in accordance to the patterns are attached to the fabric with the help of adhesive stripping or staples. Markers are laid in such a way so that minimum possible fabric gets wasted during cutting operation. After marking the garment manufacturer will get the idea of how much fabric he has to order in advance for the construction of garments. Therefore, careful execution is important in this step.

Computer marking is done on specialized software. In computerized marking there is no need of large paper sheets for calculating the yardage, in fact, mathematical calculations are made instead to know how much fabric is required.

Spreading

8.13 With the help of spreading machines, fabric is stacked on one another in reaches or lays that may go over 100 ft (30.5 m) long and hundreds of plies (fabric pieces) thick.

Cutting

8.14 The fabric is then cut with the help of cloth cutting machines suitable for the type of the cloth. These can be band cutters having similar work method like, that of band saws; cutters having rotary blades; machines having reciprocal blades which saw up and down; die clickers similar to die or punch press; or computerized machines that use either blades or laser beams to cut the fabric in desired shapes.

Sorting/ Bundling

8.15 The sorter sorts the patterns according to size and design and makes bundles of them. This step requires much precision because making bundles of mismatched patterns can create severe problems. On each bundle there are specifications of the style size and the marker too is attached with it.

Sewing/ Assembling

8.16 The sorted bundles of fabrics are now ready to be stitched. Large garment manufacturers have their own sewing units and use it give the fabrics on contract to other contractors. Stitching in-house is preferable because one can maintain quality control during the processing. On the other hand, if contractors are hired then keeping eye on quality is difficult unless the contractor is one who precisely controls the process.

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8.17 There are what is called sewing stations for sewing different parts of the cut pieces. In this workplace, there are many operators who perform a single operation. One operator may make only straight seams, while another may make sleeve insets. Yet another two operators can sew the waist seams, and make buttonholes. Various industrial sewing machines too have different types of stitches that they can make. These machines also have different configuration of the frame. Some machines work sequentially and feed their finished step directly into the next machine, while the gang machines have multiple machines performing the same operation supervised by a single operator. All these factors decide what parts of a garment can be sewn at that station. Finally, the sewn parts of the garment, such as sleeves or pant legs, are assembled together to give the final form to the clothing.

Inspection

8.18 Open seams, wrong stitching techniques, non- matching threads, and missing stitches, improper creasing of the garment, erroneous thread tension and raw edges are some of the sewing defects which can affect the garment quality adversely. During processing the quality control section needs to check each prepared article against these defects.

Pressing/ Finishing

The next operations are those of finishing and/ or decorating. Molding may be done to change the finished surface of the garment by applying pressure, heat, moisture, or certain other combination. Pressing, pleating and creasing are the basic molding processes. Creasing is mostly done before other finishing processes like, that of stitching a cuff. Creasing is also done before decorating the garment with something like, a pocket, appliqués, embroidered emblems. etc.

Vertical and form presses is automated machines. Perform simple pressing operations, such as touching up wrinkles in knit shirts, around embroidery and snaps, and at difficult-to-reach places on garments.

Final Inspection

8.20 For the textile and apparel industry, product quality is calculated in terms of quality and standard of fibers, yarns, fabric construction, color fastness, designs and the final finished garments. Quality control in terms of garment manufacturing, pre-sales and posts sales service, delivery, pricing, etc are essential for any garment manufacturer, trader or exporter. Certain

quality related problems, often seen in garment manufacturing like, sewing, color, sizing, or garment defects should never be over looked.

(i) Sewing defects

Open seams, wrong stitching techniques, non-matching threads, missing stitches, improper creasing of the garment, erroneous thread tension and raw edges are some of the sewing defects which can affect the garment quality adversely.

(ii) Color defects

Variation of color between the sample and the final garment, wrong color combinations and mismatching dyes should always be avoided.

(iii) Sizing defects

Wrong gradation of sizes, difference in measurement of various parts of a garment like, sleeves of XL size for body of L size garment can deteriorate the garments beyond repair.

(iv) Garment defects

Broken or defective buttons, snaps, stitches, different shades within the same garment, dropped stitches, exposed notches and raw edges, fabric defects, holes, faulty zippers, loose or hanging sewing threads, misaligned buttons and holes, missing buttons, needle cuts or chews, pulled or loose yarn, stains, unfinished buttonhole, short zippers, inappropriate trimmings, etc., all can lead to the end of a brand name even before its establishment.

Packing

8.21 The finished garments are finally sorted on the basis of design and size and packed to send for distribution to the retail outlets.

Recent Developments in Garment Manufacturing

8.22 CAD and CAM are two technologies that have made prominent changes in the way garment manufacturing was done in previous eras. Today all large garment manufacturing companies have developed CAD/CAM system to do the process of garment manufacturing. CAD is an abbreviation for computer-aided design and CAM for computer-aided machine. CAD/CAM is computer software that controls the production of garments. In CAD the designer designs the garments by using any suitable software like, Adobe Photoshop, Adobe Illustrator, Corel Draw, etc and in

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CAM the cutters, sewers, graders and markers control the process of development.

The designer creates 2-D or 3-D model of design in CAD and CAM as a software numerically controls the machines that generates the production. There are several advantages of CAD/CAM over manual method of designing and production of garments which are as follows:

- The expense and time is reduced in a considerable manner when compared to the laborious manual work of designing.
- Designing can be done from anywhere as the designers are able to control the process from remote locations as well.
- The data can be easily stored, transmitted, and transported through computer files.
- Digital swatches can be saved on floppy disks, zip disks, CD-ROM or hard drive thus saving space. Moreover, they can be easily organized for fast and easy retrieval.
- The designs can be easily customized and personalized as corrections and editing can be done at any time without significant delays or cost increases.
- The designers don't need to produce swatches all the time as they can now see how a particular fabric or garment looks in different colors and shapes on computer screen itself.

Part III

Practice Guide for Internal Audit

Chapter 9

Internal Audit Processes

9.1 Standard on Internal Audit (SIA) 1, “Planning an Internal Audit” requires that the internal audit plan should be based on the knowledge of the entity’s business. While developing the internal audit plan, the internal auditor should have regard to the objectives of the internal audit engagement as well as the time and resources required for conducting the engagement.

Further, the internal audit plan should be comprehensive enough to ensure that it helps in achieving of overall objectives of an internal audit. SIA 1, “Planning an Internal Audit” specifies that the internal audit plan should cover areas such as:

- Obtaining the knowledge of the legal and regulatory framework within which the entity operates.
- Obtaining the knowledge of the entity’s accounting and internal control systems and policies.
- Determining the effectiveness of the internal control procedures adopted by the entity.
- Determining the nature, timing and extent of procedures to be performed.
- Identifying the activities warranting special focus based on the materiality and criticality of such activities, and their overall effect on operations of the entity.
- Identifying and allocating staff to different activities to be undertaken.
- Setting the time budget for each of the activities.
- Identifying the reporting responsibilities.

9.2 In case of textile industry, specific care should be taken to design the internal audit plan. Audit planning should be divided into annual audit planning and individual audit planning.

Annual Audit Programme

9.3 As it would not be possible for internal auditor to audit all departments of the organization within one audit cycle, it should develop a framework for identification of departments and functional areas that would be taken up for audit of 4 to 5 department in a quarter of the year so that one department could be covered at least once in a year. Such prioritization can be done based on risk analysis and materiality of the potential risk.

Important objectives of the annual audit plan are to:

- Ensure coverage of all key departments each year;
- Review periodicity of coverage at regular intervals;
- Resource planning; and
- Control redundancy in audits.

Internal auditor should prepare the annual audit programme sufficiently in advance, at least two to three months in advance, i.e., by January so that the auditee units can be informed accordingly. Also, the annual audit programme should be broken down into quarterly programmers and it should be so arranged that travel of audit teams should be optimized and there is a good mix of audits at state capital and districts in every quarter.

Planning Individual Audits

9.4 The internal auditor should plan the audit in a manner, which ensures that an audit of high quality is carried out in an economic, efficient and effective way and in a timely manner. While planning individual audits due considerations should be given to the information available in permanent audit files. In case of first audit, sufficient time should be given to the audit team to gain understanding of the departments. Plan shall consider availability of resources and skill levels and prior experience in conducting the audit of the said department. Preliminary planning involves the following:

- gathering basic understanding about the department, its operations and controls;
- identifying areas of internal audit focus through study of past audit reports, analytical review and assessing inherent risks;

- Identifying requirements of legal compliance required of the department.

Ideally, of the total available time, about 40 percent should be budgeted for planning.

Knowledge of the Entity and its Environment

9.5 Since internal audit is a key assurance function regarding organization's achievement of its objectives, internal auditor should have fairly good knowledge of the organization and its operations. This includes understanding the rationale of establishing the department, structure of the department, functions of the department, relation between secretariat office, head office and plant level offices.

9.6 Standard on Internal Audit (SIA) 15 "Knowledge of the Entity and Its Environment" lays down that in performing an internal audit engagement, the internal auditor should obtain knowledge of the economy, the entity's business and its operating environment, including its regulatory environment and the industry in which it operates, sufficient to be able to review the key risks and entity-wide processes, systems, procedures and controls. The internal auditor should identify sufficient, appropriate, reliable and useful information to achieve the objectives of the engagement. Such knowledge is used by the internal auditor in reviewing the key operational, strategic and control risks and in determining the nature, timing and extent of internal audit procedures.

Since internal audit is a continuing engagement, auditor should keep re-evaluating the knowledge gained in previous audits and keep updating the changes. Primary source of information about the department can be obtained through the following documents:

- Internal policies;
- Budget estimates, revised estimates and actual expenditure;
- Audited financial statements;
- Standard operating procedure manuals, departmental manuals, etc.;
- Organization charts and flow charts of processes;
- Annual reports,
- MIS reports.

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9.7 Internal auditor should use flowcharts, questionnaire or interview methods to obtain necessary information. Audit manager should ensure that members of audit team inculcate habit of gaining functional knowledge of the department throughout the course of audit and share information among themselves. Knowledge so gained should be used to interpret and correlate the contents of various financial and MIS reports prepared by the department.

Gathering knowledge of the various department is a continuous process that would help internal auditor in:

- Identifying inherent risk
- Determining materiality
- Develop audit plan and program
- Evaluating audit evidence
- Identification of areas of special consideration
- Identification of unusual transactions and fraud indicators
- Appropriateness of accounting principles applied.

Understanding controls

9.8 The auditor, in determining the extent and scope of the internal audit, should study and evaluate the reliability of internal control. After gaining understanding of the organization, auditor identifies key controls in conducting operations. Internal auditor should examine and evaluate the compliance to the controls specified in the various codes, manuals to assure effectiveness of controls in fulfilling the objectives of the organization.

9.9 Standard on Internal Audit (SIA) 12, "Internal Control Evaluation" lays down that the internal auditor should examine the continued effectiveness of the internal control system through evaluation and make recommendations, if any, for improving its effectiveness. The internal auditor should focus towards improving the internal control structure and promoting better corporate governance. The role of the internal auditor encompasses:

- Evaluation of the efficiency and effectiveness of controls;
- Recommending new controls where needed; – or
- Discontinuing unnecessary controls;

- Using control frameworks;
- Developing control self-assessment.

While the primary responsibility of administering effective controls lies with management, internal auditor provides assurance of effectiveness of controls. Internal controls extend beyond financial controls and envelop all the functional areas needed to achieve the set objectives of the organization. Objective of codes, manuals and guidelines is to safeguard operations from frauds, errors, irregularities besides ensuring the sound accounting and financial reporting. Thus, understanding these controls is imperative on the part of auditor.

Identification of Inherent Risk

9.10 Risks associated in the nature of operations of an organization in absence of controls are known as 'Inherent Risk'. Auditor should also try to know the reasons for existence of adverse conditions or highly favorable conditions such as, sudden increase in the budget of department or acquisition of high value capital items. Assessment of inherent risk depends on auditor's professional judgment and may be judged at two levels, i.e., macro level (environmental factors) and micro (account balance) level.

9.11 Environmental factors that substantiate the inherent risk are as follows:

- Integrity of the management (lower the integrity levels, higher the risk);
- Management's experience and understanding of the operations (inexperience of the management can lead to potential misuse by the staff);
- Unusual pressures to perform (unrealistic deadlines may cause management to take short cuts, make false claims, etc.);
- Economic conditions (lower economic activity can have impact on functioning of some of the departments like commercial taxes);
- Accounting factors that underpin the inherent risk would involve quality of accounting system (poor quality accounting is prone to more misstatements);
- Complexity of the transactions (huge engineering project may have more complexity in accounting than simple accounting of petty cash expenses);

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- Susceptibility of assets (assets like, cash are more susceptible to theft than say, building);
- Pressure to complete unusual and complex projects (routine transactions may be accounted with ease by the staff than unusual transactions).

Identify legal Compliances

9.12 *In conducting regularity (financial) audits, a test should be made of compliance with applicable laws and regulations. The internal auditor should design audit steps and procedures to provide reasonable assurance of detecting errors, irregularities, and illegal acts that could have a direct and material effect on the financial statement amounts or the results of regularity audits. The internal auditor also should be aware of the possibility of illegal acts that could have an indirect and material effect on the financial statements or results of regularity audits.*

9.13 Organisation should adhere to all legal requirements. For example, Income Tax Act requires an organization to deduct tax at source while paying salaries to employees, suppliers, etc. The details of such deductions need to be furnished to the tax authorities periodically. Similarly Provident Fund Act requires deduction of employee's contribution from salary and payment to PF authorities. In case of textile, permissions under Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act 1981, Explosives license for FO and Diesel, Boiler License, Factory License etc is important for which internal auditor should acquaint himself with the applicable legal provisions as one of the audit objectives is to assure adherence to legal provisions.

9.14 Standard on Internal Audit (SIA) 17, "Consideration of Laws and Regulations in an Internal Audit" deals with the internal auditor's responsibility to consider laws and regulations when performing an internal audit. For the purposes of this SIA, "Non-compliance" means acts of omission or commission by the entity, either intentional or unintentional, which are contrary to the prevailing laws or regulations. Such acts include transactions entered into by, or in the name of, the entity, or on its behalf, by those charged with governance, management or employees. Non-compliance does not include personal misconduct (unrelated to the business activities of the entity) by those charged with governance, management or employees of the entity.

Perform Analytical Procedures

9.15 Analytical procedures are tests like, trend analysis, ratio analysis, changes in account balances, etc. done to study plausible relationships between two sets of data to judge the reasonableness. For example, while auditing finance department, internal auditor may compute ratio of interest paid by company over total outstanding loans taken by the company. This relationship may show that average interest paid is around 8%. However, if it showed that interest amount was abnormally high as a proportion of total loans, the internal auditor would flag this for detailed check during the audit. Significant deviation from expected results may prompt auditor to enquire and plan audit procedures accordingly.

9.16 It should be remembered that analytical procedures can establish only reasonableness, and are not in themselves evidence of any misstatement or error. Hence, they are generally used in planning and review phases of audit. As per Para 7 of SIA 6 “Analytical Procedure”, in determining the extent to which the analytical procedures should be used, the internal auditor should consider the following factors, including:

- The significance of the area being examined.
- The adequacy of the system of internal control.
- The availability and reliability of financial and non-financial information.
- The precision with which the results of analytical procedures can be predicted.
- The availability and comparability of information regarding the industry in which the organization operates.
- The extent to which other auditing procedures provide support for audit results.

After evaluating the aforementioned factors, the internal auditor should consider and use additional auditing procedures, as necessary, to achieve the audit objective.

9.17 The following are the some of the established analytical procedures applied by the auditors while conducting audit in the textile company:

- Comparison of Target V/s actual production and sales
- Comparison of Power Consumption
- Comparison of Labour cost per Kg/per meter per month

Working Papers

9.8 Standards on Internal Audit (SIA) 3 “Documentation” states that 'Internal auditors should collect, analyze, interpret and document information to support audit results.' Working papers are the documents either created by the auditor or gathered by him during the course of audit. Their preparation and maintenance is one of the key processes of audit. It provides evidence on how the processes of audit have been carried out, and hence is the source of evaluation of the quality of audit.

Good practices suggest that auditor should document all important matters that provide evidence that audit has been carried out in accordance with the generally accepted auditing standards. The working papers aid internal auditors in planning, performing, and supervising and reviewing audit work. Working papers are also a good source of evaluation of the internal auditor's work by external auditors and for peer review.

9.19 As per Para 4 of Standard of Internal Audit (SIA) 3, “Documentation” internal audit documentation:

- Aid in planning and performing the internal audit.
- Aid in supervision and review of the internal audit work.
- Provide evidence of the internal audit work performed to support the internal auditor's findings and opinion.
- Aid in third party reviews, where so done.
- Provide evidence of the fact that the internal audit was performed in accordance with the scope of work as mentioned in the engagement letter, SIAs and other relevant pronouncements issued by the Institute of Chartered Accountants of India.

9.20 It is advisable to standardize audit working papers wherever possible. Correspondence with auditee, points/ records of entry and exit conferences, questionnaires, check lists, etc. are a few that can be standardized. Well designed working papers facilitates internal auditor to delegate work and review whether the work is performed in accordance with the plan or not. It also provides a means to achieve efficiency, consistency and quality of audit. However, standardization of working papers in all audit areas is not possible as the audit procedures keep varying depending on size and complexity of audit.

Permanent and Temporary Files

9.21 Internal auditor should divide files into permanent and temporary files for better management of working papers. Permanent audit file shall contain documents that hold good over several audit periods whereas temporary audit files shall have documents that are specific to a particular audit. Thus, permanent audit file would consist of:

- Audit charter;
- Basic information of the department like, organization structure, schemes under implementation and its geographical locations;
- Roles and responsibilities of the key posts in the department; and
- Laws, codes, rules, orders, etc., as applicable to the department in the discharge of its functions and source of evaluation for the auditor.

9.21 Internal auditor should maintain three temporary audit files for each audit:

(i) Section A: Final report

- Final and draft audit reports;
- Audit Plan (its various versions);
- Status of the follow-up of earlier observations;
- Audit Programme; and
- Reviews of the work done by assistants

(ii) Section B: Correspondence with Auditee

- Entry conference letter;
- Minutes of meetings of entry / exit conferences and other meetings; and
- communication with management and other external entities during the course of audit;

(iii) Section C: Preliminary Survey

- Rules, regulations, laws applicable to auditee;
- Financial and other information collected from/ about the department; and
- Organization charts, flow charts of processes, operating policies/ procedures.

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The internal auditor should develop a consistent and rational system of numbering permanent and temporary files. Temporary files should be maintained in ring folders with separator sheets that would set apart audit plan, sampling plan, each audit area (establishment, contingent charges, procurement, etc.), audit observations, replies from auditee, audit findings and finally the audit report. The internal audit paragraphs should be cross referenced to audit observations, and the audit evidence.

Chapter 10

Conducting Internal Audit

10.1 Internal audit commences with an **entry conference**, which is a meeting between the key personnel of the auditee unit (including the head of the office) and the internal auditors to create a constructive environment for the audit. The scope and flow of activities of the audit are communicated so that auditee department makes necessary arrangements for effective conduct of audit. The plan and the methodology of the audit may be discussed for better communication and support of the auditee. However, audits with an element of surprise do not have any entry conferences. During the opening conference, internal auditors should:

- Introduce the team members and explain the scope and methodology of the audit;
- Describe the process of raising the audit queries and their finalization including the time line for replies to be received from auditee;
- Request for the support (production of records, arrangements for seating the audit team, prompt response to audit queries, etc.) that is needed from the auditee;
- Identify the information/ records that would be needed and the contact points in the auditee's organization; and
- Elicit the concerns, questions and suggestions of the auditee (particularly, the head of office).

10.2 The entry conference sets the tone for effective audit by establishing effective communication lines with the auditee organization. It also helps the internal auditor to validate the information he had gathered during the planning stage and assess the attitude and perception of the key personnel towards controls.

Immediately after the entry conference, the internal auditor should submit a list of records that they would like the auditee to submit. Simultaneously, the internal auditor should collect additional information that would enhance their understanding of the organization.

Identification of Audit Areas

10.3 Internal auditor should develop individual worksheet for evaluation of control activities and procedures in internal controls. Internal auditor should list down all components of an audit area. For example, in audit of commercial taxes department, cash receipt could be on account of the following:

- Collection of taxes
- Collection of penalties
- Sale of an asset
- Recovery of advance given to an employee

Internal auditor should then identify assertions in each audit area. For example, in case of collection of tax, assertions include occurrence (no collection is accounted without actually being received), completeness (all tax collections have been accounted for and no transaction is left out unaccounted), and accuracy/valuation (amount is credited with actual value of money received – neither understated nor overstated and accounted under correct head of account) and compliance with law.

For each of the assertions, internal auditor should identify possible misstatement. These can be identified from the controls incorporated by the organization (through various codes and manuals). The internal auditor would then comment on the effectiveness of each of the controls.

10.4 Preparation of control evaluation sheet for individual area of audit may not be required in case of repetitive audit assignments. Standardized questionnaire may be used subject to periodical review of changes in the processes or legal requirements. However, disadvantage with questionnaire is loss of creativity. In questionnaire based audit, auditors tend to lose skills of identification of controls, constructing relation between assertions and audit objectives. In long run loss of importance of evidence, documentation etc. leads to fall in standards of audit. It is, thus, a good practice to identify assertions and controls, and also verify their effectiveness.

Review of Audit Plan

10.5 After entry conference, collection of additional information regarding the auditee and internal control evaluation, the internal auditors can review the audit plan and was prepared prior to commencement of the audit.

Monitoring Quality of Audit Work

10.6 The work of the audit staff at each level and audit phase should be properly supervised during the audit, and a senior member of the audit staff should review documented work. Monitoring quality of audit is an important task of team leader. On completing each task, audit staff shall submit individual work sheet for manager's review. Key responsibilities of audit manager include:

- Coordinating staff assignments – with specific reference to capabilities
- Monitoring progress
- Level of understanding of the audit staff
- Review of documentation
- Review of evidence gathered (i.e., sufficiency, objectivity, relevance and appropriateness)
- Resolving issues
- Review of preliminary risk assessment and change in audit program and procedures needed in light of audit finding.

10.7 In each audit area, the internal audit would first check compliance with the established internal control. If the compliance is poor, the auditor should conduct a larger substantive testing. To illustrate, it is expected that every item of store is issued against a valid indent (issue voucher). Compliance testing would involve checking a sample of issues to assess the extent of compliance with the above requirement, whereas substantive testing goes beyond compliance and sees whether the outcomes are as they should be i.e., whether actual physical balance tally with bin card or stores ledger in a sample of items. If the compliance is poor, the internal auditor would be required to conduct higher substantive testing to rule out errors or mischief.

10.8 Internal auditors would also decide at each stage how they would select the transactions for audit. As 100 percent of transactions cannot be verified, a sample of transactions needs to be selected. As far as possible, internal auditors should try to apply a scientific sampling technique. The internal audit should also include surprise check on some sections like, cash and stores.

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10.9 While the items that need to be reviewed during audit of a government department may vary slightly from organization to organization due to difference in the nature of activities and functioning, some items that are common to all departments are:

- Custody of cash
- Fixed assets and stores
- Cash Receipts
- Cash disbursements
- Establishment expenditure
- Pay and allowances
- Claims
- Pension
- Contingent bills
- Grants-in-aid
- Procurement and contracts
- Budgetary controls
- Assessment of computerized systems
- Assessment of risk of fraud.

Part IV
Risk Assessment and Internal Audit
Function in Textile Industry

Chapter 11

Enterprise Risk Management and Internal Audit

11.1 The business world is becoming increasingly complex due to new, evolving, and emerging risks. Organizations are giving risk management more consideration, but implementing an effective risk management program takes time and discipline. Internal auditors are finding they can play important roles in risk management. Specifically, Internal auditor have opportunities to:

- (i) Educate and train audit committees and management on risk and risk management concepts.
- (ii) Seek opportunities to perform more risk management consulting services in support of whoever is managing the risk management program, and formally communicate the results of those consulting services to the audit committee and management.
- (iii) Evaluate strategic risks; i.e., whether management has
 - Comprehensively identified key strategic risks,
 - Developed prudent risk management techniques to address those risks, and
 - Established sufficient monitoring of strategic risk “signposts” to identify risk occurrences in time to take the appropriate actions.
- (iv) Devote the time, resources, and leadership to developing internal audit teams so that they have the right level of skills and experience related to risk management.
- (v) Use third-party and other internal resources to supplement the risk management skills of the internal audit activity.

What is ERM

11.2 Value is maximized when management sets strategy and objectives to strike an optimal balance between growth and return goals and related

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risks, and efficiently and effectively deploys resources in pursuit of the entity's objectives.

Enterprise risk management encompasses:

- (i) *Aligning risk appetite and strategy* – Management considers the entity's risk appetite in evaluating strategic alternatives, setting related objectives, and developing mechanisms to manage related risks.
- (ii) *Enhancing risk response decisions* – Enterprise risk management provides the rigor to identify and select among alternative risk responses – risk avoidance, reduction, sharing, and acceptance.
- (iii) *Reducing operational surprises and losses* – Entities gain enhanced capability to identify potential events and establish responses, reducing surprises and associated costs or losses.
- (iv) *Identifying and managing multiple and cross-enterprise risks* – Every enterprise faces a myriad of risks affecting different parts of the organization, and enterprise risk management facilitates effective response to the interrelated impacts, and integrated responses to multiple risks.
- (v) *Seizing opportunities* – By considering a full range of potential events, management is positioned to identify and proactively realize opportunities.
- (vi) *Improving deployment of capital* – Obtaining robust risk information allows management to effectively assess overall capital needs and enhance capital allocation.

These capabilities inherent in enterprise risk management help management achieve the entity's performance and profitability targets and prevent loss of resources. Enterprise risk management helps ensure effective reporting and compliance with laws and regulations, and helps avoid damage to the entity's reputation and associated consequences. In sum, enterprise risk management helps an entity get to where it wants to go and avoid pitfalls and surprises along the way.

Components of Enterprise Risk Management

11.3 Enterprise risk management consists of eight interrelated components. These are derived from the way management runs an

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enterprise and are integrated with the management process. These components are:

- (i) ***Internal Environment*** – The internal environment encompasses the tone of an organization, and sets the basis for how risk is viewed and addressed by an entity's people, including risk management philosophy and risk appetite, integrity and ethical values, and the environment in which they operate.
- (ii) ***Objective Setting*** – Objectives must exist before management can identify potential events affecting their achievement. Enterprise risk management ensures that management has in place a process to set objectives and that the chosen objectives support and align with the entity's mission and are consistent with its risk appetite.
- (iii) ***Event Identification*** – Internal and external events affecting achievement of an entity's objectives must be identified, distinguishing between risks and opportunities. Opportunities are channeled back to management's strategy or objective-setting processes.
- (iv) ***Risk Assessment*** – Risks are analyzed, considering likelihood and impact, as a basis for determining how they should be managed. Risks are assessed on an inherent and a residual basis.
- (v) ***Risk Response*** – Management selects risk responses – avoiding, accepting, reducing, or sharing risk – developing a set of actions to align risks with the entity's risk tolerances and risk appetite.
- (vi) ***Control Activities*** – Policies and procedures are established and implemented to help ensure the risk responses are effectively carried out.
- (vii) ***Information and Communication*** – Relevant information is identified, captured, and communicated in a form and timeframe that enable people to carry out their responsibilities. Effective communication also occurs in a broader sense, flowing down, across, and up the entity.
- (viii) ***Monitoring*** – The entirety of enterprise risk management is monitored and modifications made as necessary. Monitoring is accomplished through ongoing management activities, separate evaluations, or both.

11.4 Enterprise risk management is not strictly a serial process, where one component affects only the next. It is a multidirectional, iterative process in which almost any component can and does influence another.

Internal control is an integral part of enterprise risk management. This enterprise risk management framework encompasses internal control, forming a more robust conceptualization and tool for management.

Internal Auditing's Role With Strategic Risks

11.5 Standard on Internal Audit (SIA) 13, "*Enterprise Risk Management*" specifies that the role of the internal auditor in relation to enterprise risk management is to provide assurance to management on the effectiveness of risk management. Due consideration should be given to ensure that the internal auditor protects his independence and objectivity of the assurance provided. The role of the internal auditor is to ascertain that risks are appropriately defined and managed. The scope of the internal auditor's work in assessing the effectiveness of the enterprise risk management would, normally, include:

- assessing the risk maturity level both at the entity level as well as the auditable unit level;
- assessing the adequacy of and compliance with the risk management policy and framework and for the risks covered by the internal audit plan;
- Assessing the efficiency and effectiveness of the risk response; and
- Assessing whether the score of the residual risk is within the risk appetite.

11.6 An internal auditor can help the to organization to adopt a more strategic risk management focus. It includes:

- Ensuring that the risk assessment identifies those risks presenting the most significant risks to shareholder value.
- Facilitating risk management discussions across the organization.
- Viewing risk management as a core competency and ensuring that auditors receive appropriate training on risk and risk management practices.

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- Reviewing business plans to determine whether they assess the risks embedded in their strategies and have risk monitoring and trigger points.
- Reviewing the annual report to determine whether risks are addressed appropriately.
- Continuously monitoring and assessing stakeholder expectations relative to risk and risk management, as well as assisting in the education of these stakeholders.
- Building a stronger relationship with other risk and control business functions to drive an enhanced process to identify emerging risks.
- Identifying and sharing best practices in risk management.

Chapter 12

Identification of Major Risks in Textile Industry

12.1 In the following chapter, a brief description of risks associated with textile industry are given for general guidance. It should be remembered that internal audit is always dynamic as there are new instructions, processes, procedures, and so on. Internal auditors should not take them as definitive and they should supplement them as required.

Global Risk

12.2 In India the Port infrastructure is at present highly insufficient. Also shipping a container of garments from India to the US is costlier in India compared to other Asian Countries. Non-availability of direct sailing vessels also increases transit time. Further, delays and inefficiencies in Indian Ports compared to other Asian Countries add huge disadvantage to Indian exports. China enjoys 13 % cost advantage in shipping garments from Shanghai to US East Coast and an overall advantage of 37 %. The export from aircrafts is still quite expensive but saves a lot of time.

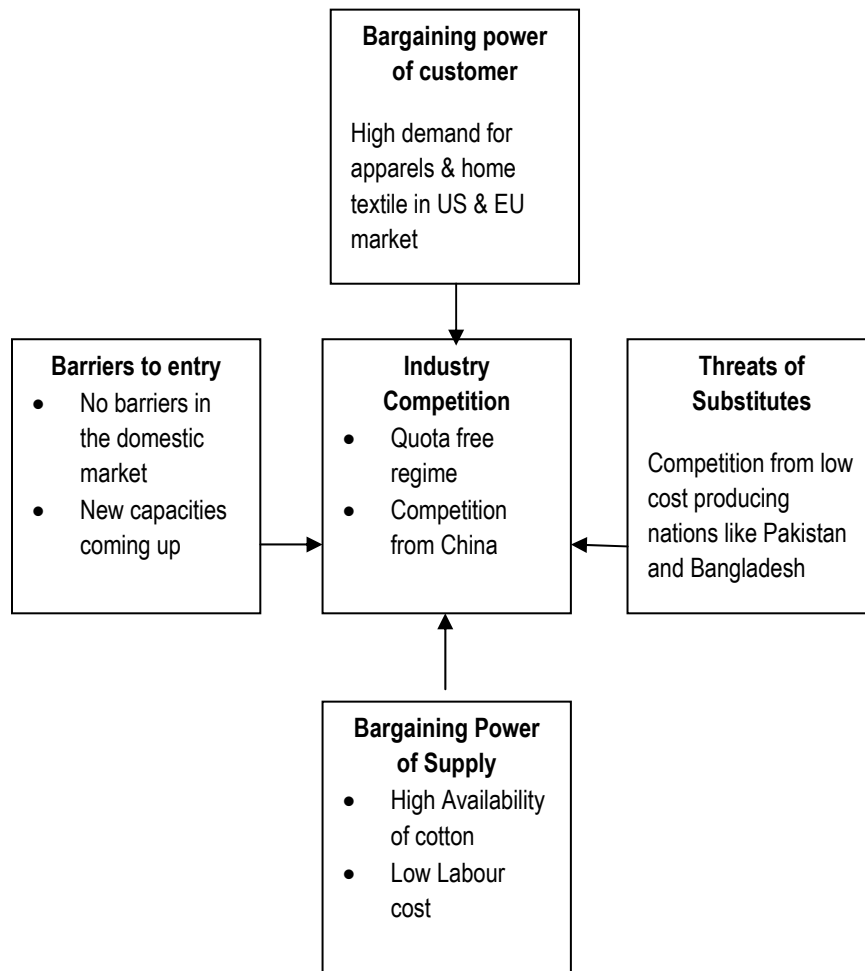
Two critical factors that cause problems to Indian textile industry are

- India has a very old and fragmented textile industrial infrastructure.
- India a totally inadequate and small service infrastructure for textiles.

To overcome this infrastructure problem it is advisable to —

- Increase the size of the industrial infrastructure, to capture the efficiencies of the economies of scale, and it must cluster the textile production.
- Create the infrastructure to service the needs of European textile markets.

12.3 Let us analyze the Indian textile industry through the **Porter's five-factor model**.



Bargaining Power of Customers (Demand Scenario)

12.4 With the dismantling of quotas, global textile trade is expected to grow. Although China is likely to become the 'supplier of choice', other low cost producers like, India would also benefit as the overseas importers would try to mitigate their risk of sourcing from only one country. The two-fold increase in global textile trade is also likely to drive India's exports growth. India, in particular, is likely to benefit from the rising demand in the home textiles and apparels segment, wherein it has competitive edge against its neighbor. Nonetheless, a rapid slowdown in the denim cycle poses risks to fabric players.

Bargaining Power of Suppliers (supply scenario)

12.5 India is the second largest producer of cotton in the world after China and has the largest area under cultivation. Cotton, a key raw material in the textile and garment industry, India has an abundant supply of locally grown long staple cotton, which lends it a cost advantage in the home textile and apparels segments. Other countries, like China and Pakistan, have relatively lower supply of locally grown long staple cotton. Low cotton prices due to a bumper cotton crop would enable India to lower its production cost and sustain pricing pressure.

Threat of New Entrants

12.6 In the quota free regime, capacity expansion is the name of the game in the textile sector. Resultantly, smaller players who cannot venture into the global markets are flooding the domestic markets with excess supply, thus weakening the pricing scenario.

Threat of Substitutes

12.7 Low cost producing countries like, Pakistan and Bangladesh (labour cost 50% cheaper) are also posing a threat to India's exports demand.

Competitive Rivalry

12.8 India's logistic disadvantage due to its geographical location can give it a major thumbs-down in global trade. The country is distant from major markets as compared to its global competitors like, Mexico, Turkey and China, which are located in relatively close vicinity to major global markets of US, Europe and Japan. As a result, high cost of shipments and longer lead-time coupled with lack of infrastructure facility may prove to be major hindrances.

Political Risk

12.9 Political risk may be defined as the probability that a political event will impact adversely on a firm's profit. The risk that a new law or a change in an existing law could have a significant impact on an investment. Whatever laws the government passes today may not be extinct tomorrow. Political risk represents the financial risk that a country's government will suddenly change its policies.

12.10 Political risk covers:

- Restriction on remittances in the buyer's country or any government action which may block or delay payment in rupees to the exporter.
- War between the buyer's country and India.
- War, revolution or civil commotion in the buyer's country.
- Imposition or new import licensing restrictions in the buyer's country or cancellation of a valid import license.
- Additional handling, transport charges due to interruption or diversion of voyage, which cannot be recovered from the buyer.
- Any other kind of loss occurring outside India and not within the control of the export or the buyer.

12.11 It is important to note that political risk is always present since the firm exists only at the pleasure of the sovereign nation. Political structure and political events impact significantly on executive decisions. wars; riots, expropriation of property; assassinations and revolutions are obvious examples of events that can change the business environment radically. Expropriation probably is the extreme form of political risk, when a nation expropriates, it formally takes over the property of the firm, with or without payment. Less obvious, but very important are changes in government policy affecting the conditions of market entry and continued operations.

12.12 The export marketer needs to evaluate both the probability of a political event that may change the environment, and also the probability that the event will impact on the exporting firm. Following are some examples:

- The long-term capital gains tax has been changed 5 times in the last 20 years with the most recent cut at 20%.
- There is no insurance cover available for war risk in advance. It is therefore, necessary that government should take up such issues with the buyer country at the government level so that the supplier is not put to losses. Many cases have happened in case of war between Iran and Iraq.
- Anti-dumping duty in case of Peru.
- The supply chain in India is highly fragmented mainly due to government policies and lack of coordination between industry and trade bodies. Existence of large number of intermediaries adds to the

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cost but also lengthen the lead times. The countries who have significantly consolidated their supply chain are globally competitive.

12.13 The main challenge is shorter lead-time, Several of our competing countries have substantially shorter transit times to Europe and USA, which are the main markets. Non-availability of direct sailing vessels and excessive government holidays (currently about 160 days a year including Saturday and Sunday's) also lead to a lot higher transit times from Indian ports. Most of Indian Garment exports being fashion garments, have very limited shelf life, hence it is important to device ways to deliver it to our customers in the quickest possible time.

So the garment export companies recommend that all apparel shipments be given the status of perishable items, so that it can be custom cleared on top priority, 24 hours a day and 365 days a year, this will put export shipments on sailing vessels or flying aircrafts, without any waste of time, to match or shorten the lead-times to various foreign destinations.

Operational Risk

12.14 Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events. Although the risks apply to any organization in business, it is of particular relevance to the banking regime where regulators are responsible for establishing safeguards to protect against systemic failure of the banking system and the economy. It is associated with systems, processes, people and covers such as, succession planning, human resources, information technology, control systems and compliance with regulations.

12.15 In day to day business affairs, besides transaction related like credit risk & market risks, another important category are operational risk. This risk signifies that for an organization to continue its operations, some external events like natural disasters, political and military turmoil, not directly connected with the organization may affect its well being.

Operational risk may be defined into two angles as follows:

- “Operational risks are all those risks which cannot be classes as credit or market risks.”
- “Operational risk is an expression of the danger of unexpected direct or indirect losses resulting from inadequate or failed internal process, people and systems or from external events”.

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12.16 This risk covers:

- External fraud- theft of information, hacking damage, third-party theft and forgery Business disruption & systems failures- utility disruptions, software failures, hardware failures.
- Execution, delivery, & process management – data entry errors, accounting errors, failed mandatory reporting, and negligent loss of client assets.
- A 1999 survey of the fortune by Mercer management consulting in Boston reveals that operational risk accounted for a loss of 31% of the enterprises.

12.17 Some example of operational risks are as follows:

- The companies' cash transactions are directly feed in the system, if there is fault in feeding the information then the management is not able to calculate the cash in hand and other cash dealings so they are in critical situation to take decisions regarding cash flows.
- The companies are getting the conformation from the buyer regarding the design, colour are done through the electronic mail transfer if there is a network problem in net then the conformation will get delay so the production also get delayed.
- The money transfer from buyer are done through banks and all the banking system are now computerized so the network problem in banks or system failure will lead to delay in payment to the parties and purchase of raw materials which lead to production problem.

Employee/ Worker Health Risk

12.18 Health and safety issues are a constant problem in the textile industry. It is very necessary for the management to develop the Labour welfare condition, which will motivate the employees to do more and will help to achieve the satisfaction. This risk covers

- Illnesses
- Infections
- Injuries

12.19 The work environment in a majority of the units is unsafe and unhealthy. The people working in such poor or standard environmental prone to occupational diseases. These illnesses are due to– excessively high

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temperature or very low temperatures; dust; inadequate ventilation; inadequate lighting; excessive noise; lack of fire-fighting equipment; blocked exits; bad sanitation; unhygienic canteens; and lack of drinking water. The types of illnesses, which may affect the employees in company, are fevers, headaches, eyesight problems, skin allergies, kidney infections, backache, stomach cramps, breathing difficulties and constant exhaustion.

12.20 It is not just workers' physical health that is undermined by these conditions but also their mental and emotional health as a result of excessive hours, unsustainable work intensity due to high quotas as well as verbal and psychological harassment from management. Employees are the people who work in the established infrastructure. When they are comfortable with the furniture and machinery with which they are working, the result will be perfect. Uncomfortable furniture leads to trouble. The physical effects of the employee's conditions are worsened by sitting bent over a sewing machine on stools and broken chairs or using a heavy iron all day. If the employees are forced in their work place to complete their work, they might have to meet with accidents. Forced position is also a critical factor in the work environment.

12.21 Implicit overtime is when workers are not directly asked to perform overtime but know that they are not free to leave at the end of the day. This can be as a result of management's attitude or because quotas are so high that it is impossible to finish them during the working day, so workers are obliged to work overtime. Even though the labor laws are not strict the social welfare of the workers are being looked after by the companies. Also the buyers insist for social audits to be conducted by the third audit, if they found any default then the buyers company cancel the order which they gave.

12.22 Benefits of Employee risk management are as follows:

- Labour turnover and absenteeism are reduced to the minimum.
- Minimizing industrial disputes and peace.
- Creating permanent and settled labour force.
- Improvement in the efficiency of workers.
- Reducing damages to equipment, machinery and workers.
- Medical inspection is provided to the employees.

Worker's efficiency is considerably enhanced when they feel safety in work environment. Workers begin to feel interested in their work when they find

that they are being well looked after by their employers. Thus, their morale is raised and industrial relations improve.

Purchasing Power Risk

12.23 The loss of purchasing power due to the effects of inflation. When inflation is present, the currency loses its value due to the rising price level in the economy. The higher the inflation rate, the faster the money loses its value. This risk is also known as inflation risk.

For example, the cotton textile industry is dependent in the vagaries of nature. Availability of the required quality and quantity of cotton is critical for business and any damage or fall in crop production can adversely impact the price of cotton, which can impact business performance and profitability. Last Year in June, 2011 cotton prices are suddenly downfall and companies who were stocking the cotton equal to six month consumption have significant financial impact in view of cost of finished product and sale price.

Technology Risk

12.24 Many institutions such as banks, investment management firms, insurance companies, brokerage firms, technology is a critical component of any risk management initiatives for institutions which rely heavily on technology, there is always a risk technology becoming the focus on risk management. Technology can response corporate cultures and facilitates innovative procedures.

12.25 The Indian textile sector weakness is their industrial technologies and process because of this reason for the next five years china will be the strongest manufacturing center. China has built up a very efficient & scalable system for sourcing fabric and manufacturing garments using recent technology.

In order to survive in the highly-competitive market, India's cotton-centric textile manufacturers need to focus on upgrading their machinery besides creating new facilities and additional capacities. They require better machinery. Though domestic machines are competitive in terms of quality and price, the delivery schedule, which even extends to two to three years, is a matter of concern. Chinese machines require a delivery time of only four to six months; the Indian textile machinery manufacturers are not able to bridge the demand-supply gap.

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12.26 The government of India has to extend the technology up gradation fund scheme in order to support industry. The Indian textile industry has to invest heavily in systems and technology to reduce costs and lead times, also development of collaborative links between customers, vendors and partners to make the supply chain more efficient.

For example, the specialty work of companies garments are hand embroidery, sequence works, crochet works etc, now china is producing garments in different varieties using various technologies this lead to reduce the export of garments from India.

Counter Party Risk

12.27 The risk that the other party in an agreement will default is known as the counter party risk. In an option contract, the risk to the option buyer that the writer will not buy and sell the underlying as agreed. In general, counter party risk can be reduced by having an organization with extremely good credit act as an intermediary between the two parties.

This risk covers following:

- Insolvency of the buyer.
- Buyer's protracted default to pay for goods accepted by him
- Buyer's failure to accept goods, subject to certain conditions.
- Buyer's failure to obtain necessary import or exchange authorization from authorities in his country.

For example, the companies are allowing 30 days credit to the buyers and because of delay in payment by buyer the Indian companies are not able to continue their further production for next order and not able to settle their credit.

Company Risk

12.28 Company risk is the risk that the individual company in which you invest will fail to perform as expected. This risk also includes the uncertainty associated with business firms operating environment and reflected in the variability of earnings before interest and taxes.

Due to the lack of planning, coordination and because of no systematic process many loss arise in the companies. The competition among the Indian companies are more and the new companies are not in a position to withstand these competitions. Some examples are as follows:

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- The growing companies are planned to open their branch in some other place if they didn't plan correctly and invest their money, loss will arise and they may fail in their business.
- Due to lack of systematic process of where to give for designing the garment i.e. finding the right person for the designing purpose they are delay in shipment.
- There are so many competitors for the company & so because of that there arise a problem for fixing the price for Yarn/ Fabric/ garments in order to capture the market.

Hazard Risk

It is related to natural hazards, accidents and fire that can be insured.

This risk covers

- Natural disaster
- Air pollution
- Water pollution
- Soil pollution
- Land pollution. etc.

Following are some examples of haryard risk:

- The shipments are done through the waterways or airways. So the natural disaster such as tsunami, cyclones may affect.
- The ship may starve, sunk or burnt.
- There are about 750 dyeing and bleaching units in Tirupur causing ground water pollution and effluents generated by these units are discharged into Noyyal River. The units have still not found suitable technology for treating effluents, including dissolving of salts. Discharging into oceans is not economically affordable.

12.30 The usual procedure, therefore, is to have an "all risk policy". It is not worthwhile for an exporter to try to save on premium payments and hence a less comprehensive policy because a few banks, negotiating letters of credit, accept such a policy. This risk is unavoidable and it cannot be transferred but this risk can be mitigated or accepted. Mitigation is a control approach that attempts to reduce the impact of an exploited vulnerability. Acceptance of

risk is the choice to do nothing to protect an information asset and to accept the outcome from any resulting exploitation.

Currency Risk

12.31 "Currency risk arises due to uncertainty in exchange rates". Currency risk is a form of risk that arises from the change in price of one currency against another. Whenever investors or companies have assets or business operations across national borders, they face currency risk if their positions are not hedged. The risk that a business operations or an investments value will be affected by changes in exchange rates. These risks usually affect business, individual investors who make international investments. This is also called as exchange rate risks. The fluctuations in the exchange rate are caused basically by the supply of and the demand for the currencies being exchanged.

Effect of Exchange Fluctuations

12.32 When quoting prices in terms of the foreign currency, the exporter knows how many rupees are to be received at the current rate of exchange. However, when the customer pays in sterling pounds, pesos, US dollars, Japanese yen or some other acceptable currency, the amount received in terms of rupees will depend upon the rate of exchange when the currency is converted. When the price is quoted in the foreign currency, the exporter accepts the risk of exchange fluctuations. Unless steps are taken to protect expected profits, a decline in exchange rates may reduce profits or even convert them into a loss.

12.33 The most completed safeguard against unfavorable exchange fluctuations is when payment is to be made in their domestic currency, but even then they have an interest in exchange fluctuations. Fluctuations following the closing of the sales contract may be so unfavorable that the foreign customer may refuse to accept the delivery, or unwilling to meet the financial obligations. Thus the exchange rate obligations rate fluctuations may increase the exporter's credit and commercial risks

Any government measures affecting the volume of exporters and importers influence exchange rates. A country may restrict the importation of certain goods in conformance with its economic development programmed in order to conserve foreign exchange for projects with a higher priority, furthermore protective tariff rates, import quota, license requirements, export subsidies,

governmental price control and trade agreements all imply a certain amount of exchange control.

12.34 The exchange risk associated with a foreign denominated instrument is a key element in foreign investment. This risk flows from differential monetary policy and growth in real productivity, which results in differential inflation rates. The hurdle in the path of growing textile exports from India is Artificial pricing of the Chinese Currency: which is giving undue advantage to the Chinese industry in the Global Market. Hardening of the Indian Rupee against US\$ has also seriously affected and eroded the bottom-lines of textile and garment exporting companies. If government offers income- tax exemption to the textile industry in particular for the next 5 years, so that, the export companies are more equipped to face undue competition from China and other competing nations.

Price Risk

12.35 Risk resulting from the possibility that the price of security or physical commodity may decline. Price risk is defined as “The risk that the value of a security or portfolio of securities will decline in the future”.

The Indian exporter faced competition internationally and also from within the country. This has lead to intense pressure on the profit margin for Indian exporters and buyers were squeezing the prices every year. A product pricing strategy by which a firm charges the highest initial price that customer will pay. As the demand of the first customers is satisfied, the firm lowers the price to attract another, more price-sensitive segment. Therefore, the skimming strategy gets its name from skimming successive layers of cream or customer segments, as prices are lowered over time. Government intervention to set an artificially high price through the use of a price floor designed to aid producers. It's the risk that you will lose money due to a fall in the market price of a security that the company own.

Financial Risk

12.36 It is the uncertainty associated with how firms finance its business. Finance for the exporters is needed at following four stages:

- 1st an exporter may need finance to develop an exportable product.
- 2nd finance is needed to upgrade export production through acquisition of new equipments, new technology.

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- 3rd pre-shipment is needed to acquire inputs that get converted into an export product.
- 4th finance is needed for systematic marketing activities.

This risk is divided into 3 types

- Credit risk
- Liquidity risk
- Settlement risk.

12.37 **Credit risk** refers to the company or governments inability to repay principal plus interest to the bondholder in a timely manner. This credit risk is also known as default risk. Credit risk is the risk that a company or individual will be unable to pay the contractual interest or principal on its debt obligations. In simple terms the credit risk is termed as the risk of non-payment. The main way to reducing credit risk is by monitoring the behavior of clients who wish apply for credit in the business. These clients may be businesses or individuals

12.38 Credit risk is the risk that a counterparty will not meet an obligation when due, and will never be able to meet that obligation for full value. The bankruptcy of counterparty is often associated with such difficulties, but there may be other causes as well. In a payment netting system, losses from defaults due to the bankruptcy of counterparties can be measured as the principal amount due less recovery from defaulting parties. Forgone interest can also be an important loss. In an obligations netting system, losses from the default of counterparty would typically be calculated from the replacement costs of one or more contracts that are not settled. If, however, one party to a contract defaults after having received settlement payments from another party, but before making required counter-payments (in the same or another currency), the loss would again be for a principle amount (less recoveries).

For example, the companies are now starting their units by applying loan in banks and other financial institutions but if there arise loss in company they are in a position of non-payment of interest.

Liquidity Risk

12.39 The risk that arises from the difficulty of selling assets an investment may sometimes need to be sold quickly. Unfortunately, an insufficient secondary market may prevent the liquidation or limit the funds that can be

generated from the asset. Liquidity risk is the risk that clearing, or settlement, payments will not be made when due, even though one or more counterparties do have sufficient assets and net worth ultimately to make them.

This risk covers following:

- A temporary inability to convert assets to cash
- Operational difficulties of various kinds
- The inability of correspondents to perform settlement functions.

Settlement Risk

12.40 The risk that a party will default on clearing obligations to one or more counterparties is sometimes referred to as settlement risk. This risk may contain elements of either credit risk or liquidity risk, or both. The usage of the term "settlement risk" varies considerably, and may also depend on the situation being analyzed.

Climate Change Risk

12.41 One more big risk in the textile and apparel industry is the shipping dates and season change risk. The entire industry works on the basis of the season. For example, if there is a spring 2010 collection, the finished product would need to reach the store before spring, the entire show room space is defined in foreign countries and the calculation is done back-wards to reach at what dates the shipping would happen, how many days for logistics, how many days for manufacture, for Qc for sample etc and then the final date is freezed. Even if there is a small change in the schedule the entire thing goes into a rough space and finally air shipment would need to be done, while the buyer would never pay for air shipment. This risk has to be clearly mentioned and most manufacturers loose money because of this risk.

Chapter 13

Records Maintenance in Textile Industry

Introduction

13.1 Cost ascertainment involves collection, classification, and recording the costing data. This data is used for making plans, taking decisions and controlling costs. Cost records are statutorily required to be maintained in a cotton textile company as per the Cost Accounting Records (Cotton Textile) Rules, 1977. In this chapter some issues relating to cost ascertainment in a cotton textile mill have been discussed keeping in view the requirements of the Rules.

Direct Material Cost

13.2 Direct material are those materials which can be identified and charged directly to the cost of the final product. In textile industry, fibre is the basic raw material from which yarn and fabric are manufactured. For weaving mills, yarn is the direct material and grey cloth is the direct material for processors. About one half of the total cost in a cotton textile mill can be attributed to direct material.

13.3 In order to spin yarn of different counts, different qualities of cotton are mixed together. The mills usually maintain a book called “**Mixing Book**” in which all mixings issued every day are recorded. Mixing is a highly specialized job and needs considerable technical skill. The purpose is to have the mixing as cheap as possible for a given count of yarn without sacrificing the strength of yarn and its other properties. At times the mixings for coarser varieties of cloth include some soft wastes which may either be purchased or may arise out of the internal processes. The total cost of cotton depends on various factors *viz.*, proportions of different grades of cotton used in mixing prices of different grades of cotton and quantity and sale value of waste.

Requirements of Rules Regarding Direct Material

13.4 The Cost Accounting Records (Cotton Textiles) Rules, 1977, require that proper records showing all the receipts, issues and balances, both in quantities and cost, of cotton, manmade fibres and filament yarn from man made fibres used in the manufacture of cotton textiles should be maintained. The Rules also provide that where cotton and/or manmade fibres are

obtained from different sources including imports, separate records should be maintained for imported and indigenous supplies, variety wise. The names and specifications used for different varieties of cotton/manmade fibre/filament yarn from manmade fibre should conform to the nomenclature and specifications as prescribed by the Textile Commissioner. The records should indicate the actual quantity and value of each variety of cotton or other raw materials used in each mixing prepared for manufacturing different counts of yarn.

Waste

13.5 The processing of raw materials in a cotton textile mill results in the production of different types of wastes. Wastes arise from almost every process. Wastes can be broadly grouped into following two categories:

(i) Soft waste

Soft wastes are those which are in the form of cotton fibre and hard wastes are those which are in the form of spun yarn. Soft waste and hard waste can further be grouped under three heads *viz.*,

- usable in the same mixing
- usable in the lower grade mixing than that from which it emerges, and
- unusable waste which is usually sold through auction.

(ii) Hard waste

The sources of hard wastes are remnants in the bobbins, off cuts of sized or unsized yarn on beams, etc. It should be ensured that the percentage of wastes to input is reasonable keeping in view the various factors which affect such waste. The percentage of waste should not be materially different from the percentage in the past and percentage of cotton tested in the mills unless special circumstances can reasonably be attributed to such variance.

Requirements of the Rules Regarding Waste

13.6 The following are rules regarding waste:

- (i) **Soft Waste:** Proper records should be maintained to show the quantity and realizable value of usable soft waste collected from each mixing in each cost centre of the spinning department, quantities reused in each mixing used in the waste plant, if there be any, sold out with the sales realization thereof and the balance lying in stock.

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The quantity of this waste collected at regular intervals, say quarterly, during the relevant period should be reconciled with such waste for which due credit is afforded to the respective production on technical basis/past performance/trial run during the said period.

- (ii) Hard Waste: Proper records should be maintained to show the quantity and realizable value of hard waste collected, typewise, such as, superfine, fine, medium coarse, etc. separately from spinning department and pre-weaving department, re-used in the waste plant, if any, sold out with the sales realization thereof and the balance lying in stock. The quantity of this waste collected to regular intervals, say quarterly, during the relevant period should be reconciled with such waste for which due credit is afforded to the respective production on technical basis/past performance/trial run during the said period. Any waste cotton purchased for use in the manufacture of yarn should also be recorded properly regarding receipts, issues and balances both in quantity and value.
- (iii) Yarn: In case the company is purchasing yarn from outside sources for use in the manufacture of cloth, proper records should be maintained showing all the receipts, issues and balances, both in quantity and value. This record should be kept count-wise, separately for carded and combed varieties.
- (iv) Grey Cloth: In case the company purchases cloth in grey stage for processing, proper records should be maintained showing the quantity and cost of such purchases, issues to processing and balance in stock, fabric-wise. Where the company receives cloth in grey stage for processing only, proper records should be maintained showing the quantity of such receipts, issues to processing and balance in stock.

Sizing Materials

13.7 The sizing process consists of strengthening the yarn with a mixture so that it can stand the rigours of weaving. Normally starch maize, tallow gum, etc are used in the sizing solution.

Other Direct Materials

13.8 In addition to cotton there are some other direct materials used by the cotton textile industry. These are: dyes and chemicals, bleaching, finishing, mercerizing, printing, etc. As some of the materials may be

consumed in more than one process, therefore, for accounting purposes as well as from cost control point of view, it may be necessary to departmentalize the costs of such materials. For each product/ class of products a formula (called 'Recipes') is worked out by the chemist. This formula shows the proportions of those materials to be used for each product/ class of products.

Requirements of Rules regarding other Direct Materials

13.9 The Cost Accounting Records (Cotton Textiles) Rules, 1977, require that proper records should be maintained for sizing materials, dyes, and chemicals and other process materials/ chemicals. These records should show the receipts, issues, and balances, both in quantities and costs of each item used. The cost should include all direct charges upto the mills, wherever specifically incurred. The issues should be properly identified with the cost centres, departments and products manufactured. In case the issues made against the receipts prepared in advance, a periodic reconciliation between the actual consumption as per the receipts should be made both in quantity and value.

13.10 Separate records should be maintained in such details as may enable the company to work out following:

- (a) The cost of sizing materials required per kg. of warp yarn seized;
- (b) The material cost of dyeing or printing each type of cloth processed;
- (c) The process material/ chemical cost in each of the processing cost centres/ departments;

Where any of the dyes and chemicals and processing chemicals are produced by the company; separate records, showing the cost of manufacture of such materials indicating the break-up of raw materials consumed for the production and conversion cost should be maintained in such details as may enable the company to determine the actual cost of such materials produced.

Recoveries of Process Materials and Chemicals

13.11 Certain materials and chemicals are recovered from different processes which may or may not be re-used. Those which cannot be re-used

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due to lower concentration are sold. Sometimes, these materials and chemicals can be re-used or sold only after further processing.

Requirements of the Rules Regarding Recoveries of Process Materials and Chemicals are as follows:

- The Rules require that proper records should be maintained indicating the quantity of materials or chemicals recovered from different processes.
- In case of certain materials or chemicals, thus, recovered which cannot be re-used in the process due to lower concentration and are sold, the realization from such sales should be recorded and adjusted against the cost of consumption of the respective materials or chemicals, if practicable, or otherwise adjusted against the processes concerned on reasonable basis.
- Where further processing is necessary to make these materials or chemicals useable or saleable, as the case may be adequate records of cost involved for such further processing should be maintained.
- If such further processing is done by any outside agency, records showing the quantity sent for processing, quantity processed and the cost involved thereon should be maintained in detail.

Wages and Salaries

13.12 Direct wages cost is the second largest element in the cost structure of the various products of the cotton textile industry. In Indian cotton textile industry, basic wages are usually based on time. However, in certain cases basic wages are also payable on the basis of machines attended to by the workers. For example, in ring spinning, basic wage is related to the number of spindles attended to by him. From time to time, the Wage Boards appointed by the Government, award certain payments to the workers employed in the industry. These payments are termed as 'Wage Board Awards'. As in other industries, workers in the cotton textile industries also receive fringe benefits e.g., provident fund, bonus, gratuity leave with pay, etc. These are usually related to the basic wage, dearness allowance and wage board award.

13.13 Accounting treatment of direct wages has following two aspects:

- Identification, classification and charging these costs to respective cost centres, and

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- Absorption of the total cost centre labour costs to products. In order to facilitate such an accounting treatment, it is imperative that the basic source documents *viz.*, clock cards, time cards, piece work cards, etc. are kept separately for each cost centre. After the direct labour costs have been allocated to the cost centres, the next step of absorption of the labour costs may be carried out as given below:
 - If the wages are payable on time basis or on the basis of machines attended to by workers and the wages cost does not vary with output, the direct labour cost should be treated in the same way as the indirect labour cost.
 - Where the wages payable vary with the output achieved (piece rate system) absorption of direct labour cost is straight forward because the per unit labour cost is known in advance.

Requirements of the Rules Regarding Wages

13.14 The Rules require that proper records should be maintained to show the attendance and earnings of all employees and the cost centres or departments and the work on which they are employed. The records should also indicate separately:

- (i) Overtime wages earned;
- (ii) Piece-rate wages earned;
- (iii) Incentive wages earned, either individually or collectively as production bonus or under any other scheme based on output;
- (iv) Earnings of casual labour engaged on casual work under classified headings.

13.15 Idle time should be separately recorded under classified headings indicating the reasons thereof. This data should be maintained, as far as possible, cost centre-wise, otherwise for principal cost centres like, ring frame, looms, bleaching, dyeing, printing, warehousing, etc. The method followed for accounting of idle time payments in determining the cost of the product should be disclosed in the cost records.

Any wages and salaries allocable to capital works such as, addition or heavy repaired works to plant and machinery, buildings, or other fixed assets should be accounted for under the relevant capital heads.

Direct Expenses

13.16 A few expenses, other than direct materials and direct labour, are directly identifiable to the final product. Such expenses are termed as direct expenses. In the cotton textile industry, examples of direct expenses are sanforizing royalty, processing charges for the jobs under taken outside the mill, etc. These can be charged to the final product directly.

Overheads

13.17 Overheads cannot be directly identified and charged to the final product. In other words, they are an aggregate of indirect materials, indirect labour and indirect expenses. Overheads can also be classified according to the functions viz:

- (i) Factory overheads,
- (ii) Administration, and
- (iii) Selling and Distribution overheads.

The following discussion pertains to the factory overheads. Since these costs cannot be directly charged to the final product a detailed procedure is required to charge them to the products.

Consumable Stores, Small Tools and Machinery Spares

13.18 In a textile mill a number of consumable stores, small tools, machinery spares, and items like, bobbins, pirns, shuttles, rollers, etc., are used in the process of production.

The Rules require that proper records should be maintained to show the receipts, issues and balances both in quantities and costs of each item. In the case of consumable stores and small tools, the cost of which is insignificant, the company may, if it so desires, maintain such records for the main group of such items. The cost of issues of consumable stores, small tools and machinery spares, should be charged to the relevant heads of account such as, production, repairs to plant and machinery and repairs to buildings. Materials consumed on capital works such as, additions to buildings, plant and machinery and other assets should be shown under the relevant capital heads.

13.19 Proper records should be maintained to show the quantity and cost of items which are not forming part of the machinery and replaced as and when necessary, such as bobbins of all sizes, pirns, winding cones, cheeses, reels, silver drums, rollers in frames, shuttles, etc., lying in the shop floor at the end of the relevant year in order to enable the company to arrive at the actual consumption of such items during the relevant year. The method followed for charging the cost of the products manufactured should be indicated in the records. Sales realization of old and discarded stores materials scrap, etc., should be identified wherever possible with respective cost centres and credit given accordingly. Otherwise it should be deducted from the common mill overheads.

Spoilages, Rejections, Losses and Wastages

13.20 As with most of the processing industries, in the cotton textile industry also, there is wastage of material as it passes from one process to another. This wastage is inherent in the different processes, therefore its cost should be charged to the good units produced. The calculation of the cost of the finished product per unit for each cost centre after taking account of the wastage multipliers for the respective cost centres. The waste multipliers are calculated to determine the quantity of raw materials required to produce one unit of the finished product. In the case of spinning activity, a waste multiplier is also known as the Yarn Equivalent Factor. The formula used for its calculation for a cost centre is as follows:

100 - Total waste% (Upto and including the waste% at that cost centre)

100 - Total waste% in all cost centres.

13.21 It may be noted that the total waste percentage in the above formula has to be based upon the input of the first cost centre. The calculation of the waste multiplier is illustrated below:

Mixing: 30s

<i>Cost Centres</i>	<i>Actual Waste %</i>
(i) Mixing and Blow Room	6.00
(ii) Carding	7.60
(iii) Pre-comb Drawing	0.80
(iv) Combing	10.10
(v) Post-comb Drawing	0 50

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(vi)	Inter-roving	0.50
(vii)	Ring-spinning	2.50
		28.00

Thus, for carding cost centre the waste multiplier is

$$=100-(6.00 + 7.60) = 1.2$$

$$100 - 28$$

If the per kg cost of yarn produced upto the 'carding' process is 'x' (before taking account of the wastages), the final per kg. cost of yarn produced upto the "carding" process can be determined by multiplying 'x' ¹ with the "waste-multiplier" for that process i. e. 1.2. This aspect has been amplified later in the section "Calculation of the Cost of Production and the Cost of Sales'.

Requirements of the Cost Accounting Records Rules Regarding Wastes

13.22 Proper records should be maintained showing the quantity and cost of wastages, spoilages, rejections and losses of raw materials, dyes and chemicals, process materials, consumable stores, small tools and machinery spares, whether in transit, storage, manufacture or for any other reason. The method followed for adjusting the above losses as well as the income derived from the disposal of rejected and waste materials including spoilage, if any in determining the cost of product should be indicated in the cost records

13.23 In the case of cotton and man-made fibre, records of wastage, spoilage and losses should be maintained in such a way as may enable the company to work out the waste multipliers for each mixing at periodic intervals. Necessary records should be maintained showing the quantity and realisable value of hard waste derived in different departments, re-used, sold out and balance in stock. The method followed for adjusting the above wastage as well as the income derived from the sale of such waste in determining the cost of product should be indicated in the cost records.

Separate records should be maintained for fents, rags, chindies, etc., arising out of finished fabrics, group-wise. Such grouping should be as per the one adopted by central excise authorities. Such records should enable the company in determining the incidence on this account in the cost of fabric. The quantity of fents, rags, etc., formed in the case of each fabric may be determined on technical basis if actuals are not available. In such cases reconciliation of such waste accounted for in the production on technical

basis and that actually formed, group-wise should be made at regular intervals, say quarterly, within the relevant period.

Service Department Expenses

13.24 The Rules require that detailed records should be maintained to indicate expenses incurred for each service cost centre or department. These expenses should be apportioned to other service and production departments on an equitable basis and applied consistently.

Utilities

13.25 In textile mill utilities like, water, steam, power and humidification are required. The provisions of the Rules regarding the various utilities are given below:-

- (i) Water: Where water is treated or purified, proper records showing the quantity and cost of water treated and consumed in different cost centres or departments for the manufacture of processed fabrics, etc. should be maintained in such detail as may enable the company to furnish the necessary particulars. The cost of treated water allocated to the departments concerned should be on a reasonable basis and applied consistently.
- (ii) Steam: Where steam is raised by the company, proper records showing the quantity and cost of steam raised and consumed in various cost centres or departments for the manufacture of cotton textile products should be maintained in such detail as may enable the company to furnish the necessary particulars. The cost of steam consumed by the cotton textile products and other products or other units of the company, if any, should be calculated on reasonable basis and applied consistently.

Where steam is raised and supplied by any other unit of the company to the textile unit, the cost of steam so supplied should be charged to the textile unit on a reasonable basis and applied consistently.

- (iii) Power: Adequate records should be maintained for the quantity and cost of power purchased. If expenses are incurred for distribution of the power thus purchased, proper records to show such expenses should be maintained.

Where power is generated by the company itself adequate records should be maintained to show the cost of power generated and

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consumed by the different cost centres, departments, etc., of the textile unit of the company, in such detail as may enable the company to furnish the necessary particulars.

Where power is generated and supplied by any other unit of the company to the spinning/ weaving/ processing departments of the textile unit, adequate records should be maintained to assess the quantity and cost of power so supplied. The rate charged by the supplying unit should be on a reasonable basis. Necessary records should be maintained to show the consumption of power by various cost centres or departments. The cost of power allocated to products should be on a reasonable basis and applied consistently.

- (iv) Humidification: Proper records should be maintained to enable determination of the cost of humidification and its distribution to different cost centres and departments.

Workshop/ Repairs and Maintenance

13.26 The Rules require that proper records showing the expenditure incurred by the workshop under different heads and on repairs, and maintenance by the various cost centres and departments should be maintained. The records should also indicate the basis of charging the workshop expenses to different cost centres, departments and units. Wherever maintenance work is done by direct workers of any production cost centre, the wages and salaries of such men shall be treated as other direct expenses of the respective cost centre.

13.27 Expenditure on major repair works from which benefit is likely to accrue for more than one financial year should be shown separately in the cost records indicating the method of accounting in determining the cost of various products manufactured during the relevant period.

Expenditure incurred on works of capital nature should be capitalised. The cost of such jobs should include the expenditure on material, labour and due share of the overheads. The jobs carried out by the workshop attached to the spinning, weaving or processing departments, for other units of the company and vice-versa should be charged on a reasonable basis and applied consistently.

Design Studio

13.28 The Rules require that proper records showing the expenditure incurred by the design studio, if any, should be maintained. The records

should also indicate the basis of charging the studio expenses to the different cost centres and departments in the printing section.

Screen Making, Photo Engraving, Pentsgraph, Chromium Plating and Rotary Screen Making

13.29 The Rules require that proper records showing the expenditure incurred by these departments should be maintained. The records should also indicate the basis of charging the expenses of these departments, to the respective cost centres of the printing department and ultimately to the products. The basis so adopted should be reasonable and applied consistently.

Depreciation

13.30 Proper records should be maintained showing the cost and other particulars of fixed assets in respect of which depreciation is to be provided. These records should *inter alia* indicate the cost of each item of assets including installation charges, if any, the date of its acquisition, the date of its installation and rate of depreciation. In respect of those assets, the original cost of acquisition of which cannot be ascertained without an unreasonable expenditure or delay, the valuation shown in the books on the first day of the financial year beginning on or after commencement of these rules should be taken as the opening balance.

The basis on which depreciation is calculated and allocated to the various cost centres and departments and to the products should be clearly indicated in the records. Depreciation chargeable to the different cost centres and departments should not be less than the amount of depreciation chargeable in accordance with the provisions of sub-section (2) of Section 205 of the Companies Act, 1956 (1 of 1956), and should relate to plant, machinery and other fixed assets in such cost centres and departments.

13.31 In the case of assets or group of assets on which depreciation is written off at the rate of 100 per cent in the relevant year, such depreciation should be spread over the number of years during which benefit is derived from such assets or group of such assets. In case, the amount of depreciation charged in the cost accounts in any financial year is higher than the amount of depreciation chargeable under the aforesaid provisions of the Companies Act, the amount so charged in excess should be indicated clearly in the cost records. The cumulative depreciation charged in the cost records against any individual item of asset should not, however, exceed the original cost of the respective asset.

Other Overheads

13.32 The Rules require that proper records should be maintained showing the various items of expenses comprising the overheads. These expenses should be analysed, classified and grouped into mills or processing house (works), administration and selling and distribution overheads. The method followed for allocation of the above categories of overheads to the cost centres, departments and absorption by the products should be indicated in the cost records.

Where the company is engaged in the manufacture of any other products in addition to cotton textiles, the records should clearly indicate the basis followed for apportionment of the common overheads including head office expenses of the company to the cotton textile activity, other activities and capital work.

13.33 In case any expenses included in the above categories of overheads can be identified with a particular activity or product, such expense should be segregated and charged to the relevant activity or product in the first instance and thereafter the remaining common expenses under the above categories of overheads should be allocated on a reasonable and equitable basis and applied consistently.

The details of administrative, selling and distribution overheads and the amounts applicable to yarn, cloth and processed cloth should be maintained in such a manner as to enable the company to fill up the necessary particulars in the cost of production and cost of sale statements of each count of yarn/ type of cloth and processes cloth (fabric-wise).

Expenses on Export

13.34 Proper records showing the expenses incurred in the export item of cotton textiles, if any, should be separately maintained so that the cost of export sales can be correctly determined for each type of the product exported.

The expenses incurred on exports as well as any export incentives, such as, cash subsidy, drawback duty and benefit derived out of the import entitlement licence issued, etc., if any, should be reflected separately in the cost of sales statements relating to export sales.

Packing

13.35 Proper records should be maintained showing the quantity and the cost of various packing materials such as, hessian cloth, polythene paper, boards, packing boxes, mild steel wires, hoops and buckles used for different types of packing of yarn, cloth and processed cloth separately. In the absence of actual consumption of such material for each type of packing, apportionment of material cost should be made on the basis of quantity requirement as per standard specifications, in such cases, reconciliation of major material cost as per standards and that as per actual should be made periodically, say quarterly.

13.36 Records should also be maintained showing the other expenses incurred in-respect of packing. Where expenses are of a general nature and cannot be identified directly with the types of packing, apportionment of such expenses to the different types of packing should be on an equitable basis and the basis of such apportionment should be clearly indicated in the cost records and applied consistently. The records should be kept in such a manner as to enable the company to fill up the necessary particulars.

Separate records for expenses incurred on special packings made for exports of yarn/ cloth in grey stage, processed cloth should be maintained and exhibited in the relevant cost of sales statements for exports.

Research and Development Expenses

13.37 Proper records showing the details of expenses, if any, incurred by the company for research and development according to the nature of such research, namely, development of products, existing and new, processes of manufacture, existing and new, design and development of new plant facilities, market research for new products, etc., should be maintained separately.

The method of charging these expenses to the cost of products during any year should be indicated in the cost records. Wherever the utility of such research extends over more than one financial year such expenses should be treated as "deferred expenses" and charged to the cost of the products on some equitable basis which is to be followed consistently.

Yarn/ Cloth in Grey Stage for Self-consumption

13.38 Proper records should be maintained showing the quantity and cost of each item of yarn and cloth transferred to another department/unit of the

company for self-consumption. The rates at which transfers are effected should be at cost.

Work-in-Progress and Finished Goods Stock

13.39 Adequate records should be maintained showing the cost of work-in-progress in each productive cost centre of the spinning, weaving, and processing departments of the company. Proper records showing the opening stock, production, issues for further processing/sales and closing stock of all the finished products like yarn of various constructions and processed and finished cloth of the various constructions designs, etc should be maintained.

The method followed for determining the cost of work-in-progress and finished goods stocks should be indicated in the cost records so as to reveal the cost elements that have been taken into account in such computation. The method adopted should be followed consistently.

Calculation of the Cost of Production and the Cost of Sales

13.40 After identification and recording of various items of costs, the next step is the determination of the cost of production and the cost of sales of yarn, grey cloth and finished cloth. Following steps are involved in the determination of the cost of production and the cost of sales.

Spinning

13.41 The following steps may be taken for the determination of the cost of yarn spun and of the yarn sold:

- (i) Calculation of the quantity and value of total cotton issued for the manufacture of carded and combed yarn for both warp and weft. The computation should be mix-wise with corresponding reduction due to wastages to arrive at the output of warp and weft yarn.
- (ii) Preparation of an input-output analysis, showing input, wastages and output in each processing cost centre upto yarn stage. This data is in mix-wise quantities.
- (iii) Computation of total output of yarn for whole of the spinning department showing input, wastages and output taking the relevant data from (1) above.

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- (iv) Computation of net mix-wise cost as follows;
(Cost of input as per step (1) x cost per Kg. of the mix)—Credit for wastes collected as per steps (2) and (3).
- (v) Computation of waste multipliers for each cost centre mixing-wise. Data is taken from step (1)
- (vi) Computation of cost-centre-wise conversion cost upto and including spinning. The conversion cost includes direct wages and salaries; utilities like water, steam, power etc.; consumable stores; bobbins; pirns; repairs and maintenance; mill overheads; depreciation; share of administration overheads; research and development cost, etc. Conversion cost should be calculated per machine shift/spindle shift.
- (vii) Computation of conversion cost per Kg. for each mixing as follows:
Conversion cost per machine shift/spindle shift as per step (6) X
Production per machine shift/spindle shift in Kgs. as per step(1)
- (viii) Computation of conversion cost of yarn per Kg. count-wise for each cost centre which is to added to the total cost = conversion cost per Kg. as per step (7) X waste multiplier as per step (5).
- (ix) Computation of cost of production of yarn count-wise, separately for warp and weft by following calculations:
 - (a) Cost per Kg. of mixing used = Net Cost per Kg. of mixing as per step (4) X Waste multiplier as per step (5).
 - (b) Cost of production per Kg. of yarn = Cost per Kg. of mixing used as (i) above + Conversion cost per Kg. of mixing as per step (8).
 - (c) Total cost of production of yarn spun cost of production per Kg. of yarn as per (ii) above X Total Quantity of yarn spun as per step (1).
- (x) Computation of the cost of yarn sold. This involves the following steps:
 - (a) A stock statement showing the quantities and values of opening stock, production during the year, yarn issued for further processing, issued for sales and closing stock, is prepared. This information is also given mixing-wise and count-wise. Relevant cost data taken from step (9).

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- (b) To the cost of yarn issued for sales as given in (i) above are added cost of reeling/winding, cost of packing, share of administrative expenses, selling and distribution expenses, bonus, interest, gratuity, etc. to determine the cost of sales. The difference between sales realization' and 'cost of sales' is the margin on the sale of the yarn.

Weaving

13.41 For calculating the cost of grey cloth manufactured and sold the following steps may be followed:

- (a) Computation of conversion cost from winding to weaving for each cost centre. The conversion cost includes direct wages and salaries; utilities like water, steam, power, etc; consumable stores; sizing materials; bobbins, pirns, shuttles etc. Conversion cost should be calculated per spindle shift/loom shift/machine shift and cost per kg/ metre.
- (b) Computation of sort-wise cost of production of cloth in grey stage. This includes following items of cost from step (1)
 - (i) Cost of yarn for warp and weft
 - (ii) Winding cost for warp and weft
 - (iii) Warping
 - (iv) Sizing cost—materials and others
 - (v) Drawing-in cost
 - (vi) Loom-shed cost.

From the above is deducted realization on account of wastes.

Cost of yarn can be taken from (A) above or if it is purchased from outside, the purchase cost plus other direct charges should be taken. Winding charges include cost of cone, pirn winding, etc. If the cloth is calendared or any other finishing is done the conversion cost of such process must also be included.

- (c) Computation of the cost of grey cloth sold. This involves the following steps:
 - (i) A stock statement is prepared. This includes sortwise information of quantities and values of production of grey cloth as per step (2), fents, rags, and chindies, good

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production, opening stock of good grey doth, issued for further processing, issued for sales (including consignment sales), and closing stock.

- (ii) To the cost of grey cloth issued for sales as given in (i) above are added share of administrative expenses, selling and distribution expenses, bonus, interest, gratuity, packing expenses, to determine the cost of sales. The difference between 'sales realisation' and 'cost of sales' is the 'margin' on the sale of the grey cloth.

Processing

13.42 Computation of the cost of finished cloth usually involves the following steps:

- (a) Calculation of the cost centre-wise conversion cost in the bleaching section. This includes expenses on account of process materials e.g., for desizing, scouring, bleaching, wetting agents, chemicals for mercerizing; utilities like water, steam, power, singeing, chemical mixing, rope washing, cooling plant, caustic recovery plant; process house/mill overheads, etc. Conversion cost should be calculated per Kg./Metre/Machine Shift/Hour.
- (b) Calculation of cost centre-wise cost of production in the dyeing section. This includes expenses on account of process materials like, chemicals; utilities like water, steam, power, pigment padding, developing, fast colouring, soaping, drying; mill, process house overheads.
- (c) Calculation of cost centre-wise cost in the printing section This includes cost of process materials; utilities like water, steam, power, soaping, drying, roller engraving, screen making, design department, chemicals mixing, etc.
- (d) Computation of cost in the Finishing section in respect of different departments like damping, calendaring, sanforizing, tabelizing, etc.
- (e) Computation of cost of different types of packing like, yarn packing (Full Bale; 3/4 Bale; 1/2 Bale, etc.), cloth packing (Rollers, Bales, etc.), and Export Packing. This includes packing material cost like hessian, cheese, card board, polythene; wages and salaries in respect of folding, reeling, inspection, stamping, cutting, baling and bundling etc.; consumable stores.

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- (f) Computation of the cost of processed and finished cloth (Proforma L of Schedule II of the Rules). This includes following expenses:
 - (i) Cost of cloth at grey stage (issued from weaving)
 - (ii) Bleaching cost as per step (1)
 - (iii) Dyeing cost as per step (2)
 - (iv) Printing cost as per step (3)
 - (v) Finishing cost as per step (4).
- (g) Computation of the cost of sales of processed cloth. This involves the following steps:
 - (i) A sortwise stock statement is prepared. This may include quantities and values of production of the processed cloth as determined in step (6), fents, rags and chindies, good production of the processed cloth, opening stock—pre-packed and packed, cloth packed during the year, packed cloth issued for sales, closing stock etc.
 - (ii) To the cost of processed packed cloth issued for sales as computed in (i) above are added share of administrative expenses, selling and distribution expenses, bonus, interest, gratuity. The difference between the 'sales realization' and the 'cost of sales' is the 'margin' on processed cloth sold during the year.

The following may be noted in this regard:

- (i) In the case of controlled cloth, the cost data required should be given for each sort in the said proforma.
- (ii) Export of yarn/cloth/in grey stage/processed cloth should be exhibited separately in the relevant cost statements and the same should be excluded from the cost statements of yarn/cloth meant for sale in the internal market. Value of export incentives, if any, should be shown in the respective cost of sales statements.
- (iii) The transfer of finished products which form the raw materials for subsequent products should be made at the cost of production of such finished products.

Miscellaneous Requirements of Cost Accounting Records (Cotton Textiles) Rules

13.43 In addition to the cost records required to be kept for the various elements of cost as detailed above, the Cost Accounting Records (Cotton Textiles) Rules, 1977 require the records explained in following paragraph to be maintained by a company manufacturing cotton textiles.

Production Records

13.44 Quantitative records of all finished and packed production, issues for further processing, department wise, issues for sales and balance in stock both packed and in pre-packed condition of:

- (i) different counts and types of yarn (both grey and . processed)
- (ii) all sorts of cloth in grey stage
- (iii) all sorts of processed and finished cloth produced should be maintained by the company.

In the process departments, the records of production of different machines, count group-wise and variety-wise only need be kept. The cost of all finished and packed production may be kept in detail. Details of the quantity of cotton blankets produced, if any, from waste cotton should also be kept in the cost records. Adequate records to show the production of yarn/ cloth in grey stage, processed cloth in various stages of production in the respective intermediary productive departments should also be maintained.

Reconciliation of Cost and Financial Accounts

13.45 The cost records should be reconciled preferably periodically with the financial books of account so as to ensure accuracy. Variation, if any, should be clearly indicated and explained. The period for which such reconciliation is effected should not exceed the period of the financial year of the company. The reconciliation should be done in such a manner that the profitability of the products under reference can be correctly adjudged and reconciled with the overall profits of the company.

A statement showing the total expenses incurred and income received by the company under different heads of account and the share applicable to cotton textile activity of the company should be made giving therein the basis of allocation of the total expenses and income duly reconciled with the financial accounts for the period.

Adjustment of Cost Variances

13.46 Where the company maintains cost records on any basis other than actual, such as standard costing, estimated cost, etc., the records should indicate the procedure followed by the company in working out the cost of products under such system. The method followed for adjusting the cost variances for determining the actual cost of the products should be clearly indicated in the cost records. The cost variances should be shown against the relevant heads. The reasons for the variances should be detailed in the cost records.

Records of Physical Verification

13.47 Records of physical verification should be maintained in respect of all items held in stock such as cotton, synthetic fibre, yarn, etc., dyes and chemicals, processing materials, machinery spares, fuels finished goods, copper cylinders, printing screens, yarn dyeing spools, etc., and fixed assets. Reasons for shortages/surpluses arising out of such verification and the method followed for adjusting the same in the cost of the products should be indicated in the records.

Inter-Company Transactions

13.48 In respect of supplies made or services rendered by the company to its holding company or to its subsidiary or to a company under the same management as defined in Section 370 (IB) of the Companies Act, 1956, or to a company in which a director of the company is also a director in such companies and vice versa, records should be maintained showing contracts entered into, agreements or understanding reached in respect of:

- (a) purchase and sale of raw materials, finished products (yarn/ cloth in grey stage, processed cloth etc.), process materials, chemicals, dyes and rejected goods including scrap, etc.
- (b) utilization of plant facilities.
- (c) supply of utilities.
- (d) administrative, technical, managerial and any other consultancy services

These records should also indicate the basis followed for arriving at the rates charged between them so as to enable determination of the reasonableness of the rates charged or paid for such services.

Statistical Records

13.49 Particulars of contracts entered into for purchase of cotton and sale of finished goods should be maintained in detail indicating separately the percentage of commission, carrying cost, etc. Data regarding available and actually utilized spindle shifts/loom shifts/ machine shifts in the spinning, weaving and processing departments respectively, as well as related data in sub-production centres of such departments should be maintained. The reasons for stoppages and under utilization under classified headings should be recorded. Records showing yield of yarn estimated and actually obtained from each type of mixing of cotton used for yarn production, production of yarn per spindle shift for each type of mixing for each type of frame used, production of different machines count group-wise and variety-wise in the processing departments, speed and efficiency of all the spindles/ looms/other machines where necessary for calculation of cloth cost in each production cost centre, etc., should also be kept. Records detailing the method of control exercised by the company in respect of efficiency in each productive department like spinning, weaving, processing, etc., losses, rejections, wastages in process should be maintained.

Such records, as will enable the company to identify, as far as possible, capital employed separately for yarn/cloth in grey stage/ processed cloth should be kept. Fresh investments on fixed assets that have not contributed to the production during the relevant period should be indicated in the records.

13.50 Detailed records showing the quantity and sale proceeds realized, for each variety of yarn/ cloth in grey/ processed cloth sold during the relevant period should be maintained, so as to enable the company to determine the actual sales realization per unit of the product sold.

13.51 Statistical and other records maintained in compliance with the provisions should be such as would enable the company to exercise, as far as possible, control over the various operations and costs with a view to achieve optimum economies in costs. The data maintained in the cost records should be reconciled with the various returns submitted to the Textile Commissioner and Central Excise authorities, under the various control orders and notifications issued from time to time in respect of cotton, yarn and processed cloth.

Chapter 14

Understanding of Audit Segment and Its Aspects in Textile Industry

14.1 An internal auditor normally reviews the operations of an enterprise to appraise their effectiveness and to ensure that control system in the organization function effectively for both internal and statutory audit, knowledge of the industry, details of the financial accounting system, and of the cost accounting system is necessary and which has been detailed in the earlier chapters.

Various Segments for Review

14.2 There are various segments in which an internal auditor has to review for the purpose of internal audit. These are as follows:

- Constitution/ Status of the entity
- Plant
 - Location of the plant
 - Segments (Yarn, Fabric, Garment etc)available
 - Types of machinery installed
 - Spare Parts and Tools
 - Types of Products manufactured
 - Versality in Product manufacturing
 - Quality control of Raw Materials
 - Process control
- Inventory
- Export documentation
- Routine Accounts checking
- Quality Control of Finished Product
- Design (in House)
- Energy Saving

- Compliance of Government Rules (State, Central)
- Commercial
 - Purchases
 - Sales
 - Allied Others

The present study deals with internal audit of various segments in textile industry. The effectiveness of internal audit is measured by the successful identification, monitoring and control of risk activities. The internal auditor should focus on the risk implications of the analysis and reporting of internal audit. The following are the broad areas where the internal control is required to make certain the business functioning of the organization.

Constitution/ Status of the Entity

14.3 Examine the constitution of the entity. (For e.g., MOA and AOA for Private Limited Company, Partnership Deed for Partnership Firm). Check whether the provisions of the governing Act have been complied with.

Procurement of Raw Material

14.4 In the textile industry, the following items are normally purchased for the purpose of consumption:

- (i) Cotton/yarn/grey cloth.
- (ii) Wastes scraps for lower grade mixings
- (iii) Sizing materials
- (iv) Other consumable stores.
- (v) Polyester Fibre
- (vi) Viscose.

Cotton

14.5 It is the most important aspect while taking into account. The cotton price varies significantly due to its seasonal nature. The history of Commodity Derivatives in India dates back to the 19th century when the Cotton Trade Association started futures trading in 1875, barely about a decade after the commodity derivatives started in Chicago. Over a period the derivatives market developed in several other commodities in India.

Following cotton derivatives trading started in oilseeds in Mumbai in the year 1900, raw jute and jute goods in Kolkata in 1912, wheat in Hapur in 1913 and Bullion in Mumbai in the year 1920.

Polyester

14.6 Polyester is a term often defined as “long-chain polymers chemically composed of at least 85% by weight of an ester and a dihydric alcohol and a terephthalic acid”. In other words, it means the linking of several esters within the fibers. Reaction of alcohol with carboxylic acid results in the formation of esters. Polyester also refers to the various polymers in which the backbones are formed by the “esterification condensation of polyfunctional alcohols and acids”. Polyester can also be classified as saturated and unsaturated polyesters.

14.7 Saturated polyesters refer to that family of polyesters in which the polyester backbones are saturated. They are thus not as reactive as unsaturated polyesters. They consist of low molecular weight liquids used as plasticizers and as reactants in forming urethane polymers, and linear, high molecular weight thermoplastics such as polyethylene terephthalate (Dacron and Mylar). Usual reactants for the saturated polyesters are a glycol and an acid or anhydride.

Unsaturated polyesters refer to that family of polyesters in which the backbone consists of alkyl thermosetting resins characterized by vinyl unsaturation. They are mostly used in reinforced plastics. These are the most widely used and economical family of resins.

14.8 The following are characteristics of polyester:

- Polyester fabrics and fibers are extremely strong.
- Polyester is very durable: resistant to most chemicals, stretching and shrinking, wrinkle resistant, mildew and abrasion resistant.
- Polyester is hydrophobic in nature and quick drying. It can be used for insulation by manufacturing hollow fibers.
- Polyester retains its shape and hence is good for making outdoor clothing for harsh climates.
- It is easily washed and dried.

Viscose

14.9 Viscose is a unique form of wood cellulose acetate that can be used for the manufacture of a number of different types of products that are used in the medical industry, when the cellulose is treated with caustic soda. Sometimes referred to as cellulose xanthate in this state, viscose is ideal for the creation of dialysis membrane and other medical tools that must be soft and supple to the touch.

Created from a combination of natural and man-made components, viscose can also be made into the more common form of rayon that is used for many types of textile products, including clothing. Viscose rayon has a silky appearance and feel, and also has the ability to breathe in a manner similar to cotton weaves. In addition to being an inexpensive material to use in lightweight clothing, viscose can also be used for such textiles as tablecloths, napkins, furniture slipcovers, and sheeting. One of the more popular properties of viscose rayon is that the fabric tends to drape very well, which makes it ideal for use in simple curtains, as well as the perfect fabric to line more formal draperies.

Purchase of Cotton

14.10 To make cotton fit for use in a textile mill, it is ginned to remove cotton seeds and other impurities. After ginning, cotton is pressed into bales of usually half a candy each (one candy = 784 lbs.). Rates of cotton are usually quoted per candy. In India, the main varieties of cotton suitable for spinning yarn upto 80 counts are:

- 320F,
- Dig Vijay,
- Kafyan,
- Desi,
- Shankar ,
- J 34
- MCU 5,
- V797,
- Varalaxmi,
- Jaidhar,

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- Wagad etc.

14.11 Cotton being an agricultural produce, its price depends upon various factors. The size of the crop in a particular year plays an important part in the determination of the price of cotton. The efforts grower and to ensure at the same time that the final product is within reach of the common man. However, there have been wide fluctuations in prices of cotton during the past few years and the industry has passed through uncertain conditions, the price of cotton also depends upon its colour, staple length, presence of dirt, dust, other impurities etc.

14.12 The textile mills have a dual system of buying cotton. Depending upon the market conditions, expectation of fluctuations in prices, their own requirement and availability of the right type of cotton at the right time, the mills usually make contracts with middle men merchants for the purchase of cotton for immediate delivery or deferred delivery.

Sometimes cotton is also purchased by mills directly through their own staff or through agents appointed for the purchase of cotton from the ginning factories, In the latter case purchases are made on behalf of the textile mills and the purchase price plus all expenses incurred in that connection are recoverable from them. Such merchants are usually allowed some commission/ brokerage for rendering their services. All these expenses and commission/brokerage become a part of the cost of cotton and have to be accounted for accordingly by the mills.

14.13 The cotton trade has another peculiar feature. Many times, because of the shortage of funds or for other reasons, the cotton is purchased but it is required to be carried by the merchants on the account of the mills for such period as may be considered necessary by the mills. The mills in such cases have to pay interest charges, storage charges, insurance, etc. for the period the cotton is required to be carried. Such charges add to the cost of cotton. This system enables the mills to take advantage of price at a particular time and also ensures quality without having to invest ready money. The charges thus paid are usually termed as 'carrying charges'. The interest is the major portion of carrying charges. Carrying charges are usually included in the purchase cost of cotton.

Where contracts for direct purchases of cotton are made, the payment is usually made on the basis of the weighment at the time of the receipt of goods in the mills. When commission purchases are made, the weight usually acceptable to the mills is the spot weight of cotton. In any case, a bale-wise record is usually kept to record weighment at the time of the

receipt of cotton in the mill. This weight, particularly in the case of commission-purchases is usually compared with the spot weight for which payments have to be made, to determine the reasonableness of gain or loss in transit.

It may be emphasised that where the 'property' in cotton has passed to the mill, whether its delivery has been obtained or not it should be accounted for as cotton purchased. Where cotton has been weighed and set apart by the supplier for the mill pursuant to the contract, it should be accounted for as purchases.

Inventory

14.14 The textile mills usually maintain proper quantitative records for purchases, issues and stocks of all qualities of cotton and other inputs. The mills, which obtain bank finance on the pledge/ hypothecation of cotton are also expected to adhere to the norms of stocks fixed by the bank.

Normally, the stock in a cotton textile mill consists of the following:—

- (i) Raw Materials—cotton, purchased yarn, waste, etc.
- (ii) Dyes and chemicals
- (iii) Consumable stores and spare parts
- (iv) Stock-in-Process
- (v) Finished goods—cloth, yarn for sale, fents, garments etc. if any,
- (vi) Wastes—saleable and usable.

Physical verification of stocks is usually done by the management in the normal course and a list of discrepancies is prepared. Reasons for differences, if significant, are located. Sometimes, there is tendency to show shortage arising on such verification as consumption by obtaining consumption slips from the consuming departments and excesses are adjusted by showing them as returns from the departments. This practice should in all circumstances be discouraged. No shortage or excess should be adjusted without proper scrutiny and any adjustment in the books of accounts should be made only after obtaining approval of the appropriate authority in the mill.

14.15 The method of valuation of stocks should be one in accordance with the generally accepted accounting principles and should be followed consistently. Guidance on what constitute the generally accepted principles

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of valuing stock is available from Accounting Standard 2 “Valuation of Inventories”, issued by the Accounting Standards Board of the Institute of Chartered Accountants of India. In case there is a change in the method of valuing stock, the effects of such change should be worked out and, if material should be disclosed in the accounts.

Sales

14.16 Sales in a textile mill can be broadly classified under the following:—

- (i) Sale of controlled cloth.
- (ii) Sale of other cloth—
 - (a) Export
 - (b) Government and Semi-Government departments
 - (c) Civil sales
 - (d) Sales through agents on consignment basis
 - (e) Sale of fents, rags and chindies
 - (f) Retail sales
- (iii) Sale of yarn
- (iv) Sale of wastes/scraps.

Export Sales

14.17 In respect of sales in export market, the proceeds of sale are recorded from the sales invoices. The price, terms of payment, adjustments for foreign currency fluctuations etc. are contained in such sale contracts. At times the services of middlemen may have been obtained in the procurement of such export orders. Contract/agreement with such agents contain terms regarding the commission or other payments. In case the agents belong to a foreign country, the RBI's permission is needed before remitting the amount of commission etc. In case revaluation of currency has taken place after the sale has been effected in law (the contract being in foreign currency) but before recovery of the sales proceeds contract is executed, proper adjustments for such currency fluctuations, if they are to the account of the seller will have to be made. Proper adjustment of expenses incurred to execute such contracts i.e., freight, insurance, transport etc. in the case of CIF contracts are made in respect of all exports made during the year. When goods have been sent out from the mill, but they are lying at the port pending shipment, at the closing date such goods

are not treated as sales if the property in the goods has not passed to the buyer but are included in stock.

14.18 The terms and conditions of the various export incentive schemes (e.g., cash incentives, or incentives in the form of import licenses or replenishment licenses) are not uniform, therefore, a set accounting treatment may not be equally appropriate in every case. Due care should be exercised by the management in ascertaining the correct and complete terms and conditions of the scheme applicable. The time honoured dictum (based on the generally accepted principle of conservatism) that anticipated profits should not be taken credit for in the accounts unless they have accrued, but expected losses should be provided for, would serve as a guiding rule in deciding the extent to which benefits not yet received under the export incentive scheme s js taken credit for. However, an equally important guiding consideration should be that the accounts should show a true and fair view of the trend of the actual results over a number of years. Thus, that accounting treatment should be adopted in respect of such benefits which, in the facts and circumstances of the case, comes nearest to reconciling what may be the conflicting requirements of these two considerations.

Sale to Government Departments

14.19 Sale to Government and Semi-Government departments are generally finalised on the basis of tenders. At times, a price escalation clause is also found in such sale contracts. Proper adjustment in this regard is made in respect of all such sales irrespective of whether the claim by the company or the purchaser has been made or not unless there are special reasons for not doing so in which case a note in the accounts may have to be given to disclose the position. Sales to Government/ Semi-government departments are usually made without the aid of middlemen. But the mills may choose to utilise such services. The usual practice of billing in case of sales to Government departments is that the first bill is raised for 90% or 95% of the sales value and the balance amount is billed by a second bill. If the goods have been actually delivered 100% of the agreed price should be accounted for as sale.

Civilian Market

14.20 Bulk of the sales takes place in the civilian market. The selling organization depends upon the marketing policies of the company. Usually, sole selling agents' selling agents/ distributors/ authorized stockiest are

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appointed by the company for sales in the civilian market. Agreements are entered into with such agents, specifying the services to be rendered by them and their remuneration. The prices in the civilian market are subject to wide fluctuations; these are fixed by the management from time to time.

Sale of Fents, Rags and Chindies

14.21 Sale of fents, rags and chindies has also to be properly accounted for in the books of accounts. Having recorded the production and stock of such goods, the rates at which such goods are sold should be properly recorded with reference to the management policy in this regard and/ or the rates fixed of the purpose from time to time.

Retail Sales

14.22 Many companies have their own retail outlets. Such retail outlets can be managed:

- (a) on the basis of contract to some outside party
- (b) company's own department or some other system. In the former case generally the responsibility for stock, insurance, etc. rests with the contractor. In any case, proper accounting of sales and expenses must be made. In case the retail outlet is the company's own department, then proper quantity and other records regarding receipts, sales and stocks must be kept.

14.23 Where the volume of business transacted at the retail outlets is large, it becomes difficult to maintain elaborate quantity of records for each variety and design without incurring large expense. In such cases it may be proper to carry out the stock taking at periodical intervals say six monthly or quarterly and reconcile the total retail account by taking into account the sale value of opening stock, of goods sent to retail outlet and of closing stock and reconcile the balance with the sale proceeds during the period. Difference, if reasonable, can be due to genuine cutting shortages or other minor clerical errors which may be ignored by the management on business considerations.

This system can work only if the selling prices are pre-determined and there are no changes during the period. Considerable difficulties have to be faced in cases where there are frequent changes in selling rates.

Sale of Yarn

14.24 Sale of yarn is generally made to power looms and hand looms in the civilian market if there are long term contracts with any purchaser there should be proper accounting of sales. Selling prices of usable or non-usable wastes sold is also decided by the management from time to time.

Sale of Scrap

14.25 Scraps are usually sold periodically by auction. A list giving quantity of goods put up for auction is prepared by the management. The auction is normally held through approved auctioneer. The auction bids are subject to management sanction.

Sale of Controlled Cloth

14.26 Controlled cloth scheme was introduced by the Government to ensure production of cheaper varieties of cloth for the poorer section of the society. Prior to the declaration of the 'Integrated Textile Policy' in August 1, 1978, all mills were obliged to produce a part of their total production to conform to the specified categories. Because, the production of such cloth entailed a loss to the mills and the sickness in the textile industry was feared to grow alarmingly, therefore, the Government decided in 1978 to withdraw this obligation. Presently, only the mills under the National Textile Corporation are required to produce the controlled cloth. The losses suffered on this account by the NTC mills are being reimbursed by the Government.

Consignments Sales

14.27 At times goods may be sent to some party on consignment basis. In such cases till the goods are sold by the consignee, they are the property of the consignor. Proper accounts of goods sent on consignment, goods sold and balance lying in stock with the consignee should be received from the consignee and sales account and sales tax, etc, adjusted properly. The consignee's remuneration should be appropriately accounted for with reference to the agreement with him and the amount of sales. If any expenses have also been allowed proper accounting thereof should be made.

Model Checklist of Generalized Areas

14.28 Model Checklist of generalized areas is being given below which may help to internal auditor to conduct the audit in these areas. The above list is not exhaustive and some points may be different from situation to situation or

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segment wise but have been provided considering the peculiarity of the financial transaction as well as operational activities taking place in this industry. The other usual modes of verification also need to be followed.

1) Administration

- Review of selection process of various Contractors i.e., Security, Canteen, Housekeeping, Routine maintenance (AMC), Doctor etc.
- Review of agreements and bill passing system.
- Comment on system of Authority Level Matrix being in place and report deviation.

2) Accounts and Finance

- Checking of Current Asset and Current Liability.
- Provisioning and cut off procedure / adherence to book closure process and timeliness.
- General expense system of sanction and deviations.
- Compliance with applicable accounting standards.
- Control over voucher preparation, modification and deletion.
- Check the calculation of commitment charges paid to financial institutions.
- Check the rebate received from financial institutions for prompt payment of interest.
- Check that the debt servicing is done properly and on due dates.
- Check that the terms of loan in respect of interest payment and loan repayment are followed correctly.

3) Cash Transaction

- Whether physical verification of Cash is carried out periodically?
- Whether adequate security arrangement for Custody of Cash exist?
- Whether proper cash retention limits prescribed have been and adhered objectively?
- Whether adequate insurance cover for protection of cash has been obtained?
- Whether all required cash transaction records are maintained?

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- Verification Funds requirement and its efficient utilization as per HO directive with optimal balance.
- Verification auditing of cash book.
- Verification of accounting of cash receipts.
- Verification of authorization of Expenditure and Payment.
- Whether adequate Fidelity Insurance of cashier and related staff has been obtained?
- Verification of treatment given to excess and shortage found in cash; if frequency of discrepancy is more what steps are taken to strengthen control?
- Whether rotation of duties in Cash/Bank department is implemented.
- Keys management.

4) Bank Transaction

- Review of requirement of funds and whether proper groundwork is carried while planning periodic cash flow?
- Ensure proper review of receipts of funds from HO/CFD.
- Verify the Custody of Blank Cheque Books and the procedure of recording for the same.
- Whether blank signed cheques are properly recorded in register and its uses is monitored and accounted.
- Whether blank signed cheque are physically verified periodically and cancelled, after return of signing authority.
- Whether Internet transaction through CC limit is restricted and all govt. payment done through current accounts in all the units. Whether the required funds will be approved and transferred to this account by cheque?
- Verification of Bank Receipts with the pay-in-slips.
- Verification of booking of Bank Commission with bank advice.
- Verification of Funds Transfers electronically (RTGS/NEFT) whether any discrepancy noticed in approval's and transaction details? Whether authorized signatories only conduct such transactions?

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- Whether electronic fund transfer are recorded in separate register and physically signed by competent authority for authentication of transaction?
- Verification of Bank Reconciliation of Operative and Non Operative Banks.
- Whether bank reconciliation is prepared by person not involved in accounting of bank transaction and rotation of duty is implemented. Whether unit CFO has counter signed the BRS.
- Whether interest charged by bank represent the transaction cost and is as per stipulated conditions of agreement.
- Whether the entries shown in Bank Reconciliation have been followed up by the designated officer not being the preparer of reconciliation statement and or the accountant concerned?
- Verification of Accounting of Stale Cheque.
- Whether, cheques are printed through computer software and signed along with voucher approval ?
- In case of yourself transfer, whether accompanied list is also signed by cheque signatory and such instruction is passed to bank ?
- Whether the FDR's reported to be kept with authorities is verifiable or a certificate is obtained on periodical basis from the custodian?
- Whether withdrawal of signing authority (for exiting employees) is informed to bank immediately?
- Whether, in case of withdrawal of signing authority, for unrepresented cheques, payees are informed for replacement of cheques and bank for stop payment?
- Whether post dated cheques are posted in the memorandum register and kept in adequate custody?

5) Imprest Transaction (Accounting and clearance)

- Review the process/stipulation of granting Permanent Imprest and Temporary Imprest.
- Review Closing of Imprest. Whether time limits for submission of Imprest is observed?
- Review of expenditure through Imprest. Whether expenditure incurred is for the same purpose for which it is granted?

6) Booking of Expenditure

- Verification of Revenue Expenses incurred in the light of delegation of power and is within the permissible budget limits.
- Whether no personal expenses have been debited to company accounts?
- Verification of proper sanction for incurring of expenditure and verification of following proper procedure laid down by the company.
- Verification of power bills with respect to actual unit consumption, check if any penalties and extra payments are levied. Also indicate material nature of defaults leading to levies.
- Whether adequate documents are attached to the vouchers signifying the expenditures evidence and authority?
- Whether proper cut-off procedures have been followed for recognition of expenses/ incomes?
- Whether project/ estimates are prepared before incurring a works contract (revenue/capital) and variance with reason analyzed and corrective action taken?
- Verification of capital expenditure with respect to provisions of companies Act, 1956, and requirement of Accounting standard.

7) Payment Procedure

- Check the company's policy and procedure for making payment.
- Check whether all such payments have been made through e-payment or as per HO directives.
- Check that the bank details of the payee have been received correctly from the authorized representative.
- Check the e-payment details with the e-payment details provided by the payee.
- Verify whether the payments made through cheque can be made through e-payments with proper safeguard.
- Check the complaint of non-receipt of payment after e-payment.
- Check whether reasons were obtained from bank for non-payment and efforts taken to resolve the problem.

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- Whether all e-banking transactions are recorded in register and signed by competent authority for authentication of transaction.
- Whether passwords of handlers of e-payment are shared or are used by the owner of the password only.

8) Time-office and employees transactions

- Review of all other HR policies in place and their implementation.
- Whether recruitment of employees, contractors and consultants are done as per company policy?
- Whether photo ID cards have been issued to all employees and whether same are taken back at the time of separation?
- Review of attendance system and records of all employees (including contractor employees).
- Comment on adequacy and effectiveness of training programs and records maintained.
- Review of leave policy and maintenance of leave records.
- Review of system of preparation and payment of salary, wage bills, overtime bills, LTA, Medical reimbursement, loans, advances, leave encashment, etc. including deductions on account of PF, ESI, TDS etc.
- Comment on staff turnover and reasons for leaving. Whether leaving formalities are duly complied with?
- Comment on maintenance, updation and control over personnel files.
- Whether job rotation is done as per company policy?
- Whether employee complaints are properly addressed and resolved.
- Comment on actual manpower against budgeted.
- Verification of Salary Bills / Supplementary salary Bills/Wages sheets.
- Verification of Overtime Bills with the original attendance records and labour union agreements along with the good work payments and senior management approval.
- Verification of regular yearly increments granted to employees.
- Verification of leave encashment with respect to policy and entitlement (Regular & On Retirement).

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- Verification of Medical Reimbursement/ Medical Claims/ Major Expenditure on medical treatment.
 - Review of Travelling Advance and Final Settlement of traveling expenses whether the frequency is high and outstanding is longer? If yes what steps are taken to control the same?
 - Review of Service Book and Leave Account.
 - Verification of Adhoc Gratuity payment and Final Gratuity Payment.
 - Review of Provisions for Gratuity/Leave Encashment/Medical Reimbursement).
 - Verification of Pay Fixation on increment and on Wage revision.
 - Verification of payment of Ex-gratia and Bonus, if any.
 - Verification of payment made under Workman Compensation, act if any.
 - Review and verification of Income Tax Calculation of staff, payment and deduction.
 - Verification of Reconciliation of deductions made on account of IT, PF, ESI, etc. and deposits on thereof.
 - Verification that all other major Recovery and Payment are being done properly or otherwise?
 - Review of Payment of Advances to Employee (Furniture, Computer, Festival, Car etc.).
 - Verification of assets given to employees under Schemes and accounting
- 9) Raw Material Purchase/Creditors (PSF/VSF/Cotton etc.)**
- a) Cotton purchase.**
- Review and verification of procedure of advance payment to cotton supplier (Ginner/ Broker etc) and its reconciliation.
 - Whether cotton procurement has been done as per cotton policy (for regular consumption and stock purpose)?
 - Whether cotton buyer intimate immediately on finalization of contract about quality, price, delivery and payment terms to respective units and purchase order is fed immediately in ERP on receipt of contract detail?

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- Whether superior quality is purchased and used where inferior quality/cheap cotton is sufficient to meet customer requirements?
- Whether QC test is conducted for each lot received as per sample size specified and deduction memo/ debit note is raised in case of deviation within permissible limit otherwise rejected and returned back (moisture, trash, elongation, Strength Average Staple length etc.)?
- In case of advance payment, whether value of money is received back for returned goods?
- Whether daily, monthly and yearly price chart is maintained for each quality of cotton to predict price trend?
- Whether purchases have been made in small quantities at higher rates where bulk purchases could have been made at cheaper rates?
- Whether records are kept to monitor the future price indexes in the global Market? Are these being used in buying decisions?

b) Purchase of PSF / VSF, etc.

- Review and verification of procedure of advance payment to fiber supplier companies and its reconciliation.
- Whether, it is ensured that total ordered quantity is dispatched by supplier, within the calendar month so that any upward price change is not affecting purchase cost as price as on date of dispatch will prevail.
- Whether, commitment quantity is lifted so that lifting/turnover discount is availed to the extent agreed?
- Whether, all available incentives/discount have been accounted for?
- Whether, credit-note on account of various incentive scheme available is adjusted timely in further payment/deliveries?
- Whether for all adjustments in prices, proper documentation is available from the suppliers?

10) Purchase Procedure and Various Purchases: Review of procedure for purchase

- Whether tender/RFQ procedures have been followed: inviting limited/open tender as per the delegation of powers, time given to

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participate in the tender, formation of tender committee, opening of sealed tender by the tender committee, conducting negotiations, etc?

- Whether tender includes technical qualification parameters and whether any proven sources have been ignored for participation in tender for no valid reason
- Whether the rates at which orders have been placed appear to be competitive and reasonable compared to the previous purchases rates?
- Whether the Company policy (Through CCD/ Direct, emergency/Regular, Revenue/capex, authority level etc) of purchases is followed by all the units uniformly?
- Whether the Repeat Orders placed are based on orders placed earlier with proper tendering; whether other conditions governing the placement of Repeat Orders are have been followed?
- Whether any attempt has been made to split the tenders to keep the value of the contract within the delegated powers of the approving authority?
- In case of cancellation of tenders, whether approval of competent authority has been obtained stating the reason for cancellation?
- Whether the same items have been re-tendered; if so, whether the rates at which order has been placed are higher than the rates received for the tender cancelled?
- Whether indents of same items from different units are clubbed at the office of Material Resource Section or CCD before tendering?
- Whether unusual time taken to place orders (from the date of indent)?
- Whether material have been supplied within the stipulated time; if not, whether liquidated damages have been imposed?
- Review time taken to inspect the store materials (after the supply), to prepare Store receipt, to send the bill to Accounts department for payment, to pass the bill for payment and make payment.
- Whether the payment made are as per the terms and conditions of the order, especially taxes and duties, whether tax concessions are availed?

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- In case of delay in supply whether the Purchase department takes follow up action. Some instances of abnormal delay in supply to be given.
- Maintenance of records such as, Tender Register, Supply orders, Bill Passing Register, etc.
- Whether purchases have been made in small quantities at higher rates where bulk purchases could have been made at cheaper rates?
- In case of local purchase, whether the materials purchased have been consumed immediately?
- Whether local purchases made are within the powers delegated to the approving authority?
- Whether any local purchases have been made when the materials were in stock or waiting for inspection?
- Whether advance payments made to suppliers are outstanding for a long time; list of such advances (separately for Capital and Spares) with age and reason for non adjustment?
- Total no. of contracts placed up to period of audit no. of contract/orders Value
 - i) Open tender
 - ii) Limited tender
 - iii) Repeat order
- Whether repetitive orders are given even when material are in inventory.

11) Imports

- Check Payments to Clearing House agents, Air freight, Demurrage.
- Check Utilization of benefits: EPCG, DEPB, Duty drawback, Advance licensing etc.

12) Creditors Management

- Enquire about advances unadjusted for more than reasonable time.
- Enquire about non-payment of credit balances.
- Check earnest money/security deposit and old outstanding balances.
- Check exceptional transactions.

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- Check Supplier account reconciliation and balance confirmations.

13) Works Procedure and Various works

- Check whether tender has been given or quotation were invited.
- Check whether detailed estimate is prepared and approved by the Competent Authority.
- Check the financial terms and conditions of the order.
- Check the clauses for applicable taxes and duties and other relevant expenses.
- Check the compliance to various applicable statutes on work order.
- Check the compliance for statutory dues like PF, ESIC etc on contractor's payments.
- Check the order execution schedule is given in the order.
- Check the qualifying criteria is meet out or otherwise.
- Check the price comparative statement of the work order.
- Check the price variation conditions in the order.
- Check the comprehensiveness of the terms and conditions of the order.
- Check the work is not split up in the small works so as to bypass the Delegation Of Power (DOP) requirement.
- Check the clauses relating to liability and losses of property/third party liability.
- Check the clause relating to measurement of work.
- Check the clause relating to the supply of material in terms of rate and value at which it will be given.
- Check all terms and conditions which are order specific and there is no scope for ambiguity.
- Check draft work order approving authority as per DOP.
- Check whether order is being issued is within the validity of the order.
- Check whether per day compensation or a piece work compensation is competitive as compared to similar works in the vicinity.

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14) Passing of supplier's bills

- Check the invoice with all the terms and conditions of the order.
- Check the recovery for late delivery.
- Check for VAT credit is availed or not.
- Check for the advance adjustment if paid against the order.
- Check whether adequate recovery of security deposit has been done.
- Check whether bill is duly passed by competent authority.
- Check whether discount/rebate if any has been given.
- Check whether TDS if applicable has been deducted and deposited.
- Check whether correct account head have been debited or credited.
- Whether payment advice is supported by original invoice for making cheques and the same is duly endorsed?
- Whether due care is taken before making payment on duplicate invoice?
- Whether payments are made within due dates?

15) Passing of works bills

- Check the invoice with all the terms and conditions of the order.
- Check the measurement as recorded in the Measurement Book with Running Bills.
- Check whether the bill and measurement have been internally verified as prescribed.
- Check the recovery for delayed execution of work.
- Check whether proper VAT credit has been taken.
- Wherever applicable, whether WCT has been deducted and deposited/adjusted?
- Check for the advance adjustment if paid against the order?
- Check whether adequate recovery of security deposit/retention money is made.
- Check whether bill is duly passed by competent authority.
- Check whether discount/rebate if any has been given.
- Check whether TDS if applicable has been deducted.

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- Check whether recovery for the material issued to the party has been affected.
- Check whether correct account head have been debited or credited.

16) Sales & Dispatch (Final product, Rejects, Scrap)

- Adherence of Sales Policy, credit period and credit limits-analysis of Sales in excess of credit limit.
- Process of creating and maintaining customer master.
- Variance of actual and booking rates.
- Contract booking system – Domestic / Export. Alterations with proper authorization. Compliance of terms of contract.
- Whether amendment made in customer order (sales order) are duly approved/authorized?
- Sales Return system including method of calculation of its ageing for valuation purpose.
- System audit of dispatch planning, Report on delay in deliveries with reasons.
- System of dispatch / invoicing including cash discount.
- Comment on OTP (On Time Performance)
- Bill passing and payment system of Logistic.
- Transit insurance coverage.
- To review the system of Waste sale.

17) Export Sales

- What is the process of appointment of agents / sub-agents, renewal of agreement?
- Check whether commission paid to agent is as per agreement.
- Check system of order booking and Contract with the customers.
- Whether export shipment is against schedule?
- Review system of document negotiation with banks
- Check export related expenses – Container detaining, demurrage etc.

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18) Debtors Management

- Debtor's ledger scrutiny, critical and doubtful debtors to be specifically mentioned with the recovery progress and action plan.
- Recovery of interest on delayed receipts.
- Enquire about incentives, discounts and commission and its authenticity.
- Scrutiny of debit/credit notes.
- Samples and its proper accounting.
- PDC cheques management, follow-up and authorization in case of holding beyond due date/ cheque dates, cases of cheque returns and delay in taking legal action.
- Check Customer reconciliation and balance confirmations.
- Approval and accounting for bad/ doubtful debts.
- Whether credit limits fixed are frequently relaxed.
- Whether the debit/ credit notes have been issued after proper authorization and documentation?

19) Preventive Maintenance

- Whether schedule of preventive maintenance is adhered to regularly?
- Whether all the plant and machineries are covered under preventive maintenance schedules?
- Whether in case of deferment of parts replacement/ overhauling, a comprehensive note is prepared and approved by competent authority?
- Whether all such case of deferment are reviewed and documented periodically till the same is taken on scheduled maintenance/ replacement of parts?
- Check if abnormal stoppages have occurred and if they relate to non-adherence to schedules quantify the losses.
- Check planning for availability of spares and substitute for imported machine spares.

20) Investments

- Whether proper documentations are available for the investment showing intentions, repayment, return on investment details?
- Whether the investment made are duly authorized by the investment committee?
- Whether documents signifying the ownership are kept in authorized custody and have been periodically verified?
- Whether interest/ dividend receipts and repayments are as stipulated?
- In case of strategic investment, joint ventures, subsidiaries whether adequate due diligence has been done?
- Whether due diligence report is comprehensive and gives a clear opinion on the proposed investment?
- Whether the conditions precedents have been complied before the investment is made?
- Whether there are any overrun's or delays in the investment object? Whether there is any loss or continuation of a loss since long?

21) Price Variation and Penalty/ Liquidated Damages

- Check whether price variation clause is applied correctly as per formula given in the order.
- Check whether penalty and liquidated damages are recovered from the party as per terms and conditions of the contract.

22) Inventory Management (Stores)

- Maintenance of records such as, MRN, Issue slip, Requisition slip, Purchase Indent, Budget and special sanction etc.
- Whether inventory levels (minimum, maximum, re-order and economic order) are fixed and adhered to.
- Number of Instances of emergency/urgent purchase or issue without following prescribed procedures is recorded separately to review the planning system and inventory requirements.
- Whether emergency spare, regular and other (as and when required) are separately classified/categories in ERP system?

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- Whether discarded/obsolete and disposable items are identified time to time and disposed-off with approval of competent authority?
- Whether the records are computerized and detailed comments about the effectiveness of computerization?
- Whether the requirement projected in the budget is substantially higher than the previous period's consumption; if so, whether justification has been given?
- Whether any item has been included in budget, the consumption of which was NIL in the previous year. If so, whether the quantity projected has been justified?
- Whether material are consumed before the preparation of Stores receipts?
- Physical verification of store materials at random periodically is conducted and adjustments in books are adequate.
- Whether issue of stores materials on loan are properly recorded?
- Review status of recovery of stores materials issued on loan
- Whether there are any cases of materials received short or in damaged condition and whether claim has been made with insurance company/ from supplier for replacement?
- Review details of avoidable, wasteful expenditure like wharfage, etc.
- Whether non-moving and slow-moving stores items have been identified, list prepared and circulated to other units and headquarters before disposal?
- Check whether the actual physical count sheets are preserved until the internal auditor verification is complete.
- Review maintenance of records for scraps along with their approximate value should be maintained.
- Comments about the scrap to dispose of major items, since when lying as scrap, their approximate value. etc. Check whether disposal procedure is adequate?
- Check whether the concept of ABC analysis is prevalent in the company and uses for operating.

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- Maintenance of records in Major Stores, value of inventory, period the spares have been lying in Major stores including return of unused store material from sub Stores.
- Whether the number of items of store materials and their quantities issued by the Major Stores tally with those received by the sub stores?
- Whether the sub stores draws materials from main stores when it is already in its stock?
- Whether the materials issued by Stores are issued and received by authorized persons?
- Whether the materials are properly arranged and stacked to locate them easily?
- Whether physical control on FOC materials lying in the plant is adequate?
- Whether value of inventory in terms of number of months' consumption of stores and spares and comparison with previous year's figures should be made?
- Whether stores materials are lying in shop floor unconsumed for a considerable period of time; if so, reason therefore and determination of their NRV?
- Details of reconciliation between price stores ledger and financial ledger need to be furnished for taking action.
- Whether stores/surplus of charged off stores are approved by higher authority for taking action?
- Whether the consumption is booked as per consistent pre determined practice.

23) Physical Verification of the Inventory

- Check physical verification of inventory taking of all stores material completed at appropriate intervals and proper reconciliation has been carried out.
- Whether perpetual inventory system is adequate to cover entire inventory in one year and whether implementation is right?

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- Is the inventory verification conducted independent of stores and stores staff? Examine the responsibility of the person involved in inventory taking.
- Check whether there is proper authority in approving the adjustment of differences in the inventory findings. Is the approval and adjustment done promptly?
- Compare the shortages and excess of present inventory findings with those of previous 2/3 years and ascertain the reason difference in the same items. Examine the steps taken to stop the recurrences of such differences.
- Check whether slow and non moving items are regularly reviewed and appropriate action is taken.
- Check whether scrap salvage and unusable inventory are identified regularly and disposed off as per procedures laid down.
- Check whether the actual physical count sheets are present until the internal auditor's verification is completed.

24) Asset Management

- Comment on maintenance of Fixed Assets Register.
- Sale of any fixed asset/surplus asset with relevant approvals and as per disposal policy of the organisation
- Scrutiny of repair account to ensure that no items of capital nature are included therein.
- Scrutiny of additions to fixed assets so that no revenue expenditure has been capitalized.
- Interest and other expenses having direct nexus whether capitalized.
- Adherence to Preventive maintenance schedule and authorization on fixation/revision of maintenance schedule.
- Whether depreciation is being charged as per Accounting Policy of the Company.
- Check tagging and movement/ transfer of fixed assets.
- Custody and Control over Original Title Deeds.
- To report Idle and Under- utilized assets.
- Bill processing and payment system.

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- To review the system of assets given to employees.

25) Capitalization of Fixed Assets

- Examine the procedure of capital expenditure authorization. How such authorization is evidenced? Review and see compliance in case there is an authorization procedure in writing.
- In case actual expenditure exceeds the sanctioned amount, is there subsequent authorization for the additional expenditure? Is the sanction obtained before or after the expenditure is incurred?
- Is the amount of capital expenditure reflected in cash flow statement so that fund is available at the appropriate time? Examine whether actual expenditure is according to cash flow.
- Examine the purchase order/ contract issued for acquiring capital asset.
- Examine and review the technique applied for assessing the productivity and profitability of capital fixed asset.
- Check whether transaction is capitalized to correct account head.
- Check whether all the direct cost incurred is capitalized except taxes for which credit is available.
- Review whether requirements of AS 10 are complied with.
- Review depreciation charged on these assets for the construction period.
- Review as to the compliance of Schedule VI to the Companies Act.
- Check whether, separate capital cost is computed as per Companies Act and Income-tax Act.
- Whether fixed assets registers have been kept and maintained and are updated on regular basis?
- Check whether adequate depreciation is charged as per Schedule XIV of Companies Act.
- Check if assets are revalued and whether the write off is adequate after revaluation.
- Examine the assets write off policy and comment on the variance and adequacy.

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26) Insurance

- Verify validity of Insurance coverage and adequacy of Insurance and Risk coverage including additions during the year.
- Review of / stipulate various risks covered in insurance.
- Checking of follow up on pending claims and refunds.

27) Physical Verification of Fixed Assets

- Check whether fixed asset register has been updated till the date of the physical verification.
- Check whether physical verification was conducted periodically as per policy approved by the Audit Committee.
- Check whether scrap salvage and unusable/ discarded/ disposable assets are identified regularly and disposed off as per procedures laid down.
- Check whether the fixed asset register mentions the location of the fixed asset.
- Verify whether the asset was found at the same location as mentioned in the fixed asset register.
- Check if the asset was transferred to any other location? if yes, whether proper documents are maintained for such transfers and the fixed asset register is duly updated.
- Check whether any material discrepancy was noticed during the physical verification of the asset. If yes, whether such discrepancy was duly reconciled or whether adjustment were made in the books of accounts and fixed asset register.

28) Accounting Standard Compliance

- Check whether the compliance of applicable accounting standard is communicated at the execution level and also ensure the implementation of the same.
- Check the inventory valuation with respect to AS 2.
- Check the accounting of prior period expenses in accordance with the AS 5.
- Check the depreciation in the light of AS 6.
- Check whether revenue is recognized in accordance with AS 9.

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- Check the capitalization of Fixed Asset as per AS 10.
- Check the compliance of AS 11, i.e., accounting of foreign exchange transaction
- Check that the interest is accounted for as per Accounting Standard (AS 16) for borrowing cost.
- Check the compliance to all other accounting standards applicable to the company.

29) Financial charges

- Check the calculation of guarantee fee paid/payable.
- Check the calculation of commitment charges paid to financial institutions.
- Check the rebate received from financial institutions for prompt payment of interest.
- Check the interest subvention received/ receivable.
- Check the TUF subsidy receivable.
- Check that the debt servicing is done properly and on due dates.
- Check that the terms of loan in respect of interest payment and loan repayment are followed correctly.
- Check that security created in favour of lenders are registered with ROC are immediately discharged on repayment of debt/loan.
- Check any guarantees issued by the bank on behalf of company or guarantee given by company to others are immediately recorded in guarantee register maintained and are within the limit specified in Companies Act or share holders approval.

30) Information Technology Controls

- Review compliance of IT policy.
- Whether there is control over sharing of user ID and Password.
- Abuse / misuse of ERP/ SAP.
- Whether proper audit trail is available or not.

31) Reconciliations

- Check whether preparation of reconciliation and maintenance of books are done by separate employee.

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- Check Inter unit Reconciliation and Report on Deviations.
- Check reconciliation of sub-ledger to main ledger.

32) Security and safety system: Stipulate various safety and security measures already in place and comment on adequacy and improvement, if any, like:

- Safety measures and its effectiveness.
- Security system (personal and assets).
- Comment On the Existing Security Systems in the Plant.
- Review of Adequacy of Records and Controls at the Main Gate.

(a) Fire and Safety Equipment

- Is the proper fire and safety equipment available?
- Is the equipment accessible (i.e., is it unblocked)?
- Are flammables stored in flammable storage cabinets?

(b) Operation of Machinery or Complex Apparatus

- Are the indicator lights on the apparatus in an O.K. or safe condition?
- Is the apparatus producing normal sounds, odors, parts, or results?
- Is the apparatus equipped with data recorders or monitors that track the condition of the apparatus?
- If necessary, are there maintenance logs or other records that track the condition of the apparatus ?
- Are proper lock/ tag techniques being practiced?

(c) Common Tools and Equipment

- Are the workers using the right tool for the job?
- Are the workers using the tools correctly?
- If necessary, have the workers been trained to use the tools?
- Are the tools in good and safe working condition?
- Have the tools been inspected recently?
- Are the tools stored in appropriate locations?

(d) Work Area and Housekeeping

- Is the work area neat in appearance?

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- Are all aisles and walk-ways sufficiently wide for personnel and moving equipment?
- Do all aisles used by moving equipment have clear line-of-sights?
- Do all walking/working surfaces have barricades or hand guards to protect personnel from hazards?
- Are the chemicals properly inventoried and stored away?
- Is the lighting adequate?
- Are the exits clearly marked and easy to find?
- Are all overhead items secured?
- Are all stairs in good and safe condition?
- Are all ladders properly secured or stored away?
- Is the overall building in good working condition?

(e) General Procedures

- Do the personnel and building occupants know evacuation procedures for fire and weather alarms?
- Do building occupants such as, lab visitors have point-of-contacts within the building?
- Is the area manager sufficiently aware of work being done by lab visitors or employees from other area?

(f) Personnel Ergonomics, Focus, Training and PPE

- Are the personnel working in a manner that is free of unnecessary physical exertion?
- Are the personnel practicing good ergonomics?
- Do the personnel seem sufficiently focused on their job, especially jobs where hazards are present?
- Are the personnel trained to do the job and are aware of the hazards and mitigations?
- Does the job appear suited to the personnel?
- If necessary, are the personnel using PPE?
- For work near machinery, are the personnel wearing proper clothing?

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- If necessary, are the personnel wearing TLD badges in radiation areas?

33) Warehousing and Storage

(a) Control Features

- Ensure that sufficient storage space is available and the layout of storage facilities is suitable to meet the operational requirements of the organization.
- Ensure that goods are effectively stored in order to provide an efficient service to customers and internal users.
- Ensure that materials, goods and products are adequately and securely stored in order to facilitate their prompt identification and dispatch.
- Ensure that the optimum warehouse locations are utilised to maximise the efficiency of distribution to customers, etc.
- Ensure that all goods are adequately protected from damage, deterioration and loss, in order that they remain in optimum condition for use.
- Ensure that all stock movements are valid, authorised and properly executed.
- Ensure that goods are stored safely.
- Ensure that staff are appropriately trained in the handling of goods in order to avoid damage to goods and injury to staff.
- Ensure provision of adequate and serviceable materials handling devices as an aid to efficiency and cost effectiveness.
- Ensure that hazardous items are safely stored.
- Ensure that all relevant regulations and legislation are complied with.
- Ensure that stocks are used in rotation.
- Ensure that adequate and relevant insurance cover is provided for both the stocks and storage facilities.

(b) Risk Issues

- How are management aware of the current and future storage capacity requirements, and what is the evidence of effective planning to meet the identified demands?

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- How does management decide where to locate warehouses, and is adequate account taken of the relevant logistical, transport and customer service considerations?
- Are the storage locations (i.e., bins or bays) adequately identified to enable the prompt location of stock units?
- Are storage facilities adequate to protect goods from damage or deterioration?
- How can management be assured that all stocks are adequately protected from theft and pilferage?
- What measures are in place to prevent unauthorised access to the storage areas?
- How can management be certain that all movements of stock are valid, authorised and correctly executed?
- Are goods (especially hazardous materials) stored safely and in accordance with established regulations and good practice, and how can management be assured that this is the case?
- Are staff adequately trained in various material handling techniques, and how can management confirm this?
- Is efficiency of the storage facility enhanced with the use of appropriate handling devices (trolleys, pallets, forklift trucks, cranes, etc.) and how can management be assured that all such devices are serviceable and contributing to the overall cost effectiveness of the operation?
- How can management be sure that all the relevant regulations and legislation are being complied with?
- What mechanisms ensure that adequate, up-to-date and relevant insurance cover is in place for both the stocks and the storage facilities?

(c) Detailed Issues

- Is space allocated in order to cope with peak loads rather than normal or minimum requirements?
- Have management provided some spare storage capacity as a contingency to cater for expansion, etc. (and how was this accurately determined)?

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- Is space usage monitored and action taken to avoid wasted or excess space?
- Are raw materials, goods and finished goods appropriately segregated?
- How does management avoid excess storage space and aim to contain the costs of providing storage facilities?
- Are fast moving items accurately identified and conveniently located for efficient handling?
- Are items adequately trailed to all the relevant storage locations?
- Are stocks used in rotation (as appropriate) in order to avoid the build up of older or outdated items?
- Is there sufficient space between storage locations to enable effective and safe access, use of handling equipment, and safe evacuation of the building in case of emergency?
- How can management be assured that production and sales requirements are promptly and accurately advised to the warehouse?
- Have specific responsibilities for the warehouse operation been allocated (and does this include maintaining an awareness of current material handling trends and relevant regulations)?
- How can management be assured that packaging, storage and handling techniques are adequate to protect the goods from damage and deterioration?
- Are damaged items promptly identified and appropriate action taken (and how is this evidenced)?
- Are the appropriate environmental conditions (i.e., air conditioning, humidity, and temperature) provided and maintained at the required level?
- Are storage areas well lit for safety and security purposes?
- What physical and other security measures are in place to protect goods and personnel, and are they regularly tested for effectiveness?
- Are adequate and operational intruder alarms systems installed and regularly tested?

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- Are adequate and operational fire prevention, protection, and containment facilities provided, and are they regularly tested and maintained?
- Would the fire containment systems (i.e., sprinklers, foam inlets, etc.) cause significant damage to stocks?
- What measures prevent staff pilferage of stock items?
- Are adequate staff provided to meet the operational demands of the organisation, and how does management determine and maintain the staffing requirements?
- Are staff aware of the required and safe handling techniques and how is this confirmed?
- Have management provided adequate and suitable protective equipment and clothing for staff, and how is its proper usage confirmed?
- How can management be sure that goods are stacked and stored safely?
- Are sufficient and adequate facilities provided for moving heavy items, and are staff aware of the correct use of such facilities?
- Are delicate items adequately protected during storage and when being moved?
- How is the accuracy of data input from other systems (i.e., stock control or Sales order processing) confirmed?
- How is data output to other systems (i.e., distribution) confirmed?

34) Foreign Exchange

- Review of foreign transactions for compliance with company policy / board mandates.
- Review of deal execution, confirmation and settlement.
- Review of deal capture in system and manual MIS.
- Review of settlements (cash/ hedge cancellation/ rollover cash flows/ delivery).
- Review of transaction documentation pertaining to foreign exchange.
- Checking of accounting for forex transactions.

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35) Review Production Resources

- Review the system of monthly target setting process
 - a. Area wise (domestic and export)
 - b. Product mix wise
 - c. Sold / confirm order
 - d. Reliability of unsold program/ process of estimation/ achievement
 - e. Evaluation on market info as prices.
- Actual production laid and program change analysis
 - a. Change memo
 - b. Approval
 - c. Reason
 - d. Impact
- Analyze reason of efficiency losses
 - a. Utilisation%
 - b. Reason, corrective action
 - c. Review machine wise capacity utilization (under-load/idle run/idle lying)
 - d. Reason analysis of abnormality/ repetition.
- Review month wise usable and saleable waste (stage wise) and waste stock tally.
- Review month wise stage wise WIP stock movement.
- Standard lot size v/s actual lot size: Lot change / quality change / repeat lot / quality / frequency at each stage since mixing to spinning.

36) Packing cost analysis

- Compare Standard v/s actual packing cost per kg/meter
- Ensure that packing material quantity tally should be v/s actual.
 - on fresh packing
 - on re-packing (with reason)
- Wastage, sample packing, change in standard packing, etc.

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- Free (sales promotion scheme): policy v/s actual.

37) Quality Issues- Complaint analysis

- Customer complaints/claims management – process for recording customer complaints, classification, escalation mechanism, response time, follow up mechanism, pending customer complaints/ claims.
- Analyse nature of Complaints, repetition of Complaints,
- corrective Action taken on previous complaints.
- Analyse cost of Complaint- (a) Claim Amount, (b) Settled Amount and (c) Loss of Customer.

38) Statutory Compliances

- Verification of receipt/ acknowledgements for the payment of statutory dues like, Income tax, VAT, Central Sales Tax, WCT and Service Tax, etc.
- Whether proper Cenvat/ Modvat credits are availed timely and there is adequate periodic inspection procedure for reviewing balances?
- Whether statutory dues have been deposited in time and whether any penalty has been imposed on this account?
- Verify reconciliation of recoveries and payment of statutory dues and other salary related deductions with financial Ledger.
- Review of pending cases and show cause notice status, and whether timely submission/appeal have been made, wherever required.
- In case of decision against the company, if company do not want to go into appeal against the order, appropriate note by competent authority supported by legal advice is recorded.
- Whether in case of major appeals/ disputes with tax department. an approval of strategy is obtained from business heads?
- Whether appropriate provision made, or shown as contingent liability
- Whether checklist for statutory compliance in place and follow-up periodically (ideally monthly) by independent employees within the organization for verification of compliance.
- Compliance to Companies Act and Other Applicable Laws (SEBI clause 49, RBI, Pollution control, Industrial Act, etc.) including the compliance of Standards on Internal Audit (SIA) 17 so far it relates to compliance of laws and regulations in internal audit.

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- Does the legal counsel(s) periodically updates the management of implications and compliances requirements of laws and new legislations?

Conclusion

14.29 In this changing scenario, the role of internal auditor has become very crucial and important in discharging their duties properly and efficiently, particularly for timely detection of irregularities and lapse, which help in minimization of irregularities as well as prevention of frauds. For best results, internal auditors, who are given the task of substantive checking, must be fully abreast with the changes in functioning and operational activities of the entity at all levels and at all times.

The system of internal control is the plan of organization and all the methods and procedures adopted by the management of an entity to assist in achieving management's objectives of ensuring, as far as practicable, the orderly and efficient conduct of its business, including adherence to management policies, the safeguarding of assets, prevention and detection of fraud and error, the accuracy and completeness of the accounting records, and the timely preparation of the reliable financial information. The system of internal control extends beyond those matters which relate directly to the functions of the accounting systems.

The internal audit now-a-days is not limited to the audit of financial transaction but the audit of operational activity or operative audit. The review need to be made considering the operational procedure in the organization.

The internal auditor should apply analytical procedures as the risk assessment procedures at the planning and overall review stages of the internal audit.

14.30 An analytical approach need also to be made with respect to the following:

- Productivity
- Source and application of funds
- Cash generation
- Trends of profit and other financial growth
- Measurement of profitability
- Trend of cost structure

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- Liquidity or working capital position
- Return on capital employed
- Whether there is over-trading
- Stock exchange quotation of shares for a number of years to examine the trends over a number of years so as to have a comparative study by teeing up with the facts and figures in Annual reports (stock Exchange Quotation are not presented in the Annual Reports in India)
- Dividend trends
- Return on investment
- Trends in the rate and quantum of dividends
- Yield potential
- Ploughing back of profits
- Inter-firm and intra-firm comparisons
- Management of corporate capital.

Part V

**Concluding Internal Audit and
Reporting Audit Findings**

Chapter 15

Concluding Internal Audit Procedures

15.1 The internal audit is concluded once all the internal audit procedures and checks are completed. The internal audit team leader should finally review the working papers to see that the internal audit has been conducted according to plan and it has achieved its objectives. He should make note of any audit procedures that could not be completed because records were not produced by the department or due to lack of time. It is time to decide finally whether all internal audit observations would find place in the report or some would be dropped in view of the department's reply. Team leader should check the supporting evidence for each observation that is proposed to be put in the report. He should satisfy himself about the sufficiency and relevance of the evidence. He should then prepare a draft report which will include his report on:

- Effectiveness of controls and any major/ minor weaknesses in them;
- Non-compliance with law, codes and government orders with assessment of possible loss; and
- Any matters relating to propriety of transactions.

The format of the draft report shall be same as final report and all the applicable quality checks equally hold good for draft report also except that the title of the report shall be "Draft Internal Audit Report".

Exit Conference

15.2 Internal auditor should seek appointment for an exit conference with preferably the head of the department once the final draft report is ready. A copy of the draft report should be given to the Read of the department at least a couple of days in advance so that he and his team have time to study it and prepare themselves for the meeting. The purpose of exit conference is to give the department an opportunity to place additional facts, its views, etc. on the internal audit findings.

Essentially, it is an opportunity for internal auditor to seek confirmation of facts given in the internal audit report and the department's views on the internal audit recommendations. If the exit conference takes place in right spirit, the internal audit report becomes an agreed document between the

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department and the internal audit. Request for exit conference can be made through a formal letter to the management enclosing the draft audit report or by personally meeting the head of the department. The following should be the approach to the exit conference:

- Auditee department should be given opportunity to initiate the discussions and offer their views on the report;
- In case of disagreement, auditee department should be able to substantiate their views with supporting evidence; and
- Auditor may agree to reconsider his conclusions in the light of the information provided by the management.

A record of discussions of exit conference should be kept on file as a part of audit working papers. It is not necessary by for the department's representative to sign it. A copy of the record prepared internal auditor may be given to the department for their information. In case they disagree with any part of the record it is for the department to convey it to the internal auditor. The record helps document reasons for dropping any internal audit paragraph.

Reporting Audit Findings

15.3 Internal audit report is the final deliverable of audit process reflects the quality of audit. Hence, auditor should take utmost care in drafting the report. The internal auditor's report should contain a clear written expression of significant observations, suggestions/ recommendations based on the policies, processes, risks, controls and transaction processing taken as a whole and managements' responses. Standard on Internal Audit (SIA) 4 "Reporting" lays down the following basic elements of the Internal Audit Report:

- (i) **Title**– Report should have appropriate title. Titling the report as "Internal Audit Report" would be appropriate and helps in demarcating the report from other reports.
- (ii) **Addressee**– It should be addressed to the appropriate authority as mentioned in the charter. In case legal requirement arises to send internal audit report, it should be addressed to appropriate authority mentioned in the relevant law or regulation.
- (iii) **Executive Summary**– It should mention period covered under audit and mention that establishing appropriate internal controls and preparation

of financial statement are the responsibilities of management and responsibility of internal auditor is to express opinion on efficiency of internal controls in achieving management objectives.

(iv) Scope paragraph– Nature of audit with reference to internal audit charter or engagement letter should be mentioned. Scope refers to terms of engagement, requirements under relevant legislation and applicable standards to be followed by the internal auditor. Internal auditor should mention scope with reference to control environment. The reader needs this as an assurance that the audit has been carried out in accordance with established standards.

(v) Audit Observations– A paragraph should give reference to the control environment and legal compliance required by the department in conducting its operations and should be supplemented by report of observations split into two sections along with auditor's opinion on effectiveness of controls. It should carry a statement that the opinions are based on audit work designed, performed to identify and check the material weaknesses in controls and observations are based on evidence collected.

15.4 Audit observations should be split into and separated for each section in the department, i.e., cash section, establishment section, engineering section etc. Within each section report should be split into

Part I A – Serious irregularities in which corrective action can be taken immediately e.g., minor changes in the current organization structure or introduction of a new MIS report for effective monitoring.

Part I B – Serious irregularities where corrective action need some time e.g., creation of a separate cell for monitoring quality/ appointment of a senior officer, etc.

(i) Follow-up Report: Status report of the follow-up actions taken by the department to the earlier report should be annexed.

(ii) Date of Report: Date of report is the date on which the report is signed. Significance of the date is that auditor has considered effect financial transactions on cut-off till the date of signing the report. This date in no case can be prior to the some important dates like of entry conference or date on which draft report is discussed with the management, etc.

(iii) Place of signature: Report should mention the location, which is city where audit report is signed.

(iv) Signature of the auditor: Report should be signed by appropriate

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authority in the audit department. Name of the officer and designation should be mentioned under the signature.

15.5 It is a good practice is to categorize audit findings by risk severity. A priority designation (High, Medium and Low) may be assigned to each of the key areas of focus detailed in the report based on auditors' assessment of the severity of the issue. The rating (High, Medium and Low) indicate the need for auditee to put priority focus which is as follows:

- **High** – Issue is high priority and should be given immediate attention and considered imperative to ensure that auditee is not exposed to high risks (i.e., failure to take action could result in major consequences and issues).
- **Medium** – Issue is medium priority and considered necessary to avoid exposure to significant risks (i.e., failure to take action could result in significant consequences).
- **Low** – Issue is not critical and considered desirable and should result in enhanced control or better value for money.

Another good practice is to classify possible causes of internal audit findings so that the auditee may address the causes of audit findings as follows:

Compliance	Failure to comply with prescribed regulations, rules and procedures.
Guidelines	Absence of written procedures to guide staff in the performance of their functions
Guidance	Inadequate or lack of supervision by supervisors.
Human error	Mistakes committed by staff entrusted to perform assigned functions.
Resources	Lack of or inadequate resources (funds, skills, staff, etc) to carry out an activity or function.

Following up Audit Report

15.6 Internal Audit Committee should set up a framework for effective follow-up.

Follow-up guidelines should be issued by them and checked independent of audit field work. The following are the indicative guidelines for effective monitoring:

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Action	Time frame
Issue of Draft Report to Head of the Department	Immediately on completion of field work
Exit conference	Within one week from issue of draft report
Issue of Final Audit Report	Within 10 days from exit conference
Action on I A irregularities	Within 20 days from the issue of final report
Action on I B irregularities	Within 6 months from the issue of final report
Action on other irregularities	Within 2 months from the issue of final report

Appendix

Abbreviation and Symbols

General Units

Amperes	A	Lu%	l%
Atmospheres	atm	Meters	m
Becquerels	Bq	Minutes	min
British Terminal Unit	Btu	Minutes of Arc	'
Calories	cal	Moles	mol
Candels	cd	Newtons	N
Coulombs	C	Ohms	Ω
Degress Centigrade	$^{\circ}\text{C}$	Ounces	oz
			oz/lin
Degrees Fahrenheit	$^{\circ}\text{F}$	Ounces Per Linear Yarn	yd
Degress of Kelvin	K	Ounces Per Squard Yard	oz/yd ²
Degrees of Arc or Temperature	$^{\circ}$	Parts Per Million	ppm
Denier	d	Pascals	Pa
Denier per Filament	dpf	Pounds	lb
Farads	F	Pounds per Square Inch	psi
Feet	ft fl	Quarts	qt
Fluid Ounces	Oz	Radians	rad
Foot Pounds	ft-lb	Relative Humidity	RH
			rpm s
Gallons	gal	Revolutions per minute	or
Grains	gr	Seconds	sec
Grams	g	Simeans	S
Grams per Denier	g/d	Specific Gravity	sp gr
		Standards Cubic per	
Grams per Linear Meter	g/m	Minute	scfm
Grams per Liter	g/l	Steradians	sr
	g/m		
Grams per Square Meter	²	Teslas	T
Grays	Gy	Turns Per Inch	tpi
Henries	H	Turns per Meter	tpm
Hertz	Hz	Variation	δ
Horsepower		Wales % Courses	w % c
Hours		Warp % Filling	w % f
Inch-Pound		Watts	W
Inches		Webers	Wb

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Intersic Viscosity	Yards	yd
Joules	Yards Per Minute	ypm

Liters

Lumens

Abbreviation and Symbols (Continued)

Metric Prefixes

Mega-(10 ⁶)	M-
Kilo- (10 ³)	k-
Hecto -(10 ²)	h-
Deka-(10 ¹)	da-
Deci-(10 ⁻¹)	d-
Centi-(10 ⁻²)	c-
Milli-(10 ⁻³)	m-
Micro-(10 ⁻⁴)	μ-

Yarn Count

Cotton Count	c.c.
Jute Count	j.c.
Linen Lea	l.l.
Metric Count	m.c.
Te%	Te%
Wool Count	W
Woolen Count	w/c
Woolen Run	w.r.
Worsted Count	w.c.
Piled Yarn	= Single Denier/number of piles.,70/3 Single Denier/number of piles/number of cabled
Cable Yarn	= piles, e.g.,70/3/2
Filament Yarn	= Total denier/filament count, e.g., 70/36

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Measures, Weights and Equivalents

Units	Multiply By:	To Get:	Multiply By:	To Get:
Linear Measures				
foot	x 0.3048	= meters	x 3.281	= foot
inches	x 2.54	= centimeters	x 0.3937	= inches
inches	x 25.4	= millimeters	x 0.03937	= inches
miles	x 1.6093	= kilometers	x 0.6214	= miles
mils	x 0.0254	= millimeters	x 39.37	= mils
yards	x 0.9144	= meters	x 1.0936	= yards
Area Measures				
foot ²	x 0.0929	= meters ²	x 10.764	= foot ²
foot ²	x 144	= inches ²	x 0.00695	= foot ²
inches ²	x 6.452	= centimeters ²	x 0.155	= inches ²
inches ²	x 645.16	= millimeters ²	x 0.00155	= inches ²
yards ²	x 0.8361	= meters ²	x 1.196	= yards ²
yards ²	x 9	= foot ²	x 0.111	= yards ²
yards ²	x 1296	= inches ²	x 0.00077	= yards ²
Volume				
foot ³	x 28.317	= liters	x 0.03531	= foot ³
foot ³	x 7.481	= gallons	x 0.1337	= foot ³
foot ³	x 29.92	= quarter (liquid)	x 0.0334	= foot ³
foot ³	x 0.02832	= meters	x 35.315	= foot ³
foot ³	x 1728	= inches ³	x 0.00058	= foot ³
fluid ounces	x 29.57	= millimetres	x 0.0338	= fluid ounces
fluid ounces	x 0.031	= quarter (liquid)	x 32	= fluid ounces
fluid ounces	x 29.57	= centimeters ³	x 0.0338	= fluid ounces
fluid ounces	x 1.805	= inches ³	x 0.554	= fluid ounces
gallons	x 3.7854	= liters	x 0.2642	= gallons
gallons	x 128	= fluid ounces	x 0.0078	= gallons
gallons	x 3785.4	= centimeters ³	x 0.00026	= gallons
gallons	x 231	= inches ³	x 0.00433	= gallons
inches ³	x 0.01639	= liters	x 61.024	= inches ³
inches ³	x 0.01732	= quarter	x 57.75	= inches ³

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			(liquid)			
inches ³	x 16.387	=	centimeters ³	x 0.06102	=	inches ³
inches ³	x 16387	=	millimeters ³	x 0.00006	=	inches ³
				1		
quarts (liquid)	x 0.94635	=	Liters	x 1.0567	=	quarts (liquid)
quarts (liquid)	x 946.4	=	centimeters ³	x 0.00106	=	quarts (liquid)
yards ³	x 764.5	=	Liters	x 0.0013	=	yards ³
yards ³	x 202	=	Gallons	x 0.00945	=	yards ³
yards ³	x 0.7646	=	meters ³	x 1.308	=	yards ³
yards ³	x 27	=	foot ³	x 0.037	=	yards ³

Mass

grains	x 0.0648	=	grams	x 15.43	=	grains
grains	x 0.00229	=	ounces	x 436.7	=	grains
ounces	x 28.35	=	grams	x 0.0353	=	ounces
pounds	x 0.4536	=	kilograms	x 2.2046	=	pounds
pounds	x 453.6	=	grams	x 0.0022	=	pounds

Force

kilograms (mass)	x 9.807	=	newtons	x 0.10197	=	kilograms (mass)
kilograms-force	x 2.2046	=	pounds-force	x 0.4536	=	kilograms-force
ounces-force	x 0.278	=	newtons	x 3.597	=	ounces-force
pounds-force	x 4.448	=	newtons	x 0.2248	=	pounds-force

Energy or Work

Btm	x 1055	=	joules	x 0.000948	=	Btm
Btm	x 778	=	foot-pounds	x 0.00129	=	Btm
calories	x 4.187	=	joules	x 0.2388	=	calories
foot-pounds	x 1.3558	=	joules	x 0.7376	=	foot-pounds
watt-hours	x 3600	=	joules	x 0.0002778	=	watt-hours
watt-hours	x 2655	=	foot-pounds	x 0.0003766	=	watt-hours

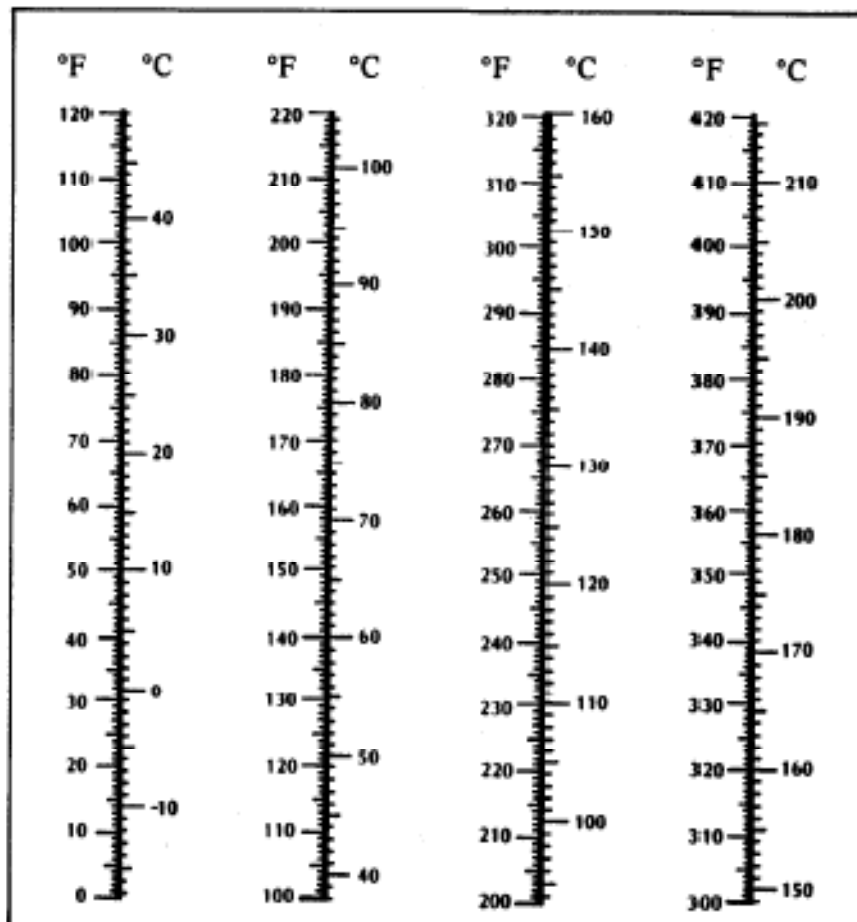
Pressure or Stress

atmospheres	x 101.3	=	kilopascals	x 0.00987	=	atmospheres
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Compendium of Industry Specific Internal Audit Guides

atmospheres	x	760	=	mm Hg (0 °C)	x	0.00132	=	atmospheres
atmospheres	x	29.92	=	inches Hg (0 °C)	x	0.0334	=	atmospheres
atmospheres	x	406.8	=	inches H ₂ O (4 °C)	x	0.00246	=	atmospheres
atmospheres	x	14.7	=	pounds per square inch	x	0.068	=	atmospheres
inches Hg (0 °C)	x	3.383	=	kilopascals	x	0.2956	=	inches Hg (0 °C)
inches Hg (0 °C)	x	0.491	=	pounds per square inch	x	2.037	=	inches Hg (0 °C)
inches H ₂ O (4 °C)	x	0.249	=	kilopascals	x	4.016	=	inches H ₂ O (4 °C)
inches H ₂ O (4 °C)	x	0.036	=	pounds per square inch	x	27.78	=	inches H ₂ O (4 °C)
mm Hg (0 °C)	x	0.134	=	kilopascals	x	7.46	=	mm Hg (0 °C)
mm Hg (0 °C)	x	0.019	=	pounds per square inch	x	52.6	=	mm Hg (0 °C)
mm Hg (0 °C)	x	13.596	=	kilogram per square meter	x	0.073551	=	mm Hg (0 °C)
mm Hg (0 °C)	x	1.3596	=	grams per square centimeter	x	0.73551	=	mm Hg (0 °C)
pounds per square inch	x	6.895	=	kilopascals	x	0.145	=	pounds per square inch
torrs	x	1.0	=	mm Hg (0 °C)	x	1.0	=	torrs
Powers								
horsepower	x	0.746	=	kilowatts	x	1.34	=	horsepower
horsepower	x	33000	=	ft-lbf/min	x	0.00003	=	horsepower
ft-lbf/min	x	0.0226	=	watts	x	44.25	=	ft-lbf/min

TEMPERATURE CONVERSION CHART
Fahrenheit ↔ Centigrate



Compendium of Industry Specific Internal Audit Guides

**SPECIFIC GRAVITY AND MOISTURE CONTENT OF
COMMON NATURAL AND MANUFACTURED FIBERS
(70° F*, 65% Relative Humidity)**

Fiber	Specific Gravity	Moisture Content
Acrylic	1.15	1 -2
Cellulose Acetate	1.32	6
Cellulose Triacetate	1.25	2.5 - 4.5
Cotton	1.54	7 (commercial = 8.5)
Glass	2.54	0
Polyamide (nylon 6 and nylon 66)	1.14	4.1 - 4.5
Polyester	1.38	0.4 - 0.5
Polyethylene	0.92	0
Polypropylene	0.90	0
Polyurethane	1.21	1.0 -1.5
Polyvinyl Chloride	1.38	0 - 1
Polyvinylidene Chloride	1.70	0
Protein	1.25	10 - 18
Silk	1.37	9
Viscose Rayon	1.51	13
Wool	1.32	13-15

*21°C

* Average of commercial hands

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YARN NUMBER CONVERSION TABLE

Yarn Per Pound	Wool Runs (1600 yd per lb)	Cotton Count (840 yd per lb)	Worsted Count (840 yd per lb)	Metric Count (1000 m per kg)	Linen Count (300 yd per lb)	Grains per 100 Yards	Denier (g per 9000 m)	Tex (g per 1000 m)
300	0.188	0.357	0.536	0.605	1.000	2,333	14,882	1,654
372	0.233	0.443	0.664	0.750	1.240	1,882	12,000	1,333
447	0.279	0.532	0.798	0.901	1.390	1,566	10,000	1,111
560	0.350	0.667	1.000	1.129	1.867	1,250	7,972	885.2
600	0.375	0.714	1.071	1.210	2.000	1,167	7,441	826.7
840	0.525	1.000	1.500	1.694	2.800	833.3	5,315	590.5
1,120	0.700	1.333	2.000	2.258	3.733	625.0	3,986	442.9
1,600	1.000	1.905	2.857	3.226	5.333	437.5	2,790	310.0
1,680	1.050	2.000	3.000	3.388	5.600	416.7	2,658	295.3
2,030	1.269	2.417	3.625	4.093	6.767	344.9	2,200	244.4
2,232	1.395	2.657	3.986	4.500	7.440	313.6	2,000	222.2
2,240	1.400	2.667	4.000	4.516	7.467	312.5	1,994	221.6
2,520	1.575	3.000	4.500	5.081	8.400	277.8	1,771	96.8
2,800	1.750	3.333	5.000	5.645	9.333	250.0	1,595	77.2
3,200	2.000	3.810	5.714	6.452	10.67	218.8	1,395	155.0
3,360	2.100	4.000	6.000	6.774	11.20	208.3	1,328	147.6
4,060	2.538	4.833	7.250	8.183	13.53	172.4	1,100	22.2
4,200	2.625	5.000	7.500	8.468	14.00	166.7	1,063	118.1
4,211	2.632	5.013	7.520	8.490	14.04	166.2	1,060	117.8
4,464	2.790	5.315	7.971	9.000	14.88	156.8	1,000	111.1
4,480	2.800	5.333	8.000	9.032	14.93	156.3	996.5	110.7
4,699	2.937	5.594	8.391	9.474	15.67	149.0	950.1	105.6
4,800	3.000	5.714	8.571	9.677	16.00	145.8	930.1	103.3
4,960	3.100	5.905	8.857	10.00	16.53	141.1	900.1	100.0
5,040	3.150	6.000	9.000	10.16	16.80	138.9	885.8	98.4
5,252	3.282	6.253	9.378	10.59	17.51	133.3	850.0	94.4
5,581	3.488	6.644	9.966	11.25	18.60	125.4	800.0	88.9
5,600	3.500	6.667	10.00	11.29	18.67	125.0	797.2	88.6
5,880	3.675	7.000	10.50	11.86	19.60	119.0	759.3	84.3
5,953	3.721	7.087	10.63	12.00	19.84	117.6	750.0	83.3
6,160	3.850	7.333	11.00	12.42	20.53	113.6	724.8	80.6
6,378	3.986	7.593	11.39	12.86	21.26	109.8	700.0	77.8
6,400	4.000	7.619	11.43	12.90	21.33	109.4	697.6	77.6
6,720	4.200	8.000	12.00	13.55	22.40	104.2	664.4	73.9
6,869	4.293	8.177	12.27	13.85	22.90	101.9	650.0	72.2

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7,280	4.550	8.667	13.00	14.68	24.27	96.16	613.3	68.1
7,440	4.650	8.857	13.29	15.00	24.80	94.09	600.0	66.7
7,560	4.725	9.000	13.50	15.24	25.20	92.59	590.5	65.7
7,840	4.900	9.333	14.00	15.81	26.13	89.29	569.5	63.2
8,000	5.000	9.524	14.29	16.13	26.67	87.50	558.1	62.0
8,117	5.073	9.663	14.49	16.37	27.06	86.24	550.0	61.1
8,400	5.250	10.00	15.00	16.94	28.00	83.33	531.5	59.0
8,929	5.581	10.63	15.94	18.00	29.76	78.40	500.0	55.6
8,960	5.600	10.67	16.00	18.06	29.87	78.13	498.3	55.4
9,000	5.625	10.71	16.07	18.15	30.00	77.78	496.1	55.1
9,240	5.775	11.00	16.50	18.63	30.80	75.76	483.2	53.7
9,300	5.813	11.07	16.61	18.75	31.00	75.27	480.0	53.3
9,520	5.950	11.33	17.00	19.19	31.73	73.53	469.0	52.1
9,600	6.000	11.43	17.14	19.35	32.00	72.92	465.1	51.7
9,900	6.188	11.79	17.68	19.96	33.00	70.71	451.0	50.1
9,921	6.200	11.81	17.72	20.00	33.07	70.56	450.0	50.0
10,080	6.300	12.00	18.00	20.32	33.60	69.45	442.9	49.2
10,200	6.375	12.14	18.21	20.56	34.00	67.07	437.7	48.6
10,500	6.563	12.50	18.75	21.17	35.00	66.67	425.2	47.2
10,640	6.650	12.67	19.00	21.45	35.47	65.79	419.6	46.6
10,800	6.750	12.86	19.39	21.77	36.00	64.82	413.4	45.9
10,920	6.825	13.00	19.50	22.02	36.40	64.10	408.8	45.4
11,160	6.975	13.29	19.93	22.50	37.20	62.72	400.0	44.4
11,200	7.000	13.33	20.00	22.58	37.33	62.50	398.6	44.2
11,400	7.125	13.57	20.36	22.98	38.00	61.40	391.6	43.5
11,760	7.350	14.00	21.00	23.73	39.20	59.47	379.3	42.1
12,000	7.500	14.05	21.08	23.80	40.00	59.31	378.3	42.0
12,400	7.750	14.76	22.14	25.00	41.33	56.45	360.0	40.0
12,600	7.875	15.00	22.50	25.40	42.00	55.56	354.3	39.3
12,760	7.975	15.19	22.73	25.73	42.53	54.86	350.0	38.9
12,800	8.000	15.24	22.86	25.81	42.67	54.69	348.8	38.8
12,880	8.050	15.33	23.00	25.97	42.93	54.35	346.6	38.5
13,200	8.250	15.71	23.57	26.61	44.00	53.03	338.2	37.6
13,440	8.400	16.00	24.00	27.10	44.80	52.08	332.2	36.9
13,500	8.438	16.07	24.11	27.22	45.00	51.85	330.7	36.7
14,000	8.750	16.67	25.00	28.23	46.67	50.00	318.9	35.4
14,280	8.925	17.00	25.50	28.79	47.60	49.02	312.6	34.7
14,400	9.000	17.14	25.71	29.03	48.00	48.61	310.0	34.4
14,560	9.100	17.33	26.00	29.35	48.53	48.08	306.6	34.0
14,880	9.300	17.71	26.57	30.00	49.60	47.04	300.0	33.3
15,120	9.450	18.00	27.00	30.48	50.40	46.30	295.3	32.8
15,300	9.563	18.21	27.32	30.85	51.00	45.75	291.8	32.4

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15,680	9.800	18.67	28.00	31.61	52.27	44.64	284.7	31.6
15,960	9.975	19.00	28.50	32.18	53.20	43.86	279.7	31.0
16,000	10.00	19.05	28.57	32.26	53.33	43.75	279.0	31.0
16,240	10.15	19.33	29.00	32.74	54.13	43.10	274.9	30.5
16,500	10.31	19.64	29.46	33.27	55.00	42.43	270.6	30.0
16,800	10.50	20.00	30.00	33.87	56.00	41.67	265.7	29.5
17,100	10.69	20.36	30.54	34.48	57.00	40.94	261.1	29.0
17,360	10.85	20.67	31.00	35.00	57.87	40.32	257.2	28.6
17,600	11.00	20.95	31.43	35.48	58.67	39.77	253.7	28.1
17,860	11.16	21.26	31.89	36.00	59.53	39.19	250.0	27.8
17,920	11.20	21.33	32.00	36.13	59.73	39.06	249.1	27.7
18,480	11.55	22.00	33.00	37.26	61.60	37.88	241.6	26.8
18,600	11.63	22.14	33.21	37.50	62.00	37.64	240.0	26.7
19,040	11.90	22.67	34.00	38.39	63.47	36.76	234.5	26.0
19,200	12.00	22.86	34.29	38.71	64.00	36.46	232.5	25.8
19,500	12.19	23.21	34.82	39.32	65.00	35.90	228.9	25.4
19,600	12.25	23.33	35.00	39.52	65.33	35.71	227.8	25.3
20,160	12.60	24.00	36.00	40.65	67.20	34.72	221.5	24.6
20,400	12.75	24.29	36.43	41.13	68.00	34.31	218.8	24.3
20,800	13.00	24.76	37.14	41.94	69.33	33.65	214.6	23.8
21,000	13.13	25.00	37.50	42.34	70.00	33.33	212.6	23.6
21,280	13.30	25.33	38.00	42.90	70.93	32.90	209.8	23.3
21,840	13.65	26.00	39.00	44.03	72.80	32.05	204.4	22.7
22,320	13.95	26.57	39.86	45.00	74.40	31.36	200.0	22.2
22,400	14.00	26.67	40.00	45.16	74.67	31.25	199.3	22.1
23,520	14.70	28.00	42.00	47.42	78.40	29.76	189.8	21.0
24,640	15.40	29.33	44.00	49.68	82.13	28.41	181.2	20.1
24,800	15.50	29.53	44.29	50.00	82.67	28.23	180.0	20.0
25,200	15.75	30.00	45.00	50.81	84.00	27.78	177.2	19.7
25,760	16.10	30.67	46.00	51.94	85.87	27.17	173.3	19.2
26,260	16.41	31.27	46.90	52.94	87.53	26.66	170.0	18.9
26,880	16.80	32.00	48.00	54.19	89.60	26.04	166.1	18.4
27,200	17.00	32.38	48.57	54.84	90.67	25.74	164.1	18.2
27,720	17.33	33.00	49.50	55.89	92.40	25.25	161.1	17.9
28,000	17.50	33.33	50.00	56.45	93.33	25.00	159.4	17.7
28,560	17.85	34.00	51.00	57.58	95.20	24.51	156.3	17.3
28,800	18.00	34.29	51.43	58.06	96.00	24.31	155.0	17.2
29,760	18.60	35.43	53.14	60.00	99.20	23.52	150.0	16.7
30,000	18.75	35.71	53.57	60.48	100.0	23.33	148.8	16.5
30,400	19.00	36.19	54.29	61.29	101.3	23.03	146.9	16.3
32,000	20.00	38.10	57.14	64.52	106.7	21.88	139.5	15.5
32,480	20.30	38.67	58.00	65.49	108.3	21.55	137.5	15.2

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33,600	21.00	40.00	60.00	67.74	112.0	20.83	132.9	14.8
34,440	21.53	41.00	61.50	69.44	114.8	20.33	129.6	14.4
34,720	21.70	41.33	62.00	70.00	115.7	20.16	128.6	14.2
35,840	22.40	42.67	64.00	72.26	119.5	19.53	124.6	13.8
36,000	22.50	42.86	64.29	72.58	120.0	19.44	124.0	13.8
36,800	23.00	43.81	65.71	74.19	122.7	19.02	121.3	13.4
37,200	23.25	44.29	66.43	75.00	124.0	18.82	120.0	13.3
38,080	23.80	45.33	68.00	76.78	126.9	18.38	117.2	13.0
39,200	24.50	46.67	70.00	79.03	130.7	17.86	113.9	12.6
40,320	25.20	48.00	72.00	81.29	134.4	17.36	110.7	12.3
42,000	26.25	50.00	75.00	84.68	140.0	16.67	106.3	11.8
44,640	27.90	53.15	79.71	90.00	148.8	15.68	100.0	11.1
45,920	28.70	54.67	82.00	92.58	153.1	15.24	97.22	10.8
47,040	29.40	56.00	84.00	94.84	156.8	14.88	94.91	10.5
49,600	31.00	59.05	88.58	100.0	165.3	14.11	90.00	10.0
50,400	31.50	60.00	90.00	101.6	168.0	13.89	88.58	9.84
53,760	33.60	64.00	96.00	108.4	179.2	13.02	83.05	9.22
55,800	34.88	66.43	99.65	112.5	186.0	12.54	80.00	8.88
58,800	36.75	70.00	105.0	118.6	196.0	11.90	75.93	8.43
59,530	37.21	70.87	106.3	120.0	198.4	11.76	75.00	8.33
61,600	38.50	73.33	110.0	124.2	205.3	11.36	72.48	8.05
63,780	39.86	75.93	113.9	128.6	212.6	10.98	70.00	7.77
64,000	40.00	76.19	114.3	129.0	213.3	10.94	69.76	7.75
67,200	42.00	80.00	120.0	135.5	224.0	10.42	66.44	7.38
74,410	46.51	88.58	132.9	150.0	248.0	9.407	60.00	6.66
75,600	47.25	90.00	135.0	152.4	252.0	9.259	59.05	6.56
81,170	50.73	96.63	144.9	163.6	270.0	8.624	55.00	6.11
84,000	52.50	100.0	150.5	169.4	280.0	8.333	53.15	5.90
89,290	55.81	106.3	159.5	180.0	297.6	7.840	50.00	5.55
92,400	57.75	110.0	165.0	186.3	308.0	7.576	48.32	5.36
97,440	60.90	116.0	174.0	196.5	324.8	7.184	45.82	5.09
99,210	62.01	118.1	177.2	200.0	330.7	7.056	45.00	5.00
1,00,800	63.00	120.0	180.0	203.2	336.0	6.945	44.29	4.92
1,11,600	69.75	132.9	199.4	225.0	372.0	6.272	40.00	4.44
1,48,800	93.00	177.1	265.7	300.0	496.0	4.704	30.00	3.33
2,23,200	139.50	265.7	398.6	450.0	744.0	3.136	20.00	2.22
4,46,500	279.10	531.5	797.3	900.0	1,488.0	1.568	10.00	1.11

Yarn Number Conversion Formulas

Yarn Number System	Cotton Count	Denier	Worsted Count	Wool Count	Linen Lea	Woolen Cut
Cotton Count	—	$\frac{5,315}{c.c.}$	$c.c. \times 1.50$	$c.c. \times 52.5$	$c.c. \times 2.80$	$c.c. \times 2.80$
Denier	$\frac{5,315}{d}$	—	$\frac{7,972}{d}$	$\frac{279,030}{d}$	$\frac{14,880}{d}$	$\frac{14,880}{d}$
Worsted Count	$\frac{w.c.}{1.50}$	$\frac{7,972}{w.c.}$	—	$w.c. \times 35.0$	$w.c. \times 1.867$	$w.c. \times 1.867$
Wool Count	$\frac{w}{52.50}$	$\frac{279,030}{w}$	$\frac{w}{35.0}$	—	$\frac{w}{18.75}$	$\frac{w}{18.75}$
Linen Lea	$\frac{11}{2.80}$	$\frac{14,880}{11}$	$\frac{11}{1.867}$	11×18.75	—	same
Woolen Cut	$\frac{w/c}{2.80}$	$\frac{14,880}{w/c}$	$\frac{w/c}{1.867}$	$w/c \times 18.75$	same	—
Woolen Run	$\frac{w.r.}{0.525}$	$\frac{2,800}{w.r.}$	$\frac{w.r.}{0.540}$	$w.r. \times 100$	$w.r. \times 5.33$	$w.r. \times 5.33$
Jute Count	$\frac{17.14}{j.c.}$	$j.c. \times 310$	$\frac{25.71}{j.c.}$	$\frac{900}{j.c.}$	$\frac{48.0}{j.c.}$	$\frac{48.0}{j.c.}$
Metric Count	$m.c. \times 0.5905$	$\frac{9,000}{m.c.}$	$\frac{m.c.}{1.129}$	$m.c. \times 31.00$	$\frac{m.c.}{0.605}$	$\frac{m.c.}{0.605}$
Grains/120 Yards	$\frac{1000}{gr/120 yd}$	$\frac{gr/120 yd}{0.1881}$	$\frac{1,500}{gr/120 yd}$	$\frac{52,500}{gr/120 yd}$	$\frac{2,800}{gr/120 yd}$	$\frac{2,800}{gr/120 yd}$
Tex	$\frac{590.5}{tex}$	$\frac{tex}{0.1111}$	$\frac{885.8}{tex}$	$\frac{31,000}{tex}$	$\frac{1,654}{tex}$	$\frac{1,654}{tex}$

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Yarn Number Conversion Formulas (*continued*)

Yarn Number System	Woolen Run	Jute Count	Metric Count	Grains/ 120 Yards	Tex
Cotton Count	$c.c. \times 0.525$	$\frac{17.14}{c.c.}$	$c.c. \times 1.693$	$\frac{1,000}{c.c.}$	$\frac{590.5}{c.c.}$
Denier	$\frac{2,800}{d}$	$d \times 0.003225$	$\frac{9,000}{d}$	$d \times 0.1881$	$d \times 0.1111$
Worsted Count	$w.c. \times 0.350$	$\frac{25.71}{w.c.}$	$w.c. \times 1.129$	$\frac{1,500}{w.c.}$	$\frac{885.1}{w.c.}$
Wool Count	$\frac{w}{100}$	$\frac{900}{w}$	$\frac{w}{31.0}$	$\frac{52,500}{w}$	$\frac{30,975}{w}$
Linen Lea	$\frac{11}{5.33}$	$\frac{48.0}{11}$	11×0.605	$\frac{2,800}{11}$	$\frac{1,654}{11}$
Woolen Cut	$\frac{w/c}{5.33}$	$\frac{48.0}{w/c}$	$w/c \times 0.605$	$\frac{2,800}{w/c}$	$\frac{1,654}{w/c}$
Woolen Run	—	$\frac{9.0}{w.r.}$	$\frac{w.r.}{0.31}$	$\frac{525.0}{w.r.}$	$\frac{310.0}{w.r.}$
Jute Count	$\frac{9.0}{j.c.}$	—	$\frac{29.03}{j.c.}$	$j.c. \times 58.33$	$j.c. \times 34.45$
Metric Count	$m.c. \times 0.310$	$\frac{29.03}{m.c.}$	—	$\frac{1,693}{m.c.}$	$\frac{1,000}{m.c.}$
Grains/120 Yards	$\frac{525.0}{g/120\ yd}$	$\frac{g/120\ yd}{58.33}$	$\frac{1,693}{g/120\ yd}$	—	$g/120\ yd \times 0.5905$
Tex	$\frac{310.0}{tex}$	$\frac{tex}{34.45}$	$\frac{1,000}{tex}$	$\frac{tex}{0.5905}$	—

Calculations for Fabric Weight

For Yards per Pound*:

- a)
$$\frac{\text{Total yards}}{\text{Net weight in pounds}}$$
- b)
$$\frac{16}{\text{Ounces per linear yard}}$$
- c)
$$\frac{\text{Total Yards}}{\text{Ounces}} \times 16$$
- d)
$$\frac{\text{Square inch weighted}}{\text{Weight in grams (width)}} \times 12.60$$
- e)
$$\frac{\text{Square inch weighted}}{\text{Weight in grams (width)}} \times 194.4$$
- f) 12-inch square sample weighted in grains =
$$\frac{27,993.6}{\text{Grains x width}}$$
- g) 8-inch square sample weighted in grains =
$$\frac{12,441.6}{\text{Grains x width}}$$
- h)
$$\frac{576}{\text{Width (Ounces per square yard)}}$$

*yd/lb x 2.016 = m/kg

For Ounces per Square yard:

- a)
$$\frac{\text{Weight in pounds(16) (36)}}{\text{Yards (width)}}$$
- b)
$$\frac{\text{Weight in ounces (36)}}{\text{Yards (width)}} = \text{Ounces per linear yard} * (36/\text{width})$$
- c)
$$\frac{576}{\text{Width (yard per pound)}}$$
- d)
$$\frac{\text{Grams weight in sample}}{\text{Square inch weighed}} \times 45.72$$

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- e) $\frac{\text{Grains weight of sample}}{\text{Square inch weighed}} \times 2.9622$
- f) 8-inch square used: Grain weight x 0.04628
- g) 12-inch square used: Grain weight x 0.02057
- h) 8-inch square used: Gram weight x 0.7144
- i) 12-inch square used: Gram weight x 0.3175

$$*\text{oz/yd}^2 \times 0.03391 = \text{kg/m}^2$$

For Ounces per Linear Yard:

- a) $\frac{\text{Weight in Ounces}}{\text{Yards weighed}}$
- b) $\frac{16}{\text{Yards per pound}}$
- c) Ounces per square yard (Width/36)
- d) $\frac{\text{Weight in grams (width)}}{\text{Square inch weighed}} \times 1.270$
- e) $\frac{\text{Weight in grains (width)}}{\text{Square inch weighed}} \times 0.0823$

Stress-Strain Calculations

For tenacity at break:

$$\frac{\text{Gram load at break}}{\text{Denier}} = \text{tenacity (g/d)}$$

For tenacity at elongation:

$$\frac{\text{Gram load at given elongation}}{\text{Denier}} = \text{tenacity (g/d)}$$

For elongation at break:

$$\frac{\text{Length at break} - \text{original length}}{\text{Original length}} \times 100 = \% \text{ elongation}$$

For elongation at any load:

$$\frac{\text{Length at given load} - \text{original length}}{\text{Original length}} \times 100 = \% \text{ elongation}$$

For elastic limit:

$$\frac{\text{Gram load at yield point}}{\text{Denier}} = \text{yield stress (g/d)}$$

$$\frac{\text{Elongation at yield point}}{\text{Original length}} \times 100 = \% \text{ yield strain}$$

For average stiffness per unit elongation (resistance to deformation):

$$\frac{\text{Gram load at break} \times 100}{\text{Denier} \times \% \text{ elongation}} = \text{average stiffness (g/d)}$$

For toughness index (work to break):

$$\frac{\text{Gram load at break} \times \% \text{ elongation at break}}{2(\text{Denier}) \times 100} = \text{toughness index (g. cm/ d. cm)}$$

For energy to break:

$$\text{Breaking strength (lb)} \times \text{elongation (in.)} = \text{energy to break (lb . in)}$$

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Textile Moisture Calculations

For moisture content:

$$\frac{\text{Original wt.} - \text{Dry wt.} \times 100}{\text{Original wt.}} = \% \text{moisture content}$$

For moisture regain:

$$\frac{\text{Original wt.} - \text{Dry wt.} \times 100}{\text{Dry wt.}} = \% \text{moisture regain}$$

To determine moisture regain of blends:

$$\frac{\% \text{ Fiber A} \times \text{Ra} + (\% \text{ Fiber B} \times \text{Rb}) + \dots}{\% \text{ Fiber A} + \% \text{ Fiber B} + \dots} = \% \text{ regain of blend}$$

Where: Ra= Commercial regain of Fiber A
Rb= Commercial regain of Fiber B

Wet Processing Calculations

To convert from grams per liter to percent on weight of fiber:

$$\frac{\text{Liquor ratio}}{10} \times \text{g/l} = \% \text{owf}$$

To convert percent on weight of fiber to grams per liter:

$$\frac{\% \text{ owf} \times 10}{\text{Liquor ratio}} = \text{g/l}$$

For percent wet weight of Fabric:

$$\frac{\text{Wet wt.} - \text{Dry wt.} \times 100}{\text{Dry wt.}} = \% \text{ wet wt.}$$

For percent wet pickup of Fabric:

$$\% \text{ Wet wt.} - \% \text{ Dry wt.} = \% \text{ wet pickup}$$

For percent dry solids add-on on fabric weight:

$$\% \text{ Solids content of liquid} \times \% \text{ wet pickup} = \% \text{ Solids add-on}$$

Weaving Guides

Diameters of Spun Yarns of Different Cotton Counts

Cotton Count	Diameter(in.)	Diameter(mm.)
80	0.00427	0.108
75	0.00433	0.110
70	0.00456	0.116
65	0.00474	0.120
60	0.00495	0.126
55	0.00521	0.132
50	0.00540	0.137
48	0.00554	0.141
46	0.00565	0.144
44	0.00577	0.146
42	0.00588	0.149
40	0.00606	0.154
38	0.00616	0.156
36	0.00636	0.162
34	0.00657	0.167
32	0.00675	0.171
30	0.00700	0.178
28	0.00724	0.184
26	0.00751	0.190
24	0.00781	0.198
22	0.00813	0.206
20	0.00841	0.215
19	0.00876	0.222
18	0.00900	0.229
17	0.00926	0.235
16	0.00957	0.243
15	0.00990	0.251
14	0.0102	0.259
13	0.0106	0.269
12	0.0110	0.279
11	0.0115	0.292

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Cotton Count	Diameter(in.)	Diameter(mm.)
10	0.0120	0.305
9	0.0126	0.320
8	0.0135	0.343
7	0.0145	0.368
6	0.0156	0.396
5	0.0171	0.434
4	0.0191	0.485
3	0.0221	0.561
2	0.0274	0.696
1	0.0382	0.970

Weaving Guides (continued)
Loom Reed Air Space

Reed Dent	50% Air Space		55% Air Space		60% Air Space	
	In.	mm.	In.	mm.	In.	mm.
10	0.0500	1.270	0.0550	1.397	0.0600	1.524
13	0.0385	0.978	0.0423	1.074	0.0462	1.173
15	0.0334	0.848	0.0367	0.932	0.0400	1.016
17	0.0294	0.747	0.0324	0.823	0.0353	0.897
20	0.0250	0.635	0.0275	0.698	0.0300	0.762
21	0.0238	0.604	0.0262	0.665	0.0286	0.726
23	0.0218	0.554	0.0239	0.607	0.0261	0.663
25	0.0200	0.508	0.0220	0.559	0.0240	0.610
26	0.0192	0.488	0.0211	0.536	0.0231	0.587
28	0.0179	0.455	0.0197	0.500	0.0214	0.544
30	0.0166	0.422	0.0183	0.465	0.0200	0.508
31	0.0161	0.409	0.0177	0.450	0.0193	0.490
34	0.0147	0.373	0.0162	0.411	0.0177	0.450
35	0.0143	0.363	0.0157	0.399	0.0171	0.434
36	0.0139	0.353	0.0153	0.389	0.0167	0.424
38	0.0132	0.335	0.0145	0.368	0.0158	0.401
40	0.0125	0.318	0.0137	0.348	0.0150	0.381
42	0.0119	0.302	0.0131	0.333	0.0143	0.363
44	0.0114	0.290	0.0128	0.325	0.0136	0.345
45	0.0111	0.282	0.0122	0.310	0.0133	0.338
47	0.0106	0.269	0.0117	0.297	0.0128	0.325
50	0.0100	0.254	0.0110	0.279	0.0120	0.305
53	0.0094	0.239	0.0104	0.264	0.0113	0.287
55	0.0091	0.231	0.0100	0.254	0.0109	0.277
57	0.0088	0.224	0.0096	0.244	0.0105	0.267
60	0.0084	0.213	0.0092	0.234	0.0100	0.254
61	0.0082	0.208	0.0090	0.229	0.0098	0.249
62	0.0081	0.206	0.0089	0.226	0.0097	0.246
65	0.0077	0.196	0.0085	0.216	0.0092	0.234

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Unit of Measures & Section wise formulas- Spinning

Conversion of Weight units

➤ 1kg = 2.2046 lbs
➤ 1kg = 1000 grams
➤ 1gm = 15.432 grains
➤ 1lbs = 453.6 grams
➤ 1lbs = 16 oz
➤ 1lbs = 7000 grains
➤ 1grain = 0.0029 oz
➤ 1oz = 437.50 grains
➤ 1penny = 24 grains
➤ 1ton = 2204.6 lbs
➤ 1bundle = 10 lbs
➤ 1bag = 100 lbs
➤ 1mund = 40 kg
➤ 1mund = 88.18 lbs

Conversion of length units

➤ 1m = 1.0936 yards
➤ 1m = 39.37 inches
➤ 1m = 100 cm
➤ 1m = 1000 mm
➤ 1cm = 10 mm
➤ 1yard = 36 inches
➤ 1yard = 0.9144 meter
➤ 1yard = 91.44 cm
➤ 1ft = 12 cm
➤ 1ft = 30.48 mm
➤ 1hank = 840 yards

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Moisture Relation for Textile Materials

➤ M.R = $w/D \times 100$
➤ M.C = $w/w+D \times 100$ = $w/W \times 100$
➤ M = $R/(1+R/100)$
➤ C.C.W = $D \times (100+R/100)$
➤ D = $C.C.W \times (100/100+R\%)$
➤ C.C.W = $D+R\%$
➤ C.C.W = $D+(D \times R/100)$
➤ Dm = $(\sqrt{D1 + D2 + D3})^2$
➤ Volume of air = area (feet sq) * liner speed (ft/min)
➤ Pm = $CA + CB/WA + WB = PAWA + PAWB/WA + WB$

Blow Room & Carding Section

➤ Cleaning Efficiency = trash removed/total trash fed *100
➤ Efficiency = $tr/tf \times 100$ = $tf-tr/tf \times 100$
➤ Waste = trash + lint
➤ Waste Extracted = weight fed * waste%
➤ Waste Extracted = weight fed – weight delivered
➤ Weight Delivered = weight fed - waste extracted
➤ Weight Delivered = weight fed * $(100 - w/100)$
➤ Weight Fed = weight delivered * $(100/100 - w)$
➤ Lap length (directly proportional) lap change wheel
➤ Lap length = lap length constant * lap length constant wheel
➤ Beats/min = rpm of beater * number of strikers
➤ Beats/inch = beats per minute/feeding rate (inches/min)
➤ Beats Constant = beats/inch * rpm of paddle roller
➤ Beats Constant = beat per minute/feeding rate
➤ Efficiency = actual production/calculated production * 100
➤ Actual production = calculated production * efficiency
➤ Actual production = weight of lap(lbs) * number of lap/hr
➤ M.D = s.s of shell roller/s.s of paddle roller

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➤	Production of B/R (lbs/hr) = production constant * N(shell roller rpm) * W(oz/yd)
➤	Production of card (lbs/hr) = $\frac{\pi DN * 36 * 60 * 1 * \eta}{36 * 840 * \text{count}}$
➤	Production of card (lbs/hr) = $\pi DN * 36 * 60 * (\text{weight in ozs}) * \eta / 36 * 16$
➤	No of scutchers required = feeding rate of cards/production of one scutchers
➤	No of card required = production of blow room/feeding rate of card deptt
➤	Production of card (lbs/hr) = $\frac{\text{delivery rate(m/min)} * \text{grain/yds} * 1.0936 * 60 * \eta}{7000}$
➤	Time to complete full card can = sliver length(yds)/delivery rate(yds/min)
➤	No. of scutchers required = production of blow room/production of one scutchers
➤	No. of card required = production of card section/production of one card
➤	Tension Draft = s.speed of C.C.R/s.speed of Doffer
➤	Total Lap weight = lap length * weight/yd
➤	D(Trumpet guide) = $0.015625 * \text{count} * \sqrt{W}$
➤	Waste% age = $\frac{\text{input} - \text{output}}{\text{Input}} * 100$

Draw frame Section

➤	Actual Draft = $\frac{\text{weight/yd fed}}{\text{weight/yd delivered}} * \text{No. of doublings}$
➤	Production(lbs/hr) = delivery rate(m/min) * 1.0936 * 60 * No. of deliveries/7000
➤	Production(lbs/hr)(only for two deliveries) = delivery rate(m/min) * 0.45 * grains/yd * η
➤	Production(lbs/hr) = $\frac{\pi DN}{36 * 840 * \text{hank sliver}} * 60 * \text{tension draft} * \eta$
➤	No. of Deliveries Required = feeding rate of simplex/production of finisher draw frame

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Unilap Section

- **Production(lbs/hr)**

$$= \text{delivery rate(yd/min)} * \frac{\text{lap weight(grains/yd)}}{7000} * 60 * 1.0936 * \eta$$
- **Note = 1 penny = 24 grains/yd**

Comber Section

- **Production(lbs/hr)** =
$$\frac{L * F}{7000 * 36} * N * H * \frac{(100 - W)}{100} * 60 * \eta$$
- **Note**
- **L = lap weight in grain/yd**
- **F = feed rate in inches/min**
- **N = nips/min**
- **W = noil %age extracted**
- **H = no of comber heads**

Simplex Section

- **Feeding Rate** = $\pi * D(\text{dia of back roller}) * \text{Rpm}(\text{back roller})$
- **Delivery Rate** = $\pi * D(\text{dia of front roller}) * \text{Rpm}(\text{front roller})$
- **TPI** = $\frac{\text{TM} \sqrt{\text{count delivered}}}{\text{spindle speed}}$
- **TPI** =
$$\frac{\text{spindle speed}}{\text{Delivery rate or F.R delivery in inches/min}}$$
- **Production(lbs/hr)** =
$$\frac{\text{front roll delivery} * 60}{36} * \frac{1}{840 * \text{count}} * \eta$$
- **Production(lbs/hr)** =
$$\frac{\text{flyer rpm} * 60}{\text{TPI} * \text{Hank roving}} * \frac{\text{No. of spindles} * \eta}{36 * 840}$$

- **Production(lbs/hr)** =
$$5.7 * \frac{\text{flyer rpm} * \eta}{\text{TPI} * \text{Hank roving}} \quad (\text{for 120 spindles m/c})$$
- **TPI** =
$$\frac{\text{flyer speed}}{\text{Delivery rate or F.R delivery in inches/min}}$$
- **CPM** =
$$\frac{\text{front roll delivery(inches/min)}}{\text{Bobbin circumference}}$$
- **CPI** =
$$\frac{\text{CPM}}{\text{Liner speed of bobbin rail(m/min)}}$$
- **CPI** =
$$\frac{\text{CPM} \sqrt{\text{count delivered}}}{\text{Liner speed of bobbin rail(m/min)}}$$

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➤	TCP(NEW) = TCP(old) * $\sqrt{\text{count(old)}/\text{count(new)}}$
➤	L.W = L.W(old) * $\sqrt{\text{count(old)}/\text{count(new)}}$
➤	B.W = B.W(old) * $\sqrt{\text{count(old)}/\text{count(new)}}$
➤	Roving Tension = winding rate/delivery rate = $(b - f)\pi D/l$
➤	Roving Tension = $(b - f)\pi D/\text{front roll delivery(inches per min)}$
➤	Lifter Constant = CPI * lifter wheel
➤	Turns per meter(TPM) = flyer rpm/delivery speed(meter per min)
➤	Draft = count deliver/count fed
➤	New DCP = old DCP * old draft/new draft
➤	New DCP = old DCP * old count/new count
➤	No. of Simplex required = production of finisher draw frame/feeding rate of one simplex
➤	No. of Simplex required = total feeding rate of ring section/production of one simplex m/c

Ring Frame Section

➤	Production(OPS) = $\frac{\text{spindle speed} * 1 * 1 * 60 * 8 * 16 * \eta}{\text{TPI} * 36 * 840 * \text{count}}$
➤	Production(OPS) = $\frac{\pi DN * 60 * 8 * 16 * \eta}{36 * 840 * \text{count}}$
➤	OPS from bags/day = total bags/total frame * No. of spindle per frame
➤	No. of ring frame required = total production of simplex section/feeding rate of one ring frame
➤	Traveler speed = spindle speed – winding speed
➤	Winding speed = front roll delivery(inches per min)/bobbin circumference
➤	Traveler angle = bare bobbin dia/full bobbin dia
➤	Linear speed of traveler(m/sec) = $\pi DN/1000 * 60$ (where D is ring dia & N is spindle speed)

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Auto Cone Section

➤	Cone Length(meters) = count * cone weight(lbs) * 840/1.0936
➤	Production(lbs/hr) = delivery rate(m per min) * No. of spindles * 60 * 1.0936 * η /840
➤	Production per spindle(lbs/hr) = $\frac{\pi * \text{Dia of Drum} * \text{Drum RPM} * 60 * \eta}{36 * 840 * \text{count}}$

Open End

➤	Production/Rotor(gm/hr) = 0.0006 * N * tex ^{1/2} * η /T.F (where N is Rotor Speed)
➤	Production/Rotor(lbs/hr) = 0.0019 * N * η /T.M * (count) ^{1/2}
➤	T.F = T.M * 9.61

Some Other Relations

➤	A.D = M.D * 100/(100 – W%)
➤	A.D = count delivered/ count fed
➤	A.D = weight fed/weight delivered
➤	Waste% = (A.D – M.D) * 100/A.D
➤	M.D = A.D * (100 – W%)/100
➤	M.D = $\frac{\text{s.s of delivery roll} * \text{Driver gear}}{\text{s.s of feed roll} * \text{Driven gear}}$
➤	M.D = $\frac{\text{s.s of delivery roll}}{\text{s.s of feed roll}}$
➤	Condensation Factor = $\frac{\text{s.s of cylinder}}{\text{s.s of doffer}}$
➤	Density = mass/volume
➤	590.5 = tex * count
➤	Yarn Diameter = $k/\sqrt{\text{count}}$ (Where k is Constant)

List of Related Websites

www.aepcindia.com

www.textileworld.com

www.texprocil.com

www.ncto.org

www.textileindustrydirectory.comwww.citiindia.com

www.handlooms.com

www.itcti.com

Research Associations

1. Ahmedabad Textile Industry Research Association (ATIRA)
2. Bombay Textile Research Association (BTRA)
3. Northern India Textile Research Association (NITRA)
4. Indian Jute Industry's Research Association (IJIRA)
5. Man-made Textile Research Association (MANTRA)
6. The Jute Corporation of India Limited
7. The Synthetic & Art Silk Mills Research Association (SASMIRA)
8. Wool Research Association (WRA)

Ministry of Textiles, Government of India

1. Ministry of Textiles, Government of India
2. Textile Commissioner
3. Technical Textiles
4. Development Commissioner for Handlooms

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**TECHNICAL GUIDE ON
INTERNAL AUDIT OF
PHARMACEUTICAL
INDUSTRY**

Foreword

Indian pharmaceutical industry has grown at a high pace during the last few years. The major challenges faced by the companies in the pharmaceutical industry are developing new products and services through research, shifting demographics, evolving governing regulations, transforming business models and increased expectations from stakeholders.

Risk is central to pharmaceutical companies as they are dependent on continuous research and development with long gestation periods, compliance issues with environmental laws, heavy capital investments as well as expenditures for environmental liabilities, management of their intellectual property rights, etc. Most innovative pharmaceutical companies are undergoing transition from their traditional business model and resort to diversification, mergers & acquisitions to deal with the growing competition for low cost generics.

The Chartered accountants can play a crucial role in helping pharmaceutical companies to address the said challenges presented by today's complex, competitive and risk driven environment by strategizing and channelizing the threats into opportunities and assist the management of the said companies in taking future course of action.

I congratulate CA. Rajkumar S. Adukia, Chairman, Internal Audit Standards Board of The Institute of Chartered Accountants of India and other members of the Board for bringing out this "Technical Guide on Internal audit of Pharmaceutical Industry" which is one of the rapidly growing industries of the country. This comprehensive publication would surely help the members to conduct value added internal audits and provide inputs that will help to improve operational efficiencies, risk management, capital allocation and market reach of the pharmaceutical companies in the country.

I am confident that the members and other interested readers will make best use of this publication.

February 4, 2013
New Delhi

CA. Jaydeep Narendra Shah
President, ICAI

Preface

The Indian Pharmaceutical industry is witnessing trends such as innovation in drugs at a faster pace, increasing investment, deeper penetration in rural markets, growth in insurance coverage and changing government regulations. These positive trends, along with favourable macro environment will help to propel the pharmaceutical industry to the next level of growth. Pharmaceuticals companies are facing competition and they need to optimally leverage financial, relational, technology and reputational capital to create strategies and provide value to consumers.

Keeping this in mind, the Internal Audit Standards Board is issuing the Technical Guide on Internal Audit of Pharmaceutical Industry, so as to provide guidance to internal auditors in carrying out internal audit of companies operating in pharmaceutical industry. The objective of this Technical Guide is to provide an insight into the functioning of the pharmaceutical industry, the key drivers of pharmaceutical industry, technical aspects peculiar to the industry and internal audit procedures with respect to certain processes which would help the readers in conducting internal audit of a pharmaceutical company. This Guide explains in brief the key drivers of Indian pharmaceutical industry which include low cost of manufacture, research & development, highly educated and specialized scientists, experience in international servicing, bio-pharmaceutical sector, etc. The Guide also covers in brief technical aspects of pharmaceutical industry which includes drug discovery and development solutions, exclusive synthesis and radiopharmaceuticals. The Guide also discusses regulatory framework for pharmaceutical industry in India especially, National Pharmaceuticals Pricing Policy, 2012. Internal audit aspects with respect to procurement to pay cycle, order to cash, statutory compliances, production and inventory management have been discussed in detail for each underlying activity alongwith it's controls objectives and the key controls to be verified in this regard.

At this juncture, I am grateful to Dr. Sanjeev Singhal and his study group members viz. C.A. R. Sankariah and C.A. Akshat Kedia for sharing their experiences and knowledge with us and preparing the draft of the Guide.

I wish to thank CA. Jaydeep N. Shah, President and CA. Subodh Kumar Agrawal, Vice President for their continuous support and encouragement to the initiatives of the Board. I must also thank my colleagues from the Council at the Internal Audit Standards Board, viz., CA. Rajendra Kumar P., Vice-

Technical Guide on Internal Audit of Pharmaceutical Industry

Chairman, IASB, CA. Amarjit Chopra, CA. Shiwaji B. Zaware, CA. Ravi Holani, CA. Anuj Goyal, CA. Nilesh Vikamsey, CA. Atul C. Bheda, CA. Charanjot Singh Nanda, CA. Pankaj Tyagee, CA. G. Ramaswamy, CA. J. Venkateswarlu, CA. Abhijit Bandyopadhyay, CA. S. Santhanakrishnan, Shri Prithvi Haldea, Smt. Usha Narayanan, Shri Gautam Guha, Shri Manoj Kumar and Shri Sidharth Birla for their vision and support. I also wish to place on record my gratitude for the co-opted members on the Board viz., CA. Porus Doctor, CA. Masani Hormuzd Bhadr, CA. Ghia Tarun Jamnadas, CA. Deepjee A Singhal, CA. Nitin Alshi, CA. Narendra Aneja and CA. Guru Prasad M and special invitee, CA. Sumit Behl and CA. Sanjay Arora for their invaluable guidance as also their dedication and support to the various initiatives of the Board. I also wish to express my thanks to CA. Jyoti Singh, Secretary, Internal Audit Standards Board and CA. Arti Bansal, Sr. Executive Officer in giving final shape to the Technical Guide.

I am certain that this Technical Guide will help the members and others in efficiently discharging their responsibilities.

February 6, 2013
Mumbai

CA. Rajkumar S. Adukia
Chairman
Internal Audit Standards Board

Glossary

Biotechnology	Use of living organisms or their products to modify human health and the human environment. The United Nations Convention on Biological Diversity defines biotechnology as "Any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use."
Non Prescription Drugs	Drugs that are sold over the counter, which means they are sold without a prescription from a doctor. They are also referred as the over-the-counter (OTC) drugs, e.g., cough-suppressants, antiseptics, aspirin, etc.
Pharmaceuticals	Pertaining to the knowledge or art of pharmacy; or to the art of preparing medicines according to the rules or formulas of pharmacy; as, pharmaceutical preparations.
Pharmacy	The art or practice of preparing and preserving drugs, and of compounding and dispensing medicines according to prescriptions of physicians.
Pharmaceutical Drugs	Defined as chemical substances used for treating, curing and preventing different types of diseases.
Prescription Drugs	Drugs that are not locally available without a physician's prescription. A prescription drug is a licensed medicine which is obtained only by prescription. The prescription drugs are regulated by legislation, e.g., anti-obesity drugs, anti-viral drugs, anti-malarial drugs, etc.

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Chapter 1

History of Pharmaceutical Industry in India

1.1 Indigenous medicines were in use even prior to the British rule in India. Western medicine, scientifically termed as “allopathic”, came to be known only during the British Era. The pioneering efforts of some few indigenous people led to the steady establishment of the modern pharmaceutical industry. Drug production meeting around 13% of Indian requirement, was produced by several other indigenous firms during and after the Second World War. By 1930's efforts were also made in the direction of producing synthetic bulk drugs.

1.2 Before the therapeutic revolution, there wasn't much difference between the activities of indigenous and foreign firms in India since they were essentially manufacturers and not inventors. Indigenous sector dominated the pharmaceutical industry in India until 1950. The therapeutic revolution led to the change in equations between Indian pharmaceutical industry and global multinationals. 1940's and 1950's saw new medicines being marketed by multi-national companies in India. This strengthened the skills in developing new manufacturing technologies. A collaborative effort between Council of Scientific and Industrial Research (CSIR) and private manufacturing industry led to development, application and advancement of substantial skills in the pharmaceutical industry in India. However, post 1950 MNC's gained the ground with new medicines being introduced in the Indian markets. A strong product patent system then prevailing under the British Patents and Designs Act, 1911 (prevailing in India even after independence) led to increasing influence of MNCs in the Indian pharmaceutical markets. System of industrial licensing favoured easy entry for MNCs prior to 1970 at the peril of indigenous industry. Thus by 1970s, the share of indigenous companies was reduced from 62% (1950) to 32% in 1970. The share of MNCs stood at 68% in 1970s, which increased from 32% held in 1952. However, during this period, the government established the India Dickey and Pharmaceutical Ltd. (IDPL) and Hindustan Antibiotics Ltd (HAL) with both indigenous and foreign technology collaboration which provided the necessary impetus to the private industry players. CSIR laboratories also contributed by developing substantial reverse engineering skills post 1970.

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1.3 During late 1960s and in 1970s, there was a conscious attempt to give preference to national industry. After a thorough review of the failure of Patents and Designs Act, 1911, introduction of Patents Act, 1970 was done, which limited patents only to process in case of pharmaceuticals and agricultural chemicals. Further, the term of patents was also reduced to 7 years. Apart from this, the Foreign Exchange Regulation Act, 1973 and the National Drug Policy, 1978 provided essential impetus to the growth of the Indian generic industry. Thus, post 1970 reversed foreign domination of the pharmaceutical industry in India. Large scale bulk drug production was possible and this led to the change in industry landscape.

1.4 A decade later, in late 1980 and early 1990, the Indian generic industry steadily increased the exports and came to be recognised as an important player in global generic industry. Substantial price controls were initiated in 1979 through the Drug Price Control Orders, based on National Drug Policy, 1978. This led to entry of large number of firms. After 1990s, export led growth and increase in domestic consumption led to a dominating share of Indian firms in the market. In 1998, the domestic companies held 68% of the market share which grew to 77% in 2003.

Chapter 2

Current Scenario

2.1 Indian Pharmaceutical Industry has witnessed a robust growth over the past few years moving on from a turnover of approx. US \$ 1 billion in 1990 to over US \$ 20 billion in 2010 (of which the export turnover is approximately US \$ 8 billion). The industry ranks 3rd in terms of volume and is 14th in terms of value globally. It has shown tremendous progress in terms of infrastructure development, technology base creation and a wide range of products. It has established its presence and determination to flourish in the changing environment.

2.2 The industry now produces bulk drugs belonging to all major therapeutic groups requiring complicated manufacturing technologies. Formulations in various dosage forms are being produced in GMP compliant facilities. Strong scientific and technical manpower and pioneering work done in process development have made this possible. The country now ranks 3rd worldwide by volume of production and 14th by value thereby accounting for around 10% of world's production by volume and 1.5% by value. Globally, it ranks 4th in terms of generics production and 17th in terms of export value of bulk actives and dosage forms. Indian exports are destined to more than 200 countries around the globe including highly regulated markets of US, West Europe, Japan and Australia.

2.3 Recognising the potential for growth, the Government of India took up the initiative of developing the Indian Pharmaceuticals sector by creating a separate Department in July 2008. The Department is entrusted with the responsibility of policy, planning, development and regulation of Pharmaceutical Industries.

2.4 An assessment of the Indian Pharmaceutical Industry strength reveals the following key features:

- (a) India exported drugs worth US\$ 8 billion to more than 200 countries including highly regulated markets in the US, Europe, Japan and Australia. Large Indian pharma companies have emerged as among the most competitive in the evolving generic space in North America and have created an unmatched platform in this space. Indian companies are also making their presence felt in the emerging

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markets around the world, particularly with a strong portfolio in anti-infective and anti-retrovirals.

- (b) Large domestic pharma companies have continued to grow, assuming leadership position in many therapies and segments in the Indian market as well as creating a strong international exports backbone.
- (c) Competitive market with the emergence of a number of second tier Indian companies with new and innovative business modules.
- (d) Indian players have also developed expertise in significant biologics capabilities.
- (e) Biologic portfolio (while still nascent in India) is being built with an eye on the future.
- (f) Multinational companies have continued to invest significantly in India and are making their presence felt across most segments of the Indian pharma market. Companies have also begun to invest in increasing their presence in tier II cities and rural areas and making medical care more accessible to large section of the Indian population.
- (g) There is massive investments by Indian pharma. Currently, projects worth more than 1.2 billion dollars are under implementation on various products.
- (h) Self-reliance displayed by the production of 70% of bulk drugs and almost the entire requirement of formulations within the country.
- (i) Low cost of production.
- (j) Low R&D costs.
- (k) Innovative Scientific manpower.
- (l) Excellent and world-class national laboratories specializing in process development and development of cost effective technologies.
- (m) Increasing balance of trade in Pharma sector.
- (n) An efficient and cost effective source for procuring generic drugs, especially the drugs going off patent in the next few years.
- (o) An excellent centre for clinical trials in view of the diversity in population.

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2.5 Top 20 Indian companies in terms of revenue from operations

S. No.	Company Name	Net Sales* (₹ in crores)
1	Ranbaxy Laboratories Ltd.	7,690.12
2	Cipla Ltd.	6,977.50
3	Dr. Reddy's Laboratories Ltd.	6,739.70
4	Lupin Ltd.	5,384.83
5	Aurobindo Pharma Ltd.	4,281.45
6	Sun Pharmaceutical Industries Ltd.	4,015.56
7	Cadila Healthcare Ltd.	3,150.80
8	Jubilant Life Sciences Ltd.	2,641.07
9	Wockhardt Ltd.	2,560.40
10	Ipca Laboratories Ltd.	2,338.03
11	GlaxoSmithKline Pharmaceuticals Ltd.	2,329.37
12	Torrent Pharmaceuticals Ltd.	1,986.69
13	Divis Laboratories Ltd.	1,844.93
14	Orchid Chemicals & Pharmaceuticals Ltd.	1,736.33
15	Sterling Biotech Ltd.	1,661.95
16	Surya Pharmaceuticals Ltd.	1,622.95
17	Glenmark Pharmaceuticals Ltd.	1,564.67
18	Biocon Ltd.	1,555.80
19	Abbott India Ltd.	1,445.57
20	Alembic Pharmaceuticals Ltd.	1,375.28

** Revenue from operations for the year ending 31st December, 2011/ 31st March, 2012 as the case may be.*

Source: Annual reports of various companies put as foot not.

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2.6 Top 20 Indian companies in terms of market capitalisation

S.No.	Company Name	Market Cap as on 26 th December, 2012 (₹ in crores)
1.	Sun Pharmaceutical Industries Ltd.	77,772.20
2.	Cipla Ltd.	33,807.00
3.	Dr. Reddy's Laboratories Ltd.	30,851.19
4.	Lupin Ltd.	27,310.16
5.	Ranbaxy Laboratories Ltd.	21,472.23
6.	Cadila Healthcare Ltd.	17,854.07
7.	GlaxoSmithKline Pharmaceuticals Ltd.	17,584.35
8.	Wockhardt Ltd.	17,323.70
9.	Glenmark Pharmaceuticals Ltd.	14,332.18
10.	Divis Laboratories Ltd.	14,193.94
11.	Piramal Enterprises Ltd.	9,577.25
12.	Strides Arcolab Ltd.	6,737.14
13.	Ipca Laboratories Ltd.	6,643.71
14.	Torrent Pharmaceuticals Ltd.	5,957.06
15.	Biocon Ltd.	5,643.00
16.	Aurobindo Pharma Ltd.	5,637.56
17.	Sanofi India Ltd.	5,414.50
18.	Jubilant Life Sciences Ltd.	3,481.89
19.	AstraZeneca Pharma India Ltd.	3,462.50
20.	Pfizer Ltd.	3,446.54

Chapter 3

Objectives of Technical Guide

3.1 The objective of the Technical Guide is to provide an insight into the functioning of the pharmaceuticals industry, the key drivers of pharmaceuticals industry, technical aspects peculiar to the industry and internal audit procedures with respect to certain processes which would help the readers in conducting internal audit of a pharmaceuticals company. The Guide briefly covers the following:

- (i) Key Drivers of Pharmaceutical Industry.
- (ii) Technical Aspects of Pharmaceutical Industry.
- (iii) Regulatory Framework
- (iv) Internal Audit Aspects of Pharmaceutical Industry
- (v) Research and Development
- (vi) Clinical Trials
- (vii) Enterprise Risk Management (ERM) in Pharmaceutical Industry.

Chapter 4

Key Drivers of Pharmaceuticals Industry

Experience and Expertise

4.1 India is the only country with largest number of US-FDA compliant plants (more than 100) outside USA. We have 793 WHO-GMP approved Pharma Plants, 153 European Directorate of Quality Medicines (EDQM) approved plants with modern state of Art Technology. No other country can boast of such infrastructure. Thus, Indian pharma companies have a wide variety of experience in manufacturing as per global standards. Through intensive competition in the Indian market, Indian companies are experienced in the manufacturing of a variety of formulations that makes them efficient and competitive in their operations.

4.2 The Indian pharma market is mature with decades of experience in generics manufacturing, catering to the needs of the general population. These companies have the experience and knowhow to produce quality drugs in an efficient, high-quality, cost effective manner without compromising on any aspect. There are many companies manufacturing drugs for oncology, AIDS and other complex therapies.

Low Cost of Manufacture

4.3 India is capable of manufacturing low cost generic alternatives due to a number of economic factors favouring the industry. Some of these include:

- (i) competitive land rates;
- (ii) cheap labour available;
- (iii) low resource costs like water, electricity, etc.;
- (iv) lower cost of production machinery.

Importantly, companies manufacturing various drugs, e.g., intermediates, APIs and Formulation, etc. are seamlessly integrated while following international regulations of safety.

Research and Development

4.4 Government has taken several policy initiatives for strengthening research and development in pharmaceuticals sector such as, fiscal incentives to R&D units sector and streamlining of procedures concerning development of new drug molecules, clinical research and new drug delivery systems leading to new R&D set-ups with excellent infrastructure in the field of original drug discovery.

India has a large branded generics market which enables most companies to launch their version of a generic drug in the market place. Research and Development is an important aspect for development of generics that match the quality and cost targets. India is now increasingly recognized as a strategic partner in the drug discovery value chain. Further, there are Indian companies who are investing in their R&D centres and are offering early stage discovery services as well as promising molecules. A large scientific pool in India is dedicated to research and development of patent non-infringing methodologies for drugs.

Highly Educated, Specialized Scientists

India's rich human capital is the strongest asset for Indian Pharmaceuticals Industry which is a knowledge-led industry. Various studies show that the scientific talent pool of Indians is the second largest english-speaking group worldwide, after the US. This enables easier access to qualifications that handle the basic work in a plant or an R&D set-up in India.

National Institute of Pharmaceutical Education and Research (NIPER) at Chandigarh is a premier institute in the field of pharmaceuticals. The institute is a member of Association of Commonwealth Universities. Further, six new NIPERs have been established recently and all are working extensively to address HR needs of pharma including regulators' training.

Experience in International Servicing

4.6 Many of the Indian pharmaceutical companies are experienced in servicing top multinational companies for their highly regulated markets, meeting their stringent quality expectations. The same experience enables Indian organizations to cater to the needs of the regulatory authorities of most nations across the world. Further, technical consultancy capability of NIPERs is contributing to the growth of the industry.

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Indian clinical trials industry has developed a complete gamut of clinical research services capabilities of global standards. From medical writing to site management, data management, regulatory submissions to patient recruitment, the expertise meets the highest standards of stringent regulatory conditions internationally.

4.7 There is an effective control system to monitor the quality of pharmaceuticals at all the levels in India. There are various agencies/ bodies under Ministry of Health and Family Welfare and Department of Pharmaceuticals. They are responsible for standard of drugs, market authorizations, import licenses, CGMP, monitoring of quality of drugs and cosmetics manufactured, pre and post licensing inspection, and price control, etc. The recent initiatives through new legislations and optimized processes are targeted towards regulating the industry better and effectively.

Drugs have to comply with stringent quality provisions under the Drugs and Cosmetic Act of India. Any drug including API confirm to the specifications of the prescribed pharmacopeias or those claimed on the label ensuring that all the products manufactured in India are of highest quality. All the pharmaceutical products are inspected at the customs port of the country by competent authorities before they are shipped out. Today "MADE IN INDIA" means a highest quality product.

Bio-Pharmaceutical Sector

6.1.1 The vaccines sector (including human and animal vaccines) represented the largest size of pie, with estimated sales of \$ 475 million in 2009-10, up from \$ 436 million the previous year. Human vaccines generated about 80% of this revenue, with domestic sales reaching \$ 218 million and exports reaching \$163 million. Demand for newer products like, the pneumococcal conjugate, meningococcal conjugate and human papillomavirus vaccines is also stimulating the paediatric and adolescent segment of the market, while flu vaccines will continue to play a big role in expanding the adult segment. Breakthrough products like, Schancho- the bivalent oral cholera vaccine jointly developed by Shantha Biotech and the international Vaccine Institute- will build international manufacturing capacities.

Diagnostics and Targeted Therapeutics

4.9 The diagnostics and therapeutics sectors have also expanded in recent years. The diagnostics market is currently worth about \$436 million,

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with molecular diagnostics accounting for sales of about \$300 million in 2009-10. The market is growing at 15-20% annually, with revenues split equally between the multinationals, e.g., Roche, Siemens (which has acquired Bayer Diagnostics) and Abbott, etc. and domestic players, e.g., Tulip Group, Transasia Biomedicals, RFCL (Diagnova), Span Diagnostics and Trivitron, etc., gradual acceptance of the concept of personalized medicine is driving much of the growth.

4.10 Meanwhile, the therapeutics sector accounted for 15% of India's biologics market in 2009-10, with cancer therapies clocking up sales of \$68 million. Oncology products are a very profitable line of business for many Indian biopharmaceuticals manufacturers because they address an area of high unmet need and thus command premium prices. Uptake of such medicines is also increasing, as domestic producers make less expensive versions than those made by the multinationals and a growing number of Indian patients get medical insurance.

Oral Diabetes Drugs and Insulins

4.11 The oral diabetes market is currently worth about \$338 million, while the insulin (and insulin analogues) market is worth about \$ 133 million. Markets are growing rapidly at a compound annual growth rate of 32%, measured in terms of value, in 2007-09. Novel delivery devices will also contribute to the expansion of the market in the future.

Biosimilars

4.12 About 20 Indian companies are already producing biosimilars. Dr Reddy's Laboratories, Ranbaxy, Biocon, Shantha Biotech, Reliance Life Sciences, Panacea Biotec and Intas Biopharmaceuticals are among those that lead the way. But several other well-known companies have recently entered the field, including Glenmark, Cipla and Lupin Pharma. In June 2010, e.g., Cipla announced that it was spending \$65 million on stakes in two biotechnology companies: MabPharm and BioMab, based in India and Hong Kong respectively, to bolster its presence in the global biosimilars space.

4.13 In 2009-10, domestic sales of erythropoietin rose to \$22 million while sales of c-GCF rose to \$ 11million, sales of interferons rose to \$22 million and sales of streptokinase rose to \$15 million. Moreover, demand is likely to grow considerably, as India becomes more affluent. US investment bank Goldman Sachs estimates that the number of Indians with annual income of

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between \$6,000 and \$30,000 (measured in terms of purchasing power parity) will increase by 250-300 million during the next decade alone.

4.14 India is one of the largest (by volume) exporters of malaria and anti-retroviral drugs at affordable costs. WHO, UNDP, Clinton Foundation, etc., source a large number of their drug requirements to fulfill their worldwide demands from India.

4.15 The Indian Pharmaceutical fraternity has spread beyond the boundaries of the country with presence all over the world. Through satisfied customers and high quality products, the industry is growing in its presence across the world, in highly stringent economies like USA, EU, Australia and Japan topping the list of exporting countries. The ability to supply to highly regulated markets catering to their stringent requirements is an evidence of quality standards of Indian medicines. These investments and commitments from different market participants is what have allowed the Indian Pharma market to prosper and bring about a more holistic growth to Industry.

Chapter 5

Technical Aspects of Pharmaceuticals Industry

5.1 The pharmaceutical industry develops, produces, and markets drugs or pharmaceuticals licensed for use as medications. Pharmaceutical companies are allowed to deal in generic and/ or brand medications and medical devices. They are subject to a variety of laws and regulations regarding the patenting, testing and ensuring safety and efficacy and marketing of drugs. Overview of few of the areas under pharmaceutical industry has been discussed in following paragraphs.

Drug Discovery and Development Solutions (DDDS)

5.2 DDDS business offers integrated services platform across target validation, discovery, pre-clinical and clinical development. The DDDS division works in accelerating both early and late stage drug development in therapeutic areas of oncology, metabolic disorders, CNS, pain/ inflammation, dermatology as well as infectious diseases. Stages of DDDS business are as follows:

Discovery		Clinical Development		Market Launch
<i>Discovery</i>	<i>Pre-clinical</i>	<i>Phase I</i>	<i>Phase II & Phase III</i>	<i>Phase IV</i>
Bioinformatics	Medicinal Chemistry	Bio availability Studies	Clinical trial management	Data management
Path art	Analytical Chemistry	Bioequivalenc e Studies	Study Feasibility	Biostatistics
Chemoinform atics	Custom Synthesis	Bioanalytics Analysis	Site identification	Quality Assurance
ChemBioBase	Library Design	Pharmacoken tic Support	Site initiation/ Close out	Regulatory Affairs
Crystallogr- aphy	Combina	Statistical support	Medical monitoring	Drug Safety

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Structure Directed	Focused			Consulting Services
Molecular design	Lead Optimisation			Staffing solutions
Information technology				
Services				

5.3 Clinical Research division provides pharmaceutical, biotechnology and medical device companies with a broad range of clinical research services in support of Phase I-IV drug and device development, including project management, clinical monitoring, scientific and medical support, investigator and patient recruitment, site management, biostatistics, data management, drug safety, quality assurance, regulatory affairs, medical writing, etc.

Clinical Research Services

CLINICAL OPERATIONS	DATA MANAGEMENT BIOSTATISTICS	QUALITY ASSURANCE
Phase I - IV Clinical Pharmacology BA BE PK Study Design Protocol Development Investigator Identification Recruitment Project Management Site Monitoring Management Patient Recruitment Medical Monitoring Staff Solutions	CRF Design Production Database Design Setup Data Entry EDC Data Validation Cleaning Database Transfers Statistical Analysis Plans SAS Programming Statistical Analysis	Quality Assurance Consulting Quality Assurance Auditing Records Management Archiving Quality Systems Regulatory Authority Inspections Preparations Management
LABORATORY OPERATIONS	DRUG SAFETY	REGULATORY AFFAIRS
Bioanalytical Method Development Bioanalytical Method Transfer Bioanalytical Method Validation Bioanalytical Sample Analysis ISO 15189 Clinical Pathology Laboratory	Serious Adverse Event Management Database Reconciliation Coding of Adverse Events and Concomitant Medications	Regulatory Strategy Consulting Regulatory Submissions Medical Writing

5.4 The following are examples of areas covered under DDDS:

- Medicinal Chemistry
- Biology
- Structural Biology
- Computational Chemistry
- Pharmacology
- Clinical Sciences

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- Domain-specific Information Technology (Life sciences and Biotech)
- Highly specialized therapeutic areas including:
 - oncology
 - cardiovascular
 - central nervous system
 - dermatology
 - respiratory
 - allergy/ immunology, etc.

Contract Research and manufacturing Services (CRAMS) : Exclusive Synthesis

5.5 In Exclusive Synthesis Business, a pharma company may offer following services:

- (i) Custom Research and Development Services
 - Early phase clinical projects in pre-clinical/ phase I/ phase II
 - Offer services such as route design, process development and analytical method development on FTE as well as on fee for services basis
 - Lab and Pilot scale synthesis
- (ii) Custom Scale-up Services
 - Late phase clinical projects in phase II / phase III;
 - Offer fast and efficient scale-up and manufacturing services.
- (iii) Exclusive Custom Manufacturing
 - In-market product either already launched in market or moved from phase III;
 - Offer exclusive manufacturing for multiple years on long term contractual basis;
 - Process Given by Customers, e.g., process familiarization, contractual agreement, complete technology transfer, commercial manufacturing, etc.;

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- Process developed, e.g., route selection, sample preparation, sample approval, process optimization, contractual agreement, pilot trial, commercial manufacturing, etc.

Radiopharmaceuticals

5.6 The focus of radio-pharmaceuticals division is on nuclear medicine, imaging and therapeutic agents. The radiopharmaceutical division develops, manufactures and markets innovative diagnostic imaging and radiopharmaceutical solutions for the global market. **Radiopharmaceuticals** are used in **Nuclear Medicine** for the characterization of various disease conditions and the treatment of thyroid disorders/cancer. Applications of these products include cardiology, oncology, thyroid uptake and scans, lung scans, kidney and brain imaging and bone scans.

Various other businesses under Pharma industry are as follows:

Generics	Allergenic Extracts	Major therapeutic and diagnostic extracts for allergy derived from pollens, animals and stinging insects venoms
	Dosage Form	Provider of high quality finished dosage forms (tablets and capsules)
CMO	Sterile & Non Sterile Products	CMO services for lyophilized products, liquid fills, biologics, suspensions, WFI/ diluents, clinical trial quantities, ointment, cream, liquid, etc.
Healthcare		Providing affordable high-quality health care services in India as well as abroad

Chapter 6

Regulatory Framework

- 6.1 List of laws governing the pharmaceutical sector are as follows:
- National Pharmaceuticals Pricing Policy, 2012 (NPPP-2012)
 - The Drugs and Cosmetics Act, 1940
 - The Drugs and Cosmetics Rules, 1945
 - The Pharmacy Act, 1948
 - The Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954
 - The Narcotic Drugs and Psychotropic Substances Act, 1985
 - The Narcotic Drugs and Psychotropic Substances Rules, 1985
 - The Prevention of illicit traffic in Narcotic Drugs and Psychotropic Substances Act, 1988
 - Narcotic Drugs and Psychotropic Substances (Regulation of Controlled Substances) Order, 1993
 - Drug Policy, 1986
 - The Medicinal and Toilet Preparations (Excise Duties) Act, 1955
 - The Medicinal and Toilet Preparations (Excise Duties) Rules, 1956
 - The Drugs (Prices Control) Order 1995 (under the Essential Commodities Act)
 - Clinical Establishments (Registration and Regulation) Act, 2010
 - Clinical Thermometers (Quality Control) Order, 2001
 - Good Laboratory Practice (GLP) Guidelines
 - Guidelines for I.V Fluids distribution, storage and administration
 - Guidelines for Blood Banks
 - Good Clinical Practice Guidelines
 - Guidelines for import and manufacture of medical devices
 - Guidelines on Recall and Rapid Alert System for Drugs

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- Guidelines on Fixed Dose Combinations (FDC)
- The Patents Act, 1970
- The Industries (Development and Regulation) Act, 1951
- Trade Marks Act, 1999
- Labour related laws
- Foreign Exchange laws
- Taxation laws
- Environmental laws, etc.

National Pharmaceuticals Pricing Policy, 2012 *(vide notification dated 7th December, 2012)*

Objective

6.2 The central objective of NPPP, 2012 is to promulgate the principles for pricing of Essential Drugs as laid down in the "National List of Essential Medicines- 2011, which was declared by the Ministry of Health and Family Welfare, Government of India vide communication No.12-01/essential medicines/08-DC/DFQC, dated 8th June, 2011. The objective is to put in place a regulatory framework for pricing of drugs so as to ensure availability of required medicines ("essential medicines") at reasonable prices even while providing sufficient opportunity for innovation and competition to support the growth of industry, thereby meeting the goals of employment and shared economic well being for all.

Key Principles of NPPP, 2012

6.3 The key principles for regulation of prices in the National Pharmaceuticals Pricing Policy 2012 are:

- Essentiality of Drugs
- Control of Formulations prices only
- Market Based Pricing

Principles for Drugs Price Control and Determination in NPPP, 2012

6.4 Price regulation would be on the basis of 'Essentiality' of the drug as laid down in the "National List of Essential Medicines- 2011" declared by the

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Ministry of Health and Family Welfare, and modified time to time, in public interest under Drug Price Control Order.

Price regulation would be applied only to formulations, i.e., the medicine actually used by the consumers, and not to any upstream products such as bulk drugs and intermediates. The Span of Price Control shall be as per the dosages and strengths as listed in NLEM- 2011. The methodology of fixing a ceiling price of NLEM medicines, by adopting the Simple Average Price of all the brands having market share (on the basis of Moving Annual Turnover) more than and equal to 1% of the total market turnover of that medicine, will be as per the formula below:

$$\text{Ceiling price} = \frac{\text{Sum of prices of all the brands of the medicine having market share more than and equal to 1\% of the total market turnover of that medicine}}{\text{Total number of manufacturers producing such brands of the medicine}}$$

6.5 The formulations will be priced only by fixing a Ceiling Price (CP). Manufacturers would be free to fix any price for their products equal to or below the CP. The CP's would be fixed on the dosage basis, such as per tablet / capsule / standard injection volume as listed in NLEM- 2011. The Ceiling Price will be fixed on the basis of readily monitorable Market Based Data (MBD). To begin with, the basis for this readily monitorable market data would be the data available with the pharmaceuticals market data specializing company – IMS Health (IMS). Wherever required this data would be checked by appropriate survey/ evaluation by the National Pharmaceutical Pricing Authority (NPPA). As the IMS data gives price figures for stockist level prices hence in order to arrive at ceiling price (which will be the maximum retail price), the IMS price will be further increased by 16% as margin to the retailer so as to arrive at a reasonable ceiling price chargeable from the consumers.

For drugs not in the IMS data, NPPA would collect data by commissioning the same. For the medicines where there is no reduction of price due to absence of competition, the overall percentage reduction in the price of same molecule with other dosage and strength will be applied; otherwise the overall percentage reduction in the price of medicines in the same therapeutic category will be applied.

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6.6 The CP for a drug listed in the NLEM would be the Simple Average of Prices as calculated on the basis of IMS data six months prior to the date of announcement of the new National Pharmaceutical Pricing Policy, i.e., the "Appointed Date" for bringing the new Policy into effect. For a drug whose data is not available in IMS, the NPPA will commission the data within a reasonable time for determining the Simple Average Prices also on the basis of prices prevailing six months prior to the Appointed Date. Once the Simple Average Price is fixed, NPPA would monitor its implementation on a continuous basis through a proper methodology and system.

6.7 The prices of these NLEM-2011 medicines will be allowed an annual increase on 1st April of every year as per the Wholesale Price Index for the previous year as notified by the Department of Industrial Policy and Promotion. In case of decline in Wholesale Price Index, a corresponding reduction in the ceiling price will be obligatory. The NPPA itself will also separately notify the revised ceiling prices as applicable as on the 1st of April each year, and in case any company has fixed the prices not consistent with the revised ceiling prices, the NPPA will take appropriate action.

6.8 The Reference Prices for calculation of Simple Average Price may also change on an annual basis due to changes in the MAT value. However, there would be no annual revision of Ceiling Prices on the basis of MAT. Revision of Ceiling Prices on the basis of MAT value would be carried out only once in five years or as and when NLEM is updated/ revised. However, the Government will revise the ceiling price of a medicine under NLEM, if there is a significant change in the market structure of the particular medicine even in between 5 years.

Non-price Control Drugs

6.9 In the policy, all essential drugs are under price control. It would follow that non-essential drugs should not be under a controlled regime and their prices should be fixed by market forces. However, in order to keep a check on overall drug prices, prices of such drugs be monitored on regular basis, and where such prices increase at a rate of above 10% per annum is observed, the Government would be empowered to have the price of these drugs reduced to below this limit, for next 12 months.

Imported Drugs

6.10 The Ceiling Prices determined for drugs falling under the span of control shall also be applicable to such drugs that are imported.

Overlap Drugs between DPCO 1995 and NLEM- 2011

6.11 The prices of medicines which are a part of DPCO 1995 but not in NLEM-2011 would be frozen for one year and thereafter a maximum increase of 10% per annum, as in case of other non-NLEM medicines will be allowed.

Exemptions

6.12 To promote innovation and R&D following drugs will be kept out of any type of price control:

S. No.	Exemption to	Period of exemption	Exemption from
(i)	A manufacturer producing a new drug patented under the Indian Patent Act, 1970 (product patent) and not produced elsewhere, if developed through indigenous R&D	5 years	The date of commencement of its commercial production in the country
(ii)	A manufacturer producing a drug in the country by a new process developed through indigenous R&D and patented under the Indian patent Act, 1970, (process patent)		
(iii)	A formulation involving a new delivery system developed through indigenous R&D		The date of its market approval in India(<i>refer note below</i>)

Note: The certification of innovation and R&D may be provided by the office of Drug Controller General of India (DCGI).

6.13 The revision of NLEM for the purpose of price control is a dynamic process and any drug can be added in NLEM in public interest under Drug Price Control Order on the recommendation of Ministry of Health and Family Welfare. The production levels, availability and accessibility to the NLEM drugs and formulations should not fall after price control is introduced and the Department of Pharmaceuticals will ensure that production levels are maintained by an appropriate mechanism. If a manufacturer of a NLEM drug with dosages and strengths as specific in NLEM, launches a new drug by

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combining the NLEM drug with another NLEM drug or a non-NLEM drug or by changing the strength and dosages of the same NLEM drug, such manufacturers shall be required to seek price approval from the Government before launching the new drug. Ministry of Health and Family Welfare will consider making prescription of drugs by generics names mandatory. The distribution of quality affordable generics drugs through Jan Aushadhi Stores will be strengthened.

Measures to Strengthen Pharmaceuticals Industry

6.14 The following are measures be required to strengthen pharmaceuticals industry:

- a) Strengthening and rationalizing the drug regulatory system.
- b) Bringing on a common platform all the regulatory authorities related to drug standards, bio-pharmaceuticals, clinical trials and Pharmacopeia.
- c) Promotion of research and development in the pharmaceutical sector, directly through research institutions and universities, as well as through provision of seed capital, venture capital funding and subsidies to innovative drug companies.
- d) Enablement of domestic pharmaceutical companies to achieve international GMP/GLP and GCP standards.
- e) Development of human resource, particularly in critical areas to meet the requirements of pharmaceutical industries.
- f) Rationalization of excise duties on pharmaceuticals.
- g) Setting up of common infrastructure through pharma development parks, pharma cluster schemes in order to strengthen and facilitate the smaller units in the pharmaceutical industries.
- h) Rationalization of pharma retail trade and strengthening of pharma supply chains.

The Drugs and Cosmetics Act, 1940

Objective

6.15 The objective of the Act is to regulate the import, manufacture, distribution and sale of drugs and cosmetics. The Act consists of 38 sections under 5 chapters and 2 schedules.

Definitions (Chapter I)

6.16 The terms defined in the Act are as follows:

- (i) **Ayurvedic, Siddha or Unani drug** includes all medicines intended for internal or external use for or in the diagnosis, treatment, mitigation or prevention of disease or disorder in human beings or animals, and manufactured exclusively in accordance with the formulae described in, the authoritative books of Ayurvedic, Siddha and Unani Tibb systems of medicine, specified in the First Schedule
- (ii) The **Board** means:
 - (a) in relation to Ayurvedic, Siddha or Unani drug, the Ayurvedic, Siddha and Unani Drugs Technical Advisory Board
 - (b) in relation to any other drug or cosmetic, the Drugs Technical Advisory Board
- (iii) **Cosmetic** means any article intended to be rubbed, poured, sprinkled or sprayed on, or introduced into, or otherwise applied to, the human body or any part thereof for cleansing, beautifying, promoting attractiveness, or altering the appearance, and includes any article intended for use as a component of cosmetic.
- (iv) **Drug** includes:
 - (a) all medicines for internal or external use of human beings or animals and all substances intended to be used for or in the diagnosis, treatment, mitigation or prevention of any disease or disorder in human beings or animals, including preparations applied on human body for the purpose of repelling insects like, mosquitoes;
 - (b) such substances (other than food) intended to affect the structure or any function of the human body or intended to be used for the destruction of vermin or insects which cause disease in human beings or animals, as may be specified from time to time by the Central Government by notification in the Official Gazette;
 - (c) all substances intended for use as components of a drug including empty gelatin capsules; and

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- (d) such devices intended for internal or external use in the diagnosis, treatment, mitigation or prevention of disease or disorder in human beings or animals, as may be specified from time to time by the Central Government by notification in the Official Gazette, after consultation with the Board
- (v) **Manufacture** in relation to any drug or cosmetic includes any process or part of a process for making, altering, ornamenting, finishing, packing, labelling, breaking up or otherwise treating or adopting any drug or cosmetic with a view to its sale or distribution but does not include the compounding or dispensing of any drug, or the packing of any drug or cosmetic, in the ordinary course of retail business.
- (vi) **Import** means to bring into India.
- (vii) **Patent or proprietary medicine** means:
 - (a) in relation to Ayurvedic, Siddha or UnaniTibb systems of medicine all formulations containing only such ingredients mentioned in the formulae described in the authoritative books of Ayurveda, Siddha or UnaniTibb systems of medicine specified in the First Schedule, but does not include a medicine which is administered by parenteral route and also a formulation included in the authoritative books.
 - (b) in relation to any other systems of medicine, a drug which is a remedy or prescription presented in a form ready for internal or external administration of human beings or animals and which is not included in the edition of the Indian Pharmacopoeia for the time being or any other Pharmacopoeia authorised in this behalf by the Central Government after consultation with the Drugs Technical Advisory Board.

Bodies under the Act (Chapter II)

6.17 The following bodies have been defined under the Act:

- (i) **The Drugs Technical Advisory Board**—The Central Government shall, as soon as may be, constitute a Board (to be called the Drugs Technical Advisory Board) to advise the Central Government and the State

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Governments on technical matters arising out of the administration of this Act and to carry out the other functions assigned to it by this Act.

(ii) **The Central Drugs Laboratory**—The Central Government shall, as soon as may be, established a Central Drugs Laboratory under the control of a Director to be appointed by the Central Government, to carry out the functions entrusted to it by this Act or any rules made under this Chapter.

(iii) **The Drugs Consultative Committee**—The Central Government may constitute an advisory committee to be called “the Drugs Consultative Committee” to advise the Central Government, the State Governments and the Drugs Technical Advisory Board on any other matter tending to secure uniformity throughout India in the administration of this Act.

Definitions under Chapters III and IV

6.18 The followings are terms defined under Chapter III and IV

- (i) **Standards of quality** means:
 - (a) in relation to a drug, that the drug complies with the standard set out in the Second Schedule, and
 - (b) in relation to a cosmetic, that the cosmetic complies with such standard as may be prescribed.
- (ii) **Misbranded drugs**: A drug shall be deemed to be misbranded:
 - (a) if it is so coloured, coated, powdered or polished that damage is concealed or if it is made to appear of better or greater therapeutic value than it really is; or
 - (b) if it is not labelled in the prescribed manner; or
 - (c) if its label or container or anything accompanying the drug bears any statement, design or device which makes any false claim for the drug or which is false or misleading in any particular.
- (iii) **Adulterated drugs**: A drug shall be deemed to be adulterated:
 - (a) if it consists, in whole or in part, of any filthy, putrid or decomposed substance; or
 - (b) if it has been prepared, packed or stored under insanitary conditions whereby it may have been contaminated with filth or whereby it may have been rendered injurious to health; or

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- (c) if its container is composed in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health; or
 - (d) if it bears or contains, for purposes of colouring only, a colour other than one which is prescribed; or
 - (e) if it contains any harmful or toxic substance which may render it injurious to health; or
 - (f) if any substance has been mixed therewith so as to reduce its quality or strength.
- (iv) **Spurious drugs.**— For the purposes of this Chapter, a drug shall be deemed to be spurious:
- (a) if it is imported under a name which belongs to another drug; or
 - (b) if it is an imitation of, or a substitute for, another drug or resembles another drug in a manner likely to deceive or bears upon it or upon its label or container the name of another drug unless it is plainly and conspicuously marked so as to reveal its true character and its lack of identity with such other drug; or
 - (c) if the label or the container bears the name of an individual or company purporting to be the manufacturer of the drug, which individual or company is fictitious or does not exist; or
 - (d) if it has been substituted wholly or in part by another drug or substance; or
 - (e) if it purports to be the product of a manufacturer of whom it is not truly a product.
- (v) **Misbranded cosmetics:** A cosmetic shall be deemed to be misbranded:
- (a) if it contains a colour which is not prescribed; or
 - (b) if it is not labelled in a prescribed manner; or
 - (c) if the label or container or anything accompanying the cosmetic bears any statement which is false or misleading in any particular.

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- (vi) **Spurious** cosmetics: a drug shall be deemed to be spurious:
- (a) if it is imported under the name which belongs to another cosmetic; or
 - (b) if it is an imitation of, or is a substitute for, another cosmetic or resembles another cosmetic in a manner likely to deceive or bears upon it or upon its label or container the name of another cosmetic, unless it is plainly or conspicuously marked so as to reveal its true character and its lack of identity with such other cosmetic; or
 - (c) if the label or the container bears the name of an individual or company purporting to be the manufacturer of the cosmetic, which individual or company is fictitious or does not exist; or
 - (d) if it purports to be the product of a manufacturer of whom it is not truly a product.

Import of Drugs and Cosmetics: Prohibition of Import of Certain Drugs or Cosmetics (Chapter III)

- 6.19 No person shall import:
- (a) any drug or cosmetic which is not of standard quality
 - (b) any misbranded drug or misbranded or spurious cosmetic
 - (c) any adulterated or spurious drug
 - (d) any drug or cosmetic for the import of which a licence is prescribed, otherwise than under, and in accordance with, such licence
 - (e) any patent or proprietary medicine, unless there is display in the prescribed manner on the label or container thereof the true formula or list of active ingredients contained in it, together with the quantities thereof
 - (f) any drug which by means of any statement, design or device accompanying it or by any other means, purports or claims to cure or mitigate any such disease or ailment, or to have any such other effect, as may be prescribed

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- (g) any cosmetic containing any ingredient which may render it unsafe or harmful for use under the directions indicated or recommended
- (h) any drug or cosmetic the import of which is prohibited by rule made under this Chapter.

Manufacture, Sale and Distribution of Drugs and Cosmetics: Prohibition of Manufacture and Sale of Certain Drugs and Cosmetics (Chapter IV)

6.20 No person shall himself or by any other person on his behalf:

- (i) manufacture for sale or for distribution, or sell, or stock or exhibit or offer for sale or distribute:
 - (a) any drug which is not of a standard quality, or is misbranded, adulterated or spurious
 - (b) any cosmetic which is not of a standard quality or is misbranded or spurious
 - (c) any patent or proprietary medicine, unless there is display in the prescribed manner on the label or container thereof the true formula or list of active ingredients contained in it together with the quantities thereof
 - (d) any drug which by means of any statement, design or device accompanying it or by any other means, purports or claims to prevent, cure or mitigate any such disease or ailment, or to have any such other effect as may be prescribed
 - (e) any cosmetic containing any ingredient which may render it unsafe or harmful for use under the directions indicated or recommended
 - (f) any drug or cosmetic in contravention of any of the provisions of this Chapter or any rule made thereunder
- (ii) sell, or stock or exhibit or offer for sale, or distribute any drug or cosmetic which has been imported or manufactured in contravention of any of the provisions of this Act or any rule made thereunder
- (iii) manufacture for sale or for distribution, or sell, or stock or exhibit or offer for sale, or distribute any drug or cosmetic, except under, and

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in accordance with the conditions of, a licence issued for such purpose under this Chapter.

Note: Every person holding a licence shall keep and maintain such records, registers and other documents as may be prescribed and shall furnish to any officer or authority exercising any power or discharging any function under this Act such information as is required by such officer or authority for carrying out the purposes of this Act.

Provisions relating to Ayurvedic, Siddha and Unani drugs (Chapter IVA)

6.21 The following are Bodies under the chapter:

- a) **Ayurvedic, Siddha and Unani Drugs Technical Advisory Board:** The Central Government shall, by notification in the Official Gazette and with effect from such date as may be specified therein, constitute a Board (to be called the Ayurvedic, Siddha and Unani Drugs Technical Advisory Board) to advise the Central Government and the State Governments on technical matters arising out of this Chapter and to carry out the other functions assigned to it by this Chapter.
- b) **The Ayurvedic, Siddha and Unani Drugs Consultative Committee:** The Central Government may constitute an Advisory Committee to be called the Ayurvedic, Siddha and Unani Drugs Consultative Committee to advise the Central Government, the State Governments and the Ayurvedic, Siddha and Unani Drugs Technical Advisory Board on any matter for the purpose of securing uniformity throughout India in the administration of this Act in so far as it relates to Ayurvedic, Siddha or Unani drugs.

Regulation of Manufacture for Sale of Ayurvedic, Siddha and Unani Drugs

6.22 No person shall manufacture for sale or for distribution any Ayurvedic, Siddha or Unani drug except in accordance with such standards, if any, as may be prescribed in relation to that drug.

Prohibition of Manufacture and Sale of Certain Ayurvedic, Siddha and Unani Drug

6.23 No person, either by himself or by any other person on his behalf, shall:

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- (a) manufacture for sale or for distribution:
 - (i) any misbranded, adulterated or spurious Ayurvedic, Siddha or Unani drugs;
 - (ii) any patent or proprietary medicine, unless there is display in the prescribed manner on the label or container thereof the true list of all the ingredients contained in it; and
 - (iii) any Ayurvedic, Siddha or Unani drug in contravention of any of the provisions of this Chapter or any rule made thereunder
- (b) sell, stock or exhibit or offer for sale or distribute, any Ayurvedic, Siddha or Unani drug which has been manufactured in contravention of any of the provisions of this Act, or any rule made thereunder
- (c) manufacture for sale or for distribution, any Ayurvedic, Siddha or Unani drug, except under, and in accordance with the conditions of, a licence issued for such purpose under this Chapter by the prescribed authority.

Drugs Prices Control Order (DPCO), 1995

6.24 The drug prices in India are controlled by the Drugs (Prices Control) Order (DPCO). The DPCO is an order issued by the government under Section 3 of the Essential Commodities Act, 1955 empowering it to fix and regulate the prices of essential bulk drugs and their formulations. The order incorporates a list of bulk drugs, whose prices are to be controlled, the procedure for fixation and revision of prices, the procedure for implementation, the procedure for recovery of dues, the penalties for contravention and various other guidelines and directions. The order is subject to the guidelines of Drug Policy and aims to ensure equitable distribution, increased supply and cheap availability of bulk drugs.

Pricing of Bulk Drugs

6.25 The 76 bulk drugs, the prices of which are controlled under DPCO 1995, have been enlisted in the First Schedule annexed to the order. The methodology through which prices of DPCO-controlled bulk drugs are fixed is as follows:

- (i) While fixing the maximum sale price of a bulk drug, the government has to provide a post tax return of:
 - (a) either 14% on net worth or

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- (b) 22% on capital employed
- (ii) Each company can choose one of the two methods mentioned above as per its own free will. So, the choice of method is company-specific and not product-specific.
- (iii) Based on the chosen method, each company submits to the government, a detailed working of the prices of various bulk drugs that it requires. The prices submitted by the companies are such that the allowed profitability parameters are achieved.
- (iv) The government subsequently studies the applications made by the major players for every bulk drug and cost audits reports of manufacturers, before arriving at the final price. The price so decided will be binding on all manufacturers, irrespective of their actual cost of production.

Pricing of Formulations

6.26 The Drug Price Control Order covers all the formulations that utilize the bulk drugs listed in the First Schedule. The methodology through which prices of formulations are fixed is as follows:

A uniform MAPE (Maximum Allowable Post-manufacturing expenses) of 100% is given on all formulations under price control, i.e., the retail price of a DPCO formulation is fixed equal to $[(MC+CC+PM+PC) \times 2] + \text{excise duty}$.

Details	Amount
(a) Material Cost (MC)	xxx
(b) Conversion Cost (CC)	xxx
(c) Packing Material Costs (PM)	xxx
(d) Packing Charges (PC)	xxx
(e) Ex-factory Cost [(a) + (b) + (c) + (d)]	xxx
(f) MAPE 100% on (e) above	xxx
(g) Excise Duty	xxx
(h) Retail Price [(e) + (f) + (g)]	xxx

Note: It is this price that is printed on the pack of a DPCO controlled formulation. This price is not the Maximum Retail Price (MRP). Local taxes are additional.

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6.27 In order for the government to decide the price of a controlled formulation, each manufacturer is supposed to submit to the government details of material cost, manufacturing process etc. The ceiling prices, once decided, are notified in the Official Gazette.

For imported drugs and formulations, the landed cost including customs duty and clearing charges is the benchmark to fix prices. The margin allowed to the importer is such that selling and distribution expenses including interest and profit are covered. However, the margin allowed cannot exceed 50% of the landed cost.

The Pharmacy Act, 1948

6.28 In India there was no restriction to practise the profession of pharmacy. One could practise this profession as any other profession. Persons, having no knowledge and having no education in pharmacy or pharmaceutical chemistry or pharmacology, were engaged in this profession. Hundreds of cases were brought to the notice of the Government wherein the compounding, mixing, or dispensing of medicines was being done by persons who were not adequately educated in this line. The system was causing great harm to the health of people by wrong compounding, mixing or dispensing. It was found necessary to enact a law for the regulation of the profession and practice of pharmacy. To achieve this goal the Pharmacy Bill, 1947 was introduced in the Legislature which was later referred to the Select Committee. The recommendations of the Select Committee were incorporated in the Bill.

Object of the Act

6.29 It was desirable that, as in most other countries, only persons who have attained a minimum standard of professional education should be permitted to practise the Profession of Pharmacy. It was accordingly proposed to establish a Central Council of Pharmacy, which will prescribe the minimum standards of education and approve courses of study and examinations for Pharmacists, and Provincial Pharmacy Councils, which will be responsible for the maintenance of provincial registers of qualified pharmacists. It was further proposed to empower Provincial Governments to prohibit the dispensing of medicine on the prescription of a medical practitioner otherwise than by, or under the direct and personal supervision of, a registered pharmacist.

Important Provisions of the Act

6.30 The Pharmacy Act consists of 46 sections under 5 chapters. Most of the states in India have also enacted state specific Pharmacy Council Rules. Registration of a pharmacist is done by the State Pharmacy Council constituted under Section 19 of the Pharmacy Act. According to Section 32(2) of the Act, the minimum requirements for registration as a pharmacist are:

- (a) Applicant should have attained the age of 18 years and paid the prescribed fee;
- (b) Applicant should reside or carry on the business or profession of pharmacy in the state;
- (c) Applicant should have successfully completed Diploma /Degree in Pharmacy from an Institution approved by the Pharmacy Council of India; or
- (d) is a registered pharmacist in another state.

No person other than a Registered Pharmacist should compound, prepare, mix, or dispense any medicine on the prescription of a medical practitioner.

The Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954

6.31 It is an Act to control, the advertisement of drugs in certain cases, to prohibit the advertisement for certain purpose of remedies alleged to possess magic qualities and to provide for matters connected therewith. The Act came into force on 1st April, 1955. It consists of 16 sections and one schedule.

Note: The schedule lists a number of diseases, disorders or conditions such as, diabetes, cataract, cancer, fevers (in general), obesity, rheumatism, impotence, high or low blood pressure, female diseases, epilepsy, stature of persons, venereal diseases, glaucoma, sterility in women, dropsy, etc.

6.32 According to Act, the magic remedy includes a talisman mantra kavacha, and any other charm of any kind which is alleged and possess miraculous powers for or in the diagnosis, cure, mitigation treatment or prevention of any disease in human beings or animals or for affecting or influencing in any way the structure or any organic function of human beings or animals.

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Unless prescribed by registered medical practitioners or after consultation with the Drugs and Cosmetics Act 1940, no person or company, should take any part in the publication of any advertisement referring to any drug that is used for:

- (a) the miscarriage in woman or prevention of conception in women,
- (b) maintenance or improvement of the capacity of human beings for sexual pleasures,
- (c) correction of menstrual disorder in women, and
- (d) the diagnosis, cure, mitigation, treatment or prevention of any disease, disorder or condition specified in the Schedule to the Act.

No person or company should take part in advertisement which gives a false impression or makes a false claim for the drug or mislead the people.

The Narcotic Drugs and Psychotropic Substances Act, 1985

6.33 The Narcotic Drugs and Psychotropic Substances Act, 1985 came into force on 14th November, 1985. The Act describes itself as 'an Act to consolidate and amend the law relating to narcotic drugs, to make stringent provisions for the control and regulation of operations relating to narcotic drugs and psychotropic substances, to provide for the forfeiture of property derived from, or used in, illicit traffic in narcotic drugs and psychotropic substances, to implement the provisions of the International Convention on Narcotic Drugs and Psychotropic Substances and for matters connected therewith.'

6.34 This Act has 83 sections and one schedule giving the list of psychotropic substances. Under the NDPS Act, it is illegal for a person to produce/ manufacture/ cultivate, possess, sell, purchase, transport, store, consume any narcotic drug or psychotropic substance. Narcotic drug means coca leaf, cannabis (hemp) opium straw and includes all manufactured drugs.

6.35 The Act is designed to fulfill India's treaty obligations under the Single Convention on Narcotic Drugs, Convention on Psychotropic Substances, and United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances. The Act provides power to the Central government to add to or omit the list of psychotropic substances, to take measures for preventing and combating abuse of and illicit traffic of narcotic

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drugs. There is a Consultative Committee to advise the Central Government for the implementation of this Act. The Narcotics Commissioner looks after the production of opium. The coca plant and coca leaves can be used in the preparation of flavoring agents with the permission of central government. No person should be engaged in or control any trade in which a narcotic drug or psychotropic substance is obtained from outside India and supplied to any person staying outside India.

Chapter 7

Internal Audit — Pharmaceutical Industry

7.1 Internal Audit with respect to following have been discussed in this chapter:

- (i) P2P cycle (Procurement to Pay)
- (ii) OTC (Order To Cash)
- (iii) Statutory Compliances
- (iv) Production
- (v) Inventory Management

P2P cycle (Procurement to Pay)

7.2 The following table gives a brief description of various activities, control objectives and key controls in procurement to pay cycle:

S.No.	Activity	Controls Objective	Key Control
1.	Vendor master: creation and maintenance	Complete, accurate and updated data should exist in the vendor master.	Review of the vendor master including documentation requirements.
		All changes to the vendor master should be duly authorized and accurately captured and no duplicate/redundant data should exist in the vendor master.	Monitor all changes to the master file, i.e., review log of changes to the vendor master.
2.	Item master: creation and maintenance	Complete, accurate and updated data should exist in the item master.	Review of the item master including documentation requirements.

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		All changes to the item master should be duly authorized and accurately captured and no duplicate/redundant data should exist in the item master.	Monitor all changes to the master file, i.e., review log of changes to the item master.
3.	Purchase Planning: <i>Production related purchases: raw material</i>	All purchases should be supported by valid business needs and should be duly authorized.	Review of monthly procurements and annual budgets for purchases along with its approval.
4.	Purchase Planning: <i>Production related purchases: project</i>	All purchases should be supported by valid business needs and should be duly authorized.	Review of monthly procurements and annual budgets for purchases along with its approval.
5.	Purchase Planning: <i>Production related purchases: engineering spares</i>	All purchases should be supported by valid business needs and should be duly authorized	Review of monthly procurements and annual budgets for purchases along with its approval.
6.	Purchase Planning: <i>Non production related planning: IT</i>	All purchases should be supported by valid business needs and should be duly authorized	Review of budgets along with its approval.
7.	Purchase: <i>Raw materials & packing materials</i>	All purchase orders are duly authorised and valid	Review of system based purchase order (PO). Review of list of amended PO along with the re-approval process in case of

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			amended PO.
			Review of regularisation procedures in case of emergency purchases.
			Review of open PO report.
		All PO's should be legally enforceable. Further, the terms and conditions of PO's should not be prejudicial to the interest of the company.	Review of legal enforceability of PO's pre-printed stationery with standard terms.
8.	Purchase: <i>Capital Asset</i>	All purchase orders should be duly authorized and valid.	Review of approval process of purchase proposal.
			Review of list of amended PO from ERP including controls on amendments and re-authorisation.
			Review of open POs report of capital expenditure.
		All PO's should be legally enforceable. Further, the terms and conditions of PO's should not be prejudicial to the interest of the company.	Review of legal enforceability of PO's pre-printed stationery with standard terms.
9.	Receiving: <i>Material received at warehouse</i>	All receipts should be duly approved and correctly accounted for in a timely manner.	Review of MRN.
			Review of process at the time of unloading and physical count of receipts raw material received in tankers.
			Review of receipt of engineering goods/ project items.

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			Review of pending MRNs.
			Review of system based approval of materials.
10.	<i>Invoice processing</i>	Rates of goods/ services should be consistent with PO/ contract, should matching with receipts of goods/ services and no duplicate payments should be made.	Review of invoices and comparison with PO and MRN including the approval process for payments.
		Liability should be correctly and completely recorded for invoices that have been processed.	Review of authorisation of deviations.
			Review of reconciliation of sub-ledger with general ledger.
			Review of reconciliation of Purchase bills to be received with general ledger.
11.	<i>Vendor advances</i>	All the advances should be duly authorised by relevant authorities.	Review of approval process for vendor advances.
		Advances should be correctly, completely and timely recorded in books of accounts and advances are adjusted as per the contracted terms with the vendors.	Review of vendor accounts.
12.	<i>Imported Material Purchase Accounting</i>	Purchase Accounting should be done as per the Accounting Policy of the Company.	Review of purchase accounting.

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7.3 In case of purchase of raw material, special consideration should be given to the qualitative aspect, e.g., material should be of desired quality. It should be checked and analysis report should be prepared by the QC team and reviewed by the management as well as the internal auditor. It should be ensured that there is a process of sealed quotes or e procurement system in case of purchases. In case of any capital expenditure, it should be ensured that the said capital expenditure is justified. Before disposal of a capital asset, it should be checked that whether the life of the asset has elapsed or not. Also, the disposal should be done at appropriate prices. In this regard, minimum three quotations should be obtained.

Order to Cash (OTC)

7.4 The following table given a brief of internal audit activity related to order to cash:

S.No.	Activity	Controls Objective	Key Control
1.	<i>Credit control</i>	Customer credit worthiness should be properly evaluated and credit limits should be accordingly set, in line with the policy of the Company.	Review of credit limits.
			Revision of credit limits.
			Auto Blocking of SOC(sales order confirmation) when credit limit is exceeded.
			Approvals for releasing the credit blocks to customer orders.
2.	<i>Credit notes</i>	Sales returns are accurately and completely recorded in the books of accounts.	Matching report: Duplicate SRCNs (sales returns credit notes).
		Sales Returns Credit Notes issued should be duly authorised.	Approval for returns by business heads.
		Credit notes raised on account of shortages, etc., should be duly authorised and supported by	Authorisation and processing of Credit notes for shortages.

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		adequate backup.	
		Credit notes raised on account of insurance claim should be duly authorised.	Review of credit notes for Insurance claims.
3.	<i>Customer master</i>	All updations to the Customers Master should be duly authorised and accurately captured.	Review of existing Customer Master
			Authorisation of Credit Limit rating form for customer code updation.
		Duplicate and inactive customer codes should not exist in the customer master file.	Configuration of System Control to prevent recording of duplicate customer codes.
4.	<i>Receipt and processing of customer Orders</i>	Customers orders received should be completely and correctly entered in the system.	Verification of SOC Norms.
			Review of Open orders.
		Orders should be genuine and should be processed accurately and only for approved customers.	Approval of SOC.
			ERP restriction for modification of orders.
5.	<i>Collections</i>	Collections should be accurately and completely accounted in the proper period.	Review of ERP generated invoices pending collections list.
			Posting collection journals in ERP.
			Review of Monthly cheque pending realisation report.
		Cheques received should be adequately safeguarded and timely deposited in bank.	Review of safeguards for cheques received.

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		Duplicate accounting of collections should not take place and all collections should be duly authorised.	Monthly review of collections exception report.
		Balance confirmation certificates should be obtained on a periodic basis and discrepancies should be correctly accounted for in the books of accounts.	Annual balance confirmation
6.	<i>Invoicing and Dispatches to Customers</i>	Goods (as per invoices) should be dispatched immediately and there should be no time lag between invoicing and dispatches.	Review of ERP based daily dispatch report.
7.	<i>Revenue Recognition</i>	Revenue recognition should be done on the basis of accounting policy of the Company which should be as per Indian GAAP.	Review of revenue Recognition Policy.
8.	<i>IT access</i>	The access to relevant modules in ERP should be restricted to the authorised personnel.	Review of user access rights list.
9.	<i>Agreement execution and monitoring</i>	All International Supply/ Sale/ Distribution agreements should be OFAC (Office of	Review of related terms and conditions of the agreement/ contracts with OFAC Regulation compliances.

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		Foreign Asset Control) regulation Compliant (i.e., not supplied/ sold/ distributed to the restricted/ sanctioned countries).	
10.	<i>Cheque Bouncing</i>	All cheques returns should be promptly and correctly accounted.	Review of cheque bounced legal file.
11.		Cheques bounced (returned) are received by authorised personnel.	Safeguarding of bounced cheques received.

Statutory Compliances

Excise

7.4 The following are important internal audit aspects with respect to excise:

S.No.	Activity	Controls Objective	Key Control
1.	<i>Refund/ rebates/ Claims</i>	All refunds/ rebates/ claims should be filed within statutorily permissible period.	Review of refunds/ rebates/ claims to ensure that all the refunds/ rebates/ claims have been filed within period of limitation expiring on the end of the quarter.
2.	<i>CENVAT Credit</i>	All eligible CENVAT credit should be accounted accurately and on timely basis.	Verification of CENVAT credit. Verification of CENVAT Credit on rejected material (review of invoices generated for returning rejected materials).

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3.	<i>Excise Rates</i>	Change in excise rates should be accurately and completely communicated and updated into the system.	Review of changes/ amendments.
4.	<i>Excise valuation</i>	Excise valuation for materials dispatched for exports should be accurately valued and authorised.	Review and authorisation of invoices.
		Excise valuation for materials dispatched to depots should be accurately valued and authorised.	Review and authorisation of invoices.
		Excise valuation for materials dispatched for domestic sale should be accurately valued and authorised.	Review and authorisation of invoices.
		Excise valuation for materials dispatched to contract manufacturer should be accurately valued and authorised.	Review and authorisation of invoices.
5.	<i>Incidence of Tax</i>	Accrual of excise duty liability should be booked as per the statute.	Review of accounting entry for excise duty on closing stock.
			Review of statement of

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			material sent to contract manufacturer.
6.	<i>Excise Returns</i>	All returns should be submitted with adequate documents and on a timely manner.	Review of Excise Returns.
7.	<i>Excise Duty Payment</i>	Excise duty payment should be on a timely manner as per the statute.	Review of duty payment and its authorisation.
8.	<i>Excise Duty Reconciliation</i>	Excise duty records should be reconciled with the financial records on a timely basis.	Verification of debit and credit entries in excise records.
9.	<i>Notices/ claims</i>	All claims and notices should be appropriately received and actioned upon on a timely basis.	Review of the actions taken for notices/ claim received. Review of deposit with government account.
10.	<i>Document retention</i>	All excise related documents should be adequately maintained.	Review of physical control.
11.	<i>Contingent liability</i>	All contingent liabilities are correctly identified and disclosed in the notes to the accounts.	Review the process for approving the amount of contingent liability.

Service Tax

7.5 The following are important internal audit aspects with respect to service tax:

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S. No.	Activity	Controls Objective	Key Control
1.	<i>Payment to Vendors</i>	Service tax should be paid as per the service tax law.	Review of payment of service tax to ensure that tax element in the invoice has been paid only against valid invoice and only to the extent of service tax applicable under the service tax law.
2.	<i>Incidence of Tax</i>	Accrual of Service Tax liability should be booked as per the Statute.	Review of liability created on service received. Review of liability created on specified services covered under reverse charge, e.g., goods transport agency.
3.	<i>Service tax payment</i>	Payments to service providers should be made within six months.	Review of payment of interest on service tax.
		Service Tax payment should be within timelines as per the statute.	Review of service tax payment and its authorisation.
4.	<i>Service valuation</i>	Valuation for services received from person not having business establishment in India should be done accurately.	Review of rate of Tax and computation of Service Tax.
		Valuation for services received from GTA, supply of manpower, works contract, hiring of motor	Review of calculation of Service Tax.

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		vehicle designed to carry passengers, sponsorship, services of an advocate (collectively referred to as specified services) should be done accurately.	
5.	<i>Service tax rate</i>	Change in Service Tax rate should be accurately and timely communicated.	Review of changes/ amendments.
6.	<i>CENVAT credit</i>	All eligible Service Tax Credit should be accounted accurately and on timely basis.	Review of documents.
		All eligible Service Tax credits should be distributed to Plant accurately and on timely basis.	Review and finalisation of Challans for transfer of service tax credit to plants.
7.	<i>Service tax returns</i>	All returns should be submitted with adequate documents and on a timely manner.	Review of Service Tax Returns.
8.	<i>Notices/ claims</i>	All claims and notices should be appropriately received and actioned upon on a timely basis.	Review of the actions taken for notices/ claim received
			Review of deposit with government account.

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9.	<i>Document retention</i>	All service tax related documents should be adequately maintained.	Review of physical control.
10.	<i>Contingent liability</i>	All contingent liabilities are correctly identified and disclosed in the notes to the accounts.	Review the process for approving the amount of contingent liability.

VAT/ CST

7.6 The following are important aspects related to VAT/CST:

S. No.	Activity	Controls Objective	Key Control
1.	<i>Statutory forms</i>	Status of pending statutory forms should be reviewed.	To ensure review of the status of pending C Forms which are overdue and exercise of due diligence in following up with the customers.
			To ensure review of the stock transfers at monthly intervals and issuance of 'F' Forms within the specified period, review of status of pending 'F' forms status and periodic reminder to the consignees for obtaining forms and steps to seek extension of time (if required) from the jurisdiction authority for submission of 'C' Forms and 'F' Forms.
		Statutory forms should be issued to sellers on timely basis and	To ensure that item detail mentioned in Forms tallies with the details as items contained in Registration

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		are accurate.	Certificate issued by the Sales Tax Department.
		Statutory forms should be received and accounted for in books of account accurately and on timely basis.	To ensure that forms have been issued to customers/ consignors/ sellers on a timely basis and register of forms C and F have been maintained and updated on a timely basis.
2.	<i>VAT/CST Rates</i>	Change in Sales Tax rates should be accurately and timely communicated and updated into the system	To ensure that sales tax master is updated properly on the basis of request send by business unit accountant and after review by the Indirect Tax team.
			To ensure review of the sales tax rates charged as reflected in the sales tax register and communication of the discrepancies to all business accountants.
3.	<i>Incidence of tax</i>	Accrual of Sales Tax liability should be booked as per the statute.	To ensure correct calculation of the sales tax liability for month end.
4.	<i>VAT/CST Returns</i>	All returns should be submitted with adequate documents and on a timely manner.	To ensure that sales Tax returns have been correctly and completely filled, amounts have been verified with ERP, all necessary documents (proof of payment of service tax, etc) have been attached with the return and return has been duly filed on timely basis.
5.	<i>VAT/CST payment</i>	Sales Tax payment should	To ensure review of the sales tax rates charged as reflected

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		be on a timely manner as per the statute.	in the sales tax register, necessary action on the discrepancies identified (if any) and deposit of sale tax within due dates.
6.	<i>VAT/CST reconciliation</i>	Sales Tax records should be reconciled with the financial records on a timely basis.	To ensure proper reconciliation of Sales tax records and finance records and necessary action on the discrepancies identified (if any).
7.	<i>VAT Credit</i>	All eligible VAT credit should be accounted accurately and on timely basis.	To ensure that all eligible VAT credit has been availed and VAT credit has been reversed on account of Stock transfers.
8.	<i>VAT/ CST valuation</i>	Sales Tax valuation for materials dispatched should be accurately determined and authorised.	To ensure review and authorisation of SOC for materials and correctness of sales tax charged.
9.	<i>Notices/ claims</i>	All claims and notices should be appropriately received and actioned upon on a timely basis.	<p>To ensure adequate actions are taken for notices/ claim received.</p> <p>To ensure review of the deposit with government on account of sales tax at each quarter end for their recoverability.</p>
10.	<i>Document retention</i>	All sales tax related documents should be adequately maintained	To ensure that adequate physical controls have been established for custody of sales tax records by placing them in separate storage rooms under the custody of authorised personnel.

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11.	<i>Contingent liability</i>	All contingent liabilities are correctly accounted for and authorised.	To ensure that verification of contingent liability note with the relevant backup documents (list of legal cases filed, etc.) for completeness and accuracy, consideration of all pending sales tax cases for estimation of contingent liabilities and adequate and complete disclosure of contingent liabilities in respect of sales tax in the Financial Statements.
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Export Benefits

7.7 The following are internal audit aspects related to export benefits:

S. No.	Activity	Controls Objective	Key Control
1.	<i>Documentation of Direct Export</i>	Comparative analysis of export benefits and documentation should be done.	<p>To ensure comparative analysis of export benefits available on each export consignment being done before exercising the option of specified benefits in the shipping bill.</p> <p>To ensure that there is no deficiency in the document for claiming export benefits and in case of any deficiency, corrective action has been taken.</p>
2.	<i>Export obligation</i>	Export obligations should be timely discharged.	To ensure that Direct Export obligation (EO) in respect of advance authorisation (AA)/ Duty free Import authorisation (DFIA)/ Export Promotion Capital Goods (EPCG) have been discharged on time or

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			extension has been obtained for completing EO.
			To ensure that all AA/DFIA/EPCG licences in respect of which export obligation has been completed have been submitted with DGFT for redemption of all documents within time.
			To ensure exercise of due diligence for redemption of AA/DFIA/EPCG and discharge of the related Bonds and Bank guarantees.
			To ensure that there are no pending imports of the relevant required material against AA/DFIA for which export obligation has been fulfilled and license has expired.
			To ensure maintenance of inventory of open AA/ DFIA/ EPCG/ DEPB licenses and physical verification of the same at least once in each quarter.
			To ensure that material imported against AA/ DFIA have been properly accounted for in the prescribed format and have been used only for the permitted purposes.
3.	<i>Documentation of Export</i>	Documentation of Exports should be forwarded	To ensure forwarding of the required documents related to exports (i.e., Bank

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		within time.	Realisation Certificate & related Shipping Documents) within 30 days of receipt of payment.
			To ensure forwarding of a Monthly listing of Export Benefits due by 10th of each month to licensing cell of commercial department.
			To ensure preparation of application within the prescribed time limit for accrued post shipment benefits for which completed documents have been received.
			To ensure that no accrued post shipment benefit has lapsed on account of delay in filing after receipt of complete documents.
4.	<i>Bond Filling</i>	Bonds and Bank Guarantees (BG) filings with the custom authorities should be complete and accurate.	To ensure maintenance of the list of total Bonds and BG filed with the custom authorities (Including Bonds filed against duty for normal imports).
			To ensure updation of the status of all bonds filed by the company and initiation of action for cancellation of the bonds where liability is discharged.
			To ensure exercise of due diligence in following with custom authorities where obligations under the Bond is discharged but bond has not been released.

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5.	<i>Rate of Duty</i>	Bill of entry should be correct and accurate.	To ensure that all Bills of entry have been assessed at the rate of duty claimed by the company for the clearance of the goods.
			To ensure that no additions have been made to the value declared by the company in the Bills of entry and valuation of the goods declared by the company has been accepted by the custom authorities.
			To ensure that Imports from Related Parties have been declared with custom authorities.
			To ensure that all the bills of entry where the duty rate or valuation claimed by the company have not been accepted by the custom authorities have been reported to the relevant authority as per the DOA matrix for further action.
			To ensure that complete disclosures have been made to the custom authorities for the purchase price paid for the imported goods including the debit notes or the service charges paid in respect of the goods.
6.	<i>Provisional Assessment</i>	All the provisional assessments for imports should be reviewed.	To ensure review of all the provisional assessments for imports and exercise of due diligence for finalisation of the same.

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Direct tax

7.8 The following are internal audit aspects related to direct tax:

S. No.	Activity	Controls Objective	Key Control
1.	<i>Exemptions u/s 10 and deductions</i>	Exemption u/s 10(34) in respect of the dividend income received from domestic company should be correctly computed and fully claimed.	To ensure that all incomes are duly supported, all computations made are reviewed and duly accounted in books, authorised JVs are posted in correct code.
		Deductions u/s 35 & 35(2AB) should be correctly computed and fully claimed.	To ensure that accurate calculation is done to arrive at the amount for claiming deduction and checked for arithmetical accuracy, proper reconciliation is done for R&D assets eligible for deduction, all conditions for claiming deduction are checked whether fully complied with or not, and review by the authorised personnel as per the DOA (Delegation of authority) matrix.
		Deductions u/s 80G should be correctly computed and fully claimed.	To ensure that accurate calculation is done for claiming deduction for donation, proper documents are collected to be filed with return for claiming deduction and review by the authorised personnel as per the DOA matrix for eligibility.

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		Deductions u/s 80IA should be correctly computed and fully claimed.	To ensure that Financial Statements are duly reviewed.
			To ensure that Financial Statement sent by unit is duly reviewed, the calculation and basis of cost bifurcation is checked for accuracy, accurate deduction is computed and duly reviewed for arithmetical accuracy, calculated amount is duly deducted from Gross total income and review by the authorised personnel as per the DOA matrix.
2.	<i>Transfer Pricing</i>	All international transactions with associated enterprise should be identified and considered at arms length price for the purpose of taxable income.	To ensure that relevant documents are called from the associated enterprises which have the effect of Transfer Pricing and proper documents are maintained.
			To ensure that associated enterprises are recognised, transactions are done on arm's length basis, proper method is taken to arrive at arm's length price, accurate computation is done and review by the authorised personnel as per the DOA matrix.

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3.	<i>Taxable Income</i>	The taxable income should be correctly computed in accordance with the provisions of Income Tax Act.	To ensure that all tax laws are complied with at the time of preparation, effect of exemptions and deductions are duly given, and it is reviewed for arithmetical accuracy, checking calculations. It is discussed with the relevant authority as per the DOA matrix for any critical issues and after discussion, it is duly signed by the authorised personnel as per the DOA matrix.
4.	<i>Corporate Tax Return</i>	The corporate tax return should be duly prepared and submitted on a timely basis.	To ensure that it is prepared in accordance with Income Tax Act, 1961, it is reviewed for verification of amounts and tax return is filed only after final discussion with the authorised personnel as per the DOA matrix.
5.	<i>Wealth tax</i>	Wealth tax applicable to the Company should be correctly calculated and deposited on a timely basis.	To ensure that relevant data for computation of wealth is collected, wealth statement is prepared by considering applicable tax laws, calculation is checked for arithmetical accuracy, statement is reviewed by the authorised personnel as per the DOA matrix and discussed for any critical issues and

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			approval is taken from the relevant authority as per the DOA matrix.
6.	<i>TDS</i>	TDS should be deducted and deposited as per the provisions of Income Tax Act, 1961.	To ensure that monthly TDS Compliance Report is collected from different units and properly documented, it is reviewed that TDS is duly deducted and timely deposited and statement is duly reconciled with payment challans.
7.	<i>Assessment proceedings</i>	All notices raised by the Income Tax department on the Company should be complied within timely basis to ensure that there is minimum difference between the assessed income and returned income to keep the effective tax rate low.	To ensure that all notices are duly kept in relevant file, proper presentation is done for the assessment proceedings before the Assessing Officer on due date and relevant papers filed are properly documented.
8.	<i>Appellate proceedings</i>	All disallowances as per assessment orders should be identified and all disallowances as per the assessment/ appellate orders are reduced to keep the effective tax rate low.	To ensure that disallowances are duly considered whether it is correctly disallowed or not, reconciliation Statement is prepared for Returned and Assessed Income and it is duly reviewed by the authorised personnel as per the DOA matrix.
9.	<i>Adaption of tax laws</i>	Correct and applicable tax laws and rules should be followed	To ensure that changes and amendments in Tax Laws are duly applied,

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		and amendments should be adapted as applicable.	proper summary is prepared for recent case laws and major amendments which have the impact on company are discussed by the authorised personnel as per the DOA matrix.
10.	<i>Advance Tax</i>	Advance tax should be correctly estimated and deposited on a timely basis.	To ensure that it is accurately computed and arithmetically checked, computed as per applicable tax laws, it is approved and signed by the authorised personnel as per the DOA matrix and is timely deposited.
11.	<i>Provision for tax</i>	Provision for tax should be correctly and completely provided for in the books of accounts	<p>To ensure that effective tax rate is duly calculated, effective tax rate is reviewed and approved by the authorised personnel as per the DOA matrix and annual provision for tax is correctly provided in books on the basis of Effective Tax Rate.</p> <p>To ensure that draft statement of computation of tax is duly prepared as per tax laws and it is reviewed by the authorised personnel as per the DOA matrix.</p> <p>To ensure that accounting entry is duly passed in books in correct code as per the</p>

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			workings for annual effective tax rate.
12.	<i>Deferred tax</i>	Deferred tax liability / asset should be correctly calculated and recorded in the books of accounts.	<p>To ensure that differences are identified and properly classified into permanent and temporary differences, deferred tax assets and liabilities are accurately calculated and arithmetically checked and it is reviewed by the authorised personnel as per the DOA matrix.</p> <p>To ensure that deferred tax assets and liabilities are separately and properly disclosed in Financial Statements and authorised JV's are passed in correct code.</p>
13.	<i>Depreciation</i>	The tax depreciation should be correctly computed and reconciled with the book depreciation.	<p>To ensure that all capital assets are properly classified as per Income Tax Act and taken into block of assets, R&D assets are not taken as additions for income tax purpose, proper reconciliation is made for capital additions/deletions as per accounting and income tax books and reconciliation is reviewed by the authorised personnel.</p> <p>To ensure that opening balances are properly</p>

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			taken from last year closing balance as per tax audit report, depreciation and additional depreciation is accurately computed as per Sec 32 of Income Tax Act, 1961, Written Down Value is properly calculated by using correct formulas and it is reviewed by the authorised personnel.
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Production

7.9 The following are important internal audit aspects rated to productions:

S. No.	Activity	Controls Objective	Key Control
1.	<i>Booking of consumption</i>	Consumption of material should be correctly and completely booked.	<p>To ensure that consumption entries for all closed batches are completely posted in financial books and in case of any difference in consumption, the same has been reconciled and rectified through journal vouchers after necessary approval.</p> <p>To ensure that for all closed batches the consumption of raw material has been booked in ERP, all batches made during the month have been completely closed at each month end (i.e., no</p>

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			<p>batch of the particular month is being kept open, and in case of any wrong batches is prepared, the same is deleted after the necessary approval from the authorised personnel as per the DOA matrix.</p> <p>To ensure that purchase price variance is completely reconciled and the adjustment entries are made with proper approval, raw material consumption is adjusted for freight provisions and debit/credit note issued to suppliers.</p>
2.	<i>Issue of raw material</i>	Issue of raw materials should be correctly and timely recorded in the books of account.	<p>To ensure that all the tank materials are issued based on the authorised request from the plant, dip reading is properly taken and noted before as well as after the issue of material and the Replenishment (RPL) order is prepared on the basis of the required/measured quantity.</p> <p>To ensure that after the issue of tank material, entries in ERP has been accounted completely and accurately</p>
3.	<i>Issue of Raw</i>	Issues of raw	To ensure that all

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	<i>Material, Packing Material and Intermediates</i>	material/ packing material/ intermediates should be correctly and timely recorded in the books of accounts.	expired/ rejected material are labelled with expiry tags and separately stored and no issue are made from the expired/ rejected material.
			To ensure that all the materials are first issued against the pending quantities of the open order before creating the new order and in case of any old pending order against which the issue are not to be made, those orders are completely cancelled/ closed.
			To ensure that all materials issued through RPL order are on the basis of authorised material issue vouchers, the quantities issued are completely and accurately booked in ERP and all issues through service order is supported by the proper service order entry in the ERP by the concerned store person.
			To ensure that all the materials are issued on FIFO basis as per receipt date of Material Receipt Note (MRN).
			To ensure that month

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			end reconciliation of inter-company transfers of different ERP Companies is made and the consumption value is updated in transferee company completely and accurately.
4.	<i>Tolling Operations: Captive Material Issues</i>	All receipt of material at toller should be accurately and completely booked.	To ensure that all the captive issue from other division is through the Inter Divisional sales invoices/ replenishment orders, all the issues from the division is through the proper RPL order and all the quantities issued are recorded in ERP completely and accurately.
5.	<i>Tolling Operations: CENVAT</i>	CENVAT credit should be accounted correctly and accurately.	To ensure that CENVAT credit reconciliation received has been checked and reviewed, any variation is promptly intimated to toller and corrections are made accordingly and necessary entries are passed in the books with proper approval.
6.	<i>Tolling Operations: Consumption Booking</i>	Consumption of material should be correctly and completely booked.	To ensure that for all goods received in plant, consumption of material has been booked through approved Journal vouchers and the consumption is

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			booked completely and accurately for the finished goods quantities received.
7.	<i>Tolling Operations: Material Issue to toller from suppliers</i>	All receipt of material at toller should be accurately and completely booked.	To ensure that all the purchased material issued to tollers are based on the approved purchase orders, for all the goods received at toller directly from vendor adequate acknowledgement have been received from the toller, for all goods supplied to the toller directly by the vendor, MRN has been prepared completely.

9.4 Inventory Management

S. No.	Activity	Controls Objective	Key Control
1.	<i>Physical verification</i>	Balance of inventories as per books of accounts should be in agreement with the physical balance of inventories.	<p>To ensure that the physical stock verification has been carried out on a periodic basis and any discrepancies in physical stock and book stock is properly reviewed.</p> <p>To ensure that the stock adjustment note is prepared for the difference between the book stock and physical count, the reason for differences are highlighted in the note, the note prepared by the</p>

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			plant have been reviewed by the authorised personnel as per the DOA matrix and necessary approval has been obtained.
2.	<i>BoM Updation</i>	BoM updation should be accurately and timely captured.	<p>To ensure that each new recipe is approved by R&D and the approved recipe is completely and accurately entered in ERP.</p> <p>To ensure that all BoM updation cut off dates have been entered in ERP and all BoM updation cut off dates are informed to the respective division and plant heads.</p>
3.	<i>Cost price updation</i>	All relevant components of costs should be taken into account for valuation of inventory at various stages.	To ensure that cost price updation session run is made on daily basis, the cost price is completely and accurately updated for all the products for which MRN is matched during the day/ previous day and transport cost updation session run is made on daily basis to update the freight surcharge.
4.	<i>Stock reconciliation</i>	Closing stock of finished goods should be reconciled with the closing stock of finished goods as per the excise records.	To ensure that stock of finished goods at plant has been cross checked with excise records and the discrepancies, if any, are reconciled and

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			communicated to concerned authorised personnel as per the DOA matrix.
5.	<i>Item master</i>	Complete, accurate and updated data should exist in the item master and all changes to the item master are duly authorised and accurately captured.	To ensure that each new item code of finished goods and work-in-progress is created on the basis of request received from concerned plant/ division and each item code is created after the adequate approval received from the authorised personnel as per the DOA matrix.
6.	<i>Scrap</i>	All sale of scrap should be duly approved and correctly accounted for in books of accounts on a timely basis.	<p>To ensure that all scrap sales are based on the invitation of the quotation and sale is awarded to the approved best rates.</p> <p>To ensure that quantity of scrap is matched with invoice generated for scrap before dispatch.</p>
7.	<i>Transfer of Finished Goods: Dispatch against SOC</i>	All transfers of finished goods should be authorised and correctly updated in inventory records.	<p>To ensure that all dispatches are based on the Sales Order Confirmation (SOC), All SOC's are properly approved by the authorised personnel as per the DOA matrix and no dispatches have been made outside plant without approved SOC.</p> <p>To ensure that all the goods in transit in same ERP division is shown in</p>

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			Transit warehouse report accurately and old pending transfers, if any, are due for any reason, is promptly highlighted by the recipient and actions taken accordingly by the transferor.
8.	<i>Obsolete inventories</i>	All obsolete inventories should be identified and accounted completely and correctly.	To ensure that all obsolete inventories are identified, stock adjustment note is prepared for obsolete inventories identified during physical verification and sent to the authorised personnel for approval.

Note: In case of physical stock verification of materials in tankers, it must be ensured that the dipstick should not be faulty.

Few other internal audit controls that should be kept in mind with respect to various areas:

- **Sales**
 - It should be ensured that there are no cases of sales push (i.e., booking of sales without a valid sales order) to meet quarterly/ yearly sales targets. Here, special focus should be given to the review of sales returns including analysing the reasons for sales returns.
 - Auditor should also review the discounting policy of the company for sales to its customers. It should be ensured that there is a transparent policy for discounts and if there is any favoured term schemes, then the same should be justified and duly approved.
- **Contract manufacturing**
 - There should be adequate control with respect to contract manufacturing. The contract manufacturing agreement

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should be reviewed and analysed. It should be ensured that there is no clause which is prejudicial to the interest of the company. Also, the relevant clauses should be adhered with.

- Input-output ratio norms should be monitored.

- **Job design and rotation of duties**

- It should be ensured that the job design in the organisation is such that no single employee should be given authority for performing multiple interdependent jobs where it may lead to abuse of authority, e.g., the employee performing invoice processing should not be the one who is authorised to make payment as well.
- It will be a good practice to ensure that there is rotation of duties at regular intervals.

Chapter 8

Research and Development

8.1 Research and development is the key to the future of pharmaceutical industry. The pharmaceutical advances for considerable improvement in life expectancy and health all over the world are the result of a steadily increasing investment in research. There is considerable scope for collaborative R & D in India. India can offer several strengths to the international R & D community. These strengths relate to availability of excellent scientific talents who can develop combinatorial chemistry, new synthetic molecules and plant derived candidate drugs.

8.2 The government has identified the pharmaceutical industry as one of the most important knowledge-based industries in which India has a comparative advantage. In order to turn India into a global R&D hub, the government has offered several R&D promotion measures to attract greater investment into the sector in order to update the existing technologies and to bring into the country technologies that were not yet available. In 1999, the Government set up the Pharmaceutical Research and Development Committee (PRDC) to study and identify the measures needed to strengthen the R&D base of the Indian pharmaceutical industry. The Committee recognized that priority must be given to initiating new drug development for diseases of relevance to the Indian population, while at the same time seizing opportunities to become a global player by introducing globally competitive products based on new molecules, new delivery systems, and so forth.

8.3 Until the mid-1990s, R&D in the Indian pharmaceutical industry has focused on R&D for development of new processes for manufacturing drugs. Since that time, the new R&D focus is on the following aspects:

- (a) Nobel Drug Delivery Systems (NDDS)
- (b) R&D for generic products for the regulated market and non-infringing processes
- (c) New Drug Development Research (NDDR).

8.4 Indian companies are increasingly focusing on R&D for Nobel Drug Delivery System (NDDS). NDDS is the most vigorous R&D area where most of the top Indian companies are increasing investment. The leading

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pharmaceutical companies in India have increased their R&D expenditures for development of generic products for the regulated market to satisfy quality and regulatory requirements for marketing off-patented drugs. Indian companies also have increased the development of non-infringing processes for filing Drug Master Fillings (DMFs) and Abbreviated New Drug Applications (ANDAs).

8.5 During the first quarter of 2011, Indian pharmaceutical companies filed 90 and total 271 Drug Master Fillings (DMFs) with US FDA during 2009 and 311 DMFs in 2010. In 2010, Indian pharmaceutical companies maintained their number one position in the US generics market, by bagging 33.17% (i.e., 139 of 419) original Abbreviated New Drug Application (ANDA) approvals from the US Food and Drug Administration (USFDA).

8.6 Since the introduction of pharmaceutical product patent encouraged R&D for new drug development, Indian companies in the private sector began investing in R&D for New Drug Development Research (NDDR) in the mid-1990s. The leading Indian pharmaceutical companies are all now engaged in R&D for new chemical entities (NCEs) and have set up their own research centre for NDDR. Indian companies have reported some successes in NDDR. A number of new chemical entities (NCEs) have been developed which are at different stages of clinical trials.

8.7 The process of new drug development is classified into two stages:

- (a) **The pre-clinical stage:** At the pre-clinical stage, the objective of research is to develop a promising molecule using animal models.
- (b) **The clinical stage:** At the clinical stage, the molecule is tested in humans and developed for manufacturing and marketing. About 40% of expenditure of new drug development goes to funding clinical development.

8.8 Recently, Contract Research and Manufacturing Services (CRAMS) business has been growing rapidly in India. CRAMS deals with manufacturing and research activities. Many Indian companies entered into CRAMS, and the number of the specialized CRAMS companies has increased. Now, India is one of the most preferred outsourcing destinations for foreign pharmaceutical companies and is becoming a global manufacturing and R&D hub.

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Let us see few of the internal controls with respect to R&D.

S. No.	Activity	Controls Objective	Key Control
1.	<i>Research & Development Expenditure</i>	Research and development expenditure should be correctly and completely identified and disclosed.	To ensure that recording of transactions is as per the Company's accounting policy and as per AS 26 on 'Intangible Assets'.
			To ensure that R&D details have been correctly and completely disclosed in the financial statements and the R&D expenditure has been grouped under appropriate heads and disclosed in the financial statements.
			To ensure that in respect of each R&D facility, approvals from "Department of Scientific and Industrial Research" have been obtained for eligible tax deductions and the approval is valid for the current financial year.

Note: It should be ensured that there is a 'confidentiality clause' in relation to Research and Development activities and the same is being adhered to so as to prevent leakage of confidential data.

Chapter 9

Clinical Trials

9.1 Under the Drugs and Cosmetics Rules, no clinical trials for a new drug, whether for clinical investigation or any clinical experiments shall be conducted except under, and in accordance with the permission granted by the Drugs Controller General of India (DCGI). Clinical trials of pharmaceuticals products are conducted on human subjects to discover or verify the clinical, pharmacological (including pharmacodynamics/ pharmacokinetics), and/or adverse effects with the object of determining their safety and/or efficacy. The protocols of such trials are examined by the office of DCGI before these permissions are granted.

9.2 Every approval/ permission for conducting clinical trials also, inter alia, includes a condition that in case of study related injury or death, applicant will provide complete medical care as well as compensation for the injury or death and statement to this effect should be incorporated in the informed consent form. Further in case of such injury or death the details of compensation provided should be intimated to the office of DCGI.

9.3 Guidelines for conducting Clinical Trial inspection of site and sponsor/ Clinical Research Organisations (CROs) are also available.

9.4 The **Clinical Trials Registry - India (CTRI)**, hosted at the ICMR's National Institute of Medical Statistics (NIMS), is a free and online public record system for registration of clinical trials being conducted in India that was launched on 20th July 2007 (www.ctri.nic.in). Initiated as a voluntary measure, since 15th June 2009, trial registration in the CTRI has been made mandatory by the Drugs Controller General of India (DCGI). Today, any researcher who plans to conduct a trial involving human participants, of any intervention such as drugs, surgical procedures, preventive measures, lifestyle modifications, devices, educational or behavioral treatment, rehabilitation strategies as well as trials being conducted in the purview of the Department of AYUSH (<http://indianmedicine.nic.in/>) is expected to register the trial in the CTRI before enrollment of the first participant. Trial registration involves public declaration and identification of trial investigators, sponsors, interventions, patient population, etc., before the enrollment of the first patient. Submission of Ethics approval and DCGI approval (if applicable) is essential for trial registration in the CTRI. Multi-country trials, where India

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is a participating country, which have been registered in an international registry, are also expected to be registered in the CTRI. In the CTRI, details of Indian investigators, trial sites, Indian target sample size and date of enrollment are captured. After a trial is registered, trialists are expected to regularly update the trial status or other aspects as the case may be. After a trial is registered, all updates and changes will be recorded and available for public display. Being a Primary Register of the International Clinical Trials Registry Platform (ICTRP)(<http://www.who.int/ictcp/search/en/>), registered trials are freely searchable both from the WHO's search portal, the ICTRP as well as from the CTRI (www.ctri.nic.in).

9.5 Good clinical practice: The history of Good Clinical Practice (GCP) statute traces back to one of the oldest enduring traditions in the history of medicine: The Hippocratic Oath. As the guiding ethical code it is primarily known for its edict to do no harm to the patient. However, the complexities of modern medicine research necessitate a more elaborate set of guidelines that address a Physician's ethical and scientific responsibilities such as obtaining informed consent or disclosing risk while involved in biomedical research. **Good Clinical Practice is a set of guidelines for biomedical studies which encompasses the design, conduct, termination, audit, analysis, reporting and documentation of the studies involving human subjects.** The fundamental tenet of GCP is that in research on man, the interest of science and society should never take precedence over considerations related to the well-being of the study subject. It aims to ensure that the studies are scientifically and ethically sound and that the clinical properties of the pharmaceutical substances under investigation are properly documented. The guidelines seek to establish two cardinal principles:

- (a) protection of the rights of human subjects and
- (b) authenticity of biomedical data generated

Note: These guidelines have been evolved with consideration of WHO, ICH, USFDA and European GCP guidelines as well as the Ethical Guidelines for Biomedical research on Human Subjects issued by the Indian Council of Medical Research. They should be followed for carrying out all biomedical research in India at all stages of drug development, whether prior or subsequent to product registration in India.

Chapter 10

Enterprise Risk Management (ERM) in Pharmaceuticals Industry

Definition of ERM

10.1 Enterprise Risk Management is a structured, consistent and continuous process of measuring or assessing risk and developing strategies to manage risk within the risk appetite. It involves identification, assessment, mitigation, planning and implementation of risk and developing an appropriate risk response policy. Management is responsible for establishing and operating the risk management framework. *(Standard on Internal Audit (SIA) 13 on Enterprise Risk Management issued by ICAI)*

10.2 Enterprise Risk Management is a process, effected by an entity's Board of Directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risks to be within its risk appetite, to provide a reasonable assurance regarding the achievement of entity objectives. *(COSO ERM- Integrated Framework, 2004)*

Overview of ERM

10.3 Enterprise risk management (ERM) includes the methods and processes used by organizations to minimize surprises and seize opportunities related to the achievement of their objectives.

10.4 ERM is an approach to aligning strategy, process, and knowledge in order to curtail surprises and losses as well as to capitalize on business opportunities. Many individuals associate risk with negative outcomes. However, there is a potential value component to risk assessment and management. Risk management is about balancing risk and reward. **A well-designed risk management program encourages and allows an organization to take intelligent risks.** It involves assessing quantitative factors and information as well as considering management experience and judgment. An effective risk management program entails balancing people and processes. Ultimately, an entity's risk profile is affected by the actions and decisions of its board of directors, management, and employees.

10.5 One cannot talk about risk management without discussing risk assessment. The vast majority of organizations conduct some type of

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informal risk assessment process. As a result, these organizations have some form of risk management plan. This plan, in most cases, is not documented.

10.6 Initial introduction of formal risk assessment and risk management within an organization is critical to the ultimate success of the initiative. An entity must consider its culture and develop an approach that is most likely to result in success. The organization should take care not to overcomplicate or overwhelm individuals with technical terminology. Initial discussions should focus on the importance and the benefits of risk management. Employees should be encouraged to think and talk about the business and what could go wrong that might result in failure to achieve entity objectives and, as a result, have a negative effect on performance and/or perception.

10.7 Good risk management is essentially choice management. It is a continuous work in progress. An entity must identify risks and subsequently determine how it will address each one. The organization must decide the degree of risk it is willing to assume and address other identified risks, likely through mitigation. It is important to consider both tangible consequences, such as loss of revenue or drop in stock price, as well as intangible possibilities, such as public perception. Perception often is a major consideration in assessing positive or negative consequences.

10.8 Organizations often evaluate risks in somewhat of a soloed process, i.e., considering the risk consequence to a single area of the business. Risks are inherently dynamic and interdependent. Consequences of unforeseen or unpredictable events typically affect multiple areas of a business. Therefore, aggregate entity consequences should be considered when conducting a risk assessment and designing a risk management program. Risks should not be separated into components and managed independently. Such an approach is rarely effective or successful. A holistic view of risk should be taken, including the contemplation of interdependencies.

10.9 Every organization is faced with uncertainty and risk. The challenge for management is to determine how much uncertainty to accept as it strives to improve stakeholder value. Risk identification is a process designed to identify first both the strategic objectives and goals and then the potential internal and external events that can adversely affect the enterprise's ability to achieve those objectives and goals.

10.10 Each entity should strive to build an integrated risk organization. This would include three components:

- (a) centralized risk management reporting to the chief executive officer and the board of directors

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- (b) an integrated risk management strategy that takes a holistic view of all types of risk within the organization and
- (c) integration of risk management into business processes

It is not easy to accomplish these stated objectives. The method and processes for execution may vary significantly based on the size, structure, and culture of the organization. Each company must determine the most practical method of implementation. However, this integrated approach will allow risk management to become an offensive weapon for management rather than the more common defensive reaction to incident occurrence.

10.11 Organizations should take a proactive approach to optimizing their risk profiles. Minimal investment in risk assessment and subsequent risk management program development and implementation can improve efficiency and reduce losses.

Organisation view



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10.12 Each entity should seek to build its organizational structure to support a **top-down approach** that begins with consideration of overall corporate governance, progresses to risk management and assessment and ultimately considers the achievement of all compliance requirements.

Executive management along with the board of directors should develop and document a strategy that outlines what the organization expects to accomplish: its goals as well as the objectives it must achieve in order to realize the desired results. **A clearly documented strategy and associated objectives are critical to the development of an effective ERM program.**

10.13 An outline in these areas allows the organization to focus on opportunities presented in the strategic plan as well as to minimize the potential impact of threats. From a practical perspective, this may be a single-page document that outlines organization goals in terms of areas such as the customer, financial expectations, and products/services. The strategic plan, at the highest level, will aid in the facilitation of all future discussions regarding risk and risk mitigation. The organization should consider the strategy from a financial and an operational perspective. **The absence of a documented strategy and objectives, including related policies and job descriptions that outline overall expectations and define roles and responsibilities, significantly impairs an entity's ability to design and implement an effective ERM program.**

10.14 Once the entity has documented and can articulate its strategy and related objectives, it can then develop and implement an ERM program. Doing this includes performance of a risk assessment, which includes considering what could go wrong that might prohibit the entity from achieving its objectives. Part of the risk assessment process should include consideration of entity compliance with all applicable laws and regulations. Ultimately the entity will seek to mitigate identified risks through numerous forms of control activities.

ERM Today

10.15 Less than a decade ago, ERM was not a major focus for most organizations. Today, it is quickly ascending to the top of the agendas of senior executives and shareholders alike as corporate scandals and globalization challenge the status quo and regulators publish new or updated requirements.

10.16 ERM is a structured approach to aligning strategy, processes, people, technology, and knowledge to identify and manage uncertainties and

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risk. Providing a comprehensive, integrated framework that enables organizations to **proactively manage** business risk, ERM aids in the achievement of balance between business needs and risk thresholds to increase competitive advantage and shareholder value.

ERM definitions tend to vary from source to source, but all contain common themes: a standard risk management process, an integrated view of risks and a focus on relating risks to business objectives.

Despite the plethora of internal and/or external events that could expose an organization to serious risks, companies focus much more on measuring and monitoring financial performance than on proactively measuring, analyzing, and responding to and mitigating risks: threats that could negatively impact financial performance.

10.17 Risk management is rapidly becoming a major area of focus, and risk areas within each organization should be analyzed. A number of major drivers prompt the development of a formal enterprise risk framework, including:

- (a) Regulatory guidance
- (b) Evolving roles of the audit committee and board of directors
- (c) Risk assessment standards

Benefits of ERM

10.18 The following are major benefits of ERM:

- Minimise surprises through better anticipation and evaluations
- Align strategy with the risk appetite (acceptable level of risk) that allows management to draw the line in a more informed and pre-established manner
- Better decision making through comprehensive evaluation of various options & their consequences
- Improve management accountability by comparing planned outcomes through ERM with actual results
- Problem anticipation, better preparedness & response to uncertainty
- Greater alignment and improvement to business objective achievement

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- Better business understanding of various inter-related events and response actions
- Increased profitability and return on assets through cost/loss reduction and revenue/profit enhancement
- Better portfolio management and allocation of scarce resources
- Risk awareness by using a formal ERM system, one can improve the 'risk awareness' of an organisation
- Promote risk taking in a more 'risk intelligent' manner

Limitations of ERM

10.19 The following are major limitations of ERM:

- *Inherent uncertainty*: With the dynamic business environment, it is hard to anticipate events with any degree of certainty
- *Data integrity*: The information may be lacking due to unique nature of the risk with limited past experience in that particular area.
- *Subjectivity*: Risk is perceived by individuals and is, therefore, exposed to the subjectivity of the perceiver due to their personal understanding and expertise.
- *Time limitations*: Most risks require to be researched reasonably quickly and extensively to be able to evaluate them in an accurate manner.
- *Cost and resource limitations*: The cost of implementing an ERM system may outshine the benefits that would reap out it.

ERM in Pharmaceuticals Industry (*based on risks associated under select businesses*)

10.20 The following are external risks related to ERM in Pharmaceuticals Industry:

(a) Volatility in input prices

Risk	Risk of constant and rising input prices coupled with rising cost of doing business in inflationary market condition may significantly impair company's ability to generate adequate positive margins to fund long-term business growth and maintain leadership position.
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	Increasing prices of inputs cannot be passed due to competitive prices prevailing in market.
Contributing factors	<ul style="list-style-type: none"> • The current in house production of input not sufficient to meet the requirement • Volatility in the prices of inputs • Major competitors are based in countries where the inputs are available at very low prices
Mitigation plan	Supply chain should assure the supply at budgeted price and R&D should look at innovative ways to significantly reduce consumptions of key raw material or develop substitute

(b) Input cost/ availability

Risk	<p>Risk of constant and rising input prices coupled with rising cost of doing business in inflationary market condition may significantly impair the organisation's ability to generate adequate positive margins to fund long term business growth and maintain leadership position. Increasing prices of acetic acid and alcohol cannot be passed on to the customers due to competitive prices prevailing in market. Risk of inability to procure the planned quantities of feedstock at planned prices may lead to significant impact on margins.</p> <p>Alcohol: Supplies to chemical industries is limited due to alternative uses, government mandate to use alcohol for petroleum blending and use of a significant percentage of available alcohol for portable use.</p> <p>Acetic Acid: Supplies of acetic acid are completely import dependent and the prices are very volatile</p> <p>With the requirement of feedstock expected to increase significantly with a significant growth expected in Acetyls revenue, any lack of availability of its required quantity or failure of the supplier to supply the desired quantities coupled with non-availability of in-house capacity could have a significant adverse impact on the realisation of business objectives.</p> <p>The risk would increase further if different feedstock technologies are being used by the organisation and its</p>
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	competitors (wherein the organisation uses alcohol and acetic acid). Shortage of alcohol or acetic acid would lead to increase in prices for the organisation, but input prices for its competitor would not be affected. Thus, the organisation would be unable to pass on the price rise fully to its customers.
Contributing factors	<ul style="list-style-type: none"> • Cyclical nature of sugar production impacting the availability and prices of molasses and, thus, impacting the price of alcohol and acetic acid, the raw materials for the acetlys business • Alternative uses of Alcohol (portable and blending) limiting the supplies resulting in price increase • Increasing instances of forward integration in sugar industries/ entry of sugar companies in manufacture of alcohol/ acetlys • Alcohol is one of the most difficult commodities to import • The contracted suppliers for acetic acid are also competitors in the final products segment • No production facility available for acetic acid
Mitigation plan	Organisation should develop new acetic acid suppliers from other countries, e.g., China and Taiwan. It should buy molasses and store in lean season. Micro level planning of inventory should be done. Also, long-term contracts should be entered with alcohol suppliers for ensuring required quantities.

(c) Competition

Risk	Risk that action of competitor's or new entrants to the market may impair company's competitive advantage and lead to erosion of margins. Highly competitive prices offered by competitors leading to pressure on margins.
Contributing factors	<ul style="list-style-type: none"> • Liberal grant of credit by competitors • Export incentives/ subsidy by competitor's government • Labour cost advantage • Capacity advantage • Availability of raw material at low rates in

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	<p>competitor's country</p> <ul style="list-style-type: none"> • Willingness of competitors to operate at low margins
Mitigation plan	<p>Cost improvement initiatives and manufacturing efficiency improvement plans should be introduced at plant. For major raw materials, significant improvement in norm should be planned. Initiatives should be taken to increase manufacturing efficiencies. From customer front, company should get closer to customers, offer unmatched services and aim for long term contract with them.</p>

(d) Customer

Risk	<p>Risks that change in customer's organisation, behaviour, needs and/ or expectations lead to decrease in market attractiveness and/ or adverse competitive position. Over-dependence on few customers may lead to significant loss to business in case of loss of customer.</p>
Contributing factors	<ul style="list-style-type: none"> • Acquisition of competitor by the key customer or vice versa • Natural/ unnatural calamity affecting any key customer • Poor quality performance of products
Mitigation plan	<p>Company may diversify risks by forward integration of businesses. In that case, project, technology, R&D and manufacturing plan should be in place. Company should spread the market place so that dependency over individual customers is decreased.</p>

(e) Technological innovation

Risk	<p>Risk that company's cost advantage is under threat due to emergence of:</p> <ul style="list-style-type: none"> • new cost effective technology to produce end product or • substitute of end product
Contributing factors	<ul style="list-style-type: none"> • Inability to identify new trends/ developments in the market • Target based development in process by the competitors

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	<ul style="list-style-type: none"> • Innovation by competitor's from completely different field • No current focus on creation of a new technology/substitute for manufacturing end product
Mitigation plan	There should be a continuous review of patents and company should strive to be at the forefront of end product's technology. R&D initiatives should be taken up.

(f) Margin protection

Risk	Foreign currency fluctuations leading to risk of failure to pass on increased input prices to customers puts margin pressure on the organisation to create reserves for future expansion and execute strategies.
Contributing factors	<ul style="list-style-type: none"> • Instability in the world market will lead to volatility in the foreign exchange • High foreign exchange exposure due to high dependence on international market for procurement
Mitigation plan	Rupee depreciation will also result in higher revenues through exports. Hedging should be done to mitigate the forex risk.

(g) Disaster/ business interruption

Risk	Risk that any disaster or other upheavals threatens the organisation's ability to sustain operations. Occurrence of natural/unnatural event at any manufacturing plant without any Disaster Recovery Plan (DRP)/ Business Continuity Plan (BCP) may impact continuity of operation
Contributing factors	<ul style="list-style-type: none"> • Complete dependency on a specific manufacturing plants subject to disaster such as earthquake, cyclone, typhoon, bad monsoon, etc., and business interruptions such as an act of terrorism. • Disasters beyond company's control • Absence of a conscious efforts by top management to draft a BCP/ DRP to handle crisis situations created by natural/ unnatural disasters • Uninsured company's assets

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Mitigation plan	Company should have Defined Business Continuity Plan (BCP)/ Disaster Recovery Plan (DRP) including but not limited to clearly defined roles and responsibilities, etc. Also, company should insure the assets held.
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(h) Suppliers relations and resource availability

Risk	Risks that high dependency on important suppliers threatens the organisation's ability to produce and deliver quality products/services to competitive prices on a timely basis. Dependency on few suppliers without developing alternate vendors may lead to stock-outs and delayed deliveries.
Contributing factors	<ul style="list-style-type: none"> • Incorrect Sales forecast • Supplier performance • Suppliers also act as competitors
Mitigation plan	Atleast two-three vendors should be developed for key molecules. A single supplier should be de-risked by having local contract manufacturing options as alternate sources and continue buying from most competitive source. For suppliers of intermediates who also act as competitors for the API, company should enter into medium term contracts to ensure timely supplies.

(i) Market dynamics and changing trends

Risk	Changes in guard from one to another political party may lead to changes in the governance of the industries, government policies, etc., impacting business operations. Promotional subsidy schemes introduced by different political parties may impact the margins.
Contributing factors	<ul style="list-style-type: none"> • Lack of stability of the Indian political environment and difference in ideologies of political parties • Lack of effective lobby/ ability to pre-empt the changes in the policy
Mitigation plan	Management should develop portfolio of pre-mixes, specialty products and trading of niche products, thereby reducing the dependency on a specific promotional subsidy scheme introduced by the political party in government.

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(j) Increase in logistic cost

Risk	Increase in logistic cost may adversely impact margin of the products. Failure of the company to minimize the logistics costs, both internationally and domestically, would add to the margin pressures. Ocean freight has been increasing significantly.
Contributing factors	<ul style="list-style-type: none"> • Increased share of logistics cost in overall cost necessitated by the plan to increase export sales • Increase in fuel prices • Distance from ports results in additional cost pressures
Mitigation plan	Supply chain should ensure that the logistics are managed in most cost effective manner.

(k) Environment

Risk	<p>The risk that activities harmful to the environment expose the organisation to liabilities for bodily injury, property damage, cost of removal and punitive damages. Possibility of damage to health and environment, prolonged exposure to chemicals, inadequate mechanism to identify pollutants, hazardous emissions, etc., leading to regulatory action or litigation against the company which could adversely impact the reputation of the company and a possibility of plant closure / imposition of heavy penalties.</p> <p>In the course of manufacturing operations, the company may generate wastes, effluents and emissions which are hazardous in nature. Prolonged / repeated exposure to chemicals at the shop floor, production facility, etc., could adversely impact the health of susceptible workers and neighbours over a period of time. Such health hazards could lead to claims against the company, fall in employee morale and also a loss of reputation for the company. Further, inadequate mechanisms to identify pollutants or limit their discharge to the environment could lead to environmental damage. With some of the manufacturing operations of the company being located in the vicinity of residential areas, the threat of community</p>
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	action / PIL's gets prominent and there could be a demand to relocate such plants.
Contributing factors	<ul style="list-style-type: none"> • Stringent environment regulations and principle of absolute liability, i.e., punishability despite having taken complete care • Lack of adequate training on/ deployment of safety guidelines • Inadequate Environment, Health and Safety (EHS) measures • Factory establishment in vicinity of residential area
Mitigation plan	Company should install waste disposal plants. PPE (Personal Protective Equipment) should be made compulsory for use by workers at shop floor level. To mitigate these risks the company may follow the Hazard Identification & Control system through Hazard and Operability(HAZOP) or similar tool to identify the Safety aspects related to manufacturing activities for new projects/ expansion of existing plants and management plan for the same. The company should also maintain an industrial all-risk insurance policy for its primary manufacturing facility, as well as property and casualty insurance at other manufacturing facilities and it should be in accordance with customary industry practices in India and abroad. The company may engage with community around as well as employees of the plant through various programs implemented for local community in the field livelihood, education and health for the upliftment of society.

(I) Regulatory

Risk	Risk that any delay from customer's side in obtaining the approval for the product would adversely affect the business. Delay in regulatory approval due to poor documentation or delayed response to regulatory bodies may result in loss of business, e.g., customer decides not to launch the product due to failure to obtain approval or delay in getting the approval.
Contributing factors	<ul style="list-style-type: none"> • Delay is inherent to the nature of business

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	<ul style="list-style-type: none"> • Delay in submitting the data or responding to the query by the customer
Mitigation plan	Regulatory approvals should be adequately prepared to answer deficiencies received from regulatory bodies. Drug Master File (DMF) amendments and frequent change in process should be minimised. However, very little can be done if customer approval gets delayed for reasons beyond the organisation's control.

Internal risks

The Internal Risks related to Pharmaceutical Industry are as follows:

(a) Production capacity

Risk	Risks that insufficient capacity threatens organisation's ability to meet customer demands and to be competitive and excess capacity threatens the organisation's ability to generate competitive profit margins. Delay in execution of capital projects or inability to create sufficient capacity to cater future demands of customers would lead to loss of potential business or permanent loss of customer.
Contributing factors	<ul style="list-style-type: none"> • Failure to identify opportunity in time • High lead time between market assessment, capex decision and actual upgrade of production capacity • Non availability of fund • Time-consuming capex approval process in general • Lack of adequate project monitoring • Unrealistic expectations on lead time • Absence of a robust mechanism to monitor the project
Mitigation plan	There should be a systematic planning for undertaking any capacity expansion project and continuous monitoring of on-going capital projects for their timely completion.

(b) Resource availability

Risk	Risks that limited availability of resources (labour, capacities, energy, raw materials, component parts, etc.)
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	threatens the organisation's ability to produce quality products at competitive prices on a timely basis. Unutilised capacity for short time due to reasons like power breakdown, unavailable labour, transport strike, etc. may lead to not meeting production targets and not fulfilling customer orders on time.
Contributing factors	<ul style="list-style-type: none"> • Frequent stalling of production • Region specific factors such as strikes, kawaria movements, etc., which impact the transportation system of the country and, thus, impacting deliveries • Transporters Strike • Defaults in design of plants • Inefficient plant maintenance • Aggressive plant up-time considerations in business plans
Mitigation plan	Any problems in supply chain should be resolved so as to ensure availability of the raw material on timely basis to the plants. Business plans should be improved. There should be regular maintenance of plants and machineries.

(c) Production efficiency

Risk	High down time due to technology under optimisation leading greater than desired plant outage, wastage and yield losses may impact the competitiveness of the business.
Contributing factors	<ul style="list-style-type: none"> • Aggressive plant up-time considerations in business plans • Chemical process makes plants more vulnerable
Mitigation plan	Plant operating capacity should continuously being improved at regular intervals. All required modifications should be done so as to achieve the required capacity.

(d) Increase in overhead costs

Risk	Increase in overhead cost leading to adverse impact on margins. Overhead costs comprise a major cost to the business in comparison to the unorganized companies. Due to the rising costs (both fixed and variable, e.g., Utilities and Power), maintaining cost competitiveness is
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Technical Guide on Internal Audit of Pharmaceutical Industry

	a challenge for the Company. Inability to control/reduce the variable cost (e.g., raw materials, power and utilities) and the necessity to invest in human capital especially compared to unorganized players may lead to reduced bottom-line.
Contributing factors	<ul style="list-style-type: none"> Rise in production costs due to inflation and other factors such as necessity to invest in human capital unlike other domestic unorganized players
Mitigation plan	Projects on lean six-sigma may be taken to identify least cost matrix. This may be done in collaboration with the manufacturing team at various plants. Business should also do the benchmark analysis with respect to cost and price with key-competitors.

(e) Product portfolio

Risk	Risk that product portfolio is not optimally aligned to deliver on desired margins due to structural challenges or non availability of information for decision making. Over-dependence on single product (e.g., choline chloride) may adversely impact the realization of long-term business objectives. Risk that any failure on the organisation's part to de-risk the portfolio either by including new products/ innovative products or by increasing the share of other businesses could result in significant losses, in the event of decrease in demand/ poor business for the key product. The product portfolio/ mix of the organisation in this business is such that a single product (e.g., choline chloride) contributes to major part of the business, e.g., over 70% of the business, and another (pre-mixes) to over 30%.
Contributing factors	<ul style="list-style-type: none"> Disruption in supplies of raw materials for the key product Availability of more economical substitutes
Mitigation plan	The company should seek the right balance between high margin-low volume products and low margin-high volume products. Low margin products provide the company with necessary cash flows, however, they block available capacities which could be used to produce high margin products, thus resulting in reduced profitability. Research

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	and development team should continuously work upon development of new products and niche specialty products.
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(f) Business portfolio

Risk	Risk that relevant and reliable information that enables management to set product/ customer priority are missing or that the strategic balance of Business Units is insufficient. Organisation Structure is not aligned to cope with exponential growth of business adversely impacting long-term business objectives. This may result in reduced effectiveness (e.g., reduced service levels, use of reactive approach rather than pro-active approach) and loss of potential business. This may also preclude organisation from optimizing its overall performance.
Contributing factors	<ul style="list-style-type: none"> • Lean/ inflexible organisation structure • Employees at key positions are resistant to change
Mitigation plan	Since it is difficult to change mind set of employees, one possible solution could be to do away with the matrix structure.

(g) Research and development

Risk	Risk that the insufficient focus on research and development or failure of research & development to create the necessary differentiations, or innovate to reduce cost could result in significant loss of revenue. Failure to innovate new and cost effective products may pose a threat to the organisation's competitive position. Nutrients business is primarily research driven and, hence, the success of research and development is proportionate to the success of the business. In order to increase the profitability of the business and to add sustainability to the business, it is imperative to have a strong and effective research and development department (especially to meet the Company's strategy of increasing its share in pre-mixes business).
Contributing factors	<ul style="list-style-type: none"> • Insufficient investment in research and development
Mitigation plan	There should be sufficient investment in research and development activities.

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(h) Inventory obsolescence and loss

Risk	Risks that the inventory obsolescence (e.g., bypass of expiration dates on strategic raw materials) or inventory shrinkage exposes the organisation to financial losses. Considering the nature of substance, materials are required to be stored at specific temperatures. Poor handling/ mishandling of material may lead to damages and inventory loss.
Contributing factors	<ul style="list-style-type: none"> • Unskilled labour employed • Storage facility out-sourced • Nature of products is such that they are required to be stored at specific temperature or conditions
Mitigation plan	First in first out method should be used as priority principal to be followed at plant. Inventory planning analysis should be done to locate obsolete items.

(i) Human resource: Recruitment and Retention

Risk	Risks that an insufficient focus on human resources processes (e.g., recruiting, talent management, labour management, development and training) threatens the possibility for the organisation to recruit and/or hold the qualified personnel required to maintain desired operational standards. Inability to retain and motivate existing talents may lead to operational inefficiency and knowledge drain. Risk that leadership does not live up to group value scorecard and, therefore, leads to de-motivation and unwanted turnover of employees.
Contributing factors	<ul style="list-style-type: none"> • High attrition rate • Non-competitive compensation structure • Non creation of an image of a great employer • Inadequate training and development
Mitigation plan	Company should opt for reward and recognition plan across the functions. Particularly for sales team, there should be a provision of attractive sales incentive. HR efforts may help on to engage the campus talent from right and premier knowledge centres.

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(j) Human resources: Succession planning

Risk	Risks that an insufficient focus on human resources processes (e.g., recruitment, talent management, labour management, development and training) threatens the possibility for organisation to recruit and/or hold the qualified personnel required to maintain desired operational standards. Lack of succession planning may lead to adverse impact on operational efficiency in case of sudden exit of any key personnel.
Contributing factors	<ul style="list-style-type: none"> Significantly high dependence on top management for providing leadership and guidance to the organization
Mitigation plan	Plan should be in place for developing second line talent and recruiting accordingly.

(k) Human resources: Confidentiality of information

Risk	Risk that the actions of the existing or former employees are prejudicial to the interest of the company, its assets, its people, its reputation, etc.
Contributing factors	<ul style="list-style-type: none"> Absence of framework to protect the information of the company Unresolved employees' grievances Employee dissatisfaction resulting from efforts and reward mismatch, etc.
Mitigation plan	Under the framework to protect the information of the company, every employee should sign a confidentiality and non-disclosure agreement at the time of joining. Company may conduct employee engagement survey at regular intervals to gauge the organization's health. Good feedback system should be implemented in the organisation to get feedback from employees on different aspects of work and work culture.

(l) Information technology (IT) access

Risk	Risks that inappropriate or unauthorized access to critical business information such as formulas is possible, leading to potential Intellectual Property loss and/or customer relationship deterioration. Loss of trade secrets
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	which may be used against the interest of the company. Risk of leakage/ loss of intellectual property/ trade secrets or other confidential information (formulae/know how, etc.) which may be used against the company's interest and cause a loss of market share (and associated margins). Sensitive information (e.g. formulas, ingredients, product-customer links, etc.) are valuable to competitors, regulators, customer and external stakeholders.
Contributing factors	<ul style="list-style-type: none">• Poor knowledge harvesting/ data archiving• Inadequate access controls, privilege management policy and procedures
Mitigation plan	Formation of groups at IT servers should be based on information need to ensure the appropriate circulation of data and information among different levels in the organisation.

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**TECHNICAL GUIDE ON
INTERNAL AUDIT OF
PETROCHEMICAL
INDUSTRY**

Foreword

Petrochemical Industry is vital to economic growth as it provides link between natural resources and value added products. It is considered to be an “enabler” industry playing a critical role in functioning of all major sectors like, textile, agriculture, infrastructure, healthcare and consumer goods. Indian petrochemical industry is one of the fastest growing industries in India and is expected to grow by 7-8% with a major growth in industries such as, clothing, automobiles, etc. Major challenges faced by the Indian petrochemical industry are lack of low cost feedstock and dependence for technology.

Considering the unique nature of this industry, internal auditors can play an important role in helping to manage risks and optimize the operations in terms of revenue optimization, process optimization and cost reduction. I congratulate CA. Shiwaji Bhikaji Zaware, Chairman, Internal Audit Standards Board, and other members of the Board for bringing out this “Technical Guide on Internal Audit of Petrochemical Industry” which is an important publication providing practical and valuable guidance to internal auditors related to this industry. This comprehensive publication would surely help the members to understand and assess efficiency and effectiveness of both core and non-core business processes of the petrochemical industry, thereby apply best internal audit techniques and procedures.

I am sure that this informative publication will prove useful to the members involved in petrochemical industry in efficiently discharging their professional responsibilities as internal auditors.

October 29, 2013
New Delhi

CA. Subodh K. Agrawal
President, ICAI

Preface

Petrochemical industry is the primary source of synthetic materials that are essential to support the present level of human development across the globe. Indian petrochemical industry had a humble beginning in mid-sixties and since then the petrochemical industry in India has come a long way with global sized plants operating in few product categories not only meeting local demand but also exporting products to global markets. In such a crucial industry, internal audit has emerged as, “value added” function with the change in focus to operational and management audit instead of a routine transaction audit.

Keeping this in mind, the Internal Audit Standards Board of the Institute has issued this “Technical Guide on Internal Audit of Petrochemical Industry” which provides an overview of the processes and controls related to various activities involved in the petrochemical industry. The Guide has been divided in two parts. The initial chapters discuss the processes involved in production from hydrocarbons and then in subsequent chapters internal audit of various processes has been explained in detail. An overview of petrochemical industry in India has been given for various major segments and products such as, polymers, polyolefins, fibre intermediates, synthetic fibres, aromatics – paraxylene, surfactants, synthetic rubber, etc. The Guide explains various important technical aspects of petrochemical industry such as, capital and power intensive, continuous process industry, feedstock procurement and management, material balancing, safety and security, duties and taxes, and trade restrictions, etc. The Guide covers in detail internal audit aspects of procurement function, materials management, production process, contracts, plant maintenance, shutdown management, sales and distribution, insurance and legal compliance of various applicable statutes.

At this juncture, I am grateful to CA. K. S. Sundara Raman for sharing his experience and knowledge with us and preparing the draft of the publication for the benefit of the members. I am also thankful to Shri Sadagopan Sridharan for reviewing and providing valuable inputs on the Guide.

I wish to thank CA. Subodh Kumar Agrawal, President and CA. K. Raghu, Vice President for their continuous support and encouragement to the initiatives of the Board. I must also thank my colleagues from the Council at the Internal Audit Standards Board, viz., CA. Babu Abraham Kallivayalil,

Technical Guide on Internal Audit of Petrochemical Industry

Vice-Chairman, IASB, CA. Rajkumar S. Adukia, CA. Jay Ajit Chhaira, CA. Tarun Jamnadas Ghia, CA. Pankaj Inderchand Jain, CA. Nihar Niranjana Jambusaria, CA. Dhinal Ashvinbhai Shah, CA. S. Santhanakrishnan, CA. J. Venkateswarlu, CA. Abhijit Bandyopadhyay, CA. Anuj Goyal, CA. Naveen N.D. Gupta, Shri Gautam Guha and Shri Manoj Kumar. I also wish to place on record my gratitude for the Co-opted Members on the Board viz., CA. Ashok Patil Pundlik, CA. Chandrakant Raghunath Karode, CA. Rakesh Dhody, CA. Saurabh Mukund Chitale and CA. Sanjeeb Kumar Agarwal and Special Invitee, CA. Sanjay Arora for their invaluable guidance as also their dedication and support to the various initiatives of the Board. I would also like to place on record appreciation to CA. Jyoti Singh, Secretary, Internal Audit Standards Board and her team of officers for their inputs in giving final shape to the publication.

I am certain that the internal auditors connected to the petrochemical industry would find this Technical Guide immensely useful.

November 21, 2013
Pune

CA. Shiwaji Bhikaji Zaware
Chairman
Internal Audit Standards Board

Abbreviations

ATG	Automatic Tank Gauge
BOE	Bill of Export
BOL	Bill of Lading
C ₂	Ethylene
C ₃	Propylene
CBFS	Carbon Black Feed Stock
CMS	Cash Management System
CNF	Cost And Freight
CP	Continuous Polymerisation
CVD	Countervailing Duty
DCA	Del Credere Agent
DCS	Distributed Control System
DEPB	Duty Entitlement Pass Book Scheme
EDC	Ethylene Di Chloride
EIC	Engineer In Charge
FCS	Fast Collection Service
FDY	Fully Drawn Yarn (Flat Yarn)
FOB	Freight on Board
GRN	Goods Receipt Note
HNP	Heavy Normal Paraffin
IDP	Inter Divisional Purchase
IDS	Inter Divisional Sales
LAB	Liquid Alkaline Benzene
LDPE	Low Density Poly Ethylene
LLDPE	Linear Low Density Poly Ethylene
LNP	Light Normal Paraffin

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LPG	Liquefied Petroleum Gas
LR	Lorry Receipt
MEG	Mono Ethylene Glycol
MPN	Material Pick Up Note
MRP	Material Resource Planning
OEM	Original Equipment Manufacturer
OX	Orthoxylene
PE	Polyethylene
PO	Poly Olefins
POY	Partially Oriented Yarn
PP	Polypropylene
PSF	Polyester Staple Fibre
PTA	Purified Terephthalic Acid
PTY	Polyester Filament Texturised Yarn
PVC	Polyvinyl Chloride
PX	Paraxylene
QC	Quality check
TOL	Truck Order Linking

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Chapter 1

Introduction

Objective and Scope of Technical Guide

1.1 The objective of this Technical Guide is to give internal auditor, an overview of the processes and controls on various activities involved in the petrochemical industry. The Guide gives an overview of different stages of producing the end product from different feedstock and covers the entire processes of Procure to Pay, Consume to Produce, Order to Cash, etc.

The contents are widely embracing the new methodologies in internal audit, focusing on “risk based audit approach” rather than a routine transaction oriented audit. The enormous capital that is put into by the entrepreneurs to operate such huge petrochemical plants in itself, suggests that a technical and economic appraisal of petrochemical spans several large subject areas requiring ‘in depth’ analysis for generating a meaningful and acceptable report by the internal auditors.

1.2 Keeping these in mind, the structure of this Guide is divided into two parts: the first five chapters discuss the processes in production from hydrocarbons, controls that are required, followed by standard internal audit check list to carry out in depth analytical study. The later chapters in Part-II concentrate on the ancillary support processes with a logical link to the production processes. The relevant chapters also contain the detailed procedures to be undertaken by the internal auditor in respect of each of the main aspects as well as the sub components thereof of petrochemical industry.

The illustrative flow charts of technical processes given in the Technical Guide aim to bring in better understanding for the readers.

Chapter 2

Petrochemical Industry – An Overview

Background

2.1 Petrochemical are synthetically produced products which are used for augmenting/ supplementing naturally occurring materials which are scarce e.g., synthetic rubber in the place of natural rubber, plastic packaging products, in the place of paper wood. Petrochemicals are organic in nature i.e., derived from natural resources such as, crude oil and natural gas.

The petrochemical industry of India is less than 40 years old. The sector has a significant growth potential. Although the current per capita consumption of petrochemicals product is low, the demand for the same is growing.

2.2 Compared to per capita consumption of PO + PVC in US at 67 kg., China at 32 kg and Brazil at 26 kg, India at 6.4 kg is still in nascent stage. US consumption has reached saturation level, china's consumption above industry curve is basically export led. India has the advantage of high population and expected to maintain high economic growth. This should propel the India's consumption in polymer to new levels in coming years.

Petrochemical Industry is a cyclical industry. This industry, not only in India but also across the world, is dominated by volatile feedstock prices and sulky demand. Feed Stock Management and Material Balancing are highly important as it is a continuous process industry.

2.3 The Indian petrochemical industry is a highly concentrated one and is oligopolistic in nature.

Petrochemical Segments and Products – Demand and Growth

2.4 Petrochemicals are derived from various chemical compounds, mainly from hydrocarbons. These hydrocarbons are derived from crude oil and natural gas. Among the various fractions produced by distillation of crude oil, petroleum gases, naphtha, kerosene and gas oil are the main feedstocks for petrochemical industry. Ethane, propane and natural gas liquids obtained from natural gas are the other important feedstock used in the petrochemical industry. The segment – wise products derived from the crude are as under:

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Segment	Intermediate Products	Merchant Products
Olefins Chain	Ethylene (C2)	LDPE - Low Density Poly Ethylene LLDPE - Linear Low Density Poly Ethylene HDPE - High Density Poly Ethylene PVC - Poly Vinyl Chloride PS - Poly Styrene EDC - Ethylene Di-chloride VCM - Vinyl Chloride Monomer EG - Ethylene Glycol EO - Ethylene Oxide DEG - Di- Ethylene Glycol MEG - Mono Ethylene Glycol TEG - Tri Ethylene Glycol
	Propylene (C3)	PP - Poly Propylene PPCP - Polypropylene Copolymer ACN - Acrylonitrile AMMS - Ammonium Sulphate ACTN - Acetonitrile EA - Ethyl Acrylate BA - Butyl Acrylate MA - Methyl Acrylate HCN - Hydrocyanic Acid PS - Poly Styrene EDC - Ethylene Di Chloride VCM - Vinyl Chloride Monomer
	Butadiene	PBR - Poly Butadiene Rubber
Aromatics Chain	C6 - Hexane C7 - Heptane C8 - Octane	BZ - Benzene OX - Ortho Xylene MX - Mixed Xylene PX - Para Xylene Toluene Sol CIX - Solvent CIX

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Segment	Intermediate Products	Merchant Products
		Hepton LAB - Linear Alkyl Benzene Cixon Styrene Caprolactum DMT - Dimethyl Terephthalate PTA - Purified Terephthalic Acid PR - Polyester Resin Polyester Chips PFY - Polyester Filament Yarn PSF - Polyester Staple Fibre PET - Polyethylene Terephthalate

2.5 The domestic polymer industry (like global industry) is dominated by polyolefin's (PE & PP), representing about 72% of all commodity resins consumed in 2010, Polymers registered demand growth of 4.6% in 2011 against growth of 12% in 2010. The demand for polymer is likely to grow by 12% and 8% in 2012 and 2013 and is expected to reach 8950 Kt and 9672 Kt respectively.

Polymers

2.6 Polymers registered a subdued demand growth of 4.6% in 2011. Demand from every major end-use segment has been affected in 2011 as the economy slowed down due to monetary and fiscal tightening for controlling inflation. Raffia, the largest end-user, has been hit by a drop in cement dispatches. Cement dispatches serve as an important indicator of manufacturing activity in the country. Growth in cement dispatches (m-o-m SA) picked up in December 2011 and grew at 5.9% as compared to -16.9% in the previous month. It has been falling since then and stood at 1.8 per cent in March 2012. Deceleration in commercial vehicles sales has hit PP copolymer sales. Commercial vehicles sales, another forward looking indicator of industrial activity, also paint a grim picture. Sales have remained more or less stagnant since October 2011 after a 22% growth in September 2011. Sales of commercial vehicles grew by just 0.8% in March 2012.

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Demand for polymers is expected to grow at 8% - 12% in 2012 and 2013. Recovery is likely to set in when interest rates, which have been raised 13 times since March 2010, are brought down and liquidity in the market increases. Polymer industry is expected to grow along with the economic growth of the country.

Polyolefins (PO)

2.7 Comprising PE and PP, Polyolefins constituted 79% of the total polymer capacity and production in India in 2011. All PE registered demand growth of 4.1% in 2011. It is expected that PE will grow at 7% approx. in 2012 and 2013 respectively.

(i) Vinyl's: PVC

The demand for PVC increased by 5.1% in 2011 and is expected to grow at 15% and 10% in 2012 and 2013 to reach 2271 Kt & 2498 Kt respectively. As the economy is expected to perform well with the easing of monetary policy and various PVC end use sectors performance improving, PVC demand is expected to be robust in coming years.

(ii) Styrenics - Polystyrene

In 2011, demand for PS increased by 12% to reach 264. Demand for PS is expected to maintain the same rate in 2013.

(iii) Acrylonitrile-Butadiene-Styrene (ABS)

Demand for ABS registered a growth of 8.2% in 2011. Further demand for ABS is expected to grow approximately at the rate of 9% – 10% in 2012 and 2013. Industry capacity is likely to remain unaltered at 87 KT till 2013.

(iv) Styrene-Acrylonitrile (SAN)

Demand for SAN registered growth of 9.5% in 2011. It is expected to grow at same rate in 2012 and 2013. There is no capacity addition expected till 2013.

(v) Ethylene and Propylene

Ethylene Capacity increased from 3730 Kt in 2010 to 4030 Kt in 2011. There was debottlenecking of 260 Kt by IOCL, Haldia – 25 Kt and GAIL – 15 Kt in 2011. Propylene capacity increased from 3833 Kt in 2010 to 3963 Kt in 2011, capacity debottlenecking by IOCL of 130 Kt. HMEL is expected to add 367 Kt by end of 2012 to reach 440 Kt by 2013. MRPL is expected to add 440 Kt of propylene capacity in 2013. In 2011, production of ethylene and propylene was 3355 Kt and 3560 Kt respectively. Production is expected to increase as the operating rates improve.

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(vi) Butadiene

The demand for butadiene registered a nominal growth of 0.8% in 2011. Demand is expected to grow at 2% in 2012. Demand for Butadiene is expected to jump by 50% by 2013 on back of new SBR and PBR plants coming up in 2013. There was an exportable surplus of 146 Kt in 2011, which is expected decline to 141 Kt in 2012 and 85 Kt in 2013 as the domestic demand for butadiene increases.

(vii) Styrene

India does not have any capacity for styrene and is fully dependent upon imports. For 2011, India's total demand for Styrene was 525 Kt and growth in styrene demand was at 11%. In 2012 and 2013, demand for Styrene is projected to grow at a rate of 11% to reach 585 Kt and 650Kt respectively.

(viii) EDC and VCM

Almost the entire production of EDC and VCM in India are consumed captively by the polymer manufacturers for production of PVC and hence, PVC manufacturers who do not have facilities for captive production of EDC and VCM have to rely entirely on imports to meet their demand for PVC building blocks viz., EDC and VCM..

Fibre Intermediates

2.8 In 2011, the combined production of fibre intermediates viz., ACN, Caprolactum, PTA and MEG reached 4614 Kt of which PTA and MEG constituted 76% and 21% respectively with ACN and Caprolactum together accounting for the remaining 4%.

PTA and MEG constituted 42% and 53% of the total 1579 Kt fibre intermediates imported in to India in 2011. Of the 70 Kt of fibre intermediates exported from India in 2011, the share of MEG was 85% and Caprolactum was 13%.

However, among the fibre intermediates produced in India in 2011, India's import dependency was highest for ACN where the quantum of imports (81 Kt) was more than double the 38 Kt produced domestically. The fibre intermediate sector registered a demand growth of 6% in 2011 and is expected to grow at 7.5% and 9% in 2012 and 2013 respectively. Acrylonitrile is expected to grow at 4%, PTA at 8% to 10% and MEG at 7% - 8% respectively in 2012 and 2013.

Synthetic Fibres

2.9 In 2011, the combined production of synthetic fibre (PSF, ASF, PPSF, PFY, PPFY, VFY, VFS and NFY) reached 3755 Kt against demand of 3367 Kt. The demand growth was at 13% in 2010 which declined to 1.9% in 2011.

It is expected that the fibre demand growth will be approx. 7% and 9% in 2012 and 2013. Expected import dependency of fibre is 3% - 4%. Further, there is capacity increase of 510 Kt and 824 Kt in 2012 and 2013, respectively.

Aromatics – Paraxylene

2.10 In 2011, PX demand increased by 3.5% and is expected to moderate at 2.1% in 2012 and then revive again to 8.7% in 2013. PX capacity was 2502 Kt in 2011. No new capacity is getting added in 2012 and 2013.

PX import was at 429 Kt in 2011 and it is expected to remain at same level in 2012 and 2013. PX export increased from 421 Kt in 2010 to 662 Kt in 2011. Export is expected to increase significantly to 684 Kt in 2012 and 501 Kt in 2013.

Surfactants

2.11 Demand for key surfactants LAB and EO increased by 6.9% and 6.1% respectively in 2011. Demand growth for LAB is expected to be 6% in 2012 and 2013 as shown in table 17. Demand growth for EO is expected to be at 9.4% and 7.1% in 2012 and 2013.

LAB capacity is expected to remain unchanged till 2013. Imports expected to increase marginally to meet the increase in domestic consumption. LAB export is expected to decline marginally from 98 Kt in 2011 to 95 Kt in 2012 and 85 Kt in 2013, as domestic consumption increases.

Synthetic Rubber

2.12 SBR demand registered a robust growth of 18% in 2012, followed by EPDM demand growth of 14%. PBR/ NBR/ SBR demand is expected to grow at 6% in 2014. EPDM demand is expected to grow at 8.1% and 11% in 2013 and 2014, respectively.

Other Key Petrochemicals

2.13 Some other key petrochemicals are as follows:

(i) Benzene

Benzene demand is expected to grow at 3.7% in 2012 and 2013. It is expected that Benzene export will be 521 Kt in 2012 and 558 Kt in 2013. Import is expected to be 50 Kt in 2012 and 2013.

(ii) Toluene

Toluene demand registered growth of 5.7% in 2011. Toluene demand is expected to grow at 6.5% and 5.6% in 2012 and 2013. Toluene import was at 230 Kt in 2011 and is expected to increase to 254 Kt in 2012 and 276 Kt in 2013.

(iii) MX

MX demand grew at 12% in 2011 and is expected to grow at 27% in 2012 and at 9% in 2013. There is no new capacity addition and production is expected to fall short to meet domestic demand. The increase in domestic demand is expected to be met by imports. Imports expected to be 40 Kt and 46 Kt in 2012 and 2013.

(iv) OX

OX demand registered a negative growth rate of -7% in 2011 after registering demand growth of 8% in 2010. There is no new capacity addition. Demand is expected to touch 263 Kt and 282 Kt in 2012 and 2013.

Outlook of Indian Petrochemical Industry*

2.14 India's aggregated demand for petrochemicals expected to grow by 7-8% in 2013. Polymers are likely to register growth rate of 12% and 8.1% and olefins at the rate of 6.5% and 5.5% in 2012 and 2013.

Fibre Intermediates are projected to grow at 11% in 2013 and 2014. Synthetic fibre demand expected to register growth in the range of 5% to 8% in next two years.

Surfactants are projected to grow at approx 5% in 2013 and 2014. Carbon Black/ CBFS to grow at approx 9% in 2013 and 2014.

* Source: APIC 2013 Country Paper from India (by Chemicals & Petrochemicals Manufacturers' Association).

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Elastomers expected to register demand growth in the range of 6% to 7% in next two years. Other key petrochemicals expected to grow at approx 8.5% in 2013 and 2014.

India's demand from the automobiles, packaging, agriculture and infrastructure sector is expected to grow at healthy rate with easing of governments monetary policy. This optimism is based on the expectation that India's GDP would again grow at 6% plus in 2013 after hitting a low of 5% in 2012.

2.15 Though the Indian petrochemical industry is highly dominated by only a few players, however, there are a number of petrochemical companies in India, doing their share of business. Based on their market share, top 10 companies can be listed as below:

- (i) Reliance Industries Ltd.
- (ii) Indian Oil Corporation
- (iii) Haldia Petrochemicals Ltd.
- (iv) Gas Authority of India Limited
- (v) HPCL-Mittal Energy Ltd. (HMEL)
- (vi) Chemplast
- (vii) Finolex
- (viii) Mangalore Refinery and Petrochemicals Ltd (MRPL)
- (ix) DCW Ltd.
- (x) Shriram

Chapter 3

Technical Aspects of Petrochemical Industry

3.1 The special features/ complexities peculiar to the petrochemical industry are enumerated below:

(i) **Capital and Power Intensive**

(a) Petrochemical industry is highly capital intensive and complex involving huge investments with long term gestation period. The criticalities involved in such a projects are:

- cost segregation studies
- process improvement and construction assessments
- real estate, machinery and equipment valuations
- business and intangible asset valuations
- fixed asset management

(b) Internal audit will have to concentrate, *inter alia*, on

- construction audits, construction project controls reviews, and allocation of purchase price analyses of major capital acquisitions and improvements
- Cost overrun due to project delay, if any and it, monitoring by the management during the project stage
- Project tax planning
- Purchase price allocations

(c) Many petrochemical plants will necessarily include captive power plants as a part of its complex to cater to the high capacity power supply required to carry out the continuous process.

- The objective of reducing energy costs and consumption should be the scope for internal audit in such case of CPP units.
- The study should also include effectiveness of utilization of power and the cost benefit on generation vis-à-vis procurement through government sources.

Technical Aspects of Petrochemical Industry

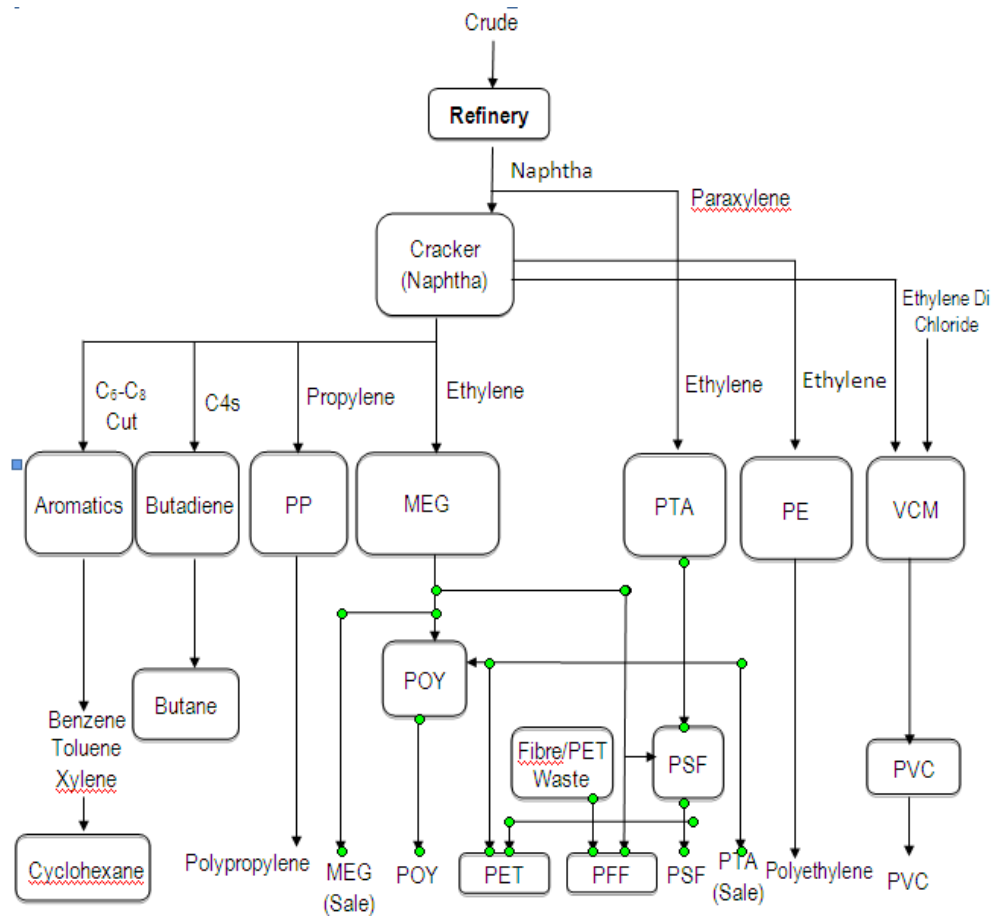
(ii) Continuous Process Industry

- (a) Petrochemical industry comprises of a chain of integrated manufacturing units commencing from petroleum product plants (generally, referred to as Crackers) to downstream petrochemical units.
- (b) The raw material for crackers (feedstock) consist of two types of products:
 - Naphtha (a derivative product of crude oil)
 - Natural Gas
- (c) Naphtha is extracted from crude oil, and natural gas is sourced from gas wells. Due to shortage constraints of crude oil, most of the new petrochemical industries use natural gas as feedstock.
- (d) The feedstock is "cracked" in the Cracker Plant to produce intermediate products such as, ethylene and propylene. These intermediates are supplied on a continuous basis to all the downstream units. The nature of industry is continuous process as both the crackers as well as the downstream plants operate on a continuous basis on a 24x7 basis. Any stoppage of any downstream unit calls for stoppage of the naphtha/ gas crackers.

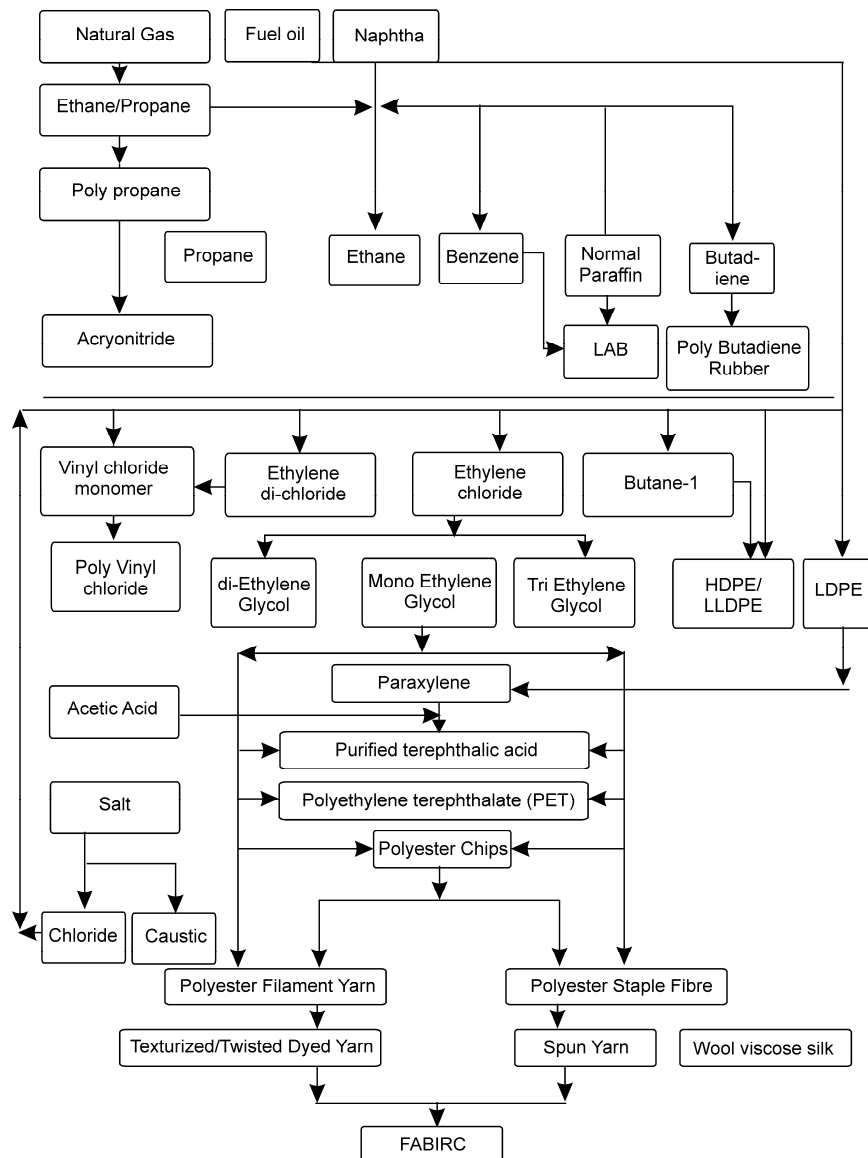
The Product flow diagram for typical naphtha based and gas based petrochemical plant is depicted below.

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Product Flow Petrochemical Manufacturing



Petrochemical Complex – An Overview



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(iii) Feedstock Procurement and Management

Volatility of Crude and Feedstock price - pricing and realisation dependent on crude and naptha prices.

(iv) Material Balancing

(a) Yield Variance

- In a continuous process industry where materials traverse from Mother Plant to other ancillary plant under different process chains, the most critical factor is to look at the three basic categories: materials in, materials out and materials stored. Material balancing in liquid/ gaseous form of materials (as against solid) is complex in ascertaining the right yield as per standards due to operation of multiple variable parameters like, temperature, pressure and density.
- A major factor in industry is, of course, the value of the materials. It is important that expensive raw materials should be considered and monitored for yield optimization, loss/ waste minimization.
- In large production units, the process variances are taken care of through innovative system like IP21 (Info-Plus 21 – software to view the periodical trends/data of streams), Sigmafine (Oil Accounting Software). Sigmafine resolves inconsistencies between plant measurements and generates uniform mass balance for the entire complex. The flow of materials is captured through Automated Tank Gauge (ATG) installed at the respective measurable point of the plant/ tanks/ pipes.
- Material Balancing Report, Plant Performance Report will be configured through integrated system to generate periodical reports to analyse variations for taking desired preventive/ corrective actions to improve the yield.

(b) Quantitative Reconciliation

- Quantitative accounting and reconciliation covers the entire gamut of material movement right from the receipt of the raw material into the factory premises to the dispatch of the finished products.

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(c) Internal Audit

- The role of internal audit is, therefore, to review and identify various check points and to validate the existence of proper system controls, to ensure that the report produces the meaningful data for the management to take appropriate corrective actions. The audit scope will include review of following aspects.
- Procedure followed for raw material accounting and reconciliation.
- Process of inter unit and WIP material stock accounting and reconciliation.
- Procedure for Inter – Divisional Sale (IDS)/ Inter – Divisional Purchase (IDP) accounting and reconciliation arising out of chain costing of various joint products emerging from various continuous processing.
- Procedure for finished goods accounting and reconciliation

(v) Safety and Security

Hazardous processing requiring very stringent safety procedures and protection of environment from discharge of hazardous chemicals.

(v) Duties and Taxes

Import tariff provides a price arbitrage. The present tax structure is as follows

- | | | | |
|-------|----------------|---|------------------------------------|
| (i) | Custom duty | - | 5% |
| (ii) | CVD | - | 10.3% (including 3% Cess) |
| (iii) | Additional CVD | - | 4% |
| (iv) | Cess | - | 3% of Custom Duty & Additional CVD |

Since the CVD & Additional CVD are CENVATABLE, it works out to effective import duty of 5.53% which provides price arbitrage in the domestic market.

(vii) Trade Restrictions

There is anti-dumping duty on import of PVC from various countries. While a few countries like Oman, Singapore and Saudi Arabia are filing for anti dumping, Indian Domestic industry has initiated anti-dumping duty application for protection from imports originating from USA, Korea and Taiwan.

Chapter 4

Internal Audit - Concepts

4.1 With increasing complexities in business, rapid growth and number of regulatory requirements, activities of a petrochemical industry have undergone various changes in processes and systems. Effective internal audit provides a tool to ease out all complexities and acts as fuel to wholesome improvements in systems and processes and, therefore, in growth and sustainability.

"Preface to the Standards on Internal Audit", issued by the Institute of Chartered Accountants of India defines the term *"Internal Audit"* as:

"Internal audit is an independent management function, which involves a continuous and critical appraisal of the functioning of an entity with a view to suggest improvements thereto and add value to and strengthen the overall governance mechanism of the entity, including the entity's strategic risk management and internal control system. Internal audit, therefore, provides assurance that there is transparency in reporting, as a part of good governance".

Scope of Internal Audit

4.2 The scope of internal audit encompasses the examination and evaluation of the adequacy and effectiveness of the organization's internal control systems. It includes:

- (i) Reviewing compliance with policies, plans, procedures, laws, and regulations.
- (ii) Reviewing the reliability and integrity of financial and operating information, and the means used to identify, measure, classify, and report such information.
- (iii) Reviewing the means of safeguarding assets and, as appropriate, verifying the existence of such assets.
- (iv) Review that revenue generating assets are judicially utilized.
- (v) Identify, quantify and report on cost saving measures.
- (vi) Process and revenue optimization.

Internal Audit Team

4.3 The internal audit Team should comprise of individuals with sufficient knowledge, skills and experience in a multitude of disciplines. A sufficient number of persons possessing the requisite degree of proficiency in the relevant disciplines are a major determinant of the effectiveness with which an internal audit of petrochemical industry will be performed. The Internal audit team should comprise of both in-house and outside internal auditors partnering with it. While in-house team will conduct special review of processes and controls to strengthen them, outsourced external firms will support in carrying out transaction audit of all functions of the organisation leveraging on industry knowledge. The primary objective of the internal audit team will be to help the organization to accomplish its objectives by bringing a systematic disciplined approach to evaluate and improve effectiveness of risk management, internal controls and governance processes.

4.4 The Institute of Chartered Accountants of India has, till date, issued 18 Standards on Internal Audit (SIAs) which codifies the best practices in the field of internal audit. These standards are aimed to increase the overall credibility, consistency, clarity and work performed by the internal auditors. The following is list of Standards on Internal Audit (SIAs) issued by the ICAI, till date:

SIA 1	Planning an Internal Audit
SIA 2	Basic Principles Governing Internal Audit
SIA 3	Documentation
SIA 4	Reporting
SIA 5	Sampling
SIA 6	Analytical Procedures
SIA 7	Quality Assurance in Internal Audit
SIA 8	Terms of Internal Audit Engagement
SIA 9	Communication with Management
SIA 10	Internal Audit Evidence
SIA 11	Consideration of Fraud in an Internal Audit
SIA 12	Internal Control Evaluation
SIA 13	Enterprise Risk Management
SIA 14	Internal Audit in an Information Technology Environment
SIA 15	Knowledge of the Entity and its Environment
SIA 16	Using the Work of an Expert
SIA 17	Consideration of Laws and Regulations in an Internal Audit
SIA 18	Related Parties

Chapter 5

Internal Audit – Procurement Function

Direct Charge Materials

5.1 Materials, the consumption of which is directly proportionate to the production of finished goods are referred to as direct charge materials. In petrochemical industry direct charge materials are:

- (a) Feedstock
- (b) Chemicals and Catalysts
- (c) Packing and Packaging materials

The key procurement strategy for each category of material has been discussed in following paragraphs:

Feedstock

5.2 Feedstock or raw materials for petrochemical products are mainly various grades of crude oil, like, C₂, C₃, Naphtha, Kerosene, etc. and Natural Gas. These materials are not freely available in the market because of supply constraint and strict Government regulations on some materials, like, kerosene and natural gas. Pricing of these materials is either government regulated or dependent on pricing published in International publications, like, Platts. Prices are derived from markets in USA, Middle East and Singapore.

5.3 Typical procurement strategy includes term contract for fixed quantity with formula pricing and spot contracts for remaining requirement. Since most of the feedstock are imported, marine logistic is very crucial for getting the desired quantity at the right time at the port. This makes the whole logistic process very complex. Apart from this, wrong planning in logistic may result in heavy demurrage. Feedstock procurement strategy includes following:

- (a) Availability of different grades of Crude
- (b) Market price of feedstock
- (c) Quality of feedstock
- (d) Political stability of oil producing nations

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- (e) Shutdown/ breakdown at supplier's plant
- (f) Availability of vessels
- (g) Storage facilities
- (h) Price movement of finished products
- (i) Technological constraint of Petrochemical plant.

5.4 Internal audit aspects related to feedstock procurement are as follows:

(a) Term Contracts

- (i) Verify contract approvals.
- (ii) Verify vendor approvals.
- (iii) Ensure adherence to contract clause.
- (iv) Verify documentary evidences for completion of transaction.
- (v) Check calculation and approval of liability and due date.
- (vi) Verify timely payment of liability.
- (vii) Check recordings of negotiations for various deals with documentary evidence.
- (viii) Review timely accounting for provisional invoices.
- (ix) Review of pending purchase orders.
- (x) Review of system of payment to vendors.

(b) Spot Contracts

- (xi) Verify contract approvals.
- (xii) Verify vendor approvals.
- (xiii) Review deal rationale and approval thereof.
- (xiv) Ensure adherence to contract clause.
- (xv) Verify documentary evidences for completion of transaction.
- (xvi) Check calculation and approval of liability and due date.
- (xvii) Verify timely payment of liability.
- (xviii) Check recordings of negotiations for various deals with documentary evidence.
- (xix) Review timely accounting for provisional invoices.

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- (xx) Review of Pending Purchase Orders.
- (xxi) Review of system of payment to vendors.

(c) Demurrage

- (i) Verify demurrage claims.
- (ii) Check demurrage calculations.
- (iii) Verify final liability.
- (iv) Check approval for payment.
- (v) Review payment of demurrage and accounting for demurrage.
- (vi) Review of system of payment to vendors.

(d) Freight/ Insurance

- (i) Verify freight calculation.
- (ii) Review of insurance coverage and insurance premium payment.
- (iii) Review analysis of time charters and their utilisation.
- (iv) Check dead freight analysis.
- (v) Check payment of freight and approval thereof.
- (vi) Verify debit notes/ credit notes.
- (vii) Review accounting for freight paid.
- (viii) Review of system of payment to vendors.

(e) Imports- Remain on Board/ Ocean Loss/ Quality give away

- (i) Verify surveyors report and other documents to identify ROB qty, ocean loss and quality give away.
- (ii) Verify claims lodged and collection thereof on account of remain on board/ ocean loss/ quality give away.
- (iii) Review of system of payment to vendors.

(f) Brokerage/ Commission/ Bunker/ Surveyors Fee/ Port Charges

- (i) Verify payments made and approval thereof for port charges, commission, brokerage, surveyors fees, etc.
- (ii) Verify approval for empanelment of brokers, agents and surveyors.

Chemicals and Catalysts

5.5 Chemicals and catalysts includes bulk chemicals, catalysts, additives and other chemicals required for making different types of petrochemical products and various grades in the same product range. Procurement strategy for bulk chemicals like, EDC, Acetic Acid, Methanol, Butane, etc. is similar to feedstock procurement. Variation in the pricing of these bulk chemicals affects product contribution. When the prices of these chemicals become volatile, business consent is taken before making procurement. Prices of these materials are generally tracked through international publications like, Platts, Harriman and ICIS.

5.6 Procurement of catalysts, additives and other chemicals are based on production planning of specific products in the product portfolio. Hence, procurement department procuring these material has to work in close co-ordination with Plants and Marketing Group. Marketing group makes changes in production plans based on quality assessment of the product from the market and demand-supply situation. Procurement department has to prepone/ postpone procurement of these chemicals based on the decision taken by the marketing team. Some of these chemicals have shelf life which makes these chemicals useless and hazardous after specific period of time. Hence, action needs to be taken quickly to defer deliveries or resale these chemicals in case of change in production plan or sudden breakdown in the plant.

Packing and Packaging Materials

5.7 Petrochemical industry produces varied products in both solid and liquid form. Liquid products do not require any packaging for sale or storage. These products are stored in tankages and dispatched through tankers. However, solid products are in powder, granular and fiber form. Packing materials for these products includes plastic bags, paper bobbins, corrugated boxes and pallets. Procurement quantities and delivery schedule of paper based packing material is critical because of their short shelf life. Generally, plant maintains 15 days inventory of these materials. Different coloured paper bobbins are used for different denier of fiber for identification purpose. Therefore, specific coloured bobbin is required from supplier. Slight change in colour makes it unusable. Rejection of these types of materials is very high.

Engineering and Maintenance Materials

5.8 Engineering and Maintenance materials are required to keep the plant running with minimum downtime. Petrochemical plants being continuous processing plants requires periodic preventive maintenance to give maximum throughput. Moreover, petrochemical plant processes hazardous chemicals at very high temperature. Hence, safety cannot be compromised in these plants. Proper maintenance with best in class spares is vital for environment and safety of the people in and around the plant.

5.7 Engineering and Maintenance materials can be further classified into spares and consumables.

- (a) Spares are generally procured from Original Equipment Manufacturer (OEM) so that performance of the equipment is optimum. Prices are, generally, dictated by OEM unless commitment of larger volume is made. Consumption of these spares is also unpredictable and may not be required for many years. However, stock of critical spares (also called insurance spares) needs to be maintained at plant in case of breakdown of equipment. Some of the spares can be refurbished and used again.

Visibility of installed quantity of these spares across plant helps in optimizing procurement.

- (b) Consumables includes greases, lubes, bearings, etc. having low value and high consumption. These are basically "C" category items. These are procured in bulk to get better discounts.

5.9 The internal audit scope with respect to the procurement would include the following:

- (i) Verify whether purchase order has been correctly prepared as per the agreed terms at the time of negotiation and as per the agreed quotation.
- (ii) Verify whether appropriate tax codes are used while preparing the purchase order.
- (iii) Review of vendor development process.
- (iv) Review of competitive quotations and rate negotiation process.
- (v) Review of delivery scheduling process in relation to inventory levels.
- (vi) Review of receipt of imported consignments and shortage recovery process.

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- (vii) Review of commercial terms and conditions.
- (viii) Review of rejections.
- (ix) Transaction and process review of purchase requisition/ indents.
- (x) Review of commercial controls in procurement process.
- (xi) Review the packaging types and methodology.
- (xii) Review inventory status vis-à-vis procurement.
- (xiii) Review of delivery schedule tracking.

Chapter 6

Internal Audit – Material Management

6.1 Inventory refers to a firm's resources that can draw economic income, including raw materials, work-in-progress, finished goods, consumables and stores. Inventory management involves determining the optimal level of a firm's resources and planning the processes to achieve it. Good inventory management contributes to the firm's overall goal of maximizing its profits.

(a) Cost Minimization

Inventory management aims to meet a firm's inventory needs at minimum cost. This involves keeping just enough inventories to achieve business goals. For example, if a company has exceeded its customer satisfaction level target, it could reduce the amount of inventory it keeps. If a business aims to deliver its products within a certain number of days from the order placement, it should consider the location of its inventory, taking account of shipping times and costs.

(b) Forecasting

A firm that can accurately forecast demand for its products can plan its inventory more efficiently. Demand forecasting helps the firm manage inventory, capacity and finances better and improves its customer service. A demand forecast can use historical data, estimates or both. The more data is available for forecasting, the more accurate the results will be. A firm can forecast demand over short, medium or long periods of time, but generally, short term forecasts will be more accurate.

(c) Supply Chain Management

Inventory management extends outside the firm to involve the entire supply chain, which includes all the activities, processes and resources from the time the firm determines the need for materials until the customer receives the product.

6.2 Supply chain management requires managers to consider the big picture, including those elements that exist outside the firm such as, suppliers, partners and alliances. Supply chain management seeks to achieve quick response to customer needs, to minimize costs through integration and coordination, to simplify processes and to use information and technologies effectively.

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Materials are categorized into various types as under:

- (i) Finished Goods, Traded Material and Raw Material
- (ii) Spares
- (iii) Catalysts and Chemicals
- (iv) Packing Material
- (v) Project Material
- (vi) Laboratory Chemicals

6.3 In case of spares, there is a sub – category of Mechanical, Electrical and Instrumentation spares. Materials are also categorized into:

- (i) Insurance category
- (ii) Critical category
- (iii) General category

6.4 The following areas have been covered in the broad function of Materials Management:

- (a) Maintenance of Material Master
- (b) Annual Materials Planning
- (c) Process of Materials Requisitions creations/ release
- (d) Receipt Process of Materials
- (e) Issue Process of Materials
- (f) Stocking at Warehouse
- (g) Insurance spares management
- (h) Rejections handling
- (i) Obsolete and Surplus Management
- (j) Fixations of Various MRP levels

A brief write up on each of the above function and the related internal audit aspects has been discussed in following paragraphs.

Maintenance of Material Master

6.5 Material Master Management refers to the process of registering a material that would get used in the course of purchase, production, packing, sales, testing, trading and maintenance. It involves creation and maintenance

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of a database of materials in the system. Material master management process also involves, besides creation of the master, carrying out changes to the master data based on the changes that are taking place with regard to the material.

6.6 Material Master Data contains essential information about the material as mentioned below that are required during the course of business, such as:

- (i) Material code
- (ii) Description of the material
- (iii) Type of the material (Finished goods, packing material, spares, etc.)
- (iv) Material Group to maintain the group identity, wherever applicable
- (v) Basic Unit of Measure
- (vi) Location of the material.

6.7 Material Master Management involves the following functions:

(a) Creation of Material Code

Various fields that are required during material code creation are as follows:

- (i) Material Description
- (ii) In case of spares, the details of parent equipment like, Manufacturer name, model No., Installed quantity , MRP Controller, UOM, Procurement Lead Time, etc
- (iii) Shelf Life of the material
- (iv) Maintenance of Excise Tariff ID/ Customs Tariff Id/ Sales tax/ VAT rates
- (v) Unit rate

Based on the above fields, a material code is created in the system. Generally, the rights for code creation are restricted and centralized

(b) Extension of Material Code (From One Location to Another)/ Changes to the Material Code

Generally, the codes are created specific to one location/ site. Based on request from users the codes are extended to other locations/ sites. Based on the inputs from the users the specification of material codes is changed.

(c) Blocking of the Material Code

Material codes that duplicate are identified and are blocked for further usage. Inventory lying in such codes is also transferred to the other operating/ live code.

6.8 The following internal audit aspects need to be reviewed:

- (i) Review the process for material code creation covering the authorizations/ approval process.
- (ii) Review the process in place for reviewing the existing codes before new material code creation.
- (iii) Review the pending PR/ PO in the operating code, for items for which the stock is available in the duplicate codes.
- (iv) Review the process for updating of various MRP parameters with regard to inventory status viz, slow moving, non-moving, surplus, obsolete and insurance items.
- (v) Review the process for flagging items as per Propriety Article Certificate (PAC) items. Report all cases where any item flagged as per PAC is being supplied by any other supplier other than the PAC supplier.

Annual Materials Planning

6.9 The Annual Marketing plan gets converted into annual production plan. Based on the recipe of each finished product, the annual material requirement is ascertained for each of the chemicals/ catalysts/ raw materials/ packing materials and accordingly annual procurement budget is prepared.

The annual production plan gets converted into periodic Rolling Plan. The same is realigned with the changed marketing forecast.

Based on the periodic Rolling Plan, the annual PR is raised or planned orders are created with schedule of delivery. The following internal audit aspect needs to be reviewed:

- (i) Process in place to ensure that amendments in the rolling Production plan after creation of planned order are communicated to the inventory Controller for cancellation of PO/ Deferment of Deliveries.
- (ii) Process in place to ensure that any unplanned shutdown is separately communicated to MRP Controller/ site Inventory Controller.

Process of Materials Requisitions Creations/ Release

6.10 Requisition for purchase of material (hereinafter referred as "PR") is raised by the users and after the process of approval; the procurement action is initiated against these requisitions. Based on the categories of material the requisition creation process is defined.

- (a) In case of Chemicals/ Catalysts/ Raw Materials/ Packing Materials, the PR's are generally raised for annual requirements based on annual production plan. In case of some organizations, for major raw materials, the PR is not raised and directly orders are placed based on Production Planning.
- (b) In case of Spares following are important aspects:
 - (i) If the item is a stock controlled item, the PR is raised by the stores based on levels (reorder level/ safety Levels).
 - (ii) If the item is not a stock controlled item, the PR is raised by the MRP controller based on requirement.
 - (iii) If the item to be procured is marked as non moving, the PR creation is restricted and only with necessary system based clearances/ approvals the PR can be raised by the users.
 - (iv) If the item to be procured is marked as duplicate, the PR has to be raised by the user in the operating material code.
- (c) In case the item is required on emergency basis, an emergency PR is raised.
- (d) The PR is approved by various authorities and thereafter procurement action is initiated.

6.11 The following internal audit aspect and need to be reviewed:

- (a) Review the controls in place to prevent PR creation for items lying as non-moving.
- (b) Review the controls in place to prevent PR creation for items marked as duplicate/ marked for deletion.
- (c) In case of annual PR's, review the schedule of delivery to validate that the same commensurates with the monthly production plans.

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- (d) Review the preventive controls in place to prevent excess PR quantity (like, Bill of Materials based controls, Maximum stock level based controls and authorizations based controls).
- (e) Review the controls in place to prevent the PR creation in excess of available budget.

Receipt Process of Materials

6.12 Material receipt at stores consists of the following sub-processes :

- (a) Unloading of incoming material
- (b) Generation of Goods Receipt Note
- (d) Quality inspection of incoming materials
- (e) RCA – Rejection/ wrong supply
- (f) Other receipts

6.13 Incoming materials is segregated into "Inspection" and "Dock to Stock Goods". Materials to be stocked/ consumed without inspection are called dock to stock materials. The dock to stock items includes consumables and commodities that are backed by vendor certified service level agreements.

Selection of these items will also be based on an analysis of their historical quality level. Items with consistently high quality of receipt (99% and above) are included in dock-to-stock category.

Critical items are identified based on the item master details on Inspection note.

Normally, critical spares shall not be identified as dock to stock item.

PSM critical items will be tagged with different colour tag for separate identification.

6.14 The following process is normally followed for acknowledging the receipt of material:

- (a) The following documents are checked
 - (i) Delivery challan/ Invoice copy
 - (ii) Lorry receipt
 - (iii) Vehicle fitness certificate
 - (iv) Other Forms if any

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- (b) Unloading of Materials
 - (i) Material Handling Equipments are arranged in case of heavy materials, if required.
 - (ii) In case of Catalysts and Chemicals weight is taken to arrive Net Weight
 - (iii) Invoice is validated from excise view point.
 - (iv) Material is unloaded at respective location.
 - (v) The damages of packages, if any, is checked.
 - (vi) Open delivery certificate/ signature of driver on Lorry Receipt is taken in case if damages are found.
 - (vii) The receipt of materials is acknowledged on the LR and the truck is released from stores/ plant.
 - (viii) The received material is tagged/ labeled.
- (c) Counting of Materials
 - (i) The physical quantity of material is tallied with the challan/ invoice.
 - (ii) Record the discrepancy, if any. (short/ excess/ damage etc..)
- (d) Creation of Goods receipt Note
 - (i) Physical quantity received, shelf life unloading location system generated batch nos are uploaded in the system, and Goods Receipt Note (Inspection Note) is generated.
 - (ii) Discrepancy Note is printed in case of excess/ short/ damage items receipt (OSD).

6.15 The following process is, normally, followed for inspection of the material received:

- (i) Pending inspection notes list is taken for concerned inspection/ quality control/ authorized engineer.
- (ii) Material is inspected with respect to PO specifications/ MERI/ TC, quality report from central lab
- (iii) Based on inspection results the material is accepted/ rejected.
- (iv) The inspection clearance is recorded in system as usage decision with quantity accepted. In case of rejection, rejected, quantity is entered as return delivery.

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6.16 The following process is, normally, followed for handling the rejection of material:

- (i) Reasons for rejection like, wrong supplier selection, improper specification, laboratory tests, etc., are investigated and corrective measures are taken in case of poor quality.
- (ii) Reason of damage/ shortage like poor packing , improper material handling, theft, short packing at transportation, etc. are investigated for preventive measures in case of shortages/ damages.

6.17 The following internal audit aspects needs to be reviewed:

- (i) Review the process for preparation of GRN including acceptance (UD) and report all cases of delay beyond reasonable period. It is also important to report on MRRs lying open for more than 30 days.
- (ii) Review action plan for usage/ disposal of excess/ rejected material. Report all cases where rejected material is lying for more than 30 days of rejection.
- (iii) Review the process for re-acceptance of rejected materials and report cases where materials are re-accepted without appropriate management approval and/ or after substantial delay.
- (iv) Review the process for tracking movement of truck/ tankers entering inside complex for unloading the bulk/ non-bulk material. Report all cases where time gap between entry of truck inside complex (TPN) and final exit (MGX) is not normal.
- (v) Review the process of material procurement on freight to pay basis and report exceptions where material is lying at transporter's Godown for more than 10 days.

Issue Process of Materials

6.18 Material issue takes place against reservation. The reservation for issue of spares can be created against cost centre or against a work order, and for issue of chemicals the reservation can be created against a process order.

Against open reservations, material is taken out from the BIN location and is delivered to the respective user. Receipt of the material by the user is acknowledged on the Issue note and Material Issue Note is closed in the system.

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Material is sometimes issued during silent hours. The Security Officer joins the Plant Engineer (User) for issue during silent hours and separate records are maintained for such issue. The same is regularized by stores in system next day morning. Monthly MIS of silent hour issue and personal delivery is circulated to HOD materials and HOD CES. Material is returned by creating a material return reservation in the system. All returned material is certified for usability by authorized persons. The inspection cell at the stores inspects all returned material to check its usability. Defective/ repairable items returned from plant are stored separately in stores. In case of chemical and catalyst, at the time of issue from stores, the material is stock transferred to the shop floor of the plant and based on actual consumption; the consumption posting is done in system. In case of engineering spares, the material is directly charged off to consumption at the time of issue from stores to plant.

6.19 The following internal audit aspect needs to be reviewed:

- (i) Review the system for open reservations review of more than 30 days old.
- (ii) Review the process of testing and accepting of materials returned by plants to stores. Report all cases where plant returns materials after lapse of considerable time.
- (iii) Review the system for monitoring the storage and issue (on FIFO basis) of chemicals having shelf life and report all cases of shelf life expired chemicals. Review the system of maintenance of shelf life data in SAP.
- (iv) Review the process for monitoring the materials/ chemicals lying at shop floor and report all cases where materials are lying at shop floor for more than 15 days.

Warehousing

6.20 Material stocking is done in an area of the complex generally referred to as the "Central Stores". Warehousing covers the following activities:

- (i) Binning
- (ii) Perpetual Verification of Inventory
- (iii) Preservation of Material

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6.21 The following areas need to be reviewed:

(i) Binning

- (a) Review the process of storage of material in appropriate locations on receipt.
- (b) Review the system of updation of storage location data in the stores database at the time of receipt/ issue of material.

(ii) Perpetual Verification of Inventory

- (a) Review the process of segmentation of items for assessing the frequency of Perpetual Inventory Verification.
- (b) Review of adherence to perpetual verification schedule.
- (c) Review the system in place for addressing discrepancies.
- (d) Review the action taken against discrepancies identified during physical verification.
- (e) Review of MIS in place for perpetual verification.

(iii) Preservation of Material

- (a) Review the preservation system in place for different categories of items.
- (b) Review the adherence to the pre-defined preservation schedule.
- (c) Review the MIS in place for identification of preservation status of all items.

Insurance Spares Management

6.22 Insurance Spares Management comprises following activities:

- (i) Insurance/ critical Spares identification based upon criticality should be high, predictability of failure should be low, and expected usage of the spare should be low.
- (ii) Insurance/ critical spares review on a continuous basis to ascertain their status. The responsibility for identifying and level setting of insurance/ critical spares lies with plant while maintaining stock lies with the Plant Engineer. New insurance spare identification is done based on management guidelines.

6.23 The following internal audit aspects needs to be reviewed:

- (i) Review system for classifying spares as insurance spares and report

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all cases where any material has been declared as insurance material without approval of site head.

- (ii) Review the accounting treatment for procurement and consumption of Insurance Items.
- (iii) Review the NIL stock insurance spares and the stand by arrangements available to meet any eventuality arising out of nil stock of insurance spares.

Rejection Handling

6.24 The following areas need to be reviewed during internal audit:

- (i) Review the process for intimating the vendor in case of rejections.
- (ii) Review the process of intimation to accounts and follow up in cases where advance payment has been made.
- (iii) Review the process of return of rejected items to vendor.
- (iv) Review the process for re acceptance of rejected items.
- (v) Review the storage of rejected items in stores and ensure that they are stored separately.
- (vi) Review of Inventory of rejected items lying in stores.

Obsolete and Surplus Management

6.25 Items which are no longer usable at site are classified as obsolete. Obsolescence can occur due to various reasons such as, discontinuance of use of the original equipment, change in the manufacturing process, de bottlenecking exercises carried out at site, etc. Surplus is referred to spares whose inventory is far in excess of the normal consumption. Obsolete and surplus inventory should be identified and system visibility across the organization to block further procurement action.

6.26 The following areas need to be reviewed during internal audit:

- (i) Review the process of identification of an item as obsolete/ surplus.
- (ii) Review the process of approval for classification of an item as obsolete/ surplus.
- (iii) Review the process of stopping procurement action for such items.
- (iv) Review the process in place blocking further procurement of such items.
- (v) Review the process followed for disposal of such items.

Fixation of MRP Levels

6.27 Inventory of engineering spares is controlled through Scientific Inventory modeling techniques whereby, based on the consumption, lead time, criticality, etc (referred to as MRP Parameters), appropriate inventory levels are fixed for each item. Hence, it is critical that MRP Parameters be correctly maintained in the system as the Inventory level fixation is based on that.

The following areas need to be validated during internal audit:

- (i) Review the process followed for setting of MRP levels for various items of inventory.
- (ii) Review the periodic review of MRP levels.
- (iii) Review the process followed for determining the correct inventory levels as per MRP parameters maintained.
- (iv) Review the process of initiating procurement action where current inventory is lower than the inventory fixed as per MRP Parameters.
- (v) Review spares item not covered under MRP.
- (vi) Review spares item where the MRP data is inadequate.
- (vii) Validate the MRP parameters maintained in the system vis-à-vis actual on a test check basis.

Chapter 7

Internal Audit – Production Process

7.1 A petrochemical complex comprises of a main plant (referred to as the Mother Plant) and downstream plants which uses the products manufactured by the "mother plant" as raw materials for manufacture of end product. Both mother plant as well as the downstream plants generate by products during the course of manufacture of the main products. There are other utility plants such as, Captive Power Plant, De Mineralized Water Plant, Steam Plant, etc, supporting the main plants. Each grade of product manufactured (excluding utilities) uses a set of standard ingredients (raw materials, chemicals and catalyst) in a definite proportion. This is referred to as a recipe for the product.

7.2 The internal audit scope under each aspect of the production process is summarized as under:

(i) Monitoring Feedstock Inputs

Review the process on monitoring the input feeds as well as the outputs on a real time basis.

(ii) Maintenance of Plants And Identification of Root Causes of Breakdowns

Review the adequacy of plant maintenance systems in place, both preventive as well as need based. (Covered in details under plant maintenance)

(iii) Recording of Planned (Budgeted) Production And Standard Quantities of Inputs

Monthly production plan for each grade of a product is captured through a unique Process Order. This includes the standard quantity of inputs of Raw Materials/ Chemicals and Catalysts. At the end of each month the Process Order is closed and the actual productions as well as inputs consumed are recorded against the Process Order. The following should be reviewed during the audit:

- (a) Review the process of creation of monthly process orders. Report on process orders open for a period exceeding one month.

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- (b) Review the process of recording input quantities in the process order. Validate on a test check basis with the recipe.
- (c) Review the controls in place for preventing
 - (i) The booking of inputs not included in a recipe against a particular grade
 - (ii) Non booking of inputs included in the recipe against a particular grade
- (d) Review the process of authorization and release of process orders.

(iv) Recording the Actual Production and Inputs

- (a) Review the process followed for allocating inputs consumed among different grades.
- (b) Review the system of carrying out a physical verification of shop floor inventory prior to booking of consumption.
- (c) Review the MIS system and other data maintained for monitoring Raw Material Consumption.
- (d) Validate the raw material consumption accounted in books with the quantity recorded in the Distributed Control Systems (DCS) on a test check basis.
- (e) Review of the system in place for reconciliation of the quantity differences and accounting thereof.

(v) Analysis of Variances

Review the process of analysis of variance between budgeted and actual production and standard vs. actual consumption.

(vi) Process Followed for Booking of Utilities and Other Costs Against Each Grade

- (a) Review the defined standards of utility consumption by each user plant.
- (b) Review the process of recording the production of utilities by the respective plant.
- (c) Review the process of recording the consumption of utilities by each consuming plant.

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- (d) Review the process of reconciliation of utility consumption and allocation among different plants. Report abnormal differences.
- (e) Review the actual consumption of inputs for manufacturing utilities with pre defined standards.

(vii) Raw Material/ Intermediate Product Balancing at Complex Level

In a petrochemical complex, output of one plant is used as a raw material for other plant(s). Hence, there is a continuous movement of material both intra complex as well as outside. Reconciliation of raw materials and intermediates (bulk materials) at complex level is critical and has to be done on a daily basis to ensure timely identification/ reconciliation of quantity differences.

The following controls need to be validated:

- (a) Process of dispatch-receipt confirmation.
- (b) Independent validation of accounted quantities with meter readings.
- (c) Documentation maintained by both sending as well as receiving plants.
- (d) System in place for addressing discrepancies.
- (e) Cross tallying of despatch quantities from the upstream plant with the final production reported by the downstream plants on a test check basis.

(viii) Accounting for the Production of By-products

The following aspects need to be validated:

- (a) Identification of by-products generated by each plant.
- (b) Review of process for accounting of the generation of by-product.
- (c) Review the physical storage of the by-product. It should be stored separately from the main product.
- (d) Physical verification of by products on a test check basis.

(ix) Validation of Overall Quantity of By-products Generated with Reference to the Production of the Main Product

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- (x) **Access Controls over Recipe and Other Critical Data**
 - (a) Review the list of persons who are able to create/ change/ view the recipe. Report cases of incompatible rights.
 - (b) Review the linkage between the recipe and the Process Order. There should be a system block, preventing inclusion of items which are not in the recipe in the Process Order.
 - (c) Review the system of authorization of amendments to the recipe and the Process Order.

Chapter 8

Internal Audit – Contracts

8.1 The two basic types of contracts are as follows:

(a) One time Contracts (OTC)

In this case, the scope of work is identified in advance. The details of the job as well as the timelines thereof are specified in the Service Work Order and the contractor has to execute the job as per work order terms, e.g., replacement of a pipeline, maintenance of a section of building, etc

(b) Annual Rate Contracts (ARC)

As per this format, rates for services which are recurring in nature are determined in advance (generally, for a period ranging from one to two years). The contractor has to execute the jobs on an “As and when required” basis. E.g., Routine mechanical/ electrical jobs at plant, canteen contracts, etc.

8.2 Usually, a combination of OTCs as well as ARCs is used for managing the outsourced activities. In a large industry, a dedicated team is deployed for managing all contract related activity. This team comprises of a combination of commercial and technical experts.

The major activities included in Contract Management are:

- (a) Identification of activities to be outsourced
- (b) Identification of vendors
- (c) Evaluation of offers received from contractors
- (d) Finalization of contracts
- (e) Contract execution.

8.3 The major aspects to be audited under each activity of Contract management are as under:

(i) Outsourced Activities

Generally, recurring services of a non critical nature and services falling outside the organization's core competence are outsourced to outside vendors. For outsourced services, an Annual Rate Contract (ARC) is entered into with the contractor, whereby the rates for each item of service are

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determined in advance and are valid for a period of one/ two years. The services are provided on an "As and when required basis".

One Time Contracts (OTC) are awarded for activities similar in nature to a Project. Hence, OTCs are awarded for activities of a non-recurring nature such as overhauling of major equipments, repairs to a buildings, etc. In case of OTCs, service is, generally, requisitioned through a "Service Purchase Requisition". In order to track the history of services as well as for cost comparison/ internal costing purpose it is essential that each item of service be uniquely identified. This identification is referred to as a service code

The following areas need to be reviewed in internal audit:

- (a) Process for identification of activities to be outsourced both under ARC as well as under OTC.
- (b) Process of codification of services.
- (c) Approval for requisitioning of services.
- (d) Completeness and accuracy of service requisitions.
- (e) Review of One Time Contracts executed in past one year to identify frequently used services for possible inclusion under Annual Rate Contracts.

(ii) Vendor Identification

Based on the services proposed for outsourcing, vendors who are capable of executing the services are identified. Based on factors such as competency/ resources available/ past experience in similar jobs, etc, they are generally grouped into various categories such as, A, B and C.

The following aspects need to be reviewed:

- (a) The process of identification of vendor.
- (b) The process of categorization of vendor.
- (c) The process of codification of new vendors.
- (d) The process of blocking inclusion of black listed/ debarred vendors.
- (e) Process of updating of vendor categorization based on results of performance evaluation.

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(iii) Contractor Evaluation

The following aspects need to be checked during internal audit of this area:

- (a) Process of opening of offers received from various vendors.
- (b) Process of confirming that all vendors have understood the scope of work correctly.
- (c) Process of matching the offers received with the rates paid for the same work previously. Internal auditor needs to validate whether such a job history database is in place.
- (d) The system of carrying out internal costing for the jobs for validation of offers.
- (e) The process of rate comparison of all offers before finalization of most competitive vendor.
- (f) The process of carrying out negotiations with vendors for achieving a reduction in rates.
- (g) Final selection of vendor.

(iv) Contract Negotiation and Finalization

The following aspects need to be reviewed during internal audit of this area:

- (a) Process for validating inclusion of all contracted terms in the Work Order.
- (b) Clear cut definition of activities in contractors as well as in company scope.
- (c) Process of automatic inclusion of standard terms and conditions in the Work Orders.
- (d) Process of optimization of various tax liabilities at the time of contract finalization.
- (e) Process in place for post facto regularization of contracts awarded on an emergency basis.

(v) Contract Execution

The following aspects need to be examined during audit of this contract execution:

- (a) The process of certification of services rendered by the Engineer in Charge. Internal auditors need to carry out physical evaluation on a test check basis by visit to the location.

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- (b) The process of periodic validation of quality of contractor used material as per contract terms
- (c) The process of maintenance of base data for certification by the concerned engineers.
- (d) Completion of jobs by contractors within stipulated timelines. In case of delays penalties need to be imposed.
- (e) The process of monitoring submission of Performance Bank Guarantees by contractors.
- (f) Process of accounting/ reconciliation of company owned materials and other resources provided to contractors, and making appropriate deductions from bills for excess consumption/ un accounted material.
- (g) In case of completion of a contract, process of validating recoveries of all amounts due from contractors before de mobilization.
- (h) The process of accounting for the amount payable for services in the books of account.
- (i) The system in place for periodic performance evaluation of contractors and appropriate categorization.
- (j) The process of debarring/ black listing of contractors.
- (k) The process for monitoring movement of contractor's material in/ out of the complex.

Chapter 9

Internal Audit – Plant Maintenance

9.1 Petrochemicals manufacturing plants are Continuous Process Plants, i.e., these plants operate on a 24X7 basis. Breakdown/ malfunctioning of equipment have a direct impact on the production process. Hence, it is imperative that proper systems and processes be in place identification/ execution/ monitoring of scheduled maintenance activity as well as addressing unforeseen issues such as, breakdowns on a real time basis.

9.2 Plant maintenance encompasses the following activities:

- (i) Equipment Codification
- (ii) Maintenance of Equipment Bill of material
- (iii) Identification of a maintenance job
- (iv) Validation and authorization thereof
- (v) Initiation of action for mobilization of resources required for the maintenance job
- (vi) Scheduling of a job
- (vii) Execution
- (viii) Close Out and Reporting.

Equipment Codification

9.3 Petrochemicals manufacturing complex comprises of a mother plant and a set of downstream plants. Both the mother plant and the downstream plant are stand alone manufacturing units. In view of the above, there is a huge number of equipments in operations at a complex. Each of the equipments needs to be properly tracked to capture details such as make/ model no/ supplier/ date of installation/ periodic maintenance schedules/ maintenance history, etc. Hence, a unique identifier which is referred to as an “Equipment Code”. Accordingly, the following areas should be reviewed during the internal audit of Equipment Codification:

- (i) The process of maintenance of equipment codes.
- (ii) The process for monitoring the completeness of the equipment database such as, make, model no, date of manufacture, etc.

- (iii) The system in place for ensuring that all equipments are properly codified. Report on equipments, which have not been codified.
- (iv) The process of maintenance of equipment history and maintenance data.

Maintenance of Equipment Bill of Material (BOM)

9.4 Bill of Material refers to a list of spares attached to a particular piece of equipment. It is essential that Bill of Material be updated for all equipments at a complex in order to have a complete database of spares required in a complex together with the consumption history thereof. Spares are generally categorized as under:

- (a) Engineering Spares-spares which form part of equipment.
- (b) Consumables-regularly consumed items such as lubricants, etc. Generally, consumables do not form part of Equipment Bill of Material.

The following areas should be examined during the internal audit of the Equipment BOM:

- (i) The process for updation of equipment BOM.
- (ii) Process of periodic review of equipment BOM's to ensure completeness. Report on equipment which are without BOM.
- (iii) Review the process of categorization of spares inventory into engineering spares and consumables.
- (iv) Validate that all engineering spares are linked to equipment BOMs. Report on spares lying in inventory not forming part of Equipment BOMs.
- (v) Review the system of blocking the drawl of spares against equipment unless it forms part of Equipment BOM.

Identification of Maintenance Job

9.5 Generally, the maintenance requirement is identified by the process or maintenance engineers who are in the field. The maintenance requirement is generally, logged in the system and put up to the shift in charge for validation. The following areas should be reviewed during the internal audit of logging the maintenance requirement:

- (a) The process for logging a maintenance requirement. Robust system should be in place to facilitate the capture of all maintenance requests from the field engineers.

Validation and Authorization of Maintenance Job

9.6 The maintenance requests logged in by the field engineers is validated and authorized for execution by the shift in charge.

The following areas should be reviewed during the audit:

- (a) Whether appropriate visibility of all maintenance requirements identified during a shift has been provided to the shift in charge.
- (b) Whether maintenance requests have been approved after appropriate scrutiny. Duplication in approvals of same maintenance request needs to be avoided.
- (c) Timeliness in approval of maintenance requests.

Resource Mobilization

9.7 Once a maintenance job is authorized for execution, necessary action has to be initiated for mobilization of resources such as materials, external services, skilled labour, etc for the job. It is desirable that the materials/ services/ labour, etc be requisitioned with reference to a particular equipment code for enabling proper maintenance of equipment history data.

The following areas need to be examined during audit:

- (i) The process of requisitioning resources for a particular job.
- (ii) The timeliness in mobilization of resources at site.
- (iii) The system checks in place blocking the procurement of unwanted resources, e.g., procurement of Engineering Spares not part of equipment BOM should be blocked.
- (iv) Number of jobs pending due to non-availability of resources.
- (v) MIS for jobs pending due to non-availability of resources.

Scheduling of Job

9.8 Once the resources are mobilized, jobs have to be scheduled for execution. The execution dates depends on the nature and criticality of the job. Emergency/ critical jobs having a direct impact on production are scheduled for immediate execution. In other cases, jobs are executed as per availability of resources, pendency of other jobs, etc.

The following areas need to be reviewed during internal audit:

- (i) Process followed for prioritization of jobs based on criticality.

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- (ii) The process followed for scheduling of jobs.
- (iii) Execution of jobs on the scheduled dates.
- (iv) The proportion of jobs not executed on scheduled dates.
- (v) MIS for pending jobs.

Job Execution

9.9 Due to hazardous nature of operations of the Petrochemical Industry, jobs are executed only after issue of safety permits by the operations engineer. A permit is issued only after validation that safety standards applicable to the particular job shall be adhered to.

The following areas need to be examined during internal audit:

- (i) System of Issue of Safety permits before commencement of the job.
- (ii) The process of surrender of permit after completion of the job.
- (iii) The process of extension/ renewal of permit.
- (iv) The process of de-mobilization from site after completion of the job.

Job Close Out and Reporting

9.10 After execution, the job needs to be closed in the pending jobs database. In addition following activities need to be carried out:

- (i) Certification of Services rendered by external agencies.
- (ii) Return of materials remaining after completion of the job.
- (iii) Final closure of the job in the pending jobs database.

The following areas need to be reviewed during internal audit:

- (a) Process followed for certification of services rendered by external agencies
- (b) Process of monitoring return of unused materials to stores
- (c) Process of final closure of jobs
- (d) Process of short closure of commitments (orders) which are pending even after job completion.
- (e) Reporting on Jobs executed but not closed out in the database.

Chapter 10

Internal Audit – Shutdown Management

10.1 Petrochemical manufacturing plants are continuous process plants. Manufacturing process is based on various chemical reactions which takes place inside a reactor (closed vessels columns). Unlike other industries, having batch processing, in a running continues process plant there is a very limited scope for carrying out maintenance activity without interrupting the process. On account of these factors the normal practice followed in the industry is to shut down a plant completely for a limited period of time for carrying out maintenance activities. Such a closure is, generally, referred to as a “planned shutdown”.

The activities carried out in a planned shutdown include:

- (i) Time based maintenance of moving equipment (technically referred to as rotating equipments).
- (ii) Inspection and maintenance of tanks/ columns/ vessels particularly from the inside.
- (iii) Minor Capex Jobs.
- (iv) Repair jobs identified during operation of the plant, which have been postponed till the shutdown.
- (v) Statutory inspection jobs.
- (vi) Jobs identified during the shutdown after inspection of equipment.

10.2 Following are the critical parameters for determining the successful execution of a shutdown:

- (i) Timeliness in completion
- (ii) Completion of all planned jobs
- (iii) Successful re-start of the plant post shutdown completion

Shutdown management comprises of the following set of activities:

- (i) Shutdown planning
- (ii) Shutdown execution and monitoring
- (iii) Shutdown closure and reporting

Shutdown Planning

10.3 Since every shutdown has production related implications, both for the plant proposed for shutdown as well as for other plants within the complex, the shutdown dates are finalized jointly by the production as well as marketing groups. Once the dates are frozen, the activities to be carried out as well as the proposed timelines thereof are finalized by the production and the maintenance teams. Based on the shutdown plan procurement action is initiated for materials and services. Proper synchronization of activities among various groups is critical to ensure adequate and timely availability of resources, both from within the organization as well as from external agencies to support activities planned during the shutdown.

10.4 The following areas should be reviewed during the internal audit of shutdown activities:

- (i) The process of fixation of shutdown dates.
- (ii) The process (including timeliness) of listing down all the activities to be carried out in the proposed shutdown. There should be a proper MIS in place which would enable identification/ inclusion of jobs to be carried out in a shutdown, apart from time based/ counter based maintenance. E.g., overhaul of an equipment giving problems during operations.
- (iii) The process (including timeliness) of fixation of the time schedule for completion of individual activities as well for completion of the shutdown project. Generally, modeling techniques such as PERT/ CPM as well as software such as MS Projects are used for planning.
- (iv) The process (including timeliness) of identification of persons responsible for completion of individual activities as well as for the completion of the shutdown.
- (v) The process (including timeliness) of identification of resources materials/ manpower with skill sets required for the shutdown.
- (vi) Fixation of the safe working norms to be adhered to during the shutdown.
- (vii) Finalization of the budgeted costs of the shutdown.
- (viii) Timeliness in the initiation of action for procurement of material as well as for finalization of shutdown contracts. Report on procurement/ contracts which were finalized on a single vendor/ emergency basis on account of delays in initiating procurement action.

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- (ix) Timely availment of various statutory permissions (if any) for the shutdown.
- (x) In case of rescheduling of shutdown, validate that proper authorizations have been obtained. The losses incurred due to rescheduling should be factored in the decision.

In all of the above areas, timeliness is critical hence delay in initiating action should be reported.

Shutdown Execution

10.5 The following areas need to be reviewed by the internal auditor:

- (i) Timeliness in mobilization of resources required for the shutdown both in house as well as external.
- (ii) Completion of all planned activities as per the schedule.
- (iii) Availability of all required resources at site prior to commencement of shutdown. Report on cases of non-completion/ delay in completion of scheduled activities due to non-availability of resources.
- (iv) Process of monitoring the progress of the shutdown on a real time basis.
- (v) Whether adequate contingency planning was in place to cover unplanned activities identified during shutdown. E.g., additional repair jobs identified after opening up of equipment.
- (vi) Whether extensions in shutdown time were authorized after detailed analysis of reasons.
- (vii) Adherence to stated safety norms during the shutdowns. Report on major safety related issues.

Shutdown Closure and Reporting

10.6 The following aspects need to be reviewed and validated during internal audit:

- (i) Review of shutdown report to validate:
 - (a) Completion of all planned activities as per scheduled timeliness.
 - (b) The unplanned activities carried out during the shutdown.
 - (c) Non completion/ delays in execution of planned activities with detailed reasons thereof.

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- (d) The total cost of the shutdown vis a vis budget with detailed justification of exceptions.
- (ii) Timely certification of all activities carried out during the shutdown.
- (iii) Timely return of all unused materials to stores.
- (iv) Timely de-mobilization of externally sourced resources from site.
- (v) Review of plant performance post shutdown to ensure that stated performance parameters have been achieved.

Chapter 11

Internal Audit – Sales and Distribution

Identification of Risk

11.1 The following factors are important for identification of risk:

- (i) Review the process of identifying the industry specific risk by the process owners.
- (ii) Report on adequacy of the steps taken to mitigate the risk.
- (iii) Review the variance analysis reported by the respective marketing department.
- (iv) Review and report on justification for variations.

Customer Master Management

11.2 The following are important factors with regards to customer management:

- (i) The process of creation of customer master & grouping as per the policy of the company.
- (ii) The criteria for groupings are followed and maintained in partner functions of enterprise ERP.
- (iii) The process for additions and deletions made to the group and identifying all cases where any addition/ deletion are not done as per the policy.
- (iv) The system for maintenance of records/ information with respect to group formation, and addition/ deletion therein.

Sales Management - Direct, Through Dealer and Consignment Agent

Pricing

11.3 The following are important factors with regards to pricing, payment terms and delivery orders release:

- (i) Check whether the Delivery Orders processed before price changes

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are invoiced as per the prevailing price (compare DO date, date of price change and invoice date)

- (ii) The price charged in the invoice with reference to pricing circulars/ pricing master in ERP.
- (iii) Whether the payment terms, Inco terms^{2*}, sales tax rates are correctly selected at the time of processing of order. Verify approvals for credit extended beyond agreed credit period (validation of customer master).
- (iv) The basis/ criteria for clearing of financial block, sales tax block while processing of order. Verify the approvals in case of deviations.
- (v) Delivery orders pending for dispatch for more than five days.
- (vi) The pricing master maintained in ERP with the pricing circular and timely updation and authorization in system.
- (vii) The criteria/ basis for prioritizing delivery orders for dispatch.
- (viii) Invoice checking w.r.t. norms such as, basic price, sales tax rate, etc.

Invoicing

11.4 Internal auditor should take following important aspects into accounts:

- (i) The process for charging excise duty and sales tax in the invoice.
- (ii) Cases where dispatch date is different than the invoice date.
- (iii) Cases where the price charged is different than the prices mentioned in do.
- (iv) The upfront discount given to the customer with the pricing circular and approval.
- (v) Process followed for monitoring of performance by customer where upfront discount is given.
- (vi) Whether all invoices are generated only through ERP system. Verify and report on any offline invoices prepared.

²*Inco Terms – International Commercial Terms are a series of pre-defined commercial terms published by the International Chamber of Commerce (ICC) that are widely used in International commercial transactions or procurement processes. A series of three-letter trade terms related to common contractual sales practices, the Inco terms rules are intended primarily to clearly communicate the tasks, costs, and risks associated with the transportation and delivery of goods like FOB(Free On Board), CIF(Cost, Insurance, Freight), etc.

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- (vii) Verify the adequacy of approvals from competent authority for issue of samples.
- (viii) The basis on which freight are charged in invoice to the customer in case of dispatches from plant. Check whether freight master in ERP is updated in timely manner.

DCA/ Agent Operation

11.5 The following are some important aspects related to DCA/ Agent operation:

- (i) Approval from competent authority is obtained for final settlement. Verify the documentation maintained for closure activities.
- (ii) The process of finalizing total dues to/ from agent/ DCA.
- (iii) Whether NOC obtained from all the customers is linked to the agent/ DCA whose services are discontinued.
- (iv) The receipt of indemnity bond from the discontinued agent/ DCA as per the policy of the company and as per the format prescribed.
- (v) Calculation of interest on security deposits from DCA at year end and TDS there on.
- (vi) Process followed for document collection, w.r.t., full and final settlement of DCA/ agent.

Credit Notes

11.6 The following are important aspects related to credit notes:

- (i) Whether the credit note proposals are approved by the competent authority.
- (ii) Whether appropriate transfers against credit notes for discounts and claims on sales made through agents are made to the account of agents.
- (iii) Whether credit notes issued to customers/ agents are adjusted towards overdue outstanding/ overdue interest/ any short payment only after approval of competent authority.
- (iv) Credit notes created manually/ through upload. Analyze the reasons for manual creation of credit notes and suggest on automation of issuance of such credit notes.

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- (v) Verify on test check basis detailed working and accounting of credit notes.
- (vi) Whether all the credit notes are sent within reasonable period.
- (vii) The process for creation/ updation and revision in rebate types. Verify that the rebate types are maintained as per the approved pricing circular/ approval from Pricing Committee.
- (viii) Whether changes/ amendments in the pricing/ discounts/ incentives policy are approved by appropriate authority and updated into the ERP system in timely manner.
- (ix) Whether timely updation in the system is done for changes in the grades or introduction of new grades.
- (x) The credit notes issued against complaints with approvals from the competent authority. Check the calculations of credit note as per approval.

Debit Notes

11.7 The following are important aspects with regards to debit notes:

- (i) Adherence to company policies for raising debit notes. Verify approvals for any deviations.
- (ii) Whether debit notes have been raised for overdue interest, delayed payment charges, trade/ cash discount reversals, cheque bounces, ET failure, rate differential recovery, etc.
- (iii) Reversal of special discounts and other discount.
- (iv) Whether the debit notes raised are sent to the customers before 15th of the following month.
- (v) The process of monitoring timely recovery of debit notes raised.
- (vi) Delays in appropriation of invoices and analyze the reasons for the same.
- (vii) Debit notes created manually/ through upload. Analyze the reasons for manual creation of debit notes and suggest on automation of issuance of such debit notes.
- (viii) Check calculation of debit notes on test basis and its accounting.
- (ix) Process for creation/ updation and revision in rebate types. Verify that the rebate types are maintained as per the approved pricing circular/ approval from Pricing Committee.

Taxation

11.8 The following are important aspects related to sales tax, excise and service tax:

(a) Sales Tax

- (i) Status of assessments completed for state sales and consignment agents sales under the jurisdiction of regional office.
- (ii) Whether sales tax collected from the customers are deposited on time.
- (iii) System for maintaining status of forms yet to be received, check forms available.
- (iv) The sales made at concessional rates without obtaining the forms.
- (v) Whether security cheques obtained in lieu of C forms are deposited into the bank for an amount equal to sales tax liability in case of non-receipt of C forms.
- (vi) State wise depot sales tax/ vat assessment status of/ DCAs.
- (vii) Sales tax payable and paid by Consignment Agent.
- (viii) Process of receipt of border forms for interstate stock transfer of material.

(b) Excise and Service Tax

- (i) Returns filed with excise authorities.
- (ii) Show-cause notices and compliance thereof.
- (iii) Whether credit on service tax on commission to agent has been availed. Report on cases of non-availment of service tax credit with ageing.
- (iv) Monthly provisions for discounts/ excise duty and stock reconciliation.

Sales Return

11.9 The following are important aspects related to sales return:

- (i) Process for passing credit notes towards returned material.
- (ii) Process for diversion sale.
- (iii) Credit notes/ replacements passed towards returned material.
- (iv) Process for receipt and storage of returned material.

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- (v) Whether approval from competent authority is obtained for sales returns.
- (vi) Adherences of sales return policy with ref to product policy.
- (vii) The system for disposal of returned materials and report cases where any such material is lying for more than 30 days.
- (viii) Sales returns and reasons for the same.
- (ix) Time period within which return material to be accepted had not expired.
- (x) Whether approval from competent authority is obtained for sales returns.

General ledger

11.10 The following are important for general ledger scrutiny:

- (i) Scrutinise general ledger balances.
- (ii) Review open items in GL accounts.
- (iii) Verify booking of accounting entries in appropriate cost centre and profit centre.

Debtors, Credit Management and Account Receivables

11.11 Internal auditor should cover following points for debtors, credit management and account receivable:

(a) Credit and Debtor Management

- (i) Process for fixation and monitoring of credit limit.
- (ii) Limits of postdated cheques/ Letter of Credit/ bank guarantees, authorized/ extended to DCAs/ customers.
- (iii) Process for updation of credit limit on receipt of any security in form of bank guarantees/ letter of Credit.
- (iv) Process for changes in the credit limit and report all cases where changes have been carried out without appropriate approval.
- (v) Sticky debtors and legal cases.
- (vi) Overdue debtors

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- (vii) Whether security cheques received from customers/ agents are scrolled into ERP and are in safe custody.
- (viii) Validity of the security cheques and authority letter obtained from customers/ agents.
- (ix) Verify the system of scrolling of postdated cheque, its timely deposition and timely uploading of deposition/ collection with reference to due dates of the invoices.
- (x) Physically verify the Postdated cheques lying with the ERP records.
- (xi) Verify the system for scrolling of cheques, safe custody and timely deposit into bank.
- (xii) Verify process for determination of due dates for payment of invoices, process for monitoring non-payment of invoices on due dates and verify whether debit notes are raised for delays in payment.
- (xiii) Verify process for segregation of cheques into high value and low value and report cases where high value cheques are deposited under low value clearing.
- (xiv) Verify process for recording and accounting of dishonoured cheques.
- (xv) Check that payees name is written on all instruments.
- (xvi) Collection of instruments is kept in safe custody.
- (xvii) Bank guarantees scrolling, scanning, authorized/ extended to DCAs/ customers.
- (xviii) Verify that penalty is levied as per policy.
- (xix) Whether any credit limit enhancement proposal is generated and action taken to address the same.
- (xx) Verify timely credit as per the FCS wise norms v/ s actual receipt.
- (xxi) Verify timely collections against dues from DCAs/ customers, and it's timely appropriation into customer's account.
- (xxii) Check the calculation of CMS charges/ collection charges paid to the banks.
- (xxiii) Verify process for collections through third party discounting.
- (xxiv) Verify process for creation of customer master.
- (xxv) Check whether duplicate customer exist under an agent.

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- (xxvi) Open line items in customer/ DCA/ consignment agent accounts and report on overdue entries lying for more than 30 days and any other debit open entries.
- (xxvii) Process for obtaining balance confirmations on monthly basis from consignment agents and DCAs.
- (xxviii) Process for maintaining of necessary records for transferring balances from one customer to other or from customer to DCAs.
- (xxix) Process for refund of old credit balances (more than a year) and report cases where proper approval has not been obtained.
- (xxx) Old unadjusted/ inappropriate balances in customer/ DCA/ consignment agent account.
- (xxxi) Open entries pertaining to debit notes raised and report cases where the debit notes are pending for realization/ adjustment for more than the 7th day of the month following the month of raising debit notes.

(b) Channel Financing

- (i) Verify system of scrolling of daily invoices for payments from channel banker and also instances and frequencies of e-payment failures.
- (ii) Verify invoices are scrolled for daily posting to banker and all corresponding credits have been obtained.
- (iii) Verify process for stoppage of supplies/ review of limits, of any customer in case of repeated returns.
- (iv) Whether Channel finance limit along with ERP limit is as per the prescribed norms and verify approvals for any exceptions.
- (v) Verify whether security cheques received from customers/ agents are scrolled into ERP and are in safe custody of the region.
- (vi) Validity of the security cheques and authority letter obtained from customers/ agents.

(c) Security

- (i) Verify the process for receipt and scrolling of bank guarantees from DCAs/ customers and report cases where scrolling is not done on the date of receipt.
- (ii) Verify whether bank guarantee are in the format prescribed.

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- (iii) Verify whether confirmations have been obtained from the issuing bankers in all cases for the bank guarantees.
- (iv) Physically verify bank guarantee received from customers with the ERP records.

Warehouse Management

11.12 The following are important aspects pertaining to internal audit:

- (i) Compliance of various statutory requirements, company guidelines by the depot/ warehouse.
- (ii) Conditions of stock stored and take physical verification in warehouses.
- (iii) Verify whether the RG-23D register is updated to reflect the position of stock of current date.
- (iv) Verify whether all physical movements of materials in warehouse are recorded.
- (v) Verify process for quantitative reconciliation/ RG 23D-modvat report with stock.
- (vi) Verify procedure of GRN preparations and report all cases where receipt details acknowledged in the receipted challan are different than the GRN details.
- (vii) Verify cases where shortages are booked other than through GRN. Check approval & recovery status on the same.
- (viii) Verify cases where receipt quantity/ quality are different than the invoiced quantity/ quality. Review the process of preparation of GRN in such cases. Report all cases where goods are lying as restricted stock for more than 15 days.
- (ix) Verify slow-moving/ non -moving items (if any).
- (x) Verify the stock in transit stock and report on materials that are in transit for more than 15 days.
- (xi) Verify system for disposal of returned materials and report cases where any such material is lying for more than 30 days.
- (xii) Verify system of preparation of invoices and exit entry and report major observations.
- (xiii) Verify status of pending claims and their resolution.

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- (xiv) Verify system of record keeping
- (xv) Verify cases where shortages are booked other than through GRN. Check approval and recovery status on the same and report on deviations.
- (xvi) Verify stock transfers between one warehouse to another warehouse affected during the period of audit coverage and scrutinize the implications, approvals, etc. Report major observations the scrutiny done.

Chapter 12

Internal Audit – Insurance

12.1 Insurance coverage of assets of a huge petrochemical plant is very critical in view of high risk involved in acceptance of the policy due to following factors:

- (i) Hazardous nature of the raw materials and product in the plant
- (ii) Criticality of the production involving high value with large potential fire hazard
- (iii) Connected third party claims due to surrounding risks and resultant consequential public liability as a result of happening of fire or other damages to the plant.

In view of the criticality and high value, the insurance premium is subject to many loading based on several parameters. However, if the Insurance Company is satisfied, after inspection of the plant, about the existence of favourable features, there will be reduction in premium outgo.

Factors Affecting Insurance Premium

12.2 The following process parameters are required to be identified for ascertaining the premium rate of the various blocks/ items/ tankages:

- (i) Separating distances
 - (a) Between plants/ process units.
 - (b) Between plant and tankage/ gas holders.
 - (c) Between plant and liquefied/ pressurized hydrocarbon/ substituted hydrocarbon/ hydrogen spheres or bullets.
 - (d) Between plant and utilities, auxiliaries, miscellaneous buildings and stocks in open.
 - (e) Between tankages/ gas holders and liquefied/ pressurized hydrocarbons/ substituted hydrocarbons/ Hydrogen spheres/ bullets.
 - (f) Between tankages/ gas holders and utilities, auxiliaries, miscellaneous buildings and stocks in open.

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- (g) Between liquefied/ pressurized hydrocarbon/ substituted hydrocarbon/ Hydrogen spheres/ bullets and utilities, auxiliaries, miscellaneous buildings and stocks in open.
- (h) Between two tanks/ gas holders.
- (ii) Type of unit operations/ process carried out such as, distillations, endothermic/ exothermic reactions, Alkylation, Halogenation, Oxidation, Nitration.
- (iii) Operating Conditions, such as, operating pressures, operating temperature.
- (iv) Hold-up of hydrocarbons, hydrogen and substituted hydrocarbons in the process equipment.
- (v) Details of storage tanks, i.e., type of tanks, contents.
- (vi) Loading warranties applicable to plants/ storages/ utilities for non compliance of fire protection infrastructures.
- (vii) Discount warranties applicable to plants, storages, and utilities for maintaining fire extinguishers equipment (FEA) installations.

Internal auditor should check whether all these measures have been taken to optimize the premium outgo for coverage of insurance since substantial reduction in premium are allowed for such favourable features.

Internal Audit Checklist

12.3 Internal auditor's procedures with respect to the various aspects of insurance would include following:

- (i) Verify adequacy of insurance coverage.
- (ii) Verify proper classification under insurance tariff and premium cost optimization.
- (iii) Verify all insurance policies are in force and valid.
- (iv) Verify that all claims are lodged and report on delays in lodgment of insurance claims and reason for the same.
- (v) Review system of timely alterations to sum insured on the basis of addition/ deletion to assets insured.
- (vi) Review system of receiving/ preserving documents necessary for filing of claims.
- (vii) Review system of follow up for settlement of claims with insurance companies.

Chapter 13

Internal Audit – Legal Compliance

13.1 The external environment is becoming much more demanding of strong corporate governance and good controls. Internal Audit has key role to play in providing independent assurance on the adequacy, appropriateness and effectiveness of internal controls and calibrates the chances of possible deviations; demonstrate transparency, accountability. This chapter provides a brief of current legislations applicable to petrochemical industry.

Statutory Regulations on Health, Safety and Environmental Protection

- (i) Various Registers/ records which are required to be maintained to comply with Health, Safety and Environment are as follows:

Sr. No.	Name of the Register	Name of the Statute	Form No./ Rules
1.	A permanent register giving full details of all gas holders.	Maharashtra Factory Rules, 1963	Form 13A/ Rule 73(A)(9)
		Gujarat Factory Rules, 1963	Rule 61(A)(8)(ii)
		Orissa Factory Rules, 1950	Form 83/ Rule 56-A(8)(ii)
2.	A copy of examination of gas holder by a competent person to be kept in the register	Maharashtra Factory Rules, 1963	Form 13B/ Rule 73(A)(10)
		Gujarat Factory Rules, 1963	Form 11A Rule 61(A)(8)(iv)
	The results of examination of water sealed gasholder	Orissa Factory Rules, 1950	Rule 56-A(8)(iii)
		Uttar Pradesh Factory Rules, 1950	Not specified
		Punjab Factory Rules,	

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Sr. No.	Name of the Register	Name of the Statute	Form No./ Rules
		1952	
3.	A register giving particulars of examinations of hoists or lifts.	Maharashtra Factory Rules, 1963	Form 11/ Rule 62
		Gujarat Factory Rules, 1963	Form 9/ Rule 58
		Orissa Factory Rules, 1950	Form 7-A/ Rule 55(1)
		Uttar Pradesh Factory Rules, 1950	Rule 55(1)
		Punjab Factory Rules, 1952	Form 23/ Rule 60(1)
4.	A register giving particulars of examination of lifting machines, ropes and lifting tackles.	Maharashtra Factory Rules, 1963	Form 12/ Rule 64(2)
		Gujarat Factory Rules, 1963	Form 10/ Rule 60(2)
		Orissa Factory Rules, 1950	Rule 55-C
		Uttar Pradesh Factory Rules, 1950	Rule 55-A(3)
		Punjab Factory Rules, 1952	Rule 60(3)
5.	A register containing information for the weekly checks carried out confirming the effectiveness of the inter-lock; weekly checks confirming all accessories are in good state of repairs; four hourly records of fuel oil temperature, pressure, thermic fluid	Maharashtra Factory Rules, 1963	Rule 73-ZA(xvii)
		Gujarat Factory Rules, 1963	Rule 68-D(20)
		Orissa Factory Rules, 1950	No register and record is specified.
		Uttar Pradesh Factory Rules, 1950	
		Punjab Factory Rules, 1952	

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Sr. No.	Name of the Register	Name of the Statute	Form No./ Rules
	inlet/ outlet pressure and temperature, flue gas temperature.		
6.	Health register containing the details of medical examination	Maharashtra Factory Rules, 1963	Form 7/ Rule 18(7)
		Gujarat Factory Rules, 1963	Form 32/ Rule 68T(1)(c)
		Orissa Factory Rules, 1950	Form 31/ Rule 96
		Uttar Pradesh Factory Rules, 1950	Form 27/ Rule 63-I(1)(c)
		Punjab Factory Rules, 1952	Form 34/ Rule 67-P(1)(c)
7.	A record of certificate of fitness of person employed for first time.	Maharashtra Factory Rules, 1963	Form 6/ Rule 73-V(2)
		Gujarat Factory Rules, 1963	Form 33/ Rule 68-T(2)
		Orissa Factory Rules, 1950	Form 30/ Rule 96
		Uttar Pradesh Factory Rules, 1950	Form 26/ Rule 63-I(2)
		Punjab Factory Rules, 1952	Form 32/ Rule 67-P(2)
8.	Minutes of Safety committee meeting shall be recorded.	Maharashtra Factory Rules, 1963	Rule 73-J(5)
		Gujarat Factory Rules, 1963	Rule 68-F(5)
		Uttar Pradesh Factory Rules, 1950	Rule 62-B(5)
		Punjab Factory Rules, 1952	Rule 66-F(5)
9.	A register of all	Maharashtra Factory	Form 30/ Rule

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Sr. No.	Name of the Register	Name of the Statute	Form No./ Rules
	accidents and dangerous occurrence.	Rules, 1963	123(1)
		Gujarat Factory Rules, 1963	Form 29/ Rule 111(1)
		Orissa Factory Rules, 1950	Form 26/ Rule 105
		Uttar Pradesh Factory Rules, 1950	Form 23/ Rule 122
		Punjab Factory Rules, 1952	Form 26/ Rule 111
10.	Inspection Book containing remarks passed by the Inspector or Certifying Surgeon	Maharashtra Factory Rules, 1963	Form 31/ Rule 124
		Gujarat Factory Rules, 1963	Form 31/ Rule 112
		Orissa Factory Rules, 1950	Rule 106
		Uttar Pradesh Factory Rules, 1950	Rule 123(a)
		Punjab Factory Rules, 1952	Form 35/ Rule 112
11.	Records of lime washing relating to dates on which white-washing, colour-washing, varnishing, etc are carried out	Maharashtra Factory Rules, 1963	Form 8/ Rules 20 and 51
		Gujarat Factory Rules, 1963	Form 7/ Rules 17 & 48
		Orissa Factory Rules, 1950	Form 7/ Rules 16 & 47
		Uttar Pradesh Factory Rules, 1950	Form 8/ Rules 17(2) & 48
		Punjab Factory Rules, 1952	Form 7/ Rules 18 & 49
12.	The report of the result of examination of Pressure Plant and	Maharashtra Factory Rules, 1963	Form-13/ Rule 65(7)(b),
		Gujarat Factory Rules,	Form-11/ Rule

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Sr. No.	Name of the Register	Name of the Statute	Form No./ Rules
	vessels operated over atmospheric pressure shall be maintained.	1963	61(9)(b)
		Orissa Factory Rules, 1950	Form-8/ Rule 56(9)(b)
		Uttar Pradesh Factory Rules, 1950	Form-9/ Rule 56(9)(b)
		Punjab Factory Rules, 1952	Form-8/ Rule 61(7)
13.	A record in respect of monitoring of working environment in the factory.	Gujarat Factory Rules, 1963	Form-37/ Rule 12B
14.	The record of inspection and test shall be maintained for connections and contacts of the tank or receptacle required under rule 127 as inspected by a competent person by means of a direct reading instrument such as a Megar.	Petroleum Rules, 2002	Rule 128
15.	The record of testing of relief valves shall be maintained. The test certificate shall be issued in the prescribed proforma.	Petroleum Rules, 2002	Rule 18(2)(xiii)
16.	The Certificate of electrical installation issued by a competent person before engineering any electric circuit and	Petroleum Rules, 2002	Rule 114

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Sr. No.	Name of the Register	Name of the Statute	Form No./ Rules
	any electric apparatus in hazardous area for the first time and after each repair, maintenance and alteration work carried out in circuit or apparatus. The retention period of certificate is max 3 months.		
17.	One copy of the plan or plans for the licensed premises signed in token of approval by the Chief Controller or Controller shall be attached to the license, which shall form part of such license.	The Static and Mobile Pressures (unfired) Rules, 1981	Rule 51(2)
18.	The owner of a cylinder shall keep for the life of each cylinder, a record containing the following information regarding each cylinder, namely:- (i) Cylinder manufacturer's name and the rotation number; (ii) The specification number to which the cylinder	The Gas Cylinders Rules, 2004	Rule 27

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Sr. No.	Name of the Register	Name of the Statute	Form No./ Rules
	is manufactured; (iii) Date of original hydrostatic test or hydrostatic stretch test; (iv) Cylinder manufacturer's test and inspection certificates; (v) Number and date of letter of approval granted by the Chief Controller.		
19.	Hazardous chemicals covered under Schedule 1 may be imported subjected to certain conditions including that the:- Occupier to maintain records of imports of hazardous chemicals in the format as per schedule 10	Manufacture, storage and import of hazardous chemical rules 1989, amended in 2000	Rule 18(5)
20.	Maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/ or handling of biomedical waste.	Bio-medical waste (Management and Handling) Rules, 1998	Rule 11
21.	Maintain records in Form 3 for generation, collection, reception, treatment, transport, storage and disposal	Hazardous Wastes(Management & Handling) Rules, 1989	Form 3/ Rule 9(1),

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Sr. No.	Name of the Register	Name of the Statute	Form No./ Rules
	of hazardous waste.		
22.	Maintain a record of such auctions.	Batteries (Management & Handling) Rules, 2001	Rule 11(iii)
23.	Record of tests of Fire extinguishes shall be maintained.	Indian Electricity Rules, 1956	Rule 43(1)
24.	A record of every earth test made and the result thereof shall be kept by the supplier for a period of not less than two years after the day of testing	Indian Electricity Rules, 1956	Rule 61(6)

- (ii) The various returns/ documents/ payments to be made under various statutes to comply with the Health, Safety and Environment Regulations are:

Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
1.	Stability Certificate	Maharashtra Factory Rules, 1963	Form IA/ Rule3(A)	Submit Stability certificate on construction, reconstruction of a factory and once every 5 years or after extension, alteration, repairs or addition or	Chief Factory Inspector.
		Gujarat Factory Rules, 1963	Form IA/ Rule3(C)		

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				replacement of plants & machinery.	
		Orissa Factory Rules, 1950	Form I-A/ Rule 3-A	Submit Stability certificate on construction, reconstruction, extension or taken into use as a factory or part of a factory.	
		Uttar Pradesh Factory Rules, 1950	Form 2/ Rule 3(3)		
		Punjab Factory Rules, 1952	Form 1-B/ Rule 4	Submit Stability certificate on construction, reconstruction or any building taken into use as a factory or part of a factory and before addition & use of new plant & machinery.	
2.	Notice of occupation	Maharashtra Factory Rules, 1963	Form 2/ Sec 7(1) & Rule 14	15 days before any premises is	Chief Factory Inspector.

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
		Gujarat Factory Rules, 1963	Form 2/ Sec 7(1) & Rule 12	occupied or used as a factory.	
		Orissa Factory Rules, 1950	Form 2/ Sec 7(1) & Rule 12		
		Uttar Pradesh Factory Rules, 1950	Form 4-B/ Sec 7(1) & Rule 14-C		
		Punjab Factory Rules, 1952	Form 2/ Sec 7(1) & Rule 15		
3.	Notice of change of Manager	Maharashtra Factory Rules, 1963	Form 5/ Sec 7(4) & Rule 15	Within 7 days from the date on which the newly appointed manager takes over charge.	Chief Factory Inspector.
		Gujarat Factory Rules, 1963	Form 3A/ Sec 7(4) & Rule 12A		
		Orissa Factory Rules, 1950	Form 3/ Sec 7(4) & Rule 12-A		
		Uttar Pradesh Factory Rules, 1950	Form 4-A/ Sec 7(4) & Rule 14-D		
		Punjab Factory Rules, 1952	Form 2-A/ Sec 7(4) & Rule 15-		

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
			A		
4.	Notification of accidents	Maharashtra Factory Rules, 1963	Form 24/ Rule 115 (1) & (2)	Send written report confirming the notice within 12 hours of the taking place of accidents which cause death to any person or are of a serious nature that is likely to prove fatal.	Chief Factory Inspector, District Magistrate, OR Sub-divisional Magistrate, Officer-in-charge of nearest Police station, the relatives of the injured or deceased person
			Form 24/ Rule 115 (3)	Send written report confirming the notice within 24 hours after expiry of 48 hours immediately following the accident which cause such bodily injury as prevented or will probably	Chief Factory Inspector

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				prevent the injured person from working.	
			Form 24-A/ Rule 115(1) & (2)	Send written report confirming the notice within 12 hours of the taking place of dangerous occurrence.	Chief Factory Inspector, District Magistrate, OR Sub-divisional Magistrate, Officer-in-charge of nearest Police station,
		Employees State Insurance (General) Regulations, 1950	Form 16/ Regulation 68	Within 12 hours of the taking place of accidents or dangerous occurrence.	Administrative Medical Officer
		Gujarat Factory Rules, 1963	Form 21/ Rule 103 (1), (2) & (3)	Send written report confirming the notice within 12 hours of the taking place of accidents which cause death to any person or	Chief Factory Inspector, District Magistrate, OR Sub-divisional officer, Officer-in-charge of nearest

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				are of a serious nature that is likely to prove fatal.	Police station, the relatives of the injured or deceased person.
			Form 21/ Rule 103 (4)	Send written report confirming the notice within 24 hours after expiry of 48 hours immediately following the accident or dangerous occurrence which cause such bodily injury as prevented or will probably prevent the injured person from working.	Chief Factory Inspector
			Form 21-A/ Rule 103 (1), (2) & (3)	Send written report confirming the notice within 12 hours of the	Chief Factory Inspector, District Magistrate, OR Sub-

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				taking place of dangerous occurrence.	divisional officer, Officer-in-charge of nearest Police station,
		Orissa Factory Rules, 1950	Form 18/ Rule 97(1) & (2)	Send written report confirming the notice within 12 hours of the taking place of an accident or dangerous occurrence causing death or bodily injury to any person as is likely to cause his death.	Chief Factory Inspector, District Magistrate, OR Sub-divisional Officer, Officer-in-charge of nearest Police station, the relatives of the injured or deceased person.
			Form 18/ Rule 97(1), (2) & (3)	Send written report confirming the notice within 24 hours after expiry of 48 hours immediately	Chief Factory Inspector

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				following the accident or dangerous occurrence which cause such bodily injury as prevented or will probably prevent the injured person from working.	
			Form 18-A/ Rule 97(1) & (2)	Send written report confirming the notice within 12 hours of the taking place of dangerous occurrence which has not resulted in bodily injury to any person.	Chief Factory Inspector, District Magistrate, OR Sub-divisional Officer, Officer-in-charge of nearest Police station
		Uttar Pradesh Factory Rules, 1950	Form 18/ Rule 110 (1), (2) & (3)	Confirm notice within 12 hours of the taking place of an accident or dangerous occurrence	Chief Factory Inspector, District Magistrate, OR Sub-divisional Officer,

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				causing death or bodily injury to any person as is likely to cause his death.	Officer-in-charge of nearest Police station, the relatives of the injured or deceased person.
			Form 18/ Rule 110 (1), (2) & (4)	Send written report confirming the notice within 24 hours after expiry of 48 hours immediately following the accident or dangerous occurrence which cause such bodily injury as prevented or will probably prevent the injured person from working	Chief Factory Inspector
			Form 18-A/ Rule 110(1) &	Confirm notice within 12 hours of	Chief Factory Inspector,

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
			(2)	the taking place of dangerous occurrence which has not resulted in bodily injury to any person.	District Magistrate, OR Sub-divisional Officer, Officer-in-charge of nearest Police station
		Punjab Factory Rules, 1952	Form 18/ Rule 103 (1), (2) & (3)	Confirm notice within 12 hours of the taking place of an accident or dangerous occurrence causing death or bodily injury to any person as is likely to cause his death.	Factory Inspector, Chief Factory Inspector, District Magistrate, OR Sub-divisional Magistrate, Officer-in-charge of nearest Police station,
			Form 18/ Rule 103 (4)	Send written report confirming the notice within 24 hours after expiry of 48 hours immediately	Factory Inspector and Chief Factory Inspector

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				following the accident or dangerous occurrence which cause such bodily injury as prevented or will probably prevent the injured person from working.	
			Form 18-A/ Rule 103(1) & (3)	Confirm notice within 12 hours of the taking place of dangerous occurrence which has not resulted in bodily injury to any person.	Factory Inspector, Chief Factory Inspector, District Magistrate, OR Sub-divisional Officer, Officer-in-charge of nearest Police station
5.	Notification of fatal accident in connection with the generation, transmission	Indian Electricity Rules, 1956	Rule 44A	A telegraphic report within 24 hours of the knowledge of the occurrence	Electrical Inspector

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
	supply or use of Electrical energy			of the fatal accident and a written report in the form set out in Annexure XIII within 48 hours of the knowledge of occurrence of fatal and all other accidents.	
6.	Furnish a copy of entries in the Register of accidents and dangerous occurrences relating to the year immediately precedes the 1 st January	Maharashtra Factory Rules, 1963	Form 30/ Rule 123(2)	Annually before 15th February.	Chief Factory Inspector
		Gujarat Factory Rules, 1963	Form 29/ Rule 111(2)		
		Orissa Factory Rules, 1950	Not specified		
		Utter Pradesh Factory Rules, 1950			
		Punjab Factory Rules, 1952			
7.	Notice of poisoning & disease	Maharashtra Factory Rules, 1963	Form 25/ Rule 116	Within 4 hours.	Administrative Medical Officer, Employees

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
					State Insurance Scheme, Bombay, Chief Inspector, Medical Inspector of Factories
		Gujarat Factory Rules, 1963	Form 22/ Rule 104	Immediately	Chief Inspector, Certifying surgeon
		Orissa Factory Rules, 1950	Form 19/ Rule 98		
		Utter Pradesh Factory Rules, 1950	Form 19/ Rule 112		
		Punjab Factory Rules, 1952	Form 19/ Rule 104		
8.	Report of accidental release or likely to be discharged of polluted water into a stream or well or sewer or on land.	Water (Prevention and Control of Pollution) Act, 1974	Sec 31(1)	Immediately	State Pollution Control Board & Chief Factory Inspector.
9.	Report of	Air	Sec 23	Immediately	State

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
	accidental release or likely to be released of any air pollutant into the atmosphere in excess of the standards laid down by SPCB	(Prevention and Control of Pollution) Act, 1981			Pollution Control Board & Chief Factory Inspector.
10.	A written report	Manufacture, storage and import of hazardous chemical rules, 1989	Schedule 7/ Rule 7(1)	3 months before undertaking any industrial activity.	State Pollution Control Board & Chief Factory Inspector.
		Gujarat Factory Rules, 1963	Schedule 7/ Rule 68-J(6)(1)		
11.	A Safety report	Manufacture, storage and import of hazardous chemical rules, 1989	Schedule 8/ Rule 10(1)	90 days before undertaking any industrial activity.	Chief Factory Inspector & State Pollution Control Board
		Gujarat Factory Rules, 1963	Schedule 8/ Rule 68-J(9)(1)	3 months before undertaking any industrial activity	

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
			Rule 68-J(10)(2)	Within 3 years of the date of the last such report and submit a copy of the same within 1 month.	
12.	A Safety Audit report	Manufacture, storage and import of hazardous chemical rules 1989,	Rule 10(4),10(5) & 10(6)	Once a year and report to be submitted within 30 days.	Chief Factory Inspector & State Pollution Control Board
13.	Updated Safety Audit Reports	Manufacture, storage and import of hazardous chemical rules 1989,	Rule 11(1)	90 days before making any modification in industrial activity	Chief Factory Inspector & State Pollution Control Board
14.	Mock drill of Onsite emergency plan	Manufacture, storage and import of hazardous chemical rules 1989,	Rule 13(4), & 13(5)	Every six months and send detailed report immediately.	Chief Factory Inspector & State Pollution Control Board
15.	Notification of major accident	Manufacture, storage and import of hazardous chemical	Schedule 6/ Rule 5	With 48 hours of taking place of an	Chief Factory Inspector & State Pollution

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
		rules 1989,		accident.	Control Board
		Gujarat Factory Rules, 1963	Schedule 6/ Rule 68-J(4)(1)	Forthwith intimate & report	Chief Factory Inspector & Factory Inspector
16.	Import of hazardous chemicals	Manufacture, storage and import of hazardous chemical rules 1989,	Rule 18(2)	Before 30 days or as reasonably possible but not exceeding the date of import	Chief Controller of Imports & Exports under Import & Export (Control) Act, 1974
17.	Annual Report	Bio-medical waste (Management and Handling) Rules, 1998	Form II/ Rule 10	By 31st January every year	State Pollution Control Board
18.	Test report of tanks	Petroleum Rules, 2002	Rule 126	Before being put into use after being installed and secured in the final position or after undergoing re-installation or any major repair	Chief Controller of Explosives.

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
19.	Certificate of safety issued by a competent person in the proforma	Petroleum Rules, 2002	Rule 130	Before any petroleum is stored in an installation or service station first time or whenever any additions or alterations to the enclosure walls and embankment s are carried out or when a tank is installed or its position shifted.	Chief Controller of Explosives.
20.	No Objection certificate	Static and Mobile Pressures (unfired) Rules, 1981	Rule 46A	For a new license to store compressed gas in pressure vessels	Chief Controller of Explosives.
21.	Notice of accident	Gas Cylinders Rules, 2004	Rule 67	Confirm notice within twenty four hours by a letter giving particulars of the	Chief Controller of Explosives, District Magistrate, & Officer-

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				occurrence	in-charge of nearest Police station.
22.	End-use certificates from the consumers and furnish customer-wise sales	Solvent, Raffinate and Slop (acquisition, Sale, Storage and Prevention of use in Automobiles) Order, 2000	Clause 3(3)	Quarterly basis	District Magistrate or to the State Civil Supplies Authorities
23.	End-use certificates	Solvent, Raffinate and Slop (acquisition, Sale, Storage and Prevention of use in Automobiles) Order, 2000	Clause 3(4)	Quarterly basis	District Magistrate or to the State Civil Supplies Authorities
24.	End-use certificates from the consumers and furnish customer-wise sales	Naptha (acquisition, Sale, Storage and Prevention of use in Automobiles) Order, 2000	Clause 3(iv)	Quarterly basis	District Magistrate or to the State Civil Supplies Authorities
25.	End-use certificates	Naptha (acquisition, Sale,	Clause 3(v)	Quarterly basis	District Magistrate or to the

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
		Storage and Prevention of use in Automobiles) Order, 2000			State Civil Supplies Authorities
26.	Annual Report	Bio-medical waste (Management and Handling) Rules, 1998	Form II/ Rule 10	By 31st January every year	State Pollution Control Board or Committee.
27.	Copy 1 of (white) Manifest	Hazardous Wastes (Management & Handling) Rules, 1989	Form 9/ Rule 7(4), 7(5),	Whenever hazardous waste is sent for disposal.	State Pollution Control Board or Committee.
28.	Additional Copy 1 of (white) Manifest	Hazardous Wastes (Management & Handling) Rules, 1989	Form 9/ Rule 7(4), 7(5)	In case hazardous waste is likely to be transported through any transit state.	Concerned State Pollution Control Board or Committee.
29.	Provide relevant information	Hazardous Wastes (Management & Handling) Rules, 1989	For 10/ Rule 7(7)	Whenever hazardous waste is sent for disposal.	The transporter
30.	Environmental Impact Assessment (EIA)	Hazardous Wastes (Management & Handling) Rules, 1989	Rule 8(3)	Whenever a site is identified for establishing the facility for	State Pollution Control Board or Committee.

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
				treatment, storage and disposal of hazardous waste	
31.	Annual returns of hazardous waste	Hazardous Wastes (Management & Handling) Rules, 1989	Form 4/ Rule 9(2)	by 31st January every year	State Pollution Control Board or Committee.
32.	Accident report	Hazardous Wastes (Management & Handling) Rules, 1989	Form 5/ Rule 10	Immediately	State Pollution Control Board or Committee.
33.	Annual returns of auction of Non-ferrous metal wastes/ Used oil/ Waste oil	Hazardous Wastes (Management & Handling) Rules, 1989	Form 13/ Rule20(5)	by 31st January every year	State Pollution Control Board or Committee.
34.	Environmental statement for the financial year ending 31st March	Environmental Protection Rules, 1986	Form V/ Rule14	On or before 30th September every year	State Pollution Control Board.
35.	Fact of occurrence of discharge of environment	Environmental Protection Rules, 1986	Rule12	Immediately	Officer in-charge-of emergency or disaster relief

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
	al pollutant in excess of the prescribed standards or apprehension of such occurrence				operation in a district or other region of a State or Union territory, Regional Officer of CPCB or SPCB, Chief Inspector of Factories.
36.	Half yearly returns of auctions of used batteries	Batteries (Management & Handling) Rules, 2001	Form IX/ Rule 11(ii)	By 30 th June and 31 st December every year	State Pollution Control Board.
37.	Quantity of water consumed in the previous month.	Water (Prevention and Control of Pollution) Cess Rules, 1978	Form I/ Rule 4(1)	On or before 5th of every calendar month	Member Secretary of Central Pollution Control Boards/ State Pollution Control Board or Nominated member of State Pollution Control Committee.

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Sr. No.	Nature of Return/ Compliance	Name Of The Statute	Form/ Rules	Time Limit	To be sent to
38.	Environment Audit	Gujarat High Court orders dtd. 20.12.96 & 13.3.97 and modified vide order dtd. 16.6.99	-	On or before 31 st January every year	Gujarat Pollution Control Board
39.	Payment of Cess	Water (Prevention and Control of Pollution) Cess Act, 1977	Sec 6(2)	Before the due date specified on the assessment order	State Pollution Control Board.
40.	Particulars regarding nucleonic gauges and analyzers	Radiation Protection Rules, 1971	Proforma - C	Furnish information in the first week of January and July every year	Head RSD, AERB.
41.	Forward test report of every high or extra-high voltage circuit or additions thereto, other than an Overhead line.	Indian Electricity Rules, 1956	Rule 63(2)	Before making an Application for approval.	Electrical Inspector