Appendix - 1

ISO 9000 "Quality System"

A 1.1 INTRODUCTION

- The **ISO 9000**, a well-known and widely accepted **Quality Management System**, is a series of *standards* developed by the **International Organization for Standardization** (ISO) in Geneva, Switzerland.
- There are *five standards* in the ISO 9000 series, ISO 9000-9004.
  ISO 9001, 9002 and 9003 are applicable to contractual situations.
  ISO 9004 is for non-contractual cases and used for internal management purposes.
- **ISO 9000**
  It is the contour map furnishing the guidelines for selection and use of ISO series standards.
- **ISO 9001**
  Model for quality assurance in design/development, production, installation and servicing.
- **ISO 9002**
  Model for quality assurance in production and installation.
- **ISO 9003**
  Model for quality assurance in final inspection and test.
- **ISO 9004**
  Quality management and quality system elements — Guidelines.

As part of ISO 9000's commitment to continuous improvement, the standards are reviewed every five years.

A 1.2 NEED FOR ISO 9000 CERTIFICATION

- Customers, all over the world, like to have confidence in manufacturer's capability to design, develop, produce and service. *Competition* is forcing industries to get *ISO 9000 certification.*
- Today, more than 40 countries worldwide have already adopted ISO 9000.
- Already European markets are insisting on ISO 9000 certification. Very soon it will be a pre-qualification for bidding in the markets.
- ISO 9000 is the only credibility passport which certifies that a company meets international standards in designing, developing, producing, installing and servicing the products it supplies.
- The time has already come, when an industry will not be able to export to World markets without ISO 9000 certification.

- Few Indian industries have already got ISO 9000 accreditation of their quality system and many more are at various stages of implementation.
- ISO 9000 is based on the philosophy that an integrated, systematic and planned approach only can ensure quality.

  ISO 9000 has originated from Western Countries and is a documentation oriented quality system requiring participation by *all.*

  Since cultural, economic, political and social differences between Western Countries and India are great, so certain *obstacles* are clearly in the way to implement ISO 9000 in India.
- The Indian Industry will have to overcome the following *obstacles/weaknesses* in order to improve quality and not only to get ISO 9000 accrediation but to sustain it also :

(1) Lack of faith. The management lacks faith in workers (unions) and vice-versa.
(2) Lack of clarity/seriousness for achieving targets.
(3) Lack of precise observation of rules and norms.
(4) Low quality of items bought from vendors.
(5) Management view of short term benefits.
(6) Politicalisation of Labour Unions.
(7) Lack of accountability for actions.
(8) Lack of top management commitment.
(9) Lack of national quality policy.
(10) Inadequate infrastructure.
(11) Quantity before Quality.
(12) Lack of planning.
(13) Lack of manufacturing and test facilities.
(14) Lack of education and training of workers.
(15) Passive attitude of Industry towards Quality.
(16) Lack of professional attitude.
(17) Indian cultural factors.
(18) Resistance to change etc.

A 1.3 BENEFITS OF ISO 9000 CERTIFICATION

There are manifold benefits, direct as well as indirect, resulting from ISO 9000 Quality Systems Standards. Some of them are given below.

(1) ISO 9000 provides a competitive edge in the domestic and global markets.
(2) It provides a climate for consistent improvement in quality.
(3) It reduces wastes and repairs — enhancing profits in turn.
(4) It maintains streamlined records.
(5) It maintains streamlined material handling and storage.
(6) It changes the attitude of workforce, the result is — improved house keeping, work atmosphere and quality awareness.
(7) Process of quality improvement is maintained.
(8) Products right in the first instance, no rework and nothing for rectification.
(9) ISO 9000 gives international recognition of ability, credibility and expertise, thereby increasing the number of customers.

(10) Supplier without ISO certification can face higher insurance rates, or, be denied insurance in some markets.

A 1.4 LIMITATIONS OF ISO 9000

(1) Implementation of this system is very demanding of resources.
(2) Assessment and registration are expensive.
(3) Work-culture need to be changed/improved.
(4) Upgrading of manufacturing and test facilities is essential.
(5) Unless carefully planned, the system can become non cost effective.
(6) Dedication, will to improve and constant improvement are must for success.

A 1.5 THE QUALITY NOTION

- **Quality** is the conformance to requirement or specification.
- **Quality** is the fitness for the purpose. In other words if a product serves your purpose well, it can be called of good quality.
- Quality is what the customer wants.
- According to ISO 8402 (1986) :
  Quality is defined as the totality of features and characteristics of product or service, in conformance with the customer's stated or implied *needs*. Needs may include safety, reliability, maintainability, economics etc.
- The term quality is not used to express a degree of excellence in a comparative sense nor it is used in a quantitative sense for technical evaluations. In these cases, a qualifying objective shall be used.
- The *quality* should not be confined to *product* quality alone, rather quality should mean — to be the quality of the *system*. Quality cannot be inspected into a product, it has to be manufactured along it. The concept of quality as an inspection function is obsolete now, it is perceived to be a process control function.

Quality Control

- The operational techniques and activities that are used to fulfil requirements for quality is **Quality Control.**
- *Quality control* involves operational techniques and activities aimed both at monitoring a process and at eliminating causes of unsatisfactory performance at relevant stages of the quality loop (quality spiral) in order to result in economic effectiveness, (Fig. A.1).
- There are two main aspects of Quality control.
  (i) *Make things right first time.* In other words, production should be defect free.
  (ii) Work for continual improvement in quality.

Quality Policy

- The overall quality intentions and direction of an organization as regards quality, as formally expressed by top management.
- Quality policy shall be consistent with Company's policy and the top-management must ensure that its corporate quality-policy is clearly understood, implemented and maintained. This will ensure the degree of commitment of top-management to quality.

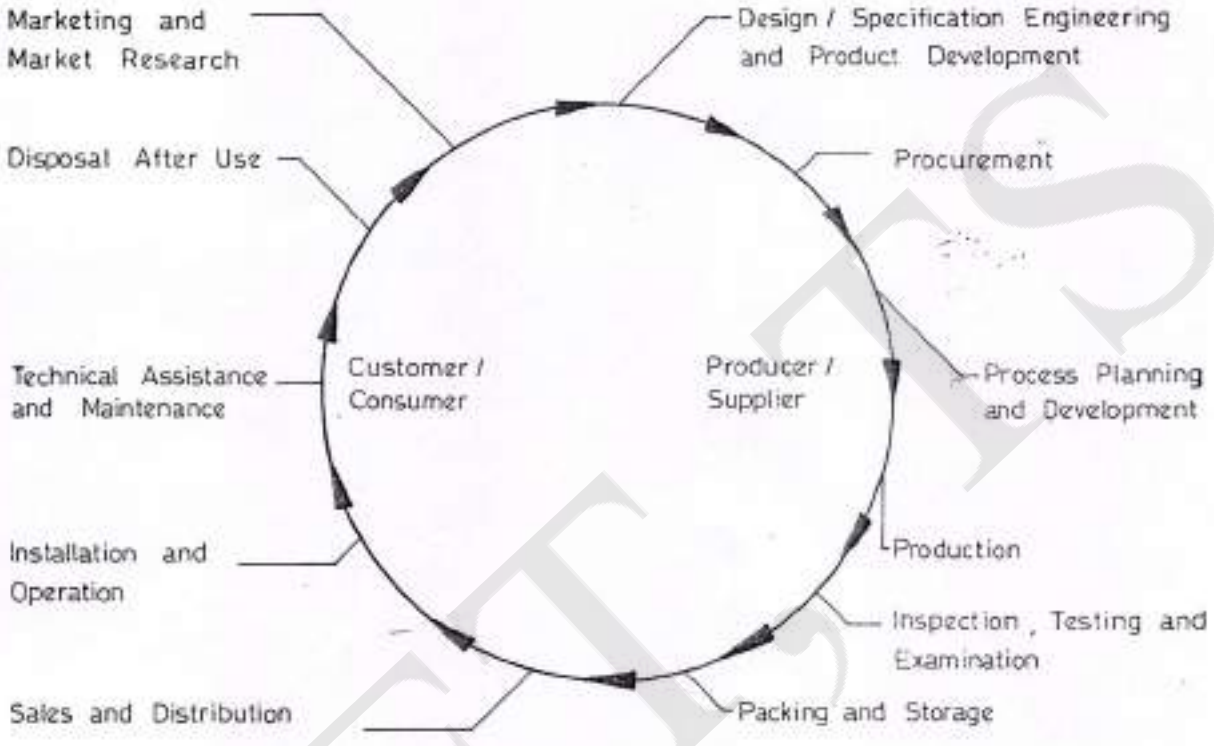

Fig. A. 1. Quality loop

- Quality policy shall cover the areas in terms of quality improvement and strategic planning: the design, conformance to design, field service and marketing.
- Quality policy must clearly state key-elements of quality such as fitness for use, performance, safety, reliability etc. Product design shall meet the customer's quality requirements including functional, safety etc. Every attempt shall be made to adhere to specifications during manufacture.

Quality Management

- That aspect of the overall management function that determines and implements the quality policy.
- Quality management includes strategic planning, allocation of resources and other systematic activities for quality, such as quality planning, operations and evaluations.
- The attainment of desired quality requires the commitment and participation of all members of the organization whereas the responsibility for quality management belongs to top management.

Quality System

- The organizational structure, responsibilities, procedures, processes and resources for implementing quality management.

- The quality system should only be as comprehensive as needed to meet the quality objectives.

Benefits of Quality Systems :

(1) Quality performance is institutionalized.
(2) Efficient tool to achieve and ensure consistent quality improvement.
(3) Reduces wastes and time consuming reworks and repairs — increasing profits in turn.
(4) Saves money as quality system ensures efficient and sound procedures.
(5) Provides a competitive edge in domestic as well as global market.
(6) Brings confidence to the consumer.

Quality Assurance

- All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality.
- For effectiveness, quality assurance usually requires a continuing evaluation of factors that affect the adequacy of the design or specification for intended applications as well as verifications and audits of production, installation and inspection operations. Providing confidence may involve producing evidence.
- *Within* an organization, quality assurance serves as a management tool. In *contractual situations* quality assurance also serves to provide confidence in the supplier.

Quality Objective

(1) The organization should achieve and sustain the quality of the product so as to meet continually the purchaser's stated or implied needs.
(2) The organization should provide confidence to its own management that the intended quality is being achieved and sustained.
(3) The organization should provide confidence to the purchaser that the intended quality is being, or will be, achieved in the delivered product or service provided. When contractually required, this provision of confidence may involve agreed demonstration requirements.

A 1.6 TOTAL QUALITY ELEMENTS/INGREDIENTS

There are four basic elements of total quality operation :

(a) Quality awareness.
(b) Management Attitude.
(c) Tools and Techniques of Process Management.
(d) Quality System Standards.

(a) Quality Awareness

- Company-wide awareness as regards *quality* is must from top to bottom if manufactured goods and services have to meet the customer's specifications and requirements.
- The company must communicate its *quality objectives* to the workforce, through *quality awareness programmes,* stressing on the following *points* :

(i) To make quality as the foremost policy.
(ii) Customer's requirements first.
(iii) Products/services right first time (prevention tha cure).

13. **Control of Non-Conformity Product** : Non-Conformity of product be prevented from inadvertent use or installation. The non-conformity product be identified and arrangements be made for its disposition and notification to the functions concerned.
14. **Corrective Action :** Whenever a discrepancy is observed during an audit, the cause of non-conformity be investigated and corrective action taken to prevent re-currence.
15. **Handling, Storage, Packing and Delivery :** The procedures for handling, storage packaging and delivery of the product be well established, documented and maintained.
16. **Quality Records :** Identify the features essential to a record document to qualify it as objective evidence on quality. Records shall be legible and identifiable to the product involved.
17. **Internal Quality Audits :** The management shall plan and execute quality audits to verify whether the quality activities comply with planned arrangements and to determine the effectiveness of the quality system.
18. **Training :** Identify the training needs and provide for training of all personnel performing activities affecting quality.
19. **Servicing :** If servicing is specified in the contract the management shall establish and maintain procedures for performing and verifying that servicing meets the specified requirements.
20. **Statistical Techniques** : Where appropriate, the management shall establish procedures for identifying adequate statistical techniques required for verifying the acceptability of process capability and product characteristics.

A 1.8 ISO 9000 QUALITY SYSTEM SERIES

Introduction

- *ISO is the international organisation* for standardisation, set up with the objective to promote the development of standards and related activities, for facilitating *international exchange of goods and services.*
- *ISO 9000 series of standards* developed in 1987, *relate to quality systems.* It has evolved from the standardization of *quality assurance system standards* of several nations all over the world.
- The standards allow a wide flexibility, but, at the same time, are rigid too. They permit a supplier to formulate his own *quality policy* and write the *quality manual*, procedures and instructions in his own way, within the frame work of the system elements, but does not allow rendering of nonconforming products or services.
- For an organization having several good quality systems, ISO 9000 certification is just a step ahead, for others it means a quantum jump, presenting real challenge.

Characteristics of ISO 9000

(i) ISO 9000 can be implemented in any type and size of organization.
(ii) It is independent of the product, size and country.
(iii) It has international acceptance and recognition.
(iv) It ensures consistent improvement in quality.

ISO 9000 series

- There are *five standards* in the ISO 9000 series, ISO 9000-9004.
- ISO 9001, 9002 and 9003 are applicable to *contractual situations.*
- ISO 9004 is for *non-contractual* cases and is used for internal management purpose.

In the *contractual cases,* the *purchaser* contractually requires that certain quality system elements be part of the *supplier's* quality system so that he gets quality products at consistent level. The purchaser wants to make sure that the supplier has the capability to meet contractual requirements.

The same supplier may sell some products in *Contractual situations* and others in *non-contractual situations* where he is not bound by any specific written quality contract; but some standard of quality is even then to be maintained.

	International Standard	*Corresponding Indian Standard*
(1)	ISO 8402 : 1986 Quality—Vocabulary	IS 13999 : 1988 Quality systems—Vocabulary (identical)
(2)	ISO 9000 : 1987 Quality management and quality assurance standards—Guidelines for selection and use	IS 14000 : 1988 Quality systems—Guidelines for selection and use of standards on quality systems (identical)
(3)	ISO 9001: 1987 Quality systems—Model for quality assurance in design/development, production, installation and servicing	IS 14001 : 1988 Quality systems—Model for quality assurance in design/development, production, installation and servicing (identical)
(4)	ISO 9002 : 1987 Quality systems—Model for quality assurance in production and installation	IS 14002 : 1988 Quality systems—Model for quality assurance in production and installation (identical)
(5)	ISO 9003 : 1987 Quality systems—Model for quality assurance in final inspection and test	IS 14003 : 1988 Quality systems—Model for quality assurance in final inspection and test (identical)
(6)	ISO 9004 : 1987 Quality management and quality system elements—Guidelines	IS 14004 : 1989 Quality systems—Guidelines on elements of quality management system (second revision) (Technically equivalent)

ISO 9000 series of standards deal with generic quality principles, the need for an international minimum standard to establish quality control methods not just to control product quality, but also to maintain it. People, today in the world market, want assurance that whether they will get reliable quality for their money.

ISO 9000 is a big success from day one and probably a first of its kind to go beyond nuts and bolts and attempt to address management practices.

ISO 9000

- It is the contour map furnishing the guidelines for selection and use of ISO series standards.
- It gives guidelines for selection and use of quality standards to have quality assurance.

- It provides the basis for the implementation of quality systems and their assessment and verification. In establishing a quality system it is essential that the organisation clearly defines the personnel who are responsible for functions affecting quality.
- The quality system will generally be codified in a series of documents which are commonly known as the **Quality Manual.** All aspects relating to quality should be identified in these documented procedures which should include all references to work instructions and records. The manual should also contain procedures for specific actions which need to be taken as part of the quality control procedure.

ISO 9001 Quality System

It is for *use* when conformance to specified requirements is to be assured by the supplier during several stages which may include design/development, production, installation and servicing.

ISO 9002 Quality System

It is for *use* when conformance to specified requirements is to be assured by the supplier during production and installation.

ISO 9003 Quality System

It is for use when conformance to specified requirements is to be assured by the supplier *solely* at final inspection and test.

- ISO 9001, 9002 and 9003 provide guidelines for external quality-assurance purposes in contractual situations. Therefore purchaser and supplier should refer to these standards to determine which of these standards is most relevant to the contract.

ISO 9004 Quality System

- ISO 9004 provides guidelines on the technical, administrative and human factors affecting the quality of products or services, at all stages of the *quality loop system* (Fig. A-1). In this standard, emphasis is laid on the satisfaction of the customer's need, the establishment of functional responsibilities and the importance of assessing the potential risks and benefits.

  ISO 9004 can be used for internal quality assurance.

  ISO 9004 may deal with quality related cost, quality in marketing, quality in specification and design, quality in procurement, quality in production, quality in documentation and records, corrective action etc.

It is intended that these international standards will normally be adopted in their present form, but on occasions they may need to be tailored for specific contractual situations. ISO 9000 provides guidance on such tailoring as well as selection of the appropriate quality assurance models.

A 1.9 PREREQUISITES FOR IMPLEMENTING ISO 9000 QUALITY SYSTEM

For effectively implementing ISO 9000 Quality systems, any organization must meet the following requirements:

(1) Development of Quality Awareness.
(2) Imparting Education and Training to Employees.

(3) Introduction of Motivation and Incentive Programs.
(4) Development of Measuring Equipments Laboratory.
(5) Development of Planning Scheme for implementation.
(6) Above all, to have firm commitment of top management to fully support the Quality system with a strong will and faith to make it success.

(1) **Development of Quality Awareness**

Every body in the organization from top to bottom should extend his wilful support to the quality program and make quality as the first policy.

(for details refer page A-5)

(2) **Imparting Education and Training to Employees**

- The first and most important component of managing quality project is education and training of employees.
- Purposeful education and training to the workforce at different levels is a must in order to make sure that the desired skill is available within the organization to meet International Quality Standards.
- Education and training should be job-oriented and must be an integral part of quality policy, because education and training are the basic requirements on the road leading to quality excellence, quality maintenance and quality improvement.
- Properly planned education and training makes each employee to understand the work to be performed by him. Training puts the education into practice.
- The education and training program should be structured for three levels on the lines of ISO 9004, as explained below:

(a) *Training for executives and managerial personnel*

- Understanding of quality system together with the tools and techniques needed for participation in the operation of the system.
- Understand the criteria to evaluate the effectiveness of the system.
- To make use of employees to achieve the quality targets.

(b) *Training for technical personnel*

Training should be imparted to technical persons in the following fields:

- Process engineering and Product engineering.
- On-line and Off-line quality control techniques.
- Statistical quality control techniques.
- Process capability studies.
- Quality improvement methods.
- Problem identification, problem analysis and corrective action.
- Material and equipment procurement, etc.

(c) *Training to work-force (shop floor) and production supervisors.*

This training should include

- Operation of machines, tools and instruments.

- Reading and understanding the documents provided.
- Relationship of their duties to quality and work place safety etc.

(3) Motivation and Incentive Programs

- Quality systems have clearly recognized the importance of *people* in achieving product quality on a consistent basis. Until and unless the workforce is motivated, the chances of success are not bright.
- The two main programs viz. *Zero Defect program* and *Quality Circles* (refer page 8–45) which enlist the cooperation, assistance and participation of employees to improve product have built-up motivational and incentive programs in them. (For motivation and incentive programs refer pages 19–20 and 30–31 respectively).

(4) Laboratory for Measuring Equipments

- In order to prove that yours is a quality product, you have to measure and control its *quality characteristics.*
- *Quality Characteristics* refer to product parameters (i.e. dimensions, shape etc.) that can be quantitatively assessed/measured by some equipment such as scale, vernier calliper, micrometer, gauges and comparators etc. The measured quality characteristics of a component are then compared with some *standards* and these standards are the foundation for quality. Standards establish the quality of products.

  Therefore, test methods and measuring equipments are extremely important components of quality system.
- A *Metrology and Material Testing Laboratory* is a very important prerequisite to make the Quality System a success.
- **According to ISO 9001 : 1987**
  (a) Identify the product measurements to be made in terms of accuracy required and select the measuring equipment and the appropriate inspection accordingly.
  (b) Accordingly, identify, calibrate and adjust all inspection, measuring and testing equipments those can affect product quality.
  (c) Establish document and maintain calibration procedures including details of equipments, frequency of checks, check method, acceptance criteria and the action to be taken when the results are not satisfactory.
  (d) Ensure the capability of accuracy and precision of the inspection, measuring and test equipments.
  (e) Ensure that environmental conditions are suitable for calibration, inspection, measurement and test being carried out.
  (f) Ensure the handling and storage of inspection, measuring and test equipments so that their accuracy is maintained.

(5) Planning Scheme for Implementation

- **Quality Planning** (ISO 9003 and 9004) is a written document which must be read and understood by every body from top to bottom in the organization before implementing quality systems.

- For projects relating to new products, services or processes, (ISO 9004), management should prepare, as appropriate, written **quality plans** consistent with all other requirements of a company's quality management system.

Quality Plan should Define

(a) the quality objectives to be attained;
(b) the specific allocation of responsibilities and authority during the different phases of the project;
(c) the specific procedures, methods and work instructions to be applied;
(d) suitable testing, inspection, examination and audit programmes at appropriate stages (for example, design, development);
(e) a method for changes and modification in a quality plan as projects proceed;
(f) other measures necessary to meet objectives.

- **Development Planning** should include the following because without these the *quality plans* cannot be developed:

(a) Clear cut definition of project and its objectives.
(b) Organization of project, team structure, contractors, subcontractors etc.
(c) Project schedule — the tasks to be performed and their time phases.
(d) How the project is to be managed.
(e) Development planning needs updating on the basis of feedback.

- **Verification** of each phase of development is a must. The supplier should get verified the output at the end of each phase.

  The verified development output should be submitted to *Configuration Management* and then accepted for subsequent use.

- *Configuration Management* should provide a mechanism for identifying, controlling and tracking the versions of each item being used, and then the status of products in development or delivered and installed.

- **Audit Inspection** provides management with an early view of the product quality. It allows immediate *corrective action*, if any, on the part of supplier, before the product goes into the market and the customer complaints about it.

  During the course of audit, reporting and follow up of audit-findings are essential to make it success.

Corrective Action

(As per ISO 9000 and ISO 9004)

- The implementation of *corrective action* begins with the detection of a quality problem (e.g. materials, components or products non-confirming to quality standards) and involves taking measures to eliminate or minimize the recurrence of such a problem.
- The supplier shall establish, document and maintain procedures for

(a) investigating the cause of nonconforming product and the corrective action needed to prevent recurrence;
(b) analysing all processes, work operations, quality records, service reports and customer complaints to detect and eliminate potential causes of non-conforming product;

(c) initiating preventive actions to deal with problems to a level corresponding to the risks encountered;
(d) applying controls to ensure that corrective actions are taken and they are effective.
(e) implementing and recording changes in procedures resulting from corrective action.

Procedure for Corrective Action

(1) The responsibility and authority for instituting corrective action should be defined as part of the quality system.
(2) The significance of a problem affecting quality should be evaluated in terms of its potential impact on production costs, quality costs, safety, reliability etc.
(3) Investigation of possible causes (cause and effect relationship) resulting in non-conforming products should be carried out.
(4) Analysis of problem to determine root cause should be done before planning preventive measures.
(5) In order to prevent a future recurrence of a nonconformity, it may be necessary to change a manufacturing process, packing, storage process, product specification etc.
(6) When the preventive measures are implemented, their effect should be monitored in order to ensure that desired goals are met.
(7) For work-in-process, remedial action should be instituted as soon as practicable in order to limit the cost of repair, reworking or scrapping. Recall finished goods not confirming to quality standards.
(8) Permanent changes resulting from corrective action should be recorded in work instructions, product specifications or the quality system.

A 1.10 INSTALLATION PROCEDURE OF ISO 9000 QUALITY SYSTEM

- Every organization is interested in improving the quality of its completed work, as it has to compete with the best in the World market. Thus it has become quite essential for a company to have a structured and well defined quality system that identifies, documents, coordinates and maintains the necessary quality to meet the customer demands.
- ISO 9000 Quality System is just a model that stipulates certain time honoured quality management practices as guidelines and minimum requirements.
- Therefore every organization, today, is bent upon installing ISO 9000 Quality System.

This system can be installed in several stages, that have to be sequentially undertaken. The time involved in installation depends upon the size and complexity of the organization.

The basic steps to be followed for ISO 9000 certification are given below:

(1) Quality Awareness training.
(2) Form task force.
(3) Analyse existing practices and corrective action.
(4) Design and develop standard procedures.
(5) Prepare Documentation.
   - Quality manual

- Quality procedures
- Work instructions

(6) Implement the Quality System.
(7) Quality Auditing.
(8) Preliminary Audit by Third party.
(9) Apply for Accreditation.
(10) Maintain the system.

(1) Quality Awareness Training
(Refer page A-5)

(2) Form Task Force

(a) *Strategic* : Management — Quality Policy/Quality Manual.
(b) *Tactic* : Dept. Heads — Quality Procedures.
(c) *Operational* : Supervisors — Work Instructions/Drawings.

(3) Analyse Existing Practices and Corrective action
(As per ISO 9001 : 1987)

- The supplier shall establish, document and maintain procedures for
  (a) investigating the cause of nonconforming product and the corrective action needed to prevent recurrence;
  (b) analysing (*existing practices* i.e.,) all processes, work operations, concessions, quality records, service reports and customer complaints to detect and eliminate potential causes of nonconforming product;
  (c) initiating preventive actions to deal with problems to a level corresponding to the risks encountered;
  (d) applying controls to ensure that corrective actions are taken and that they are effective;
  (e) implementing and recording changes in procedures resulting from corrective action.

Corrective action also presupposes the repair, reworking, recall or scrapping of unsatisfactory material or items (components/products).

(4) Design and Develop Standard Procedures

Standard procedures of manufacturing will have to be developed to fully meet the customer's quality requirements including functional, safety, aesthetic etc., with adequate attention to economy of manufacture.

(5) Prepare Documentation
(As per ISO 9004 : 1987 and IS 14004 : 1989)

- All the elements, requirements and provisions adopted by a company for its quality management system should be documented in a systematic and orderly manner in the form of written policies and procedures.
- Such documentation should ensure a common understanding of quality policies and procedures that is, quality programmes/plans/manuals/records.

- The quality management system should include adequate provision for the proper identification, distribution, collection and maintenance of all quality documents and records.
- The following are *examples* of the types of quality documents requiring control:

(a)	Drawing	(b)	Specifications
(c)	Blue prints	(d)	Inspection instructions
(e)	Test procedures	(f)	*Work instructions*
(g)	Operation sheets	(h)	*Quality manual*
(i)	Operational procedures	(j)	*Quality (assurance) procedures.*

Quality Manual (As per ISO 9004 : 1987)

- The typical form of the main document used in drawing up and implementing a quality system is a *Quality Manual.*
- The primary *purpose* of a quality manual is to provide an adequate description of the quality management system while serving as a permanent reference for implementation and maintenance of that system.
- Procedures should be laid down for making changes, modifications, revisions or additions to the contents of a quality manual.
- In large companies, the documentation relating to the quality management system may take various forms, such as:
  (i) corporate quality manual;
  (ii) divisional quality manuals; and
  (iii) specialized quality manuals (for example, design, procurement, project, work instructions).

In brief, a quality manual includes the quality policy of the company, organisational structure of the quality assurance department, job description of the quality assurance personnels, relationship of the quality control department with other departments, quality control/inspection procedures and documentation (with a copy of every form in use).

Quality Policies and Procedures (As per ISO 9004 : 1987)

- All the elements, requirements and provisions adopted by a company for its quality management system should be documented in a systematic and orderly manner in the form of written *policies* and *procedures*. Such documentation should ensure a common understanding of quality policies and procedures, that is, quality programmes/plans/manuals/records.
- **Quality procedures** instruct the workforce how the quality objectives mentioned in the quality manual can be obtained. Procedures document inter-documental activities, detailing the working and interaction of different sections of the company, for fulfilling the requirements of quality.

  The *procedures specify* what has to be done, by whom, when, where and how will it be done. A common format and a suitable numbering system has to be devised for all procedures. This enables easy identification of individual sections and individual procedures in each section.

Work Instructions

Work instructions deal with a lower level of activities than the *quality procedures*. While procedures describe who does what, work instructions give specific information about the standards of quality to be achieved. The instructions include what has to be done, the proper sequence of work stages, the materials and equipments to be used, the environmental conditions to be maintained, reference/standards to be adhered to and instructions for special processes, if any, like welding, annealing, soldering etc. The instructions also include the recordings, product/process affected, issue and control and authorization of the concerned signatories.

(6) **Implementing the Quality System**

- Before implementing the quality system, certain pre-requisites are to be met. Such requirements have been discussed on page A-10.
- Implementing the quality system means putting the system into practice in the organization.
- It will be always better to start the implementation, when the *documentation* is ready for use and success is expected. *Education* and *Training* are essential for a successful quality system. The *follow-up action* on the effectiveness of quality system is done by performing *audits*. The audit reports should be followed up, correcting the procedure/process and providing training at all levels. Whenever changes are made in the procedures, the documents also should be amended and have to be controlled, as a part of implementation.

(7) **Quality Auditing** (ISO 9004 : 1987)

- *Quality Auditing* is independent and objective evaluation of the outgoing product level, as it would be measured and judged from the viewpoint of the customer, whether that customer be the ultimate user, a dealer, the next department or another plant.
- *Quality Audits may be of the following types*
  (a) Internal audits.
  (b) Customer audits.
  (c) Independent third party audits.
- All elements and aspects pertaining to a quality system should be **internally audited** and evaluated on a regular basis. Audits should be carried out in order to determine whether these are effective in achieving stated quality objectives. For this purpose, an appropriate audit plan should be formulated and established.
- **Audit Plan** format should cover the following:
  (a) Specific activities and areas to be audited;
  (b) Suitability of personnel carrying out audits;
  (c) The basis for carrying out audits (for example, organizational changes, reported deficiencies, routine checks and surveys); and
  (d) Procedures for reporting audit findings, conclusions and recommendations.
- When **Carrying out the Audit**, objective evaluation of quality system elements by competent personnel may include the following activities or areas:
  (a) Organizational structures;

(b) Administrative and operational procedures;
(c) Personnel, equipment and material resources;
(d) Work areas, operations and processes;
(e) Items being produced (to establish degree of conformance to standards and specifications); and
(f) Documentation, reports and record keeping.

- **Personnel Carrying out Audits** of quality system elements should be independent of the specific activities or areas being audited.
- Audit findings, conclusions and recommendations should be submitted in documentary form for consideration by appropriate members of the management.

The following points should be covered in the **reporting and follow-up of Audit findings:**

(a) Specific examples of noncompliance or deficiencies should be documented in the audit report, possible reasons for such deficiencies, where evident, may be included;
(b) Appropriate corrective action may be suggested; and
(c) Implementation and effectiveness of corrective actions suggested in previous audits should be assessed.

(8) Third Party Audit

A third/external party assessment is carried out by an independent body to establish the extent to which an organization meets the requirements of an applicable standards or set of regulations.

- Third party can assess an organization against any quality standard but the concentration here is given on ISO 9000 : 1987 against which assessment can be made. It is an independent audit body which would normally issue a *certificate of registration*, indicating acceptance of the organization as *A Company of Assessed Capability* i.e., witness to the world that this assessed organization complies with all the requirements of ISO quality standards.

(9) Accreditation

The next step for the organisation is to apply for Accreditation.

- The National Accreditation Council for Certification Bodies (NACCB) funded by Department of Trade and Industry (DTI) is responsible for the accreditation and supervision of *Certification Bodies* in U.K. An accredited certification body issues the *Crown and Tick logo* only after certification within its accredited scope. Some bodies have accreditation in a wide range of activities and they assess organizations to ISO standards.
- After, an assessment by an independent audit body is successfully concluded, the *certification body* will issue a certificate, attached to which is a definition of the scope of activities which have been assessed.
- A few *Accredited Certification Bodies* are

(a) ASTA Certification Services, Prudential Chambers, 23/24 Market Place, Rugby CV 21 3 DT.
(b) Lloyd's Register Quality Assurance Limited, Norfolk house, Wellesley Road, Croydom CR 9 2 DT.

(c) Bureau Veritas Quality International Limited, 3rd floor, 70 Borough High Street, London SE1 1XF.

– Certification bodies carry out assessments in accordance with documented procedures. Most of the certification bodies are always prepared to issue copies carrying informations regarding registration.

(10) Maintain the System

– The Quality system is to be reviewed periodically by the *management*, by performing *internal audits* and taking corrective actions where necessary based on audit reports, thus streamlining the system.

– The *Certification body* also maintains some system of monitoring to ensure continued compliance with the standard.

Monitoring the quality system needs to have a system of regular, unannounced audits, reassessment at regular intervals, etc.

A 1.11 INDIAN STANDARD ON QUALITY SYSTEMS

The Bureau of Indian Standards recognized the importance of preparation of Indian Standards on quality systems. Therefore, an Indian Standard manual on quality assurance system, IS 10201 was published in 1982 which describes a basic set of quality elements by which quality management systems could be developed and implemented within an organization. After the publication of International Standards on Quality Systems, BIS adopted these as IS 14000 series of Standards.

(1) IS 13999 : 1988

This standard defines basic and fundamental terms relating to quality concepts, as they apply to products and services, for the preparation and use of quality standards and to facilitate mutual understanding in international communication. The terms defined in this standard have a direct application to all Indian Standards in the series on quality systems (IS 14000).

(2) IS 14000 : 1988

This standard provides the guidelines for the selection and use of series of Indian Standards on quality systems that can be used for internal quality management (IS 14004) as well as external quality assurance purposes (IS 14001), (IS 14002) and (IS 14003). It clarifies the relationship among various quality concepts and specifies the rules for using the three models given in IS 14001, IS 14002 and IS 14003. IS 14000 introduces the notion of degree of demonstration concerning the adequacy of the quality systems and the conformity of the product with the specified requirements. A cross reference list of quality system elements has also been included as an annexure to the Standard.

(3) IS 14001 : 1988

This standard is applicable when conformance to specified need is to be assured by the supplier throughout the whole cycle—from design through to servicing. It is used when the contract specifically requires design effort and the product requirements are stated (or need to be

stated) principally in performance terms. This standard represents the fullest requirements, involving all the quality system elements detailed in IS 14000 at their most stringent.

(4) IS 14002 : 1988

This standard is for use when the specified requirements for products are stated in terms of an already established design or specification. Only the supplier's capabilities in production and installation are to be demonstrated. All the quality system elements listed in IS 14000 : 1990 except 'design' and 'after sales service' are present but some are treated less stringently.

(5) IS 14003 : 1988

This standard applies to situations where only the supplier's capabilities for inspection and tests (conducted on the product as supplied) can be satisfactorily demonstrated. In this standard, only half of the quality system elements of IS 14000 : 1990 are required, and at a lower level of stringency than for IS 14002 : 1990.

(6) IS 14004 : 1991

This standard, together with IS 14000, provides guidance to all organizations on quality management. Each of the quality system elements listed in IS 14000 : 1990 has been explained in 14004.

The standard helps in developing and implementing a quality system as also determining the extent to which each quality element is applicable. It also provides guidance on the technical, demonstrative and human factors affecting the quality of products or services at all stages — from detection of customer's needs to their satisfaction. Throughout this standard, emphasis is placed on the satisfaction of the customer's needs and establishment of functional responsibilities. The object is to minimize the cost of the quality project while maximizing the benefits.

(7) IS 14004 (Part 2) : 1992

Quality and customer satisfaction are important subjects receiving increasing attention worldwide. The creation and maintenance of quality in an organization is dependent upon a systematic approach to quality management aimed at ensuring that customer needs are understood and met. The achievement of quality necessitates a commitment to quality principles at all levels in the organization and continual review and improvement of the established system of quality management based on feedback of the customer's perception of the service provided.

The successful application of quality management to a service provides significant opportunities for

- improved service performance and customer satisfaction,
- improved productivity, efficiency and cost reduction, and
- improved market share.

To achieve these benefits, a quality system for services should also respond to the human aspects involved in the provision of a service by

- managing the social processes involved in a service,
- regarding human interactions as a crucial part of service quality,
- recognizing the importance of a customer's perception of the organization's image, culture and performance,

— developing the skills and capabilities of personnel, and

— motivating personnel to improve quality and to meet customer expectations.

This standard gives guidance for establishing and implementing a quality system within an organization. It is based on the generic principles of internal quality management described in IS 14004 : 1991 and provides a comprehensive overview of a quality system specifically for services.

This standard can be applied in the context of developing a quality system for a newly offered or modified service. It can also be applied directly when implementing a quality system for an existing service. The quality embraces all the processes needed to provide an effective service, from marketing to delivery, and includes the analysis of service provided to customers.

The concepts, principles and quality system elements described are applicable to all forms of service, whether solely of a service character or in combination with the manufacture and supply of a product.

A-2 FACTORS AFFECTING PLANT LAYOUT

— *Plant layout* shows the physical relationships between the plant and its equipment, workers, machines, workbenches etc.

The factors affecting plant layout are

(1) The components/products to be manufactured.

(2) The volume of production and hence the volume of raw material and inprocess inventory to be handled.

(3) The operations needed to be done on each component, sub assemblies and assemblies.

(4) The assembly relationship between the components and subassemblies of each product.

(5) The type, size and capacity of machines required for each operation and to be installed (layout) in the plant.

(6) Location of manufacturing areas for individual components, subassemblies and assemblies.

(7) Movement of material handling equipments.

(8) Characteristics and requirements of auxiliary services (e.g. compressed air, steam, standby electricity etc.) necessary for production to proceed.

A-3 ROLE OF MANAGEMENT

Given below are the roles of management which a manager has to fill :

A. *Interpersonal roles*

1. The figure head role (performing ceremonial and social duties)
2. The leader role
3. The liaison role (particularly with outsiders)

B. *Informational roles*

1. Receiving information about the operation of an enterprise.
2. The disseminator role (passing information to subordinates).
3. The spokesman role (transmitting information outside the organization).

C. *Decision roles*

1. The entrepreneurial role

46

Total Quality Management

46.1. INTRODUCTION

In order to capture increased market share, quality had been the main concern of every manufacturer since old days. Started with the inspection, concept moved to the quality control concept, when it was realised that making the inspection department only responsible for quality of the product would be counter productive. Concept of quality control emphasises self inspection and appropriate systems to ensure quality by identifying defectives and eliminating them. Help of statistical quality control, sample analysis, were also undertaken.

Then arose the concept of quality assurance. But the quality movement did not stop with this and the attempt is to continuously improve the quality and assure higher and higher standards of quality, offer better products to the consumer, ensure better and longer service and improve the utility of the product. It was felt that quality is not the job of quality control department only, but other departments like sales, accounting, procurement, material handling, industrial relations, design, production, forecasting, marketing, stores, after-sales service have also to contribute substantially. Thus, quality is the responsibilities of all the employees. The workers should run the system, managers should design and improve the system, while top management should provide leadership and team spirit.

In a Total Quality Management concept, the word quality has a wider meaning, it means quality of output of every department and by every employee, cleanliness, orderliness, punctuality, customer service, standardization of works and continuous efforts for their improvement are also part of T.Q.M. In this, needs of the customer are constantly monitored to improve the products and processes to meet their requirement.

In Total Quality Management programme, voluntary participation of workpeople is sought for the quality of the task.

Total Quality Management involves effective Decision making, Problem-solving and Integration of Quality Planning, Quality Implementation and Quality Improvement strategies of all the departments of an Organisation (such as Marketing, Production, Finance, Personnel) and other satisfied suppliers, highly committed and involved employees, lower costs, higher

revenues and high profits for the Organisation.

Customer satisfaction is the most important aspect of TQM. Here Customers are all those who are affected by our work. They could be external to the organisation or may be inside the organisation. Meeting the needs of the outside customers depends on meeting the needs of the inside customers. Any individual (or department) receives inputs, processes them and passes it to next person (or department). Every individual (or department) plays these roles : Customer-Processor-Supplier.

It has been emphasized that Quality be managed by a structured process of Planning, Implementation (or Control) and Improvement. Quality Planning identified the quality features to be provided and plans for delivering them without deficiencies. Quality Implementation (or Control) compares the actual performance with the planned performance to take proper actions to bring these two to an agreement, Quality Improvement works for reducing or eliminating deficiencies in the present products, processes or services.

Total Quality Control

Total quality control (TQC) may be defined as, "an effective system for integrating the quality development, quality maintenance and quality improvement efforts of the various groups in an organization so as to enable production and service at the most economical levels which allow for full customer satisfaction". TQC requires participation of all divisions.

Characteristics of Total Quality Control Concept

1. Quality Control is the responsibility of all the workers and all the divisions.
2. Total Quality Control is a group activity and can not be done by individuals.
3. It calls for team work.
4. Quality Control Circle activities are part of the T.Q.C.
5. It adopts the philosophy of refusing to allow any defect.
6. It relies on Sampling (S.Q.C.) rather than cent-percent inspection.
7. Continuous process for improving quality of products and services.
8. All employees are provided with proper tools and proper training to do the quality job.
9. It clearly defines top management's permanent commitment to quality.

Integrated Quality Control

In affecting integrated quality control, control of quality is central, but at the same time cost control (profit control and price control), quantity control (amount of production, of sales, of stock), and control of delivery date are to be promoted. This method is based on the fundamental assumption of QC that a manufacturer must develop, produce and sell commodities that satisfy the needs of consumers. This extends the term quality to the quality of work in the offices, in the service related industries and in the banks etc.

Elements of TQM

1. Customers satisfaction
2. Employees involvement
3. Total Organisation involvement
4. Morale of employees
5. Quality control Circles and suggestion system.
6. Higher revenue.
7. Lower cost
8. Quality control
9. Control of production.
10. Quality planning
11. Quality implementation

12. Quality improvement
13. Quality Assurance system
14. Vender control & quality in procurement.
15. Customer relationship management.
16. Measurement information analysis
17. Strategic quality management.
18. Leadership
19. Quality education and training.

Ways for T.Q.M.

1. Adopt new philosophy of 'not to allow defects to occur'.
2. Create consistency of purpose for improvement.
3. Improving production and service quality, should a continuous process.
4. Cease dependence on mass inspection. Adopt statistical quality control.
5. Insist quantiliable evidence from the suppliers about the quality of their product.
6. All employees should be trained, retrained and refresher courses be arranged.
7. Provide proper tools to all the employees.
8. Adopt proper communication system.
9. Encourage productivity.
10. Encourage coordination between departments
11. Permanent commitment of top management to quality.
12. Respect towards 'work' and 'humanity'.
13. Adopt consumer orientation and not the product orientation.
14. Objective should be, 'Quality first, and not the short term profits'.
15. Use facts and data

46.2. EFFECTIVE TOTAL QUALITY IMPLEMENTATION

1. Quality Implementation ensures that a process continuously produce the quality that was planned into it. Effective Implementation includes :

(*i*) A clearly stated policy.

(*ii*) Development of resources of men, machine and others to specific tasks involved, identifying the departments/ individuals to do the specific tasks.

(*iii*) Proper selection of control factors, with details of when, where, who, what, how and why they are to be done.

(*iv*) Establishing self control for all those who run the process.

(*v*) Personnel leadership from the Manager in motivating, training and recognising the work of his people. Creation of a healthy culture.

(*vi*) Existence of an established Quality Assurance System.

(*vii*) Total Organisational Involvement, both formal and informal, such as Quality Circles.

(*viii*) Informations needed about deficiencies in the goods and processes, and cost of poor quality, with analysis of their causes.

(*ix*) Measurable standards are to be established for having a benchmark for Quality Implementation purposes.

2. A feedback loop measures on output from a process, compares them with the established standards and takes the necessary action. Control standards are established based on the actual performance of the process. CONTROL CHARTS are the tools for establishing control standards and testing the actuals against standards.

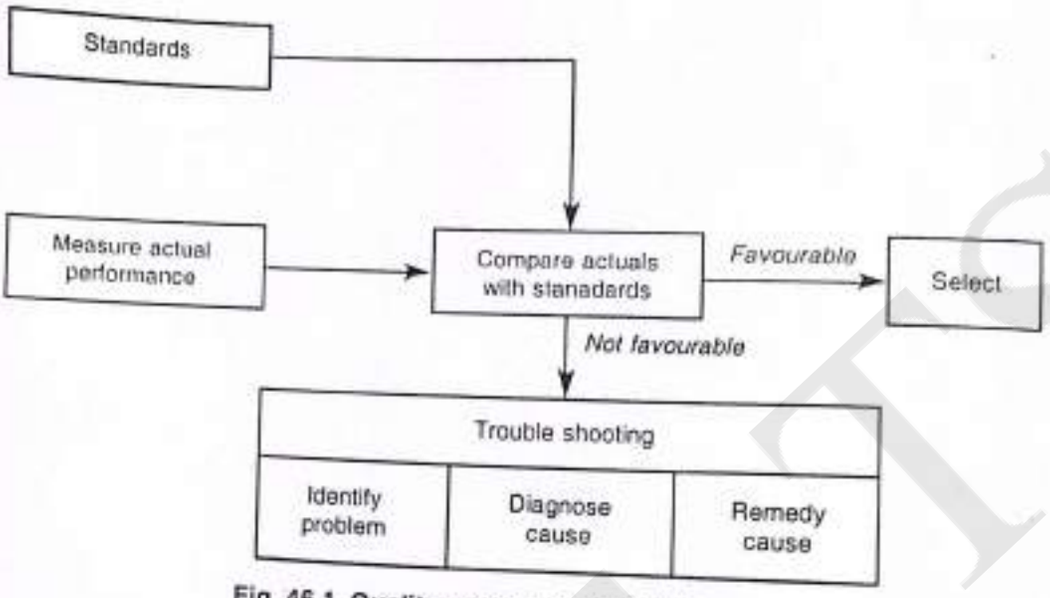

Fig. 46.1. Quality control feed-back loop.

46.3. TOTAL QUALITY IMPROVEMENT

1. Total Quality Improvement is a structured process for reducing the deficiencies that are present in products, processes and services and/or improving performance whenever there is an opportunity to improve.

2. Improvements take place in following steps :
   (*i*) A clear understanding of the SYMPTOMS
   (*ii*) A diagnosis to find the CAUSES
   (*iii*) To find REMEDY/REMEDIES for the causes :

(*a*) For achieving Quality Improvement specific problems are to be identified and well defined such as : reducing energy consumption, improving capacity, reducing lead time and reducing failure rates.

(*b*) Diagnosing the root cause is a structured process. The team must analyze the symptoms to identify and clearly define the problem or problems. Then they must formulate assumptions, hypothesis and theories which might be causing the symptoms. Lastly, they test the theories systematically until the data and the analysis establish the causes. Brain storming, Pareto Analysis, Flow diagrams, Data Analysis, Data Collection, Ishikawa Diagrams, Histograms are all helpful in this exercise.

(*c*) Once the root cause/causes is/are known, the team should deliberate in great detail by considering all aspects such as managerial, technical, personnel, financial and other aspects before formulating any remedies. Control charts, Motivational Techniques, Training Methods are very helpful in this connection.

3. To overcome resistance to change, some of the things that a manager must do are :
   (*i*) providing enough participation
   (*ii*) giving time to adjust and accommodate
   (*iii*) being flexible instead of being rigid
   (*iv*) being capable of practicing what he says, recognizing, respecting and positively responding to employees.

4. The Quality Improvement suggestion should be capable of giving "GAINS' which are stable, long term and should become a part of the employees usual work. Quality Improvement Process should be continuous.

5. Quality Planning, Quality Implementation and Control and Quality Improvement Process are all "Inter-Related".

46.4. THREE T.Q.M. AXIOMS (SELF-EVIDENT TRUTHS)

For achieving sustainable, long term competitive advantage, continuous efforts should be made for improvement. The essence of the strategy should be the establishment of a TQM culture, which should be based on its three principles : Commitment, involvement, and scientific knowledge. These three principles are interdependent. Considering these principles TQM can be defined as follows :

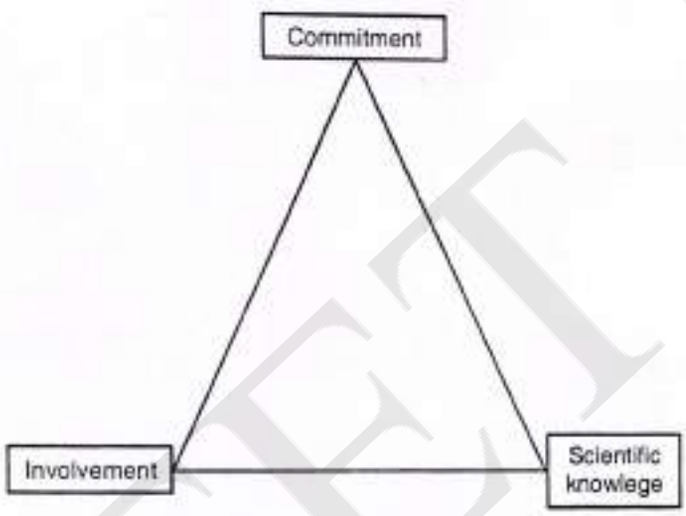

Fig. 46.2. The T.Q.M. Triangle.

Total quality management is a culture , inherent in this culture is a total commitment to quality and an attitude expressed by everybody's involvement in the process of continuous improvement of products and services, through the use of innovative scientific methods.

The three TQM axioms are discussed hereunder :

1. Commitment.

A management commitment to continually improving the quality of products and services is most essential, but it needs a total cultural transformation in the company. Management participation and demonstration by example are the best ways of convincing the workforce that the managers are serious about quality and that the same should be expected of everybody. Commitment should be demonstrated by actions and not just words and declarations.

Change in attitudes and culture can be achieved by :

- Proper working conditions.
- Good communication and cooperation.
- Good incoming materials.
- Appropriate tools of good quality.
- Adequate education and training.
- Modern leadership.
- Good equipment.
- Job satisfaction etc.

From this, it can be seen that such a change is not possible by quality department alone. In this, top management is responsible to plant the seed of quality tree (through quality policy and demonstration of commitment) and to provide appropriate soil and environmental conditions,

middle management is responsible to ensure that the quality tree is continuously nourished and strengthened (by spreading TQM principles to maintain TQM culture so as to bring results).

2. Scientific Knowledge.

The role of a TQM quality department should be that of coordination, education and support of scientific quality tools throughout the organisation, and continuous research on and development of innovative methods. In order to avoid fire fighting and wastage, 'preventive' methods like predictability, statistical techniques, process capability etc. can be adopted.

3. Involvement.

Principles 1 and 2 i.e. commitment and scientific management are concerned with structural and technological aspects, while this principle is concerned with social aspects. TQM culture can only be brought through social factors, as it concerns every body in the organisation and requires a new social attitude and new network of relationships. Unless work-force is motivated enough, commitment and scientific knowledge will not help much.

It has been experienced that higher salaries and monetary rewards can motivate only for a short duration, real motivators for the long term are : pride in one's work and being involved in the achievement of excellence are the real motivators.

46.5. FOCUS ON CUSTOMER

Total quality management focuses on the requirements of the customers. Following facts should be recognised about the customers :

(*i*) Customers are the most important people in any business.
(*ii*) They are not dependent on us, rather we are dependent on them.
(*iii*) They are doing a favour when they are coming to us.
(*iv*) They are part of our business.
(*v*) They are human beings with feelings and emotions.
(*vi*) People come to us with their needs and wants, and it is our job to fulfill them.
(*vii*) They deserve most courteous and attentive treatment.
(*viii*) Without them we would have to close our business.

Consumers are now-a-days becoming stronger and well organised. Consumer forums are becoming popular. In some countries consumer reports are published by them in respect of large number of products. Most manufacturing concerns concentrate on 'getting' the new customers rather then 'retaining' them. Marketing relationship must therefore be given more importance.

In TQM, quality involves 5 dimensions for the customer to be satisfied. Quality measurements of these should be decided through questionnaire asked from the customers. These elements are :

1. **Specifications.** Customers must be asked as to what he expects from the product or service, during the survey to ascertain the customer requirements.
2. **Conformance.** Whether the product fulfills his expectations ?
3. **Reliability.** Does it continue to do, what was expected ?
4. **Cost (Value).** How much customer expects to pay ?
5. **Delivery.** When customer expects to have it ?

Considering above factors, quality can be defined as : fully satisfying agreed customer requirements at the lowest internal cost.

To meet the customers' requirements means to listen to the customer and to respond to what he wants and to what is agreed. Customers may be;

(*a*) external to the company i.e. the people outside who are the end users of firm's products, and

(*b*) internal customers i.e. the person within the company who receives the work of another and then adds his contribution to the product before passing it on to someone else. In manufacturing, the internal customer is the next person down the line who builds the product. If the internal customers' requirements are agreed and met, a chain of quality is made.

Some of the routine duties of every individual or division within the organisation, for the achievement of customer satisfaction could be as follows :

1. To monitor performance and customer satisfaction levels.
2. To identify improvement necessary in the customer interface.
3. To deliver improved customer products at the lower cost.
4. To assess and agree the customer's requirements.
5. Output should be as per customer's demand.

46.6. MAIN CONCEPTS OF TQM

1. Quality for Profit. Quality improvement in product and services, business processes and people is profitable. Quality is the single largest factor in achieving market success for any company. Actual quality improvement also increases sales by generating customer demand.

Fig. 46.3 indicates that, to gain increase in profit P through increased sales would require a significant increase *A* in operating costs (sales, personnel, promotion, inventories etc.), while the same profit P can be increased through quality improvement by increasing operating costs *B*, which also diminishes through time.

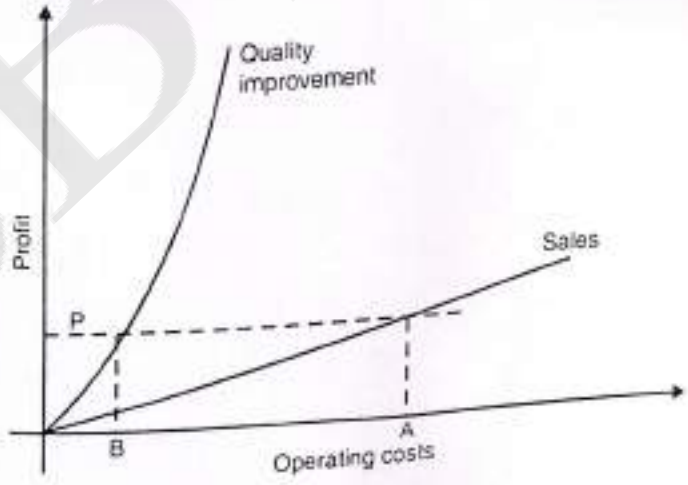

Fig. 46.3. Quality improvement reduces cost.

Fig. 46.4. Quality itself increases sales.

Fig. 46.4 indicates, more quality improves, faster will be increase in sales because customer satisfaction carries its own acceleration. 'Quality reputation' when grows it acts as a major element in advertising and reduce the money required on advertisement.

2. Right First Time or Zero Defect. Main aim of TQM is the conviction that it is possible to achieve defect-free work most of time . This can be phrased as : right first time or zero defects. The idea is to strive for perfection in the work. Right first time is the result of an emphasis on prevention, and the use of measurement, process control and the data-driven elimination of waste and error, continuous improvement. Planned and systematic action such as documentation, work processes, quality audits, quality assurance etc. prevents quality problems.

Importance of zero defect can be visualised from the fact that, if one sets an acceptable quality level of 99 percent , the results will be : 10000 wrong prescriptions in a hospital treating 1 million patients in a year, no electricity, telephone and television transmission for about 15 minutes each day, no newspaper for 4 days in a year, one misspelled word on every page of a book. It means 1 percent goods were waste or scrap.

Fig. 46.5 indicates defects/cost as per traditional culture. In this culture, achieving quality is expensive—defects are reduced over time only by increasing cost through extensive inspec-

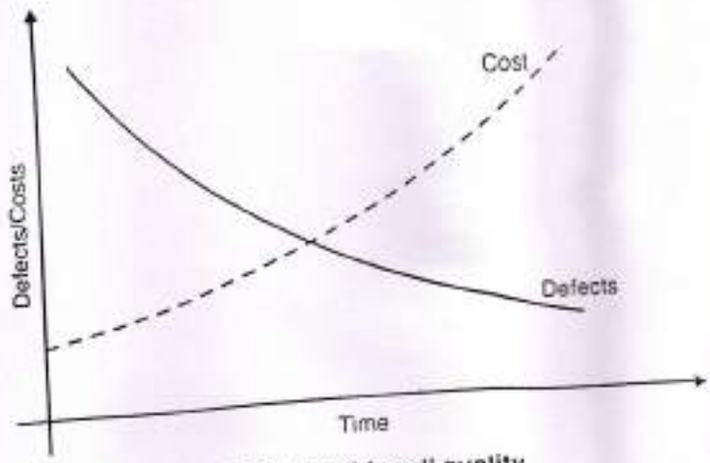

Fig. 46.5. 'Traditional' quality

tion, checking and progress chasing. In this, most effort is concentrated on correcting failure. Fig. 46.6 indicates that by adopting TQM management, after certain time defects and costs both will be minimal.

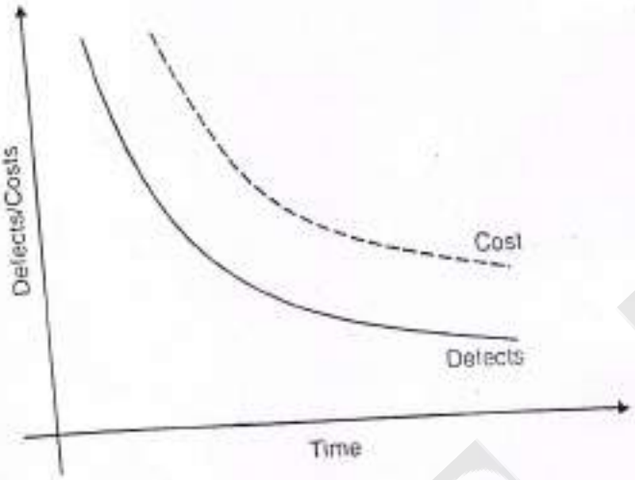

Fig. 46.6. 'Total Quality' concept.

3. Cost of Quality. As discussed in earlier chapters, cost of quality include prevention costs, appraisal costs, internal failure costs, external failure costs, the cost of exceeding customer requirements, and the cost of lost opporunities. Taken together these costs amounts to 20-30 percent of its revenue.

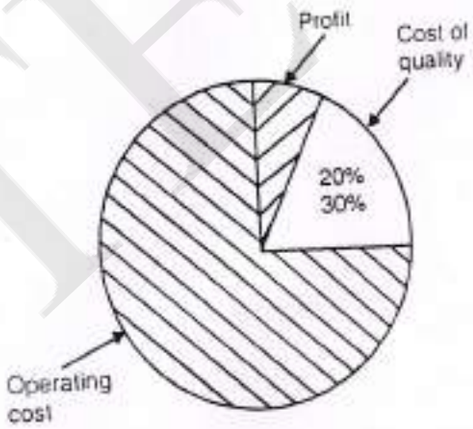

Fig. 46.7. Cost of quality as a proportion of revenue.

4. Competitive benchmarking. Competitive benchmarking is a continuous process that helps firms assess their competition. In this case, to strive to be better than the best competitor is the target. The means to achieve this aim are :

(a) benchmarking the products and services delivered to external and internal customers,

(b) benchmarking the business processes in all departments and functions, and

(c) benchmarking the organisation, business culture and calibre of people.

Benchmarking process has the following steps :

(*i*) Decide what is going to be benchmarked.

(*ii*) Select the competitors who are the best in terms of products and services, business processes, and people and aspects that one's firm wants to measure.

(*iii*) Decide the most appropriate measurements.

(*iv*) Determine competitor's strengths against own company.

(*v*) Develop an action plan.

5. Involving everybody. This aspect has already been discussed in this chapter.

6. Synergy in Team Work. Synergy means harmony in working, and is the result of team work in which output is greater than each of the inputs taken separately and also greater than the sum total of the inputs. As theoretical knowledge of engineers as well as practical knowledge of workers are essential for progress, both of them acts as partners for effective management.

Main points for the success of team work are :

(*i*) Team members be valued as individual.

(*ii*) Individuals feel integrated within a team.

(*iii*) Team in-charges be fair to all team members.

(*iv*) Team must be confident.

(*v*) Individuals must enjoy themselves.

7. Self-management. This aspect has already been discussed in the book.

8. Managers as Role Models. Managers need to be conscious that they are role models for total quality. It is very important that what they say and do about total quality. The best TQM programme has a system of management feedback so that managers get some idea on how they are doing as role models for quality. Performance feedback is most important to enable managers at all levels to improve their contribution.

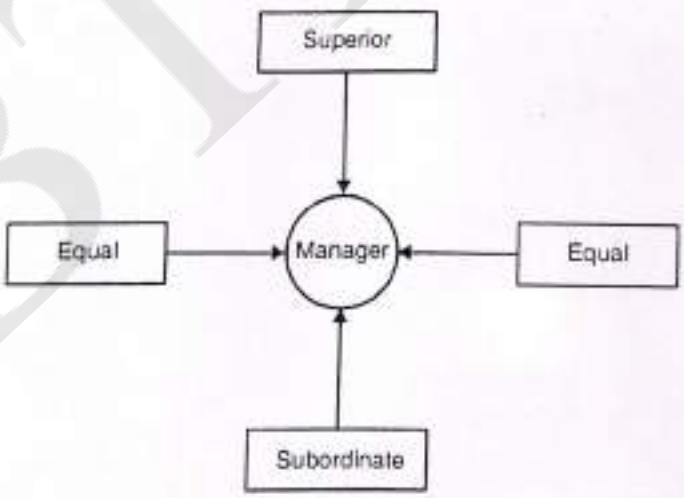

Fig. 46.8. Directions of managerial feedback.

Feedback should be on general management areas : leadership , team work, motivating, people development, and commitment to the total quality process.

9. Recognition and Rewards. This concept have already been discussed in the preceding chapters.

10. Quality Delivery Process. It is the name given to the implementation of new systems. This is necessary for quality improvement which is a continuous process.

Following steps are taken for quality delivery process.

(*i*) Create mission statement.
(*ii*) Determine the outputs of the workgroup.
(*iii*) Identify both internal and external customers.
(*iv*) Define agreed customer requirements for each output.
(*v*) Develop specifications for each output of work group.
(*vi*) Determine the group's work processes.
(*vii*) Identify the measurements of each output.
(*viii*) Identify any problem/opportunity for achieving target.
(*ix*) Establish a project team to solve the identified problem.
(*x*) Measure customer satisfaction against the agreed customer requirements.

The ways in which the quality of outputs can be measured are :

1. Defects
2. Rework
3. Scrap
4. Lost items
5. Work behind schedule
6. Late deliveries
7. Surplus items.

Key measurements for each output are :

1. *Target* : budget or level of performance.
2. *Forecast* : level of performance.
3. *Actuals* : level of performance.
4. *Problem* : difference between the actual and target level of performance where actual is less than target.
5. *Opportunity* : Opportunity for improving quality at no extra cost.

11. Six Sigma Theory. Six sigma (6σ) is a statistical term used to describe the state of zero defect or as close as the experts estimate it is possible to come to perfection. Six sigma is a rigorous and disciplined methodology that uses data and statistical analysis to measure and improve a company's operational performance by identifying and eliminating defects in manufacturing and service related processes - six sigma translates to 3.4 defects per million or 99.99976% perfection. Six sigma quality is not just product quality, it also means getting every thing right throughout the organisation. Thus six sigma is a culture, according to which improvement will occur because the elimination of defects at the source of the defects within the design stage rather than adjusting the machinery after detecting the defects. To succeed at a six sigma level, the suppliers also must be encouraged to follow along the same quality lines.

46.7. PIONEERS OF TOTAL QUALITY CONCEPT

By adopting the learnings from the quality gurus, the Japan which was a largely illiterate, semi-industrialized country in fiftees manufacturing cheap and unreliable copies of Western products, has now became a nation with world's highest per capita income and a producer of best quality goods.

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Views of some of the renowned quality *gurus* are given here :

1. W. Edwards Deming

Dr. Deming was the first American quality expert to reach Japan in 1947 to teach Japanese managers methodically about quality.

According to Deming, interpreting quality in terms of reliability, dependability, predictability and consistency of product and service, it is clear that quality improvement is analogous to reduction of variation. *i.e.*

"Quality and productivity increases as variability decreases".

Deming's points on promoting product or service quality are :

(1) Be constant and purposeful in improving products and services. Aim is to be competitive, to stay in business, long-term needs.

(2) Adopt new philosophy. Commonly accepted delays, mistakes, defective workmanship can no longer be tolerated.

(3) Stop depending on mass inspection, demand statistical evidence of quality being build into manufacturing and purchasing functions.

(4) Work to minimise total cost not just initial cost. Move towards a single supplier for any one item on a long-term relationship of loyalty and trust.

(5) Improve the system continually. Make better every process for planning, production and service to improve quality, increase productivity and decrease costs.

(6) Institute modern methods of on-the-job training. New skills are required to keep up with changes in material, methods, product design, machinery, techniques and service.

(7) Set up new ways of supervising production workers. Improvement of quality will automatically improve productivity. Management should initiate action in response to reports of inherited defects, maintenance needs, bad tools, confused operational definitions and other things that lead to poor quality.

(8) Drive out fear, so that everyone may work effectively for the company.

(9) People in research, design, sales and production should work as a team to deal effectively with problems of products and service.

(10) Eliminate numerical goals, slogans, exhortations (like zero defects).

(11) Use statistical methods for continuous improvement of quality and productivity.

(12) Abolish performance appraised and management by objectives.

(13) Institute a vigorous programme of education and retraining. Competitive advantage is always rooted in knowledge.

(14) Push every day to progress the thirteen preceding points and take action to make the total transformation happen.

According to Deming, following are the major obstacles to implementing his philosophy.

1. Preoccupation with short-term profits.
2. Lack of consistency.
3. Reliance on only visible figures.
4. Performance appraisal.
5. Managerial job mobility.

2. Dr. Joseph M. Juran

Juran developed his TQM message around the following ten steps :

1. Create awareness of the need and opportunity for quality improvement.
2. Set goals for continuous improvement.
3. Build an organisation to achieve goals for establishing a quality council, identifying problems, selecting a project, appointing teams and choosing facilitators.
4. Give training to everyone
5. Carry out projects to solve problems
6. Report progress
7. Show recognition
8. Communicate results
9. Keep a record of successes
10. Incorporate annual improvements into the company's regular systems and processes and thereby maintain momentum.

Juran expresses his essential message to managers through the three basic quality related processes : quality planning, quality control and quality improvement which has become known as the Juran trilogy.

3. Kaoru Ishikawa

He is known as 'Father of Quality Circles' and is known for his role in launching Janpan's quality movement in the 1960s.

According to him, seven basic tools were 'indispensable for quality control'. These tools are:

(*i*) Pareto analysis.
(*ii*) Fishbone diagrams.
(*iii*) Stratification.
(*iv*) Tally charts.
(v) Histograms.
(*vi*) Scatter diagrams.
(*vii*) Control charts.

With these tools , Ishikawa argued, managers and staff could tackle and solve the quality problems facing them.

4. Philip B. Crosby

Crosby prefers to target his training on managers rather than on quality control people. He cited his zero defects goal as something practical, reasonable and achievable. He listed following four essentials of quality management. He calls them 'The absolutes' :

1. Quality is defined as conformance to requirements, not as goodness.
2. Quality is achieved by prevention not appraisal.
3. The quality performance standard is zero defects.
4. Quality is measured by the price of non-conformance not by indexes.

5. William E. Conway

Conway defines quality as a result of quality management which is 'the development, manufacture, administration and distribution of consistent low-cost products and services that customers want and need'. He targets three categories of waste in a company : time, capital and material, with time being his priority, excessive inventory comes second which requires space with all the associated costs.

Conway recommended following six tools for continuous improvement :

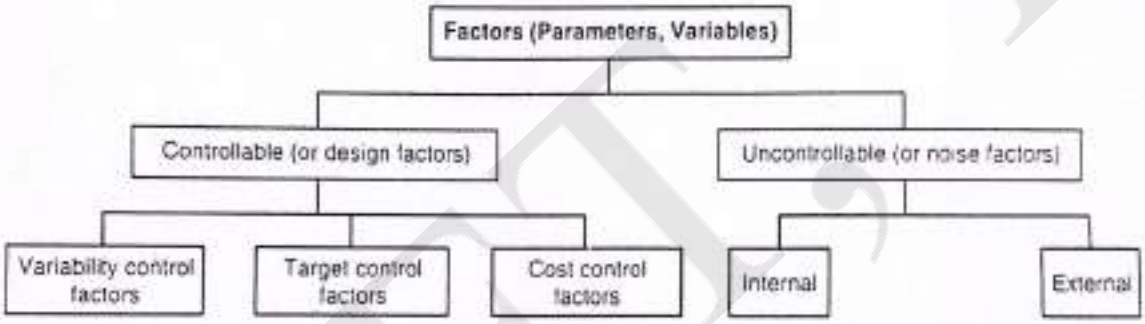
1. *Human relations skills* : Motivate and train all empolyess at all levels of the company.
2. *Statistical surveys* : Collection of data about internal and external customers, employ-

ees, technology and equipment.

3. *Simple statistical techniques :* Charts and diagrams should be used to identify problems.
4. *Statistical Process Control :* These are used to reduce variation
5. *Imagining for problem Solving :* Technique encourages creativity when linked to 'vision statements' and brainstorming.
6. *Industrial Engineering :* To use workstudy including pacing, work simplification, method analysis, plant layout and material handling to make improvement.

6. Genichi Taguchi

Taguchi devised a quality improvement technique that uses experimental design methods for efficient characterisation of a product or process, combined with a statistical analysis of its variability. He divided the behaviour of a product or process in terms of factors (parameters or variables) as follows :



Principal idea in the Taguchi philosophy is that statistical testing of a product should be carried out at the design stage in order to make the product and the process robust to variations in the manufacturing and use environment.

Taguchi suggested that following steps should be taken in carrying out statistical studies :

1. Define the problem.
2. Determine the objectives.
3. Conduct a brainstorming session.
4. Design the experiment.
5. Conduct the experiment.
6. Analyse the data.
7. Interpret the results.
8. Run a confirmatory experiment.

Taguchi defines quality in a negative way as,"the loss imparted to society from the time the product is shipped." This loss include (*a*) the cost of customer dissatisfaction which may lead to a loss of reputation and goodwill for the company, (*b*) direct loss to the company arising from warranty and service costs, (*c*) indirect loss due to market share loss, and (*c*) increased marketing efforts needed to overcome lack of competitiveness.

46.8. COMPANY-WIDE QUALITY ASSESMENT

As we have already discussed, for total quality mangement, company-wide participation from top management to all levels of employees of all the departments is essential. Participation by not only departments of technology, design, research and manufacturing but also by sales, materials, marketing, electrical and other management departments like planning, finance, personnel, business development etc. Similarly in the total quality management, quality control concept is used not only for incoming materials, production process, new product design but also for checking whether quality policies of the management are being implemented C.

Company-wide assessment of quality comprises of following major elements.

1. Cost of poor quality.
2. Standing in the market place.
3. Quality culture in the organisation.
4. Operation of the company quality system.

(1) Cost of Poor Quality.

This aspect have already been discussed in detail in the chapter on "Quality Concept". This assessment of cost of poor quality is essential for quantifying the size of the quality problem in the language of money, as this can be easily understood by the upper management and middle management.

This assessment or analysis identifies major opportunities for cost reduction. The vital few segments so identified, accounts for the bulk of the costs, are tackled through "the Pareto Principle" as discussed later in the book. This also identifies the opportunities for reducing the customer dissatisfaction and associated threats to product salability.

(2) Stranding in the market place.

Although it is essential to estimate the cost of poor quality, but it is also necessary to understand where the company stands in the marketplace as regards to quality relative to the competition. This component of assesment is very important in increasing sales income by identifying opportunities and threads.

Such market studies should be conducted by a team involving members from marketing, product development, quality, manufacturing, and other areas as needed. The questionair should include the questions which enable to understand customer needs. The market study report based on the answers to such questions is prepared considering as inputs from customers. This study helps in understanding the company's standing in the market.

(3) Quality Culture in the Organisation.

Quality Culture in the organisation is judged by the employees' opinions, beliefs, traditions and practices regarding the quality. For this, if required a detailed survey can be got conducted, which may also include the aspects related to the attitudes of employees and management in this regard.

(4) Operation of Company Quality System.

The assesment of this aspect is carried out by evaluating the current quality related activities in the company.

46.9. TEN MANTRAS FOR TQM

1. Quality is always the will to produce a quality product and is the result of continuous and intellegent efforts.
2. Quality never comes out without hardwork and devotion.
3. Quality is every body's business.
4. Quality begins with the cleanliness of the workplace.
5. Take care of quality, quantity (productivity) will take care of itself.
6. Make it right for first time and all times.
7. Quality is achieved through tenm work.
8. Document is dependable and not the memory.

9. Quality begins and ends with education (includes knowledge)
10. Quality is the attribute that a customer uses to evaluate products or services.

46.10. TOOLS AND TECHNIQUES FOR TQM

Commonly used tools and techniques for analysing quality process and then utilising for quality improvement are :

1. Histograms
2. Block diagrams
3. Bar charts
4. Line graphs
5. Control Charts
6. Pareto analysis
7. Brainstorming
8. Scatter diagram
9. Break-even analysis
10. Quality circles
11. Statistical tools
12. OC curves
13. Risk analysis
14. Quality function deployment (QFD)
15. Kaizen
16. Poka Yoke
17. Kanban system
18. 5-S compaign (Principle of House-keeping).
19. Just-In-Time (JIT) philosophy
20. Cause and effect diagram (Fishbone diagram) or Ishikawa diagram.

Tools and techniques mentioned at serial numbers from 1 to 8 are also known as basic analytical tools.

1. Histograms

Histograms are graphical representations of the spread or distribution of data. They are also called "frequency distribution". These are used to monitor a process to see if it consistently meets customer requirements. The information presented in historgrams is represented by a series of rectangles which are proportional to groups of data. Histograms also illustrate the various measures of central tendency, the mean, mode and median. This information can be helpful in understanding the extent to which a process is operating in control. Deviations from normal can help teams to locate root cause(s).

2. Block Diagram

In block diagram, every activity which is part of process is represented by a block (box) and all blocks are connected by lines representing the interfaces between activities, a macrolevel view of the process is obtained. The diagram traces the paths that any information, necessary actions or materials can take between the original input and the final output of the process.

3. Bar Charts

A bar chart is a graphical representation of discrete groups or categories of data, shown in such a way that clear comparisons can easily be made. The bar chart is normally used to emphasize the variation and uneveness in data. Using this information, further investigation can be made to determine the reasons for occuring the variations. When the data are spread across a continuous range of values, a bar chart is equivalent to a histogram.

4. Line Graphs

A line graph is a simple way of graphical representation data. Direct relationship between the two qualities can be shown easily without looking at the actual data. These can be used to summarize the complex information, to point out trends, fluctuations and relationships, and generally to effectively organize the data and communicate important results. These are drawn to display the relationship between two variables, and are useful in monitoring trends of a variable interest.

5. Control Charts

A control chart is a line chart to which statistically determined limits have been added. A detailed description of the control chart—the main tool of statistical process control—can be seen in the section on "Statistical Control Charts".

6. Pareto Analysis

Pareto analysis is a technique for arranging the causes or problems from the most to the least significant. Thus, the most significant problems are identified (Juran has called them as "the vital few") and efforts can be concentrated on those, so as to get maximum benefits with least efforts in minimum time.

Pareto analysis can also be referred in the chapter on "Reliability Engineering". The pareto analysis takes the help of Pareto diagram, which is in the form of bar chart and displays in decreasing order, the relative contribution of each cause (or problem) to the total. This relative contribution may be based on the number of occurrences, the quality damage or the cost associated with each cause. The Pareto diagram is based on the Pareto principle which states that a few causes are responsible for most of the effect. This principle when applied to quality improvement *i.e.*, solving a few key quality problems, can lead to major improvements.

7. Brain-storming

Brain-storming is an activity which promotes group participation and team-work, encourages creative thinking and stimulates the generation of as many ideas as possible within a short period of time. The participants in a brain-storming meeting are invited on the basis of their particular knowledge and experience, and are expected to contribute to the topic under discussion.

8. Scatter Diagram

A scatter diagram is used to determine if a relationship exists between two variables.

9. Break-even Analysis

Break-even analysis helps in "cost-volume-profit analysis" or simply known as cost-benefit analysis. For studying the relationship between sales volume, costs (fixed and variable), prices and profits, cost-volume-profit analysis is carried out. It helps in determining the minimum sales volume to avoid losses. Thus it helps the management to seek the most profitable combinations of costs and volume.

The break-even analysis not only highlights the areas of economic strength and weaknesses in the firm but also helps in finding out the ways which can enhance its profitablility. With the help of this analysis management of a production firm can take decisions related to the following:

(a) Volume needed to attain target profit.
(b) Change in price and its effect.

(c) Whether to expand production capacity or not.
(d) How much cost can be incurred for improving the quality.
(e) Whether to add a new product or drop production of any product.
(f) Whether to make or buy.
(g) Selection of production machinery so as to get maximum profit for a particular volume of the product.
(h) Improving profit performance, by
  (i) increasing the volume of sales, and/or
  (ii) improving the quality, and/or
  (iii) increasing the selling prices,
(i) When to discard a machine?
(j) How much sale should increase, to offset a wage increase or increase in expenses on quality improvement.?

As mentioned above, break-even analysis technique helps in cost-benefit analysis which is used for assessing the viability of an action in monetary terms. In this analysis, the cost of taking a particular action are compared to the benefits achievable from the future outcome. It can also be used to compare, in money terms, a number of problem solutions or plans of action.

10. Quality Circles

Quality circles have been discussed in detailed in the chapter on "Participative Management".

11. Statistical Tools

Various statistical tools have been described in detail in the sections on "Statistical Concept" and also on "Statistical Control Charts".

12.. O.C. Curve

Operating characteristic curve (O.C. Curve) qualifies manufacturer's (producer's) risk and consumer's (purchaser's) risk. This is a graph of the percentage defective in a lot versus the probability that the sampling plan will accept a lot. O.C. curve have been discussed in the section on "Acceptance Sampling and O.C. Curves", in the Chapter on "Quality Assurance".

13. Risk Analysis

The purpose of risk analysis is to identify and qualify all risks which could hamper the quality improvement effort. Appropriate risk management can control and possibly eliminate each risk. Risk analysis alongwith risk management can reduce costs and effort, can assess potentially damaging circumstances and control any slippage in the project plan. Main element of risk analysis are as follows :

1. Identify and list potential areas of risk.
2. Quantify the risks.
3. Develop contigency plans
4. Monitor and review the risks

14. Quality Function Deployment (Q.F.D.)

Quality function deployment is defined as, a system for translating consumer requirements nto appropriate company requirements at every stage, from research, through product design

and development, to manufacture, distribution, installation and marketing, sales and services.

Thus, quality function deployment (QFD) is a process which brings together the essential elements and crucial characteristics of the various phases in the lifecycle of a product, from its conception through design, development, manufacture, distribution and use. It encourages teamwork between marketing people, design engineers and manufacturing staff.

By recognising the interrelationship between the engineering properties of the product and the customer's requirements, appropriate actions can be taken at every stage of the product's development, so that the customer needs are anticipated, prioritized and effectively incorporated into the product.

The products that only satisfy the basic needs of performance and specification, but miss out on additional desirable or 'excitement' features available elsewhere, will probably cause the intending purchaser to select the competitor's product.

Therefore, the management of QFD ensures that vital customers satisfaction and excitement attributes are recognized and developed, so that the company can achieve a competitive edge. QFD is used as a planning tool to fulfill the customer requirement/expectations to achieve product design, engineering, production and a methodology for indepth evaluation of a product.

QFD when implemented can improve knowledge, productivity and quality. In addition, this also reduces cost and product development time.

15. Kaizen-Continuous Improvement

Kaizen concept have already been discussed in the section on "quality concept". Kaizen means gradual unending improvement, doing little things, better settings and achieving higher standards. Following this strategy Japanese, during the past three decades, improved productivity, quality and flexibility and emerged as a leader of world market. Now-a-days Kaizen philosophy is being extended to such fields as labour management, relations, marketing practices and supplier relations. Middle managers, supervisors and workers are also actively involved.

Kaizen is the process oriented rather than individual task oriented where most emphasis is placed on individual performances and rewards.

Salient features of Kaizen philosophy :

(*i*) It has a long term and long lasting but undramatic effect.
(*ii*) Small steps of improvements.
(*iii*) Continuous process resulting in gradual change.
(*iv*) It involves everybody.
(*v*) Its approach is collective and system oriented.
(*vi*) It requires little investment but great efforts to maintain it.

This Kaizen concept is based on Daming's P-D-C-A cycle.

16. Poka Yoke (Fool-Proofing)

Poka-Yoke is a Japanese word which means "to avoid unintentional errors". The basic philosophy behind Poka Yoke is that human beings are liable to commit error unknowingly during any operation they perform. If there is a system which prevents them from committing the error, the mistake can be eliminated. Poka-Yoke aims at the total elimination of the possibility of human error. Thus Poka Yoke is an effective method of achieving zero defect objective.

Thus Poka-Yoke is designing the work process to eliminate human mistakes. Fool proofing create devices that can discover defectives/disorders. The process of fool proofing is standardised

to ensure that stable quality can be assured. Fool proofing can be achieved by following ways:

(*i*) by designing of the machines and tools so as to make human error impossible,

(*ii*) by providing redundancy,

(*iii*) by magnifying normal human muscle strength and senses through programmed indexing of fixtures, optical magnification, viewing through closed-circuit television, simultaneous signals to multiple senses etc.

Some of the commonly used methods for fool-proofing are :

1. If any step is missed during production process, the device does not allow goods to be mounted to jigs or the machine does not start processing.
2. If a disorder is found in goods, the device does not allow the machine to start processing.
3. The disorder that has occurred in preceding process is examined at the next process, the device will stop defectives.

Thus, in the poka-yoke, emphasis is placed on preventing defects, during the production process instead of correcting defects after the item is produced.

Objective of the fool proofing can be accomplished by following principles :

(*i*) Eliminate the possibility of error.

(*ii*) Substituting a more reliable process.

(*iii*) Making the work easier to perform.

(*iv*) Detecting the error before further processing.

(*v*) Minimizing the effect of the error.

17. Kanban System

The word *Kanban* means a signboard of a store or shop, but here it means any small sign displayed in front of a worker. Kanban has two functions :

(*i*) To contain information that serves as a work order which gives information that about what, how much, when, by what means to produce and how to transport it ; and

(*ii*) To move with actual material.

Since material and Kanban moves together no overproduction will occur, control of material and production becomes easier. For implementing Kanban following rules are followed :

(*i*) Do not send defective products to subsequent process.

(*ii*) Subsequent process comes to withdraw only what is needed. This is known as the "path system of demand".

(*iii*) Produce only the exact quantity withdrawn by the subsequent process.

(*iv*) Equalise production.

(*v*) Stabilise and rationalise the process.

In this system chain of withdrawal and production is continuous from the end product to the beginning of the process.

18. "5-S" (The principles of house-keeping)

The upkeep of workplace is of most important as it helps in quality and productivity improvement. It has been proved that the first step towards quality improvement is workplace utilisation. The Japanese have developed five simple words as a directive for achieving workplace utilisation. The five words starting from letter "S" are :

1. **SEIRI (Sort out)—Proper Arrangement :** "Seiri" means sort out unnecessary items. Unwanted things at workplace occupy precious space and create confusion and obstackle to working.

2. **SEITON (Set)—Orderliness :** The word "Seiton" means a place for every thing in its place. Everything should be kept in a predetermined place and maintained so that it need not to be searched whenever it is required by any body.

3. **SEIKETSU (Sound)—Cleanliness :** In Japanese the world "Seiketsu" means prevent problems by keeping things clean. It is important to keep the work area very clean with no oil spots, burns, dirt or dust. This will provide a pleasant working environment and result in quality products.

4. **SEISO (Shine)—Clean up :** "Seiso" means after work cleaning up and maintenance. To have consistent quality output, it is important to clean the machine and work place and to maintain the machine by carrying out routine checks like, lubrication, check-ups etc.

5. **SHITSUKE (Self Discipline).** The word "shitsuke" means maintaining good habits like following work instructions/standards, safety precautions, punctuality etc., to achive consistent desired quality of products and good work culture.

19. Just-in-time (JIT) Philosophy

Just-in-time is not just an inventory reduction programe or kanban, or material requirement planning, or a production control technique. It is a corportate strategic philosophy and aims at elimination of waste. It is based on following factors :

1. Unnecessary complexity in the design of products should be removed for producing it at least cost.
2. Plant layout should be changed to eliminate or shorten material movement and reduce time loss.
3. Provide incentives to workers to tap their knowledge to develop methods of eliminating waste of all forms.
4. People should be accountable for accuracy and institute programmes to measure it.
5. Reduce paper work. Use of on-line, real-time data update and retrieval and interaction decision making is important.
6. Scrap should be completely avoided, as scrap is more costly than mere material.
7. Reduce inventories by eliminating large queues and many kinds of safety stocks. When ordering purchase of parts from vendors, negotiate prices based on long term commitments and then schedule frequent releases to support the flow of production with minimal inventory.
8. In order to strive for continuous improvement, set goals and when they are achieved, set them higher.

JIT means a structural approach in a manufacturing organisation focussed on improving timeliness, quality, productivity and flexibility utilising various methods of work simplification and waste elimination. The company following the JIT philosophy want to do work systematically, remove excess work, eliminate waste, un-evenness and unreasonableness and thereby raise their productivity.

JIT concept when applied results in smaller set-up costs which justifies smaller lot sizes and provide greater flexibility for changeovers from one product to another. Companies adopting JIT concept found improvement in productivity, reducing set-up lime, reducing inventory,

improving quality, saving space and reducing lead times. Reduction in economical batch sizes lead to reduction in-process inventory. This leads to productivity improvement in the following way :

- Smaller lot size inventories
- Less indirect cost of inventories
- Less equipment to handle inventories
- Less physical inventory control effort
- Less direct labour wasted on rework.
- Smaller buffer inventories
- Less space for inventories
- Less inventory accounting
- Less scrap
- Reduction in delays and scrap also improve market response.
- Because of speedy changeover, reduces production lead times, better delivery dates can be promised, as the product mix and quantities can be changed quickly as demand and forecasts of demand change.

For reduction in in-process inventories use of Kanban is very helpful.

JIT purchasing : JIT purchasing emphasises on supplying materials just in time for use on factory floor, equally important are the close relationships with suppliers on long-term basis who are geographically close for frequent deliveries of small and exact quantities. For the success of JIT, cooperation from the company's vendors is essential. In this concept vendors are virtually an extension of the company. JIT vendors have to deliver goods to production line at the required time ; which may be quite frequent — say every 3 or 4 hours. In view of this JIT purchase agreements need be simple, specifying price, specifications, and an overall quantity to be delivered in accordance with long-term production schedules. The specifications are focused on product performance rather than being highly detailed.

The objective of this system alongwith Kanban is to have right number of parts or components at the right place at the right time.

JIT Production System. In this concept, factory produces the required goods only at the times when they are needed in the quantity that is needed, and in this situation the inventory of the finished goods and work in progress would be almost zero. If we make raw material suppliers also agree to deliver their goods only at a time in quantities we need them, then we are almost eliminating raw materials as well. In such a situation we shall have near zero inventories.

In this system, workers go to the preceding process to withdraw the required parts or components for their operations using the Kanban system. If there are fluctuations in the rates of which these materials are withdrawn, then the preceding process must hold buffer in-process inventories to give off-the shelf service. This require minimising production fluctuations on the final assembly line by scheduling small lots of individual models.

In JIT, production processes are so designed that it need less specialisation of workers, and the physical layout is so arranged that a worker can operate two or three different machines for providing flexibility in processes. The organisation of multi functional workers have following benefits :

(*i*) A decrease in the number of workers required, resulting for increase in productivity.

(*ii*) Increased worker satisfaction because of more broadly defined jobs.

20. Cause and Effect Diagram (Fishbone diagram)

This diagram is a useful tool for formulating possible causes of quality problems. This is an effective technique to obtain the leads to improve the understanding of problems experienced in

work area. Any defect or a problem or an effect on quality/performance of a component, a product or service could be due to one or more causes.

The "Cause and Effect diagram" was developed by Koran Ishikawa of Japan (hence also known as Ishiknwa Diagram) and represents the relationship between some "effect" (problem) and all the possible "causes" influencing it. The effect or problem is stated on the right side of the diagram and the major causes are listed on the left. For every effect there are likely to be several major categories of causes. The major causes might be summarized under four categories referred to as the 4 M's, i.e. Manpower, Machines, Methods and Materials. In administrative areas it may be 4 P's i.e. Policies, Procedures, People and Plant. Other major categories as emerges can also be listed e.g. Design, Customer etc. so that there is no chance of leaving out any.

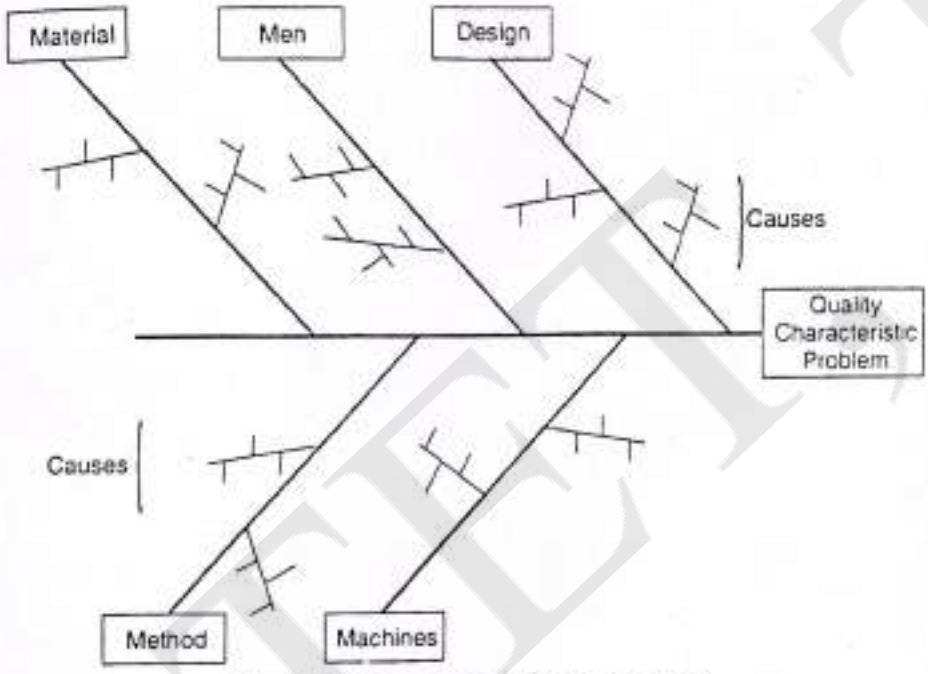


Fig. 46.9. Causes and Effect Diagram.

Preparation of the diagram will need a brain-storming session among representatives of different functional groups so that the problem is looked at in its totality. All possible factors suspected to have some influence on the problem are listed systematically. In this emphasis is given only to listing of suspected causes and does not identify the real culprit. As identification shall require a process of elimination which will require further collection of facts or experimentation. Pareto technique will be useful at this stage of investigation. Cause and Effect diagram is also known as "Fishbone diagram" because a well detailed cause and effect diagram will take on the shape of fishbone. Cause and effect diagram is not an answer to a problem, but it helps in keeping a track of the issue and helps in quickening the process.

I.S.O-9000 SERIES

46.11. ISO-9000 QUALITY MANAGEMENT SYSTEM

Introduction

ISO is the **International Organisation for Standardization.** It is located in Switzer-

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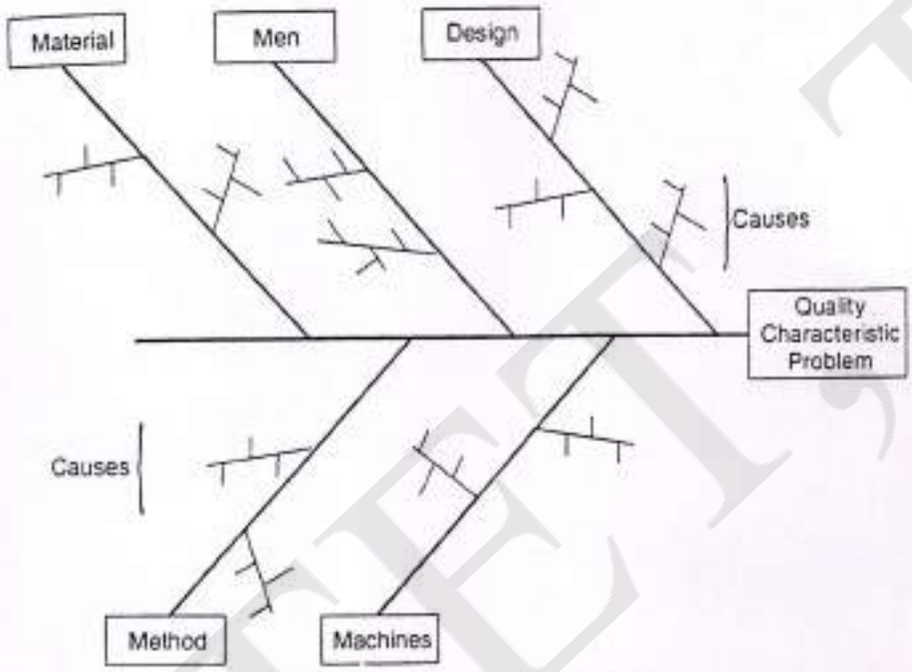

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I.S.O-9000 SERIES

46.11. ISO-9000 QUALITY MANAGEMENT SYSTEM

Introduction

ISO is the **International Organisation for Standardization.** It is located in Switzer-

land and was establish in 1947 to develop common international standards in many areas. Its member come from over 130 national standards bodies. ISO first published its quality standards in 1987, revised them in 1994, and then republished an updated version in 2000. Standards presently applicable are known as "**ISO : 2000 Standards**", and facilitate international trade by providing a single set of standards that people everywhere would recognise and respect.

ISO-9000 refers to a set of standards and is the only available internationally accepted standard for quality management system in the world. It is rapidly becoming the most important quality standard and hundreds of thousands companies in over 100 countries have already adopted it. ISO-9000 is applicable to all types of organisations in manufacturing or service sectors. It is a documentation oriented system which allows complete freedom selection and use of process and framing of operating procedures and work instructions. This is a widely recognised quality management tool and meet the quality requirements of every kind of products or services. Production of consistently good quality product or service is very important for customer confidence company who wants to survice and grow, have either adopted this standard or in the process of adopting it.

A properly established quality management system will help to reduce cost, improve quality, develop confidence and a good image in the minds of customers and public. This requires consistent implementation, careful auditing and total commitment of the whole organisation.

ISO-9000 set of standards are "**generic management system standards**". This means that the same standards can be applied :

- to any organisation, large or small, whatever its product;
- including whether its "product" is actually a service;
- in any sector of activity ; and
- whether it is a business enterprise, a public administration, or a government department.

The "ISO-9000 quality management system" adopting organisations fulfill :-

- the customer's quality requirements ;
- applicable regulatory requirements ;
- enhance customer satisfaction ; and
- achieve continual improvement of its performances

Many companies require their suppliers to adopt ISO-9000 and get registered. Registerred companies find that their market opportunities have increased as it ensures a sound quality management system. Registered companies had reduction in customer complaints, significant reductions in operating costs and increased demand for their products and services. Other benefits can include better working conditions, increased market share, and increased profits.

History and Origin of the ISO-9000

After issuing several inspection system documents in the 1950's the U.S military later integrated them into a set of requirements documents and issued them in December 1963 with the names of *Inspection System Requirements* and *Quality Programme Requirements*. There after, documents issued were on standard clauses in procurement, contracts, required control over final inspection and testing, and then on *Calibration System Requirements*.

Similarly, Canadian series of standards were issued, in four levels, in the mid 1970's ; and the British standard, was issued, in three levels, in 1977 as quality management systems.

In the meantime, in December 1979 the United States issued *Generic Guidelines for quality systems*. This was a menu of quality management elements, and each organisation could choose the elements they felt were helpful, allowing them for almost infinite degree of tailoring.

Since different standards for different countries were creating problems international trade, necessity was felt for developing internationally recognised quality management standards. The ISO Technical Committee (TC - 176) was therefore constituted, which had its first meeting in 1980, and issued its first standard ISO 8402 - regarding "Quality System-Vocabulary". Thereafter, in 1987, they issued ISO-9001, 9002, 9003, and 9004. These standards were later on revised in 1994, and then extensively revised in the year 2000.

Before going into the details of ISO-9000 series of standards we shall first discuss the term "standard" and "standardisation".

Standard. A standard is defined as a document, establish by consensus and approved by a recognised body, that provides ; for common and repeated use, rules, guidelines or characteristics for activities of their results, aimed at the achievement of the optimum degree of order in a given contest.

Standardization. A standardisation is an activity consisting of the process of formulating, issuing and implementing standards.

International Organisation for Standardization, popularly known as I.S.O. started the work on quality standardization through their technical committees and issued six standards related to quality.

I.S.O. 8402 in the year 1986 followed by I.S.O. 9000, I.S.O. 9001, I.S.O. 9002, I.S.O. 9003, and I.S.O. 9004 in the year 1987. The latter five of these are popularly known as I.S.O. 9000 series. When we refer to I.S.O. 9000, we mean the whole series or a particular standard belonging to the series.

This helped in avoiding confusion, because different terms like quality control, quality assurance, quality management, quality policy, quality plan, quality system etc. have acquired different or conflicting meaning in different countries.

Since most international firms in their tender notices now clearly mention that only I.S.O. 9000 certified firms need apply, therefore Indian companies expanding their overseas base, have to obtain this certificate.

While the use of most sophisticated machinery, high technological inputs and trained man power are essential, they are not themselves adequate, greater importance is given to the well documented systems, which guide each one of business processes to precisely tell what to do, when and how. The degree of standardisation extends towards systemisation at all levels of operations of the enterprise.

I.S.O. 9000 series promote standardised management of quality systems in order to achieve commonly established global quality standards. **These standards primarily provide assurance to the buyer that the supplier has in fact well documented, well maintained and practiced quality systems covering all his operations, thereby ensuring consistency in quality of his processes, products and services.** I.S.O. 9000 series of standards reflect refinements in all practical and generally applicable principles of quality systems. Implementation of I.S.O. 9000 standards by an organisation provides opportunity to move from a state of disorganised system into high degree of system standardisation.

I.S.O. 9000 insists on existence and adoption of internal quality audits which help in identification of non-conformities from the set procedures, if any, and for taking necessary corrective steps well in time.

In order to evolve and implement appropriate procedure, documents and records, the company has to train every single employee towards these quality system. I.S.O. 9000 standards involve all employees, workmen upwards to the level of directors. All these need to be trained to understand and appreciate both implicit and explicit requirements of the I.S.O. 9000 standards.

I.S.O. 9000 also necessitate the periodic review of implementation. The review may be in the form of market feedback, customer complaints and improvement in methods are systematically planned and executed.

Following steps should be taken to attain the I.S.O. registered status :

(*i*) Management commitment.
(*ii*) I.S.O. Education
(*iii*) Organisation to work on systems.
(*iv*) Documentation.
(v) Study of existing systems.
(*vi*) Align existing systems towards I.S.O. standards.
(*vii*) Audits and accreditation.

Characteristics of I.S.O. 9000

- I.S.O. 9000 is the only available internationally accepted standard for quality management system.
- It does not replace but complements the product standards.
- I.S.O. 9000 is applicable to all types of industries or organisation in manufacturing or service sector.
- It stands for systematic standardisation and certification rather than product standardisation and certification.
- I.S.O. 9000 is a documentation oriented system which allows complete freedom on selection and use of processes and framing of operating procedures and work instruction.
- A mistake made in selection of proper product standard can never be compensated by I.S.O. 9000 implementation.

Advantages Of ISO-9000

It is widely acknowledged that proper quality management improves business, often having a positive effect on investment, market share, sales, sales growth, sales margins, competitive advantage, and avoidance of litigation. The quality principles in ISO 9000:2000 are also sound,and ISO 9000 guidelines provide a comprehensive model for quality management systems that can make any company competitive. Implementing ISO often gives the following advantages.

1. Creates a more efficient, effective operation
2. Increase customer satisfaction and relation
3. Reduces audits
4. Improves marketing
5. Improves employee motivation, awareness, and morale
6. Promotes international trade
7. Increases profit
8. Reduces waste and increases productivity
9. Common tools for standardization.

Criticisms of ISO-9000

1. A common criticism of ISO-9000 and 9001 is the amount of money, time, and paper work required for registration.
2. Some believes that ISO standards elevate inspection of the correct procedures over broader aspects of quality, and therefore, the work place becomes opressive and quality is not improved.
3. Some other believe that it is effective only as a guideline, but mislead companies to think that certification means better quality.
4. Certifications are often based on customer contractual requirements rather than a desire to actually improve quality.

The quality has a positive effect on return on investment, market share, sales growth, better sales margins and competitive advantage; but taking a quality approach is unrelated to ISO-9000 registration. In fact, ISO itself advises that ISO-9001 can be implemented without certification, simply for the quality benefits that can be achieved.

Effectiveness of ISO-9000

Effectiveness of the ISO system being implemented depends on a number of factors, the most significant of which are:

1. **Commitment of senior management to monitor, control and improve quality.** Organizations that implement an ISO system without this desire and commitment often take the cheapest road to get a certificate and ignore problem areas uncovered in the audits.

2. **How well the ISO system integrates into current business practices.** Many organisations that implement ISO try to make their system fit into a ready-made quality manual instead of creating a manual that documents existing practices and only adds new processes to meet the ISO standard when necessary.

3. **How well the ISO system focuses on improving the customer experience.** The broadest definition of quality is "Whatever the customer perceives good quality to be." This means that a company doesn't necessarily have to make a product that never fails; some customers will have a higher tolerance for product failures if they always receive shipments on-time or have a positive experience in some other dimension of customer service. An ISO system should take into account all areas of the customer experience and the industry expectations, and seek to improve them on a continual basis. This means taking into account all processes that deal with the three stakeholders (customers, suppliers, and organization); only then will a company be able to sustain improvements in the customer's experience.

4. **How well the auditor finds and communicates areas of improvement.** Many auditors simply rely on submitting reports that indicate compliance or non-compliance or non-compliance with the appropriate section of the standard. Auditors that can clearly identify and communicate areas of improvement in language and terms executive management understands facilitate action on improvement initiatives by the companies they audit. When management doesn't understand why they were non-compliant and the business implications associated with non-compliance, they simply ignore the reports and focus on what they do understand.

46.12. AREAS COVERED IN I.S.O. 9000 : 1994 SERIES

1. I.S.O. 9000 provides the guideline for selection and use of the quality standards.
2. I.S.O. 9001 is a quality system model for quality assurance in design/development, production, installation and servicing. This is most exhaustive standard. The engi-

neering organisation, where the manufacturing capabilities are based on in house designs have to work for I.S.O. 9001 certification. Manufacturers of (*a*) household good like TV, refrigerator etc. (*b*) perishable consumer goods like tooth-paste etc. which have both servicing and design/development have to work towards I.S.O. 9001.

3. I.S.O. 9002 provides a model for quality assurance only in production and installation. This does not cover areas of design/development and servicing. I.S.O. 9002 also looks at internal quality audits. Steel plants, departmental stores, hospitals, chemical plants etc. where the designing and servicing do not constitute the key activities, may prefer I.S.O. 9002.
4. I.S.O. 9003 deals only with quality systems related to final inspection and testing.
5. I.S.O. 9004 provides guideline for quality management and quality system elements.

In addition to the I.S.O. 9000 series, I.S.O. 8402 deals with vocabulary used in the I.S.O. 9000 series.

46.13. ISO-9000 : 2000 SET OF STANDARDS

ISO-9000 : 1994 series revised to ISO-9000 : 2000 set of standards, which included three quantity standards : ISO-9000 : 2000, ISO-9001 : 2000 and ISO-9004: 2000. In these standards ISO-9001 : 2000 presents **requirements**, while ISO-9000 : 2000 and ISO-9004 : 2000 presents **guidelines**. All of these are process standards (not product standards). The certificate is awarded to an organisation in respect of compliance of standards ISO-9001 : 2000.

Following standards make up the ISO 9000 : 2000 family :

Standards and Guidelines	*Purpose*
ISO-9000 : 2000, Quality Management Systems-Fundamentals and vocabulary.	For understanding the standards and defines the fundamental terms and definitions used in the ISO-9000 family
ISO-9001 : 2000, Quality Management Systems-Requirements,	This is the requirement standard used to assess the ability to meet the customer and applicable regulatory requirements and thereby address customer satisfaction. It is now the only standard in the ISO-9000 family against which third-party certification can be granted.
ISO-9004 : 2000, Quality Management Systems - Guidelines for performance improvements.	This guideline standard provides guidance for continual improvement of your quality management system to benefit all parties through sustained customer satisfaction.

From the above it is clear that, in order to develop a quality management system, you are required to only meet the requirements specified by ISO - 9001 : 2000. You can consult the ISO-9000 : 2000 and ISO - 9004 : 2000 guidelines only when you need clarification. Your quality management system must simply meet *requirements* as specified in ISO-9001 : 2000. When your quality system has been fully developed and implemented, you carry out an internal assessment to ensure that you have not every single ISO-9001 : 2000 requirement. When you are ready, you ask an external auditor to audit the effectiveness of your quality management system. If your auditors find that you have introduced and implemented the ISO-9001 : 2000 standard, they will certify that your quality system has met ISO's requirements. They will then issue an official certificate to you and will record your achievement in their registry. You can

then announce to the world that the quality of your products and services is managed, controlled, and assured by a registered ISO-9001 : 2000 Quality Management Systems.

46.14. ISO - 9000 : 2000 STANDARDS—QUALITY MANAGEMENT PRINCIPLES

ISO - 9000 : 2000 standards are based on eight quality management principles. ISO choose these principle because they can be used to improve organisational performance and achieve success. These principles can be used by senior management as a framework to guide their organisation towards improved performance. The eight quality management principles as given in the ISO -9000 : 2000, Quality management systems - Fundamentals and vocabulary; and in ISO - 9004 : 2000, Quality management systems - Guidelines for performance improvements are :

Principle 1 : Focus on your customer

Organisations depend on their customers. Therefore

- Organisations must understand customer needs.
- Organisations must meet customer requirements.
- Organisations must exceed customer expectations.

Principle 2 : Provide Leadership

Organisations rely on leaders. Therefore :

- Leaders must establish a unity of purpose and set the direction the organisation should take.
- Leaders must create an environmental that encourages people to achieve the organisation's objectives.

Principle 3 : Involvement of People.

People at all levels are the essence of an organisation and therefore :

- Organisations must encourage the involvement of people at all levels.
- Organisations must help people to developed use their abilities.

Principle 4 : Use a Process Approach

Organisations are more efficient and effective when they use a process approach. Therefore:

- Organisations must use a process approach to manage activities and related resources.

Principle 5 : Take a System Approach

Organisations are more efficient and effective when they use a systems approach. Therefore:

- Organisations must identify inter-related processes and treat them as a system.
- Organisations must use a systems approach to manage their inter-related processes.

Principle 6 : Encourage Continual Improvement

Organisations are more efficient and effective when they continually try to improve. Therefore :

- Organisations must make a permanent commitment to continually improve their overall performance.

20

Personnel Management

20.1. DEFINITION AND CONCEPT

- Management in industry inevitably sub-divides itself into a series of functions such as sales, production, finance, etc. *Personnel* is one of these functions.
- The personnel function exists in every enterprise regardless of its size and irrespective of the fact that whether or not there is a personnel department.
- In a small concern, the personnel function is carried on by the owner itself whereas as soon as the organisation reaches a certain size, the personnel function like other functions is given a separate organizational status.
- The *personnel function* is concerned with all of the human relationships among workers as people.
- The essentials of Personnel Management were first exemplified by the work of Robert Owen (1771-1858). He recognized the immense importance of the human factor in industry and he put efforts to apply this knowledge.
- Any industry depends upon human beings ; it has to acquire workers and it creates an acceptable environment and a rule-of-practice to encourage the greatest degree of participation from its employees.
- Personnel Management, Personnel Administration or Industrial Relations in an enterprise tends to attain maximum individual (employee) development, desirable working relationships between employees and employers and between groups of employees and effective moulding of human resources as contrasted with physical resources.
- *Personnel Management* may be defined as the Planning, Organising, Directing and Controlling of the Procurement, Development, Compensation, Integration and Maintenance of people (*i.e.*, employees) for the purpose of contributing to the organizational goals.

The different words used in the above definition are explained below :

(*i*) *Planning.* It means determination in advance of a personnel programme. It involves ability to think, analyze and to reach decisions.

(*ii*) *Organizing.* It means (after determining a course of action) establishing an organization by designing the structure of relationships among jobs, personnel and physical factors to attain the company objectives.

(*iii*) *Directing, Motivation or Actuation* means getting employees to go to work willingly and effectively.

(*iv*) *Controlling.* It concerns with regulating activities in accordance with the personnel plan (formulated on the basis of organizational goals).

(*v*) *Procurement* means obtaining proper kind and size of personnel necessary to achieve company goals.

(*vi*) *Development* involves increasing of employee's skill, through training, that is necessary for proper job performance.

(*vii*) *Compensation* means (adequate and equitable) remuneration of personnel for their contribution to achieve organizational goals.

(*viii*) *Integration* is concerned with the attempt to effect a resonable reconciliation of individual and organizational interest.

(*ix*) *Maintenance* means sustaining and improving the conditions (*e.g.*, health and safety measures, employee service programme, etc.), that have been established.

20.2. AIMS, OBJECTIVES OR FUNCTIONS OF PERSONNEL MANAGEMENT OR PERSONNEL DEPARTMENT

– Being used upon the definition of Personnel Management given in section 20.1, it is generally recognized that the following areas of the work situation in an industry are the province of the Personnel Department, *i.e.*, Personnel Manager and the staff of his department.

(*a*) *Procurement and Maintenance of adequate work-force (employees) as regards to both –number and quality of personnel.*

- Recruitment
- Interviewing
- Testing
- Induction
- Placement
- Follow up of new employees for adjustment
- Merit rating
- Promotion, transfer and discharge
- Employment records.

(*b*) *Education and training of present employees*

- Job instruction : Apprentice training vestibule schools
- Economic education
- Training plans : operative training, supervisory training, Executive training
- General industrial education
- Training materials and audio-visual training aids
- Reading rooms and libraries
- Records and statistics.

(*c*) *Maintaining Satisfactory Personnel Contacts and Employee Relationships*

- Job analysis, job specifications, etc.
- Merit rating of employees
- Wages and rewards
- Labour audit
- Labour records and labour statistics
- Regularization of employment
- Handling grievances
- Labour turn-over
- Labour market surveys
- Suggestion systems
- Morale studies.

(d) Maintaining satisfactory group relationships, by

- Contacting employer's groups
- Contacting employee's representatives
- Contacting government agencies
- Integrating group interests.

(e) Maintaining employees health

- Health standards
- Sanitation control
- Physical examinations
- Treatment of minor injuries and diseases
- Hospitalization
- Personnel hygiene and health education
- Rest periods, Recreation, etc.

(f) Maintaining employees safety

- Safety standards
- Safety guards and inspection of safety equipments
- Safety programmes, safety publicity, safety rules and safety contests
- Fire protection and accident investigations
- Safety records and workmen compensation for injuries.

(g) Maintaining employees service activities (employee welfare)

- Credit unions
- Savings and investment plans
- Group insurance
- Profit sharing
- Pension
- Legal assistance
- Housing programme
- Company stores and restaurants
- Recreation plans.

20.3. PRINCIPLES (CHARACTERISTICS) OF A GOOD PERSONNEL POLICY

- A personnel policy is a directive, usually written, to help personnel department in accomplishing its objectives or functions.
- A personnel policy is dynamic to meet fundamental changes or the current situation.
- A personnel policy contains the information regarding

(i) Recruiting employees	*(ii)* Employment conditions
(iii) Promotions	*(iv)* Discharge
(v) Safety practices	*(vi)* Training
(vii) Financial aid	*(viii)* Health standards, etc.
(ix) Separation.	

- Various characteristics/principles of a good personnel policy are :

1 It should avoid opportunism and be stable.

2. It should have due regard for the human equation, the employees, the employers and the consumers (or public).
3. An employee should be able to approach personnel manager to express his grievances.
4. It should not contain ambiguities and uncertainties.
5. It should guarantee permanent employment to competant employees.
6. It should be flexible enough to meet varying needs of employees and the changing conditions.
7. It should have provision to train competent employees for promotion.
8. It should be easily understood by all concerned persons.
9. It should guard employees against unfair dismissal.
10. It should have a fair wage agreement system.
11. It should provide good working conditions, safety and medical benefits.
12. It should recognize individual differences in capacities, interests, emotional reactions, etc.
13. It should organise and encourage social facilities.
14. It should be above religious, social or political discrimination.
15. A worker or workers should have formal recognition in phases of management of their vital interest.
16. It should maintain effective consultation between employers and employees.

20.4. RECRUITMENT AND SELECTION OF EMPLOYEES

Introduction

- The first step in the development of a concern's personnel activity is to *employ* the right type of persons to operate the organization. if the organization does not possess right kind of people, it leads to lowered production and employee morale and increased absenteeism and labour turn over.
- Employing people is one of the most critical steps in the establishment and growth of a business.
- The basic purpose of the employment office of the company is to hire desirable employees for specific company openings.
- Recruitment is a major step in the total staffing process.
- *Recruitment* may be described as the process of getting potential employees willing to apply for a iob with the concern or firm.
- In other words, recruitment develops and maintains adequate manpower to run an organization efficiently.
- The term *recruitment* is used to describe the attraction of applicants from among whom to select.
- *Recruitment* is the process of searching for prospective employees and stimulating them to apply for jobs in the cencern.
- For this reason, recruitment is a positive process ; it increases the number of candidates aspiring to take up a job with the organisation.
- As compared to *Recruitment, Selection* is a negative process because it picks out a few suitable persons from amongst a number of applicants and thus eliminates many candidates aspiring for the same post.
- Selection divides the applicants approaching for employment into the classes – those who will be offered employment and those who will not.
- A *good and effective selection* of employees :

(*i*) Raises output,
(*ii*) Improves product quality,
(*iii*) Reduces total product cost,
(*iv*) Minimizes disputes and grievances, and
(*v*) Lowers the labour turn-over rates, etc.

– The applicant selected for the post should :

(*i*) Be willing to work,
(*ii*) Be able to handle the job,
(*iii*) Be stable, *i.e.*, stay with the organisation for a fair period,
(*iv*) Be able to fit in the work situation, and
(*v*) Have development and growth potentialities.

Functions of Employment Section of the Company

(*a*) To hire right type of employees for specific company openings.
(*b*) To maintain adequate supply of right kind of employees.
(*c*) To develop job specifications.
(*d*) To procure information about current wage rates.
(*e*) To introduce selected employees with personnel policy of the company.
(*f*) To follow up the new recruits for initial adjustment.
(*g*) To look after employee counselling and operating the seniority system.
(*h*) To keep records of employees, hired, resigned, discharged and transferred.

Sources of New Employees

(a) *From within the Company*

– By promotion
– By transfer
– Former employees who had good service records when they left.

(b) *From outside the Company*

– Friends and relatives of present employees duly recommended by them.
– Through press and other advertisements.
– Through employment agencies.
– Through schools, colleges and universities.
– Through labour unions.
– From waiting lists.
– As recommended by Professional bodies and societies.
– Foreign sources.
– From unsolicited applications received, both at the gate and through the mail.
– Through trade associations.
– From Government employment exchanges.
– From labour contractors.
– Through personnel consultants.
– With the help of Notices exhibited at the factory gate.

SELECTION PROCESS OR TECHNIQUE

- After attracting a number of applicants through various sources described earlier, the next stage is the selection process, *i.e.*, to select the persons most appropriate for the organization.
- The different procedural steps involved in the selection process are

(A) (Obtaining) job descriptions,
(B) Application forms,
(C) Employment tests,
(D) Interviewing,
(E) Physical examination,
(F) Induction or orientation.

(A) Job description

- The first important step of any selection process is to develop job descriptions for the positions to be advertised and filled.
- A *job description* is a combination of short statements that describe both the work to be performed and the essential requirements of the particular job.
- The *job description* includes

(*i*) Job title.
(*ii*) Department in which the job exists.
(*iii*) Work to be performed by the new employee.
(*iv*) Job responsibilities, *e.g.*, care and maintenance of machine tools.
(*v*) Job Knowledge, *i.e.*, ability to read from job instructions and blue print.
(*vi*) Mental concentration.
(*vii*) Dexterity and accuracy.
(*viii*) Machines, tools and processes to be handled.
(*ix*) Relation with other jobs.
(*x*) Qualification and experience required.
(*xi*) Amount of supervision.
(*xii*) Physical activities.
(*xiii*) Working (environment) conditions, *i.e.*, whether hazardous or safe.

- **The job description of Personnel Officer may look like**

Responsible for all personnel management functions involving industrial relations, personnel administration, manpower planning, selection, training and development, labour laws, welfare services, etc. will advise the management regarding labour disputes, grievance handling, disciplinary action, bipartite negotiations on a day-to-day basis and also coordinate with Government departments. Should be gradutate having post-graduate qualification in Personnel Management or Industrial Relations in the age group of 30-40 with a minimum of 5/8 years' similar experience.

(B) Application Forms

- An application blank or form is the most universal mechanism used to screen the applicants to be called for interview and other tests for selection purposes.
- The contents of an application form can discourage unsuitable applicants and its design can, reflect a firm's dignity, reduce to a minimum the time required to fill it out and simplify its review.
- The application form may be used to get from the applicant, the information such as his age,

marital stauts, previous education and training, previous work experience, including nature of duties, salary, length of time on the job, reasons for leaving, etc.

- A duly filled application form helps determine which applicants meet the job requirements, because an application form elicits sufficient accurate information that the least likely applicants can be eliminated by simply reviewing the contents of the filled application forms.
- An application form tests an applicant's ability to write, to organise his thoughts and to present facts clearly and succinctly.
- An application form tells whether the candidate has consistently progressed to better jobs and whether his education, training and experience have been logically patterned.
- For assessing and screening purposes, the various questions listed in the application form may be weighted and scored according to their predictive value. Such scores are then matched against the scores of company employees with good tenure and performance records.
- An application form should be made simple, easy to fill and easy to check.

(C) Employment Tests

- Very often considerable training money is expended upon an employee when it is discovered that he is unsuited to do the job for which he was employed. For this reason and in order to avoid the re-occurrence of such a situation, employment tests are, sometimes considered an essential part of the selection programme.
- Tests are conducted as a means of scaling applicants in terms of their innate abilities.
- Tests are conducted as a means of scaling applicants in terms of their innate abilities.
- Tests are helpful in determining a mimumum below which the candidate has little or no chance for reasonable success.
- A test is a rapid method of obtaining samples of behaviour to help the interviewer form a judgement to hire or not to hire a given applicant.
- An *employment test* measures selected psychological factors such as ability to reason, capacity for learning, temperament, specific aptitudes, physical or motor abilities (*e.g.*, manual dexterity or eye-hand coordination), etc.
- *Characteristics of good employment tests*

(*i*) A test should be designed on the basis of a sound job analysis programme.

(*ii*) The test should be reliable. *i.e.*, an applicant if tested even second or third time under same condition should achieve the same score.

(*iii*) The test should be valid, *i.e.* highly specific to the objective it intends to measure and to the particular business situation.

- *Advantages of a good test*

(*i*) A good test eliminates the possibility that the prejudice of interviewer will govern the selection decisions.

(*ii*) It uncovers the hidden talents of an applicant which might have been otherwise overlooked in the selection porcess.

(*iii*) A number of candidates can be tested at one time and a good amount of information about each applicant can be obtained in a relatively small duration of time.

(*iv*) Test score of an applicant is a positive point (reason) to accept him or to reject him.

(*v*) Tests tend to lower the cost of selection because a number of candidates can be tested simultaneously.

– **Types of employment tests**

A simple classification of tests used in selection would distinguish the following main types :

(*a*) Achievement tests,
(*b*) Aptitude tests,
(*c*) Intelligence tests,
(*d*) Interest tests.
(*e*) Dexterity (motor) tests, and
(*f*) Personality tests.

(a) Achievement tests or Performance tests

– When an applicant claims to know something, an achievent or permormance test is given in order to given him a chance to demonstrate his ability and thus to measure what the applicant knows about a particular job or what is his degree of proficiency in doing that job.
– Prospective stenographers are asked to take dictation and then type it out, a welder is asked to weld two metal pieces together, a machinist is asked to prepare a job involving many different machining operations, etc.
– Achievement tests prove to be very useful in selecting employees at the lower levels, *e.g.*, a welder, a typist, a driver, etc.
– Performance tests are highly acceptable to both management and applicants because of their evident close relationship to the job in question.
– **Trade Tests** measuring an applicant's (*e.g.*, a welder's or turner's) trade knowledge and skill are a type of achievement tests. Trade tests may be oral, written, picture or performance type.
– In general, performance tests achieve high validity when the tasks to be evaluated are representative and when the rating system is objective and uses appropriate standards.

(b) Aptitude Tests

– An aptitude test explores inborn tendencies of an applicant to perform well in a particular field.
– An aptitude test determines whether an applicant has the capacity or hidden ability to learn a given work if he is given proper training.
– Examples of aptitude tests are : mechancial, clerical, musical, and motor capacity tests such as finger dexterity, eye hand coordination, etc.
– An aptitude test is used to measure the job proficiency (from production records) and job training of an employee.

(c) Intelligence tests

– Intelligence tests give an idea of mental quickness or quickness of perception and general knowledge of an applicant.
– An intelligence test is probably the most widely administered standardized test in industry.
– An intelligence test explores

Quick learning,

Alertness,

Comprehension, and

Reasoning.

Judgement making qualities of an applicant and his ability to deal with abstract symbols, ideas, words, number and so forth.

- Questions in intelligence tests are practical, job oriented and abstract type.
- Generally many industries make use of short, paper-and-pencil tests which give a rough approximation of the I.Q. (Intelligence Quotient) of the applicants.
- Intelligence tests can be employed by an organization for selecting all levels of employees taking from workers to managers.
- An example of an intelligence test is as follows :

  Fill in the blank space :

16	28	41	58
37	49	62	

(**Ans.** Seventy nine)

(d) Interest tests

- A person interested in a job will do it much better than the one who is uninterested. Interest is a main factor which contributes to the success on the job.
- Interest tests discover the patterns of an applicant's interests and thus suggest what types of work may be satisfying to the prospective employee.
- Interest tests measure an applicant's preferences for certain activities of either a vocational or avocational nature.
- Most widely used interest tests are
  - (*i*) Strong Vocational Interests Blank for men and women. The applicant is asked if he likes, dislikes or is indifferent to many examples of school/college subjects, amusements, occupations, particular activities, etc. and then his interests are compared with the interests of successful personnel in specific professions and occupations.
  - (*ii*) Kuder Preference Record.

  The test deals with more basic interest groupings. These areas are mechanical, scientific, computational, musical, social service, etc.
- Interest tests are very useful in counselling situations where a person is in need of help and is willing to cooperate fully.

(e) Dexterity Tests

- They discover an applicant's cleverness to work with his hands and fingers when the job requires the skilful use of one's hands and body, *e.g.*, assembling operations.

(f) Personality Tests

- An applicant may possess intelligence, aptitude, interest and what not, but if he lacks in personality, he may not be able to get along with and motivate other persons in the organization.
- A personality test measures an applicant's :
  - (*i*) Self-action or knowledge of other people's behaviour.
  - (*ii*) Social or unsocial tendencies.
  - (*iii*) Emotional adjustment and instability.
  - (*iv*) Vocational interests.
  - (*v*) Originality.
  - (*vi*) Motives and basic needs.
  - (*vii*) Self-confidence, and decisiveness.

(*viii*) Capacity for interpersonal relations.

(*ix*) Optimism, Patience etc.

– A few examples of personality tests are

(*i*) Do you ever feel that people are staring at and laughing at you : Yes/No.

(*ii*) Do you frequently wake up in a *cold sweat* : Yes/No.

– Personality tests are very useful in counselling and in selecting salesmen, supervisors, etc.

(D) INTERVIEWING

– An interview is a conversation (directed to a definite purpose) between an applicant and the interviewer and much of the interaction between these two is carried on by gestures, postures, facial expressions and other communicative behaviour.

– It is in the interview that both the prospective employee and the employer get the chance to learn and know about each other.

– The interview is a commonly used method of human evaluation and it is also probably the oldest.

– If an organization is asked to pick up a single method for selecting employees, it would choose interviewing most frequently.

Purpose of Employment Interview

(1) It measures all relevant attributes and integrates and clarifies all other information about the applicant.

– An interview helps studing the impact of personality of the applicant upon others.

– An interview helps exploring the innate abilities, *e.g.*, quickness in the uptake, of the applicant.

– An interview helps studying the motivation and emotional adjustment of an applicant.

(2) It helps the employer to view the total individual (*i.e.*, applicant) and to appraise the person and his behaviour direclty.

(3) It measures the applicant against the specific requirements of the job and helps deciding whether there will be a good "fit".

(4) It helps finding the suitability of one or a few candidates from amongst the many.

(5) It gives the applicant a chance to learn the opportunities and job possibilities that exist in the organization.

Types of Interviews

(1) Guided, directed or patterned interview in which a list of questions (to be put up to the applicant) is prepared based on the analysis of the job specification.

– A patterned interview measures the personality traits such as self-reliance, emotional stability, ability to get along with others, willingness to take up responsibility etc.

– The typical employment interview is guided, nonetheless, as its average length is 30 minutes for plant employees and 45 minutes for office employees.

(2) Unguided, nondirected or unpatterned interview as its name implies is not directed by the interviewer; instead the applicant talks about what he chooses.

– Unguided interview is more often used in situations other than employment, *e.g.*, counselling, handling grievances, etc.

Conducting the Interview–Procedure

The typical sequence of functions that occur in the process of interviewing are as follows :

1. *Preparation for the interview*
   - Spell out the specific objectives of the interview.
   - Select the appropriate type of interview *i.e.*, guided or unguided.
   - Determine the number of interviewers.
   - Review all the information submitted by the applicant on the application form.
   - Decide the length of interview.
2. *Setting for the interview*
   - Decide the place for interview. The place should be private, comfortable and free from all disturbances.
   - Mental setting will help the interviewee to feel at ease. Allow a little time to interviewee to get accustomed to you and your situation.
3. *Conduct of interview*
   - Make interviewee feel that you have a basic liking and respect for people and you are interested in hearing the applicant.
   - Begin with simple questions and encourage the interviewee to talk.
   - Once you get into the main topic of interview, do everything to get interviewee talk freely with as little prodding from you as possible.
   - Listen the interviewee attentively, patiently and, if possible, projectively (*i.e.* by projecting one's consciousness into that of another person).
   - Do not run the risk of letting the interview loose direction, keep control of interview.
4. *Close the interview*
   - The interviewer should make some overt sign (*e.g.* laying his pencil down, pusing back the chair), to indicate the end of interview.

     At the close of interview, watch for additional information in the casual remarks of interviewee.
   - Give to the interviewee some type of answer or indication of future action.
5. *Evaluate the interview*
   - The interview provides much opportunity for inferences, sound and unsound.
   - The applicant may be finally assessed on the basis of

   (*a*) *The Analytic Approach* in which a rating sheet is used and the applicant is rated on the basis of a number of factors predictive of success.

   (*b*) *The Integrative Approach* evaluates the applicant as a total integrated person, *i.e.* the applicant is assessed on the basis of overall fitness.
   - From the interview, the interviewer concludes whether the applicant is :
     - (*i*) Dependable.
     - (*ii*) Adaptable.
     - (*iii*) Persevering.
     - (*iv*) Cooperative.
     - (*v*) A hard worker.
     - (*vi*) Able to work under pressure.
     - (*vii*) Positively motivated.
     - (*viii*) Good in human relations.
     - (*ix*) A turn-over problem.

(E) Physical Examination

- The physical examination as a step in the employment procedure is found in most businesses.
- Many jobs require unusual stamina, strength or tolerance in unpleasant conditions.

  The physical examination reveals whether or not an applicant is fit for a particular job.
- *A physical examination may include*

  (*i*) Family medical history.

  (*ii*) Personal history of previous illness.

  (*iii*) Height, chest and weight measurements.

  (*iv*) General physical examination of the skin and joints.

  (*v*) Examination of eyes, nose, throat, teeth and ears.

  (*vi*) Chest X-ray.

  (*vii*) Check-up of heart and blood pressure.

  (*viii*) Urine and blood test, etc.
- *Purpose of physical examination*

(*i*) To ascertain the physical capabilities of the applicant. *i.e.*, can he work standing up? Can he lift heavy objects ? etc.

Physical examination prevents employees from being assigned to jobs which are beyond their strength.

(*ii*) To find if the applicant has the general physical characteristics required for the job.

(*iii*) To find if the applicant is suffering from communicable diseases.

(*iv*) To determine the exact state of health of the applicant in order to protect the company against unwarranted claims under workmen's compensation laws or against law suits for damages.

(*v*) The company's general health programme is facilitated by initial physical examination. Later physical check-ups will indicate whether the employee's general health is improving or deteriorating.

- The physical examination may be conducted by the doctor of the industrial hospital or of a civil hospital.

(F) Induction and Orientation

- It has been reported by many concerns that over half of the voluntary (employee) quits occur within the first six months on the job and a large portion of these is because workers are introduced to their jobs in a haphazard manner.
- Induction implies introducing or orienting a new employee to the organisation.

20.5. EDUCATION AND TRAINING

20.5.1 Introduction

- When the employment aspect of the personnel function has succeeded in providing suitable employees for various tasks, it is followed by an Education and Training aspect which brings employees to a standard where they can carry out industrial tasks efficiently.
- One of the characteristics of modern society is the increasing rapidity of change today compared with older social orders. This intensifies the need for study, adaptation and new education and training.
- In the field of education and training, personnel management deals with an extensive programme, ranging from the placement, induction and training of new recruits to the provision of courses for middle and higher management levels.
- Training is an ever-continuing process in all organisations and it is employed as a technique of control as well as of imparting information and developing new skills.

- The main object of all industrial training is to prepare people to do efficiently their own particular tasks or to do another job equally well.
- Industrial training is based upon a specific need. It imparts knowledge and develops employees aptitude and skill for a particular industrial task.
- *Education* improves an employee and he can take up and handle jobs of higher responsibility whereas

Training prepares an individual so that he can accomplish his industrial task efficiently and effectively.

- Every industrial organisation realises the *need* of training the recruits before putting them on a (new) job. If there is no planned training programme, the employees train themselves by trial and or by observing others; this not only results in higher training costs (because of more work spoilage and scrap rate), the learning period gets considerably lengthened and even then employee is not able to learn the best operating methods.

20.5.2 Objectives, Aims or Need for Training

Training of employees is essential in order :

1. To ensure an adequate supply of properly trained employees at all levels of industry.
2. To improve the performance of each employee to the highest attainable level and to develop his potential so that he can take up jobs of higher responsibility.
3. To attain precision and clarity in the transition of business.
4. To increase productivity by conceptual skill, imagination and judgement of employees.
5. To reduce scrap rate.
6. To reduce accident rate.
7. To minimize absences.
8. To reduce fatigue and tardiness.
9. To minimize over-time.
10. To reduce labour turn-over.
11. To boost employee morale.
12. To promote cooperation and good relations between workers and management.
13. To reduce cost of product through economic and more efficient use of company resources.
14. To provide knowledge and appreciation of techniques necessary to enable a trainee to do his job.
15. To inculcate a broad understanding of relevant science and technology so that the trainees adjust to the changes in the nature of work.
16. To teach employees the standardized work methods.
17. To inculcate good work habits on the part of employees.
18. To promote team work.
19. To find out whether an employee is suited to the job.
20. To adjust employee's outlook to new needs of new times.

20.5.3 Advantages of Employee Training

1. Increased productivity.
2. Fast production rate and improved product quality
3. Reduced supervision of employees.
4. Better cooperation and team work among employees.

5. Increased organizational stability and flexibility.

6. Reduced labour turn-over, quits and fires.

7. Reduced accidents.

8. Less fatigue to workers.

9. Heightened morale of the employees.

10. Increased labour efficiency.

11. Reduced scrap rate.

12. Less equipment maintenance problems because a properly trained worker handles machinery carefully.

13. Increased wage rates.

14. More job satisfaction.

20.5.4 Methods of Training

Instructional methods may be classified as follows :

1. *Individual Instruction.* This involves devoting personal attention to an employee in order to teach him a complicated skill, *e.g.*, to run a machine or to perform a complicated assembly operation.

2. *Group Instruction.* Under this method of instruction, a group of trainees are given certain basic facts about the job *e.g.*, explaining to the workers the importance of adopting a new method for doing the same old job.

3. *Lecture Method.* It is the most effective method for giving to trainees the basic or supplementary (usually technical) information on specific subject, *e.g.* mathematical treatment of the forces acting on a lathe tool when doing rough turning.

4. *Demonstration Method.* It is employed to help trainees to grasp manual skills *e.g.*, the right way to hold the job against the grinding wheel.

5. *Written Instructional Method.* This method is used to give to trainees the important information in permanent form for immediate or future use, *e.g.*, Standard Practice Instructions on how to perform various jobs.

6. *Oral Instructions.* Oral instructions method is used when it is required to give information needed at once – in short form, *e.g.*, when an employee starts on a new job. The oral instructions explain the principles behind the work and reason why it is required to do.

7. *Conferences.* The conference method of training is of particular value on account of its flexibility. It helps solving problems or changing attitudes, *e.g.*, how to reduce waste or scrap rate or how to control absenteeism.

In conference method, the text material plays only a minor role, practical experience forms the background for every discussion.

8. *Meeting.* Meetings are held to exchange information, solve immediate problems or to get ideas of group *e.g.*, department safety meeting will extract from the employees as how to make machine operation more safe, how to reduce accidents, etc.

20.5.5 The Training procedure

The procedural steps involved in the process of training are :

1. Make the instructor ready to teach

The instructor should,

Know the job himself thoroughly.

Break up the job into logical steps, for example for infeed grinding on a centerless grinder, first

step is to place the workpiece on the plate against the grinding wheel, the second step is to lower the lever, feed and grind, etc.

- Know at which stage of training which training method (*i.e.* lecture, demonstration, etc.) is to be used,
- Keep physical work place ready for training.

2. *Get the trainee ready to learn*
   - because a person who is interested in learning is easiest to teach,
   - make trainee feel at ease,
   - explain to the trainee what he is going to learn, what is the purpose behind, what is the importance of job, how it is related to work done before and afterwards and what is the benefit of rapid and effective learning.

3. *Demonstrate the method of doing the job*

Tell and show to the trainee the correct procedure of doing the job, step by step, using appropriate training aids and let the trainee watch the whole show. While doing so

- explain the sequence of the entire job,
- demonstrate each operation using the best motions and their correct sequence at a standard pace rate,
- repeat if necessary, and
- emphasize key points in each step. A key point is one which might damage the job or injure the trainee.

4. *Let the trainee try the operations himself*

Under the guidance of the instructor

- correct the trainee when he is wrong,
- encourage him when he is working right,
- learning curves* may help at this stage, and
- an attitude of patience and goodwill on the part of instructor might be very much beneficial.

5. *Gradually put the trainee on his own*
   - When the instructor feels that the trainee can do the work resonably well in his presence, he may let the trainee loose for a while; but not abondon him completely.
   - The time for which the trainee is working independently should be increased gradually and gradually.

6. *Follow up*
   - The trainee should be checked from time to time in order to find whether he is doing correctly and working satisfactorily or not.
   - Any deviation from the standard method (practice) noticed should be told to the trainee and corrected accordingly.

20.5.6 Systems, Forms or Kinds of Training for Different Levels of Staff in Industry

- Different staff levels and the type of training conducted for each level is listed in Table 20.1 below

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Refer 'Workstudy' by Dr. O.P. Khanna (Page 106).

Table 20.1

	Staff	*Type of training*
(*a*)	Workers or Operators Training	1. Induction and orientation. 2. By skilled and old workers. 3. On-the-job training. 4. Apprentice Training. 5. Vestibule schools.
(*b*)	Foreman or Supervisor Training	1. Induction. 2. Lectures. 3. Written material (instructions). 4. Conferences. 5. Training within Industry (TWI).
(*c*)	Executive Training and Development	1. Management induction. 2. On-the-job experience, coaching and under study. 3. Conferences. 4. Meetings. 5. Special projects. 6. Committee assignments. 7. Selective reading. 8. Special courses and classes.

(a) WORKER'S OR OPERATOR'S TRAINING

1. Induction and Orientation

- When a new worker joins a concern, everything is strange for him; physical layout is unfamiliar and he does not know to whom to approach for the most obvious day-to day requirements.
- The induction and orientation training aims to get over this settling in period as quickly as possible and with the minimum of emotional upsets being experienced by the new employee.
- Induction and orientation training involves familiarizing the new employee about the following :
  - (*i*) The concern or the enterprise which he has joined, its history, organisation structure, products being manufactured, etc.
  - (*ii*) Conditions of employment, disciplinary rules and other aspects of personnel policy.
  - (*iii*) Employee activities and service benefit plans.
  - (*iv*) Community facilities and plant facilities (*e.g.*, Canteen, etc.)
  - (*v*) Information about the work, he has to undertake and the department in which he has to work.
  - (*vi*) Wage rate and incentive schemes.
  - (*vii*) Safety and proper use of tools and equipments.
  - (*viii*) Introduction with fellow workers and supervisor.

2. Training by Skilled, Experienced and Old Workers

- The new worker is attached with an old, skilled and experienced worker. The new worker watches the experienced worker while he works and then tries to do the same himself in the same way. From time to time he gets instructions from the skilled worker also.

- This type of training can be seen in very small concerns, *e.g.* auto repair shops where there is no established training programme.
- This method of training has a disadvantage that the new worker will learn even the wrong work practices followed by the old worker.

3. **On-the-Job Training**

- On-the-job training is imparted to the new workers on-the job itself ; no additional training equipment is required.
- This type of training is conducted either by the shop supervisor or by an experienced worker already familiar with the job.
- The supervisor explains and demonstrates to the trainee the job, the use of tools and equipment and the correct procedure to do the job.

  The trainee is then asked to try himself and make the job.

  Mistakes, if any, made by the trainee are corrected and he is kept under constant watch until he develops correct work habits.

Advantages

1. It is a simple and inexpensive method of training.

2. It does not require any additional machinery for training purposes.

3. Its flexibility permits a programme to be started and stopped at will and to be adjusted to the individual concerned.

4. The worker has first-hand experience with the job and learns by doing. He gets introduced very soon to the realism of the actual work situation.

Limitations

1. All supervisors are not inherently successful teachers.

2. A trainee may not be able to learn efficiently on the production floor because of the noise and bustle of the work-place.

3. This type of training will not produce skilled workers in a short time.

4. On-the-job training does not produce workers uniformly skilled.

5. Working of trainee on the production floor may increase chances of spoilage of material, damage to equipments, accidents, etc.

6. On-the-job training tends to be administered and coordinated on a somewhat haphazard basis.

4. **Apprentice Training**

- Apprenticeship training has an academic side as well as practical one *i,e*, a trainee attends certain courses as well as receives practical training.
- Apprentice training is a variation of on-the-job training in which a trainee is taught the WHY as well as the HOW and he is given a broad training to enable him to take up a wide varity of tasks within his field of specialization.
- An apprentice is trained to do a job requiring highly skilled work applied to varying work patterns.
- Under this scheme young boys 16 to 18 years of age are trained for 2 to 4 years. The training involves doing a planned sequence of jobs and spending a prescribed number of hours in the class-room. The apprentice is paid wages (normally increasing with the passage of time) for hours of instruction as well hours of production.
- Apprentice training is being conducted in a number of fields such as electrician, turner, welder, moulder, motor mechanic, etc.

Apprentice training is a long, thorough and costly practice.

5. Vestibule Schools

- This type of training is performed outside the shop floor-as if it were carried out in the vestibule (*i.e.* a fore-court or an entrance hall) of the company before actual entry into the working part of the plant.
- It becomes necessary for a concern to start a vestibule training school when the amount of training to be imparted and the number of trainees exceed the capacity of a shop supervisor (to impart on-the-job training).
- A vestibule school is set up on the company property and equipment actually used on the shop floor is duplicated as closely as possible.
- A large number of trainees undergo a planned course of instructions and practice usually by instructors not attached with immediate production.
- After the trainees achieve proficiency, they are transferred to production floor to take up regular production work without delay.

Advantages

1. A large number of trainees can be trained in similar skills, quickly and uniformly.
2. Unlike on-the-job training, the vestibule school training does not damage actual production.
3. The school atmosphere is calm, peaceful and conducive to efficient learning.
4. Instructors are not worried about immediate production.
5. Specially trained and professional instructors can be employed for imparting instructions to trainees.
6. Wastage and spoilage of raw material and damage to production machinery is eliminated.

Limitations

1. It is a costly affair and every industry cannot afford it.
2. Production machinery need be duplicated.
3. A trainee does not achieve familiarity with actual shop floor conditions while he is being trained in the vestibule school. Therefore he requires a period to adjust himself with the shop floor conditions when he enters the working area of the plant after completing his training in the school.
4. If the demand of workers is uneven, usually either a part of vestibule school is idle or trainees are rushed through it without proper training.

(b) FOREMAN OR SUPERVISOR'S TRAINING

Introduction

- Foremen or supervisors are the next step above the workers or operators level employees in the organizational pyramid.
- A forman is the keyman who interprets management to the workers and at the same time is responsible for production. He stands between management and the *rank and file* level employees.
- *A supervisor generally has to take care of the following :*
  - (*i*) Selecting and training of workers.
  - (*ii*) Work production.
  - (*iii*) Control of quality, quantity and cost.
  - (*iv*) Discipline, motivation and morale of workers.
  - (*v*) Work method improvement.
  - (*vi*) Accident prevention.
  - (*vii*) Maintaining machinery and supplies.

(*viii*) Compliance with labour laws.

(*ix*) Cooperation and coordination with other departments.

(*x*) Handling labour grievances.

(*xi*) Record keeping.

– Therefore, the training of the foreman should be planned by keeping the above-mentioned points in view.

– **The foreman training should :**

(*i*) Bring his impact up to the standard where he can handle his interactions with others effectively.

(*ii*) Primarily aim to develop the qualities of leadership.

(*iii*) Equip him with an adequate knowledge of management methods to deal with other people.

(*iv*) Broaden him and at the same time develop qualities of analysis that will enable him to visualize his job.

(*v*) Encourage the development of his motivation and adjustment.

(*vi*) Develop the foreman to qualify for advancement to positions of greater responsibility.

(*vii*) Impart to him a deep knowledge about the work so that workers should feel that he is superior to them.

(*viii*) Develop in him the skill to impart instructions to the workers under him.

(*ix*) Develop in him the skill to improve upon the existing methods of work.

(*x*) Preferably be conducted within the company itself.

– **Foreman Training Techniques**

1. **Induction**
   - Any new employee whether he is a worker or foreman needs proper induction before he is asked to do the job or work predecided for him.
   - For details of induction programme refer to section 20.5.6.
2. **Lecture (class-room) Method**
   - Class-room training depends entirely upon lectures as the medium of training.
   - Lecture can be delivered to as many supervisors as can be accommodated in the room.
   - Lecture is delivered by experts from within or outside the company.
   - Lecture is a very good medium of training where no reliable books or other written meterial is available.
   - The value of the lecture can be enhanced by using audio-visual aids such as technical films, slides, overhead transparencies, etc.
3. **Written Meterial**
   - Refer section 20.5.4.
4. **Conference**
   - A conference brings together many people who tend to train themselves and learn together.
   - People attending a conference, compare, consider and discuss the subject matter of their interest, *e.g.*, how to control absenteeism, how to minimize scrap rate etc.
   - A conference helps pooling ideas and experiences of different persons and puts them open for discussions to arrive at a feasible solution of the problem in hand.
   - A conference can uproot fixed ideas, change attitudes and develop analytical and questioning ability.

- The conference discussions should be thoroughly planned and the points of conclusion (but not the conclusion itself) must be predetermined.
- The conference leader or trainer should guide, be active, lead, interpret, stimulate and draw out the ideas and opinions of the group engaged in discussion.

5. Training within Industry (TWI)

- An outcome of World War II was the TWI-Training Within Industry Programme of the War Manpower Commission.

This was basically a supervisory training programme to make up for the shortage of civilian supervisory skills during the war.

One of the parts of this programme was the job instruction training course, which was concerned with how to teach.

- During war time and even afterwards more supervisors have been trained by TWI than by any other method.
- TWI courses can be held on a concern's premises and cause little disruption of work.
- TWI courses are based upon group conference method, and supervisors attend on a part-time basis.
- TWI courses can be easily adapted to special needs and impart effective training in minimum time.
- A TWI course imparts training in

(*a*) *Job Instruction.* The supervisor develops the ability to impart clear instructions to the workers as regards what to do and how to do it.

(*b*) *Job Relation.* This programme develops in a supervisor

- Leadership qualities.
- The ability to analyse and handle labour problems.
- The ability to promote good working relations.

(*c*) *Job Method.* This programme increases supervisor's skill to

- improve methods of doing work, and
- make best use of men, materials and machines.

(*d*) *Job Safety.* Supervisor learns how to

- Prevent accidents.
- Spot dangers and eliminate them.

(C) EXECUTIVE TRAINING AND DEVELOPMENT

- Executive training and development is one of the most important and complex tasks of Personnel Management.
- Larger concerns give increased attention to the training and development of their Managers and Executives.

The primary emphasis in executive development should be in self-development. There is no substitute for personal drive, initiative and ability.

- Executive training and development can be classified as follows :

(*i*) *On-the-job training* and development which includes,

- Learning by experience.
- On-the-Job coaching.
- Understudies. The trainee is kept understudy and he learns the ways of his superior under whom

he is at study.

- Position Rotation. Rotating an executive from one position to another broadens his background in the business.
- Special Projects. A special assignment, *e.g.*, "to develop a system of dust collection in the foundry," is highly useful and flexible training device.
- Committee Assignments. Unlike special projects, committee assignments are regularly constituted. Committee assignments very well impart the necessary general background.
- Selective Reading, *e.g.*, going through Business Magazines, Trade Journals, etc.

(*ii*) *Off-the-Job training and development which includes*

- Attending special courses conducted at colleges and universities.
- Role Playing. It involves constructing artificially a conflict situation in which the trainee is given a strategic position to play.

Role playing increases the trainee's skill in dealing with other people (*e.g.*, Sales Training).

- Sensitivity Training. It develops executive's awareness and sensitivity to behavioural patterns of oneself and other people.
- Simulation. Trainees are asked to make decisions about production, cost, inventories, sales etc., for a simulated firm.
- Conference Training (discussed earlier).
- Attending Special Meetings of one or two days duration in various fields, *e.g.*, Personnel, Production or Marketing Management, etc.

20.6. SAFETY ENGINEERING

Safety in Industry

- The modern safety movement started around 1912 with the First Cooperative Safety Congress and the organization of the National Safety Council in U.S.A.

From 1912 to the present time, remarkable advances have been made in reducing the rate and severity of accidents.

- The importance of industrial safety was realized because every year millions of industrial accidents occur which result in either death or in temporary and permanent disablement of the employees and involve a good amount of cost such as resulting from wasted manhours, machine hours etc.
- In 1952 in U.S.A., fifteen thousand workers were killed in industrial accidents, 2,000,000 were injured and the total cost of these accidents was about $ 2,900,000,000.
- Loss of lives and accidents costs gradually led to the formation of Factories act, Office, Shops and Railway Premises Act etc.
- The requirement for consideration of safety by management as part of its responsibility arises primarily from these Acts.
- Safety begins on the drawing board when in the original design of tools or workplace layout, accident hazard may be built in or eliminated.
- *Safety results*

(*i*) from safe plant, processes, and operations, and

(*ii*) by educating and training workers and supervisors regarding safe practices on the shop floor.

- In an industry, safety may be considered from the mechanical side (equipment, tools etc.) or from legel angles of workmen's compensation or even as a matter of training in and motivation towards safe work practices for workers (especially newly recruited ones).

Need for Safety

Safety in industry helps,

(*i*) Increasing rate of production.

(*ii*) Reducing production cost.

(*iii*) Reducing damage to equipment and machinery.

(*iv*) Preventing premature death of talented workers who are an asset to the society.

(*v*) Preventing needless pain and suffering to its emplyees.

Organization for Safety

- In a small concern each shop supervisor may be made responsible for safety in his shop.
- Each shop supervisor may report to top executive as regards safety matters.
- Since the shop supervisor has its main job to turn out production, he may treat safety as a secondary aspect.
- For this reason sometimes the safety function is taken care of by personnel officer or general foreman.
- With the growth in the size of the industry and depending upon the hazardousness of processes/ operations, a full fledged safety department may be created with the safety Director/Manager as its chief executive and a number of persons under him at different levels.

The safety Director/Manager may be given a line position or staff position depending upon the conditions in the industry.

- Sometimes the responsibility for safety rests on a safety committee.

Safety Committee

- A safety committee may consist of executives, supervisors, and shop floor workers.
- Thus the lower level employees get a channel of communication on safety matters direct to executive level.
- It was observed that those organizations which made safety committees had lower record of accidents than those without safety committees.
- Safety committees aid in developing safety consciousness as well as it is a policy making body on such safety matters as come before it.
- The Safety Manager/executive requires a degree of firmness and ready discrimination to exclude personal and union matters in which safety is merely the pretext for their airing.
- The safety executive should guard jealously the responsibilities of management and supervision.
- Lastly, to get maximum out of a safety committee
  - (*i*) It should be assigned specific problems and duties such as planning safety rules, publicizing them etc.
  - (*ii*) Its members should be asked to go on the shop floor and watch what is being done about it (*i.e.*, the safety).
  - (*iii*) It should be asked to report periodically as what improvements have been made and what more can be done.

Safety Programmes

- A safety programme tends to discover when, where and why accidents occur.
- A safety programme aims at reducing accidents and the losses associated with them.
- A safety programme begins with the assumption that most work-connected accidents can be prevented.

- A safety programme does not have an end; rather it is a continuous process to achieve adequate safety.
- A safety programme tries to reduce the influence of personal and environmental factors that cause accidents.
- A safety programme involves providing, safety equipments and special training to employees.
- A safety programme is composed of one or more of the following elements :
  - (*i*) Support by top management.
  - (*ii*) Appointing a Safety Director.
  - (*iii*) Engineering a safe plant, processes and operations.
  - (*iv*) Educating all employees to work safely.
  - (*v*) Studying and analysing the accidents to prevent their occurrence in future.
  - (*vi*) Holding safety contests, safety weeks etc., and giving incentives/prizes to departments having least number of accidents.
  - (*vii*) Enforcing safety rules.
- A safety programme includes mainly four E's (as explained above also) :
  - (*i*) *Engineering i.e.*, safety at the design and equipment installation stage.
  - (*ii*) *Education* of employees in safe practices.
  - (*iii*) *Enlistment.* It concerns the attitude of employees and management toward the programme and its purpose. It is necessary to arouse the interest of employees in accident prevention and safety-consciousness.
  - (*iv*) *Enforcement, i.e.*, to enforce adherence to safety rules and safe pratices.

Safety Instructions and Training

- This is essential for educating the employees to think, act and work safely so that the number of accidents can be minimized.
- Safety training/education gives knowledge about safe (and unsafe) mechanical conditions, personal practices and of the remedial measures.
- Safety training involves :
  - (*i*) Induction and orientation of new recruits to safety rules and practices.
  - (*ii*) Explaining safety function, during, on the job training.
  - (*iii*) Efforts made by the first level supervisors.
  - (*iv*) Formulating employees safety committees.
  - (*v*) Holding of special employee safety meetings.
  - (*vi*) Displaying charts, posters, films etc., to emphasize the need to act safely.

Educating Employees to Develop Safety Consciousness

- A worker will usually accept the use of a safety measure if he is convinced of its necessity.

Therefore, suitable measures should be adopted to increase the awareness of a need for safety in the environment of work.

- Some such measures to develop safety consciousness among workers/employees are as follows :
  - (*i*) Display of safety posters and films to remind workers of particular hazards/accidents.
  - (*ii*) Providing simple and convenient safety devices.
  - (*iii*) Providing allowance (in the standard time) to the worker for setting, removing and replacing any necessary safety devices.
  - (*iv*) Ask the employee from the first day he starts work to adopt safety measures because a

worker who has commenced work and has become familiar with it would never feel the need for safety measures at a later date.

(*v*) Hold safety competitions and award prizes to the winners.

(*vi*) Give due respect and recognition to safe workers and create in employees a feeling of pride in safe work.

(*vii*) Elaborate on the safety theme until all the employees are safety-conscious.

(*viii*) Hold regular safety meetings. They stimulate ideas and workers get more safety conscious as the time of meeting approaches near.

(*ix*) Lay out work areas to reflect safety considerations.

(*x*) Mail information and literature pertaining to safety at the homes of all employees.

(*xi*) Report safety activities to all employees.

(*xii*) Welcome all safety suggestions.

(*xiii*) Cross-mark all accident areas.

(*xiv*) Conduct safety training lectures periodically.

20.7. ACCIDENTS

– An industrial accident may be defined as an event, detrimental to the health of man, suddenly occurring and originating from external sources, and which is associated with the performance of a paid job, accompanied by an injury, followed by disability or even death. An accident may happen to any employee under certain circumstances.

Economic Aspects (Cost) of Accidents

– An accident can be very costly to the injured employee as well as to the employer of the concern.

– There are definite costs associated with the accident, *e.g.*, *direct and measurable costs* and *indirect, i.e.*, somewhat intangible but nevertheless real *costs*.

Direct Costs of an Accident. They associate :

(*i*) Compensation insurance, including Payment, and Overhead costs.

(*ii*) Uncompensated wage losses of the injured employee.

(*iii*) Cost of medical care and hospitalization.

Indirect Costs of an Accident. They associate :

(*i*) Costs of damage to equipment, materials and plant.

(*ii*) Costs of wages paid for time lost by workers not injured.

(*iii*) Costs of wages paid to the injured worker.

(*iv*) Costs of safety engineers, supervisors and staff in investigating, recording and reporting of accidents and its causes.

(*v*) Costs of replacing the injured employee.

(*vi*) Cost of lowered production by the substitute worker.

(*vii*) Cost of delays in production due to accident.

(*viii*) Cost of reduction in efficiency of the injured worker when he joins the concern after getting recovered.

And lastly the influence of accident on the morale of employees.

Example 20.1. Cost of an accident. A foundary worker got burns on his foot while pouring molten metal from the ladle into the mold.

Direct costs	
Compensation paid for burns	Rs. 350
Medical expenses	Rs. 150
Total compensation cost	Rs. 500
Uncompensated wage loss	Rs. 100
Total direct cost	Rs. 600
Indirect cost	
Material spoiled and labour for cleaning it up	Rs. 200
Injured worker's make up pay while at home	Rs. 80
Fellow workmen standing and watching at time of accident	Rs. 300
Supervisor's time in investigating and recording	Rs. 110
Down time on casting	Rs. 150
Slowed up production rate of other employees	Rs. 120
Total indirect cost	Rs. 960
Total cost of *accident* [Not including overhead charges which may raise the total cost of accident by as much as 50%]	Rs. 1560

Causes of Accidents

- An accident is an unplanned incident and for each such incident there is usually a specific cause or causes if one could but discover them.
- Accident may be caused due to

1. Technical causes — Unsafe conditions — Mechanical factors / Environmental factors
2. Human causes — Unsafe acts — Personal factors.

- **Technical causes or unsafe conditions** reflect deficiencies in plant, equipment, tools, materials handling system, general work environment, etc.
- **Human causes or unsafe acts** by the person concerned are due to his ignorance or forgetfulness, carelessness, day-dreaming, etc.

It has been estimated that there are four accidents caused by human causes to every one that is caused by technical causes.

- **Mechanical causes or factors**

1. Unsafe mechanical design or construction.
2. Hazardous arrangement (piling, over-loading etc.)
3. Improper machine guarding.
4. Unsafe apparel.
5. Defective agencies or devices.
6. Improper material handling.
7. Broken safety guards.
8. Protruding nails.
9. Leaking acid valve.
10. Untested boilers or pressure vessels.

Environmental Factors

Environmental factors indicate improper physical and atmospheric surrounding conditions of work which indirectly promote the occurrence of accidents. Environmental factors include

1. Too low a temperature to cause shivering.
2. Too high a temperature to cause headache and sweating.
3. Too high a humidity (in textile industry) to cause uncomfort, fatigue and drowsiness (especially when the atmosphere is also hot).
4. Defective and inadequate illumination causing eyestrain, glares, shadows, etc.
5. Presence of dust, fumes and smokes (*e.g.*, in foundary or welding shop) and lack of proper ventilation.
6. High speed of work because of huge work load.
7. More number of working hours and over and above them the tendency of the employer to insist for over-time work.
8. Inadequate rest pauses or breaks between the working hours.
9. Noise, bad odour and flash coming from the nearby machinery, equipment or processes.
10. Poor housekeeping.

Personal Factors

1. Age.
2. Health
3. Number of dependents.
4. Financial position.
5. Home environment.
6. Lack of knowledge and skill.
7. Improper attitude towards work.
8. Incorrect machine habits.
9. Carelessness and recklessness.
10. Day-dreaming and unattentiveness.
11. Fatigue.
12. Emotional unstability, *e.g.*, jealousy, revengefulness, etc.
13. High anxiety level.
14. Mental worriness.
15. Unnecessary exposures to risk.
16. Non-use of safety devices.
17. Working at unsafe speeds.
18. Improper use of tools.

Types of Accidents

1. Near accident – *i.e.*, An accident with no damage or injury.
2. Trivial.
3. Minor.
4. Serious.
5. Fatal.

Accident Prevention

- Accident prevention is highly essential in an industry, in order to
  (*i*) Prevent injury to and premature death of employees.
  (*ii*) Reduce operating and production costs.
  (*iii*) Have good employer-employee relations.
  (*iv*) High up the morale of employees.
- Above all, prevention of accidents is a true humanitarian concern.
- Accident prevention does not occur by itself ; there should be consistent implementation of safety measures and safety programmes emphasizing the need for
  1. Safe workplace layout and working conditions.
  2. Safe material handling.
  3. Personal protective devices.
  4. Safety activities in the organization.

1. Safe Workplace Layout and Working Conditions

Layout

- Although most accidents take place because of unsafe act of the employees, the role of the environments and surroundings cannot be ignored in determining the cause of accident.
- A good layout and working conditions play a major role in preventing many accidents which would have otherwise occurred.
- For preventing accidents, the *layout* should be such that:
  (*i*) Every employee has enough space to move and operate.
  (*ii*) Passageways between working places, roads, tracks and alleys, etc. must never be ob structed.
  (*iii*) It prevents the inrush of cold/hot air and draughts to the working place.
- For adequate lighting, ventilation etc., the heights of the working rooms should be of 3 metres.
- Floors must be of nonskid type, satisfactorily plane and must possess such properties that they can be easily cleaned and absorb sounds.
- Windows should be of adequate dimensions in order to make full use of natural day light.
- Doors and gates leading to open should be provided with guards, etc., to prevent draughts at the neighbouring workplaces.
- Fire hazards can be reduced by utilising fire walls to separate manufacturing area into several compartments.
- A worker operating on the machine should have easy access to the safety switches provided on the machine/near workplace.

Working Conditions

- In enclosed rooms, in order to have comfortable conditions, the following should be controlled.
  Air temperature, air purity, velocity of air, humidity of air, and heat radiations between bodies of different temperatures.
- Not only in enclosed rooms, even otherwise proper ventilation is a must if the manufacturing processes give rise to dust, smoke, fumes,etc.
- Whether natural or artificial, there should be sufficient illumination, of adequate colour of light, continuous and uniform and free from glare.

- A high noise level at the workplace impairs men at work and may even endanger them. Noise develops from riveting, grinding, forging, engines, compressors etc. To reduce noise level and to minimize detrimental effects (*e.g.*, deafness) arising out of it :
  - (*i*) Select, purchase and make use of machines and processes which produce little noise.
  - (*ii*) Isolate and keep noise producing machines in separate closed cabins.
  - (*iii*) Use silencers to minimize the hissing sound of compressed air escaping from blow-off valves in pneumatic tools and machines.
  - (*iv*) Use suitable machine mounts to damp down the vibrations.

2. **Safe Material Handling**
   - Careless handling of heavy materials and components is a major source of back and foot injuries.
   - To avoid premature fatigue of transport workers, full use should be made of mechanised materials handling equipment.
   - Use mechanical means of conveyance to ensure the safety of men engaged in material handling.
   - The transport workers should not be asked to lift more than the permissible load, *e.g.*, for a boy of 16 to 18 years of age, this load is 19 kgs.
   - During transport, sharp materials, sharp edged goods, poles etc., should be covered, placed in stable holders and retained by means of wire.
   - Goods should be piled up such that they do not collapse due to impact or vibrations.
   - Containers or vessels employed to transport liquids or small parts :
     - (*i*) should not be too large to limit the range of vision and impede lifting and carrying,
     - (*ii*) should be light, and
     - (*iii*) should not be defective/leaking.
   - Depending upon the condition of material, use a proper material handling equipment, (Refer chapter on Material Handling).
   - All material handling equipments should be promptly repaired and adequately maintained on priority basis.

3. **Personal Protective Devices for**

(*a*) *Protection of head*
- Safety hard hats.
- Rubberized hats for protection against liquids (chemicals).
- Ear protectors.

(*b*) *Protection of face*
- Face mask.
- Face shields.
- Welding helmets.

(*c*) *Protection of eyes*
- Goggles of case-hardened and clear glass for protection against impact.
- Eye cup goggles for protection against flying objects and dust.
- Eye cup goggles impervious to chemicals for protection against acids/alkalies splashes.

(*d*) *Protection of lungs*
- Air line respirators
- Cartridge respirators

- Oxygen or air-breathing apparatus.
- Gas mask.

(e) *Protection of other body parts, e.g., hand, foot, leg, etc.*

- Protective asbestos clothing.
- Gloves.
- Safety shoes.
- Foot guards.
- Safety body belt.
- Aprons.
- Safety (moulder's) shoes.

4. Safety measures Essential in Industry

- Refer section 20.6.
- Other *safety measures* which may be adopted are :
- Provide wire mesh *safety guards* to all rotating parts, *e.g.*, pulleys etc.
- High voltage equipments and other machines which cannot be properly guarded should be *fenced.*
- Pressure vessels and their component parts (*e.g.*, valves, gauges, etc.) should be periodically tested as per their specifications, the defective parts should be replaced.
- Material handling equipments should have unobstructed paths to move on.
- Defective tools, *e.g.*, hammers, spanners, etc., should be immediately replaced.
- Power should be switched off before repairing the equipment.
- Inflammable material should be stored separately and away from the general store.
- Electrical connections and insulation should be checked at regular intervals.
- To avoid electrical accidents
  - (*i*) None except the electrician should be permitted to touch electrical connections.
  - (*ii*) All live wires should be isolated and insulated from each other.
  - (*iii*) Electrical connections and ground connections of all portable and unportable machinery should be checked periodically.
  - (*iv*) Damp environmental conditions (floor etc.) should preferably be avoided.
- Fire extinguishers should be kept in proper condition and at key places.

Accident Proneness

- Examination of safety records often show that out of all the workers doing the same job and being subjected to the same physical environments, only a few have substantially more accidents than the rest.
- Such few workers who are found consistently to experience more accidents than the average (other) workers, are classified as ACCIDENT-PRONE workers/employees.
- ACCIDENT PRONENESS may be defined as the continuing tendency of a person to have more accidents as a result of his persisting characteristics etc.
- Accident proneness is perhaps because of peculiar psychological and physiological make up of certain persons.

Causes of Accident Proneness

(*i*) Unattentiveness and day-dreaming.

(*ii*) Poor eyesight and hearing and lack of stamina.

(*iii*) Poor adjustment of work ; distaste for the job.

(*iv*) Too much sensitivity and tendency to get perturbed easily, (Emotional stresses).

(*v*) Dislike of the supervisor/foreman, etc.

(*vi*) Lack of training, proficiency and skill to do a work.

(*vii*) Insufficient intelligence.

(*viii*) Unsafe behaviour of the worker (*e.g.*, intentionally not using safety devices and safe practices).

Methods to Reduce Accident Proneness

(*i*) Depending upon the job conditions select only those applicants who possess appropriate standards of physical and mental ability.

(*ii*) Transfer accident prone workers to comparatively less hazardous job situations.

(*iii*) Impart adequate training to a recruit before putting him on the job.

(*iv*) Encourage employees working under you and see that they do not get unnecessarily perturbed, frustrated or emotionally disturbed.

First-Aid

- Even after taking all safety precautions and measures, accidents occur in factories.
- An injured worker needs immediate proper treatment : in the absence of which, his condition may become critical.
- To take care of such situations, factories employ full time, at least a person who has successfully completed his Red-cross first-aid course, and who can give preliminary treatment to the injured person, who may later on be taken to the hospital as the ambulance arrives.
- Besides the above service, a first-aid personnel can look after those workers who get minor cuts, burns or electric shock.
- A first-aid box which contains the following is always kept ready during working hours.

Contents of a First-aid Box

	Items	*Numbers*
(*i*)	Rolled bandages 10 cm wide	12
(*ii*)	Rolled bandages 5 cm wide	12
(*iii*)	Pair of scissors	1
(*iv*)	Bottle (4 oz) of salvolative having the doze and made of administration indicated on label	1
(*v*)	Large size sterilized dressings	12
(*vi*)	Medium size sterilized dressings	12
(*vii*)	Small sized sterilized dressings	24
(*viii*)	Safety pins	2 packets
(*ix*)	Large size burn dressings	12
(*x*)	Packets of sterilized cotton wool	2
(*xi*)	Eye drops	1 small bottle
(*xii*)	Adhesive plaster	2 roller
(*xiii*)	4 oz bottle containing a 2% alcoholic solution	1
(*xiv*)	4 oz bottle containing $KMnO_4$ crystals, etc.	2

20.8. GOOD-HOUSEKEEPING

Definition and Concept

– The term *housekeeping* has been borrowed from the maintenance of domestic properties in the home/house and is now liberally applied to the maintenance of both *cleanliness* and order in all kinds of business establishments, *e.g.*, industries etc.

Cleanliness is a condition wherein buildings, work and rest areas, machinery, equipments and tools are kept free from dirt, dust filth, stain etc.

Necessity of Good Housekeeping

Good plant housekeeping is essential in order to :

1. Make and maintain a clean, neat and orderly factory work area and its surroundings.
2. Make work areas look pleasant, more satisfying and motivative for a worker to work.
3. Minimize fatigue and discomfort to the workers.
4. Minimize injury and accidents.
5. Increase the life of plant, building and the facilities it contains.
6. Avoid fire and other hazards.
7. Permit effective natural illumination and ventilation.

Advantages of Good Housekeeping

1. Fewer accidents.
2. Increased life of building, machinery, tools, etc.
3. Improved employee morale.
4. Increased production.
5. Better product quality.
6. Continuous cleaning reduces housekeeping costs because intermittent clean up is more expensive.
7. Little or no time is lost in searching for tools etc.
8. Material handling and transportation pick up speed.
9. Inspection, maintenance and production control functions become easier.
10. Much floor space otherwise occupied by unused raw material and tools, etc. is released for production.

Good Housekeeping Procedure

1. Plan and project the housekeeping programme carefully and completely. Associate the employees in this venture.

2. Divide the plant and offices into cleaning zones and assign a person to each zone. This person is responsible for the good housekeeping and orderliness of his zone.

3. Keep an eye on the performed housekeeping schedule and conduct periodic housekeeping inspections. The following *check-list* may help in carrying out inspection properly.

(*a*) *Machinery and Equipment*

– General cleanliness.
– Containers for waste materials.
– Machine guards on and operating.
– Oil, air, water, steam leakage.
– Portable equipments—Do they hamper personnel and material movements ?

(*b*) *Materials and Storage*

- Piling and stacking—Can material slip easily ?
- Materials protruding out of racks, bins, benches, machines etc.

(*c*) *Building*

- Windows clean and unbroken.
- Painting and upkeep.
- Door jambs clean.
- Fire extinguishers and sprinklers clear.

(*d*) *Floors*

- Slippery, wet or oily.
- Badly worn or rutted.
- Garbage, dirt or debris.
- Loose materials.

(*e*) *Stairways and Aisles*

- Clear and unblocked
- Well lighted.

(*f*) *Employee facilities*

- Drinking taps clean.
- Toilets and locker rooms clean.
- Soap and towels available.

(*g*) *Other Aspects*

- Lamps and lamp reflectors clean.
- Bulletin boards and safety signs clean.
- Protective equipment and clothing clean and in good condition.
- Electrical motors clean.
- Ventilation unobstructed.

20.9. PERSONNEL (LABOUR) WELFARE

Definition and Concept

- Employee services are provided under a number of titles in industry. Sometimes, it is referred as Benefit Programmes,

  Personnel (employee, labour) welfare, or as

  Hidden payroll.

Perhaps employee services are generally described as a part of *Fringe Benefits.*

- Fringe benefits include those elements of compensation other than wages which are significant when initially considering employment and in the ongoing evaluation of one's welfare on the job.

Fringe benefits may be of

(*i*) Monetary nature, *e.g.*, Retirement benefits, Insurance benefits, and Investment plans, etc.

(*ii*) Non-monetary nature, *e.g.*, Position title, Good office, Automobile, and Good parking space etc.

Importance (and Objectives) of

Personnel welfare or employee service and benefit programmes are important because they :

(1) Make the plant personnel a healthier, sounder-thinking and more forward-looking group.

(2) Make the employee a group of citizens better able to carry on the productive processes.

(3) Contribute to the maintenance of employee morale and loyalty.

(4) Maintain an employee's favourable attitude towards his work and work environment.

(5) Serve to attract and keep a work force in competition with other organizations.

(6) Serve to maintain some degree of peace with the organized labour union.

(7) Fulfil social, recreational, and cultural needs of the employees and at the same time make their life easier.

(8) Reduce labour turn-over and absenteeism.

(9) Promote good public relations.

(10) Encourage employees and promote goodwill and cordial relations between employers and employees, which ultimately result in more production, better product quality and increased profits.

Welfare (and Services) Methods or Measures

They may be categorised into three classes, namely

(1) Economic.

(2) Recreational.

(3) Facilitative.

1. *Economic*

(*a*) Insurance (including group insurance)

(*b*) Retirement and pension plans.

(*c*) Health and accident services.

(*d*) Credit unions[1].

(*e*) Paid holidays.

(*f*) Profit sharing.

2. *Recreational*

(*a*) Sports.

(*b*) Social get-togethers.

(*c*) Special interest groups such as dramatics, athletic programmes, flying and particular hobbies.

3. *Facilitative*

(*a*) Housing.

(*b*) Transport.

(*c*) Educational facilities and library services.

(*d*) Medical services (including first-aid, hospitalization, sick leave, etc.).

(*e*) Canteens, cafeterias and lunch wagons (Eating facilities).

(*f*) Company (cheap) stores.

(*g*) Discounts on purchases of company products.

(*h*) Rest-rooms and locker-rooms.

(*i*) Legal and financial counselling.

The above listed facilities are self-explanatory.

1. A credit union is an organized group of people who pool their money and agree to make loans to one another at the time of need.

20.10. COMMUNICATION IN INDUSTRY

Introduction

- In recent years there has been an increasing recognition of the importance of communications in industrial organisations. Communication function is viewed as one of the most important processess of Management.
- The subject of communication is one of the broadest in the field of Personnel Management. It encompasses a consideration of the subjects to be communicated, media, channels, communicators and the symbols of communication.
- Nearly every aspect of human relations and of supervisor-subordinate relations involve communications.
- *Communication* is the process of conveying messages. For communication to take place, messages must be composed, transmitted and understood.
- Communication is the process of transmitting ideas or thoughts from one person to another, for the purpose of creating understanding in the thinking of the person receiving the ideas or information.

Formal and Informal Communication

(*a*) A *formal communication* is official that is a part of recognized system involved in the successful operation of a concern.

- Information passed on from the supervisor to a worker to do a particular work is an example of formal communication.
- Formal communication may be written, or oral.
- Formal communication may be a
  - (1) *Vertical communication, downward* from top management to workers to do a job, a praise or a reprimand; or *upward* from workers to higher management levels giving work accomplishment report or other feed-back information.
  - (2) *Horizontal communication, i.e.*, the transmission of information from and to, to positions of the same level, *e.g.*, Manager production informing Manager maintenance regarding a machine breakdown.

(*b*) An *informal communication* is one that is outside the formal, recognized communication system, such as conversations between and among workers and the *grapewine.*

- A person is motivated to communicate naturally. When he is unable to communicate his feelings to his supervisor/ Manager, he communicates the same informally to his colleagues. Such (*i.e.*, informal) communication arises from social interaction.
- Informal communications or grapewine
  - (*i*) is a natural and normal activity of a person and arises out of social relationships of people,
  - (*ii*) works like a cluster chain in which each link (*i.e.*, person) associates and communicates to a cluster of other links (*i.e.*, persons),
  - (*iii*) spreads fast,
  - (*iv*) is a good method of vertically upward or downward communication,
  - (*v*) involves feelings, facts, rumours, etc.

Communication Channels and Structure

- Communication channels tend to

  Discover clashes of interest,

  Reconcile conflicts, and

Coordinate efforts.

- It is better to set up formalized communication channels between the different levels of organization, but among personnel at the same level, the information flow should be circular and more free.
- Proper structure of communication leads to efficiency.
- Less structuring leads perhaps to greater individual job satisfaction.
- Communication left largely unstructured among personnel, gets a significant amount of structure of its own after a period of time.
- Upward channels of communication include :

1. Face-to-face contact.
2. Group meeting.
3. Grievance/complaint procedure.
4. Counselling.
5. Morale questionnaires.
6. Open-door policy.
7. Labour union.
8. Grapewine.

- Downward channels of communication include :

1. Chain of command.
2. Company periodicals.
3. Notice boards.
4. Information racks.
5. Pay inserts.
6. Annual reports.
7. Group meetings.
8. Employee handbook.
9. Labour union.
10. Grapewine.

Communication Process and Systems

- A communication process involves

1. The sender.
2. The media to transmit information.
3. The receiver.

- A meaning or concept is first of all converted into *symbols* by the sender and then transmitted at the receiving end.
- The symbols of communication are

(*i*) Words.
(*ii*) Actions.
(*iii*) Pictures.
(*iv*) Numbers.

The media to transmit information consists of channels of communication described earlier.

– The receiver or person at the receiving end receives the symbols and translates them into meanings for himself.

For other details refer to chapter 7.

Barriers to Successful Communication

– A barrier to successful communication does not permit the transmission of accurate and full information at the receiving end.

– A communication barrier breaks down, obstructs, delays, distorts and tends to give another colour to the information by the time it reaches the destination.

– Various barriers to successful communication are:

(1) More levels in the organization structure through which an information has to pass.
(2) Long and ill-structured channels of communications.
(3) Heavy work-loads at certain levels in the organisation structure.
(4) Attitude—either not to hear or to hear what one expects to hear.
(5) Prestige and superiority complex.
(6) Sender and Receiver having different perceptions.
(7) Sender unable to symbolise the information correctly.
(8) Prejudiced and biased attitude of the receiver.
(9) Receiver unable to get the information (subject to different meanings) clarified.
(10) Receiver ignoring conflicting information.
(11) Receiver tending to evaluate information from his own angle.
(12) Receiver emotionally upset.

Techniques to overcome Barriers and Improve Communication. They are :

1. Sending direct and simple messages.
2. Feedback system to know whether the message has been understood correctly or not.
3. Using many communication channels.
4. Adopting face-to-face communications.
5. Be sensitive to the private world of the receiver, try to predict the impact of what you say on his feelings and attitude and tailor your message to fit the receiver's vocabulary, interests and values.
6. Time the message carefully. Communicate when the receiver is motivated to listen and he is not worried about other things.
7. Reinforce the words with actions, *e.g.*, employees are more likely to accept the change when they themselves participate in the process of change.
8. Introduce a proper amount of redundancy in the message, *i.e.*, some amount of repetition of information, so that the information is not misunderstood.
9. Create cordial and peaceful atmosphere in the organisation.

20.11. SUGGESTION SYSTEM

Concept

– One of the most successful bridges between plant-improvement efforts and good industrial relations is the use of a *suggestion system*.

– A *suggestion system* taps the tremendous store of ideas that rest in the mind of employees.

Certain employees volunteer their ideas because they derive satisfaction by making a suggestion, while others feel reluctant and thus arises the necessity of setting up a proper suggestion system so that

employees can give way to their feelings, ideas and valuable suggestions.

- Majority of companies make a cash reward for a valuable and useful suggestion.
- All suggestions go to the suggestion committee by-passing the immediate supervisor and other intermediate levels of management.

Purpose (objectives). Suggestion systems have the following purposes :

1. To suggest to management as how to improve company efficiency. Employees may suggest how to cut waste, prevent safety hazards, improve work methods, etc.

2. To encourage the submission of complaints.

3. To raise employee morale through giving them a chance to express their ideas on how the job should be done, to take pride in seeing their suggestions accepted, etc.

A well run suggestion system may yield a never-ending stream of ideas which cut costs and increase the employee's feeling of accomplishment and participation.

Procedure

- A suggestion committee is usually formed in order to consider, analyse and evaluate all suggestions made by employees.
- Suggestions Blanks (Fig. 20.1) are designed as a means of writing suggestions.

Serial No. 58267

A. B. C. Co. FARIDABAD
SUGGESTION FORM
PUT YOUR IDEAS TO WORK

Date _____

I suggest .....
.....
.....

I believe the above suggestion will result in .....
.....

Name _____ Clock No. _____ Department _____

Fig. 20.1. A suggestion form or blank.

- Suggestion boxes are placed in conspicuous and convenient places throughout the plant.
- Employees write their suggestions on suggestion forms (or blanks) lying by the side of suggestion box and drop the same in the box.
- The suggestions are periodically collected and put before the suggestion committee for review, investigation and action.

  The practicability of each suggestion is explored and evaluated in consultation with the supervisors who may be affected.
- For all those suggestions which are accepted, the employees get a reward, often 10 to 25% of the savings produced by the suggestion during the first year.

Suggestion System Problems : A number of problems may be encountered in the establishment and administration of a suggestion system, *e.g.*,

1. Suggestion system bypasses the (immediate) supervisor so there is a considerable amount of apathy or outright opposition by the supervisors on a worker's suggestion being accepted and adopted. Thus, suggestion system instead of doing benefit may do harm by antagonising supervisors.

Supervisors fear that if a worker's suggestion is adopted they may be criticized by their superiors for not having thought of the suggestions presented by the workers.

This problem may be solved by giving recognition to both the supervisor as well as to the worker who submits a good suggestion.

2. A good suggestion helps doing the same job with less effort, *e.g.*, with less number of workers. Thus, worker's jobs are threatened. For this reason, workers generally hesitate to submit suggestions.

3. Suggestions being submitted and rewarded on an individual basis may generate serious resentment within the group.

4. Suggestion systems, sometimes, arouse union opposition because, as a form of upward communication, they usurp what the union regards as one of its rightful functions.

20.12. DISCIPLINE IN INDUSTRY

Definition

1. Discipline may be defined as instruction or training,
   - To behave in accordance with rules and regulations,
   - To train to obey implicitly an order,
   - To bring under control, etc.
2. Discipline relates to employee conduct.
3. Discipline is employee self-control to meet organisational standards and objectives.

Purpose. Discipline is necessary in all efficient organisations in order to

1. Encourage employees to behave sensibly at work.
2. Effectively realise or attain the objectives of the organisation.
3. Help employees learn the requirements of their job.

Forms (Types). There are two basic forms of discipline

1. *Negative discipline*
   - Negative discipline controls employees by force, *e.g.*, by threats, dismissal etc.
   - With the growth of trade union movement and from 1945 onwards, negative discipline to some extent has been replaced by a constructive approach.
2. *Constructive, co-operative or positive discipline*
   - Constructive discipline means the fostering of cooperation and a high level of morale so that written and unwritten rules and regulations are obeyed willingly. Employees should be told clearly whatever is expected of them.

Prerequisites of Discipline

1. Define the company rules and regulations clearly in unambiguous terms.
2. Communicate these rules to all those concerned.
3. Specify the rules enforcing authority.
4. Specify the punishment associated with breaking the rules.
5. Check out a procedure for appeal.

Effects of Indiscipline

Increased :

1. Absenteeism.
2. Accidents.
3. Sick leaves.
4. Labour turn-over.
5. Grievances and frustrations amongst employees.
6. Waste and scrap rate.

Reduced :

1. Production.
2. Product quality.
3. Employee morale.

Disciplinary Action and Penalties

- Disciplinary action generally means the application of penalties that lead to an inhibition of undesired behaviour.
- The objective of disciplinary action is to reform the offender, to deter others and to maintain the integrity of the organisation. It is therefore educational and corrective rather than punitive slapping back at an employee in the wrong.
- Disciplinary action penalties commonly employed are :

1. Oral warning (reprimand).
2. Written warning.
3. Loss of privileges.
4. Fines.
5. Lay-off.
6. Demotion.
7. Discharge.

Methods to Improve Discipline

1. Effectively communicate the rules and regulations to all employees and the penalties to be inflicted for breaking the rules.

2. Positively motivate the employees.

3. Create within the employees "a sense of belonging to industry" by introducing fair wages, their participation in management and other activities of the industry.

4. Give rewards and recognition to disciplined employees.

5. Study the factors promoting frustration, grievances, etc. and leading to indiscipline.

6. Continuously keep on informing the employees the losses which occur to them and to the organisation as a whole due to indiscipline among employees.

7. Counsel the employees from time to time so that they can be made better disciplined.

20.13. PROMOTION, TRANSFER, LAY-OFF AND DISCHARGE

Introduction

- Employees do not remain at one job level throughout their life. They are promoted, transferred and if conditions are unfavourable they may even be demoted or laid off and discharged.

– Promotions and transfers can do a lot in improving the morale of employees and in motivating them. Even if the new job does not involve monetary benefit, and it is just a change in (night) shift or from a hot, dusty and smoky location to a better one, employees often consider it as a promotion.

(A) Promotion. *Promotion* may be defined as a significant enlargement in job responsibility, but also variably :

1. any increase in pay, prestige, rank or status ;
2. an upgrading within a certain job classification ;
3. Any increase in responsibility that provides additional privileges, comforts, etc.

– There should be a well-developed system of making promotions. Lines of promotion should be clearly defined and a real promotion policy should be formulated.

– A sound personnel policy demands that promotions should be made from within the industry if suitable persons are available.

– Promotion from within

1. Develops employee loyalty and builds up employee morale.
2. Increases job satisfaction.
3. Motivates employees.
4. Is a good incentive to the employees.
5. Enables the formation of an efficient and stable workforce.
6. Increases efficiency and efficacy of the organisation.

– However the policy to promote always from within the organisation

1. May stop talented outside persons to join the organisation.
2. May prevent the knowledge and drive that comes from new ideas.
3. Stops mobility of labour and labour turn-over which should be present to some extent for the good health of the concern or enterprise.

– Bases for promotion from within

If promotion from within is to be an incentive for the employees, the best performing employees ought to be promoted. The following factors help deciding the best performing employee :

1. The results of Merit Rating or Employee Rating System.
2. Productivity and Quality records of the employees.
3. Attendance and punctuality records of employees.
4. Health and physique (stamina) of the employee to meet the challenge of the higher job.
5. Personal file and records of employees.
6. Skill and proficiency on the existing job.
7. Seniority of the employee.
8. Qualification and experience, if any, possessed by the employee as per demands of the higher job.
9. Ability, *i.e.* potential performance of the employee on other jobs taken up till date.

(B) Transfer

– Transfer implies a change in job where the new job is substantially equal to the old one in terms of pay, status and responsibilities.

– Just like promotions, transfers also require planning.

– A *good transfer policy* should ascertain and consider

1. The reasons for a transfer.
2. The department(s) in which the transfer can be made.
3. The effect of seniority on the transfers.
4. Whether the transfer is temporary or of permanent nature.
5. The posting of available job openings.
6. The effects, if any, of the transfer on the salary of the employee, etc.

– **Types of transfers.** The different types of transfers are those

1. Which shift individual who have just gone into wrong jobs.
2. Designed to enhance training and development (role playing).
3. Which are made to meet changing production requirements (temporary transfer), *i.e.* adjustments to varying volumes of work within the concern.
4. Remedial transfers which are made when an employee has some trouble in doing his work or develops friction with his boss or fellow employees.
5. That are made to provide an opportunity to an employee occupying a dead-end job to move sideways into another job.
6. That are made to give some relief to an employee from his monotonous job such as fitting a single part in an equipment over and over again, all day long. Periodic transfers under such conditions stimulate greater job interest.
7. Requested tranfers in which the employee requests for a transfer because he is allergic to oil or some type of smell, etc.

(C) Lay-off

– Whereas promotions mean more money and better status, transfers imply rarely any loss, *lay-off* means taking away something.
– Lay-off is the temporary removal or suspension of the employee from his job (during period of emergency).
– Lay-off is undergone in order to reduce financial burden on the concern when the employees cannot be utilized profitably.
– Lay-off indicates the temporary inability of an employer to avail the services of the employee due to following reasons :

1. Non-availability/shortage of material, fuel or power.
2. Accumulation of excess stocks.
3. Breakdown of machinery.

Besides, lay-offs afford an opportunity to weed out sub-standard employees, those who have not the inclination to do a fair day's task and those who create disciplinary problems.

– A laid off employee who has more than one year's of continuous service with the firm is entitled to compensation equal to 50% of his salary (*i.e.* basic pay+DA) during the laid off period.

(D) Discharge or Dismissal

– Discharge is most severe penalty that an organization can give to its employees.
– Many arbitrators, indeed, refer to discharge as *Industrial Capital Punishment.*
– Discharge means ending the services of an employee. In other words, separating or removing the employee from the pay roll for following reasons :

1. Serious or habitual infractions of company rules and policies.
2. Dishonesty.

3. Poor job performance.
4. Malicious damage.
5. Intoxication.
6. Fighting.
7. Insubordination.

– Discharging an employee throws an extra expense (on the organisation) to train a new employee to take the place of the discharged one.

Moreover, because of the hardships the discharged man faces, the unions pressurize the management to think twice before discharging an employee.

– Because of these and other serious implications of discharge many concerns reserve only to higher management the final decision wheather to discharge the employee or not.

– Adequate records should be made to justify discharge and they should be duly signed by the immediate supervisor, manager and the employment officer with any other witnesses who are available.

– To support a case for disharge, it is often essential to have

1. A permanent merit rating record of the employee.
2. Memoranda indicating attempts to correct the employee faults.
3. A copy of the final warning.
4. A letter of discharge stating the reasons for the action.

20.14. LABOUR TURNOVER

Introduction, Definition and Calculation

– Labour turnover refers to the movement of workers into and out of an organisation.

– Labour turnover has been a subject of manager concern and scholarly study for atleast half a century because labour turnover rate is an index of the stability of workforce in an organization.

– Labour turnover may be defined as the time-to-time changes in the number of the work force that result from the hiring, release and replacement of employees.

– The simplest measure of labour turn over is the *separation rate*, generally defined as the number of separations per month per hundred of the average working force. Separations include all quits, lay-offs and discharges

$$\text{Net labour turnover} = \frac{\text{Total separations}}{\text{Average working force}} \times 100 \qquad ...(a)$$

Assume an average working force of 1000 employees for a month. If during this period 100 employees had severed their relationship with the concern, then

$$\text{Labour turnover/separation rate} = \frac{100}{1000} \times 100 = 10\%$$

– The formula for calculating labour turn-over as given by equation (*a*) above has certain limitations :

(i) It does not take seasonality into account.

(ii) It does not differentiate among the causes for labour turnover.

– In order to overcome these limitations, current practice makes use of Refined net labour turnover rate which is the ratio of the avoidable separations to the average working forces (per hundred). The formula is

$$T_R = \frac{(S-U)}{W} \times 100 \qquad ...(b)$$

Methods to Reduce Labour Turnover

The best method to reduce labour turnover is to study the causes of labour turn-over and tl attempt to remove the reasonable factors that promote labour turnover. A few methods to reduce lab turnover are

(*i*) Improve factory working conditions.

(*ii*) Handle worker's grievances faithfully.

(*iii*) Do not abuse and fire workers for petty matters.

(*iv*) Try to minimize fluctuations in the work load.

(*v*) Give appropriate wages and incentives to the workers.

(*vi*) In matters of hours of work compensation, disputes, etc., go by the appropriate Labour La

(*vii*) Take care of employee's health and welfare.

(*viii*) Adopt safety and good housekeeping practices.

(*ix*) Motivate the employees and try to high up their morale.

(*x*) Be impartial in the matters of promotion and transfers.

21

Union and Industrial (Labour) Relations

21.1. INTRODUCTION

Trade Unions

- The social historians Sydney and Beatrice Webb defined a trade union as

  "A continuous association of wage-earners organised for the purpose of maintaining and improving the condition of their working lives'.

  This definition was given in 1920; today it has been widened and includes salary earners as well.
- There are more than 17,000 registered trade unions in India with the average membership per union of the order of around 575 to 600.

Industrial Relations, Definition and Concept

- Industrial Relations is that aspect of management which deals with the manpower of the enterprise—whether machine operator, skilled worker or manager.
- Cordial and peaceful Industrial Relations between the employees and the employer are highly essential for increasing productivity and the economic growth of the country.

  Through good industrial relations only, the enterprise can move towards the welfare of the employees and the management of the concern.
- Industrial Relationship is the composite result of the attitudes and approaches of the employees towards each other with regard to the planning, supervision, direction and co-ordination of the activities of an organisation with a minimum of human effort and friction, with an animating spirit of cooperation and with proper regard for the genuine well-being of all the members of the organization.
- The term *Industrial Relations* has been looked upon and worded differently by different pioneers of the field.

Integrated programmes of industrial relations are of relatively recent origin. Fragmented attention to employee concerns started around World War I and became inclusive during the 1940s. The human-relations approach is a long term trend toward recognizing the individual interests of workers.

Certain people define Industrial Relations as—the relations between employers and employees in industry.

Others describe Industrial Relations as—the relationships between employees and management that grow out of employment.

Still others call Industrial Relations as—Social relations in production.

However, with the industrial developments after World War II, the term *Industrial Relations* has been widened in its meaning and now it implies—Employers-Employees-Unions and Government relationship in industry.

- The basic requirements of an Industrial-relation programme are

(*i*) To have the support of top management.

(*ii*) To be based on sound personnel policies

(*iii*) To follow proper practices.

(*iv*) To follow up and evaluate the pattern of employee action.

– The important *functions* of Industrial Relations are :

(*i*) Employee Relations.

(*ii*) Labour Relations.

(*iii*) Public Relations.

– The important **aspects** of Industrial Relations are :

(*i*) Cooperation.

(*ii*) Conflict.

The remaining portion of this Chapter will describe functions and aspects of Industrial Relations.

Labour Relations

– Whereas **Employee Relations** is a broader term which represents the relations and contacts between the Management and its (all) employees ; Labour Relations has its field of contact between Management and employees, limited. In other words unlike Employee Relations, Labour Relations represents relations and contacts between Management and employee representatives (or the union) only.

– The increased size of today's employers and union organisations have caused the government to become more active in employer-employee relationship and for this reason, Legislation and Government regulations affect considerably the field of Labour Relations.

– *The Labour Relations department of an industry*

(*i*) Deals with management and the labour union in arriving at a satisfactory resolution of problems such as low wages, poor fringe benefits, etc.

(*ii*) Carries out all correspondence with the labour unions.

(*iii*) Participates in Grievance handling.

(*iv*) Represents the company in arbitration cases.

(*v*) Participates in negotiations.

(*vi*) Conducts the necessary correspondence with government labour agencies.

In brief, Labour Relations Department looks after,

(*i*) Union Relations.

(*ii*) Collective Bargaining.

(*iii*) Discipline in the Industry.

(*iv*) Handling Grievances.

21.2. TRADE UNIONS OR LABOUR UNIONS

Definition

– A trade union or labour union is a continuing long term association of employees formed to promote, protect and improve, through collective action, the social, economic and political interests of its members.

– A trade union may also be defined as any combination, whether temporary or permanent, formed primarily for the purpose of regulating the relations between workmen and employers or between workmen and workmen or between employers and employers or for imposing restrictive conditions on the conduct of any trade or business and includes any federation of two or more unions.

Origin

- Trade unions are the creation of industrialisation and modern industrial conditions.
- Industrial Revolution destroyed the earlier way of life and left the individual worker, who was protected by the customary values, to drift by himself in the anonymity of the town, and (also) gathered these workers together around the employer.
- The employer did pay as little as possible to the workers ; the workers as individual could not protest against it and therefore those (workers) similarly situated, economically and socially and closely associated with the work of the same employer developed mutual understanding and a common solution of their problems of living and this crystallised them into a self-conscious group what we may call as Trade Union.
- Trade unions got originated out of the necessity of workers to protect and defend themselves from encroachment, injustice and wrong imposed upon them by the employer or the management of the concern.
- The aspects of the process of industrialisation those necessitated the origin of trade union are :

(*i*) Separation between the ownership of capital and labour, both of which are essential for producing goods and rendering services to the consumers.

A difference got created between the owners of capital and the labour. The former wanted to pay lowest possible to the latter and the latter were interested to secure the maximum possible price for the work done for the former. These two classes with divergent and conflicting interests gave rise to conflicting situations and the workers thought of uniting.

(ii) Since, individually the workers did not have any other source of the livelihood except that of service under the owners of capital, there was no match between the two as regards economic resources or bargaining power or skill. It was the owner of capital who dictated the terms and conditions of employment, *i.e.* wage rate, hours of work, etc and either a worker had to serve under those conditions or starve. This again infused a spirit of union among the workers.

(iii) When the workers were suffering in this way, the State or Law remained silent because in its eyes workers and employers were equal. This further increased the exploitation of workers by the owners of capital.

(iv) Though an individual worker was dispensable to an employer, but he could not afford to dispense with the services of a group of workers. The day it was realised by the workforce, they thought to unite and get their reasonable rights from the owners of capital.

Functions. Functions of trade unions are

1. The *provision of friendly services* such as a place for leisure pursuits, information about jobs existing in other factories, games and outings, etc.

2. The *provision of social services* such as insurance against old age, unemployment, strike, pay, payment for hospital fee, legal services, etc.

3. *Wage bargaining, i.e.* collective wage bargaining with the employers.

4. *Safeguarding* the job of the workers.

5. *Political activities, i.e.* the political pressure for reform, *e.g.* trade union legislation works to protect the union and the workers from such industrial abuses as delay in payment of wages, excessive hours of work, poor working conditions, etc.

6. To *develop cooperation with employers.*

7. To *arouse public opinion* in favour of labour.

8. To *secure some shares* in profit and in the control of the enterprise.

Objectives. Objectives of trade unions are :

1. To take labour out of the competitive process ; because if a number of workers freely compete for a job, the employer will definitely offer them less wages.
2. To negotiate at all levels with employers over wages and conditions of work.
3. To protect the workers in their inalienable right to higher and better life.
4. To make workers to take part in union activities and to obey union rules and decisions.
5. To protect and promote the interests of the workers.
6. To provide legal assistance to workers (*i.e.*, union members) in connection with work affairs.
7. To improve economic status of workers.
8. To protect the jobs of the workers against lay off, retrenchment, etc.
9. To ensure that workers get as per rule, the pension, provident fund, compensation for injuries, etc.
10. To ensure for the workers, better health, safety and welfare standards.
11. To have a voice or participation in the factory management.
12. To ensure that workers get respect and human treatment from the foremen, managers, etc.
13. To improve their political status.
14. To offer educational services to the workers.

21.3. INDUSTRIAL DISPUTES

Definition and Introduction

- An *Industrial Dispute* means any dispute or difference between employers and employers or employers and workmen or between workmen and workmen which is connected with employment or non-employment or terms of employment or conditions of labour, of any person.
- Every human being (say a worker) has certain needs. *e.g.*, economic needs, social needs and needs for security. When these needs do not get satisfied, there arises a conflict between labour and capital. A conflict means a struggle or clash between the interests of the employer and the workers. For example, in order to compete in the market, the employer would like to reduce the price of his product and for doing so he will tend to reduce the wages of the workers ; the workers would not agree to it and the result will be an *industrial conflict* between the employer and the workers.
- When an industrial conflict (which otherwise is general in nature) acquires a concrete and specific display or revelation, it becomes an *Industrial Dispute*.
- A conflict takes the shape of Industrial Dispute as soon as the issues of controversy are submitted to the employer for negotiations.
- An industrial dispute may be looked upon as a controversy or disagreement between employer (or management) and the workmen on issues such as

  Wages and other benefits,

  Work hours and working conditions, etc.
- Industrial disputes cause losses to , workers, management and nation as a whole.

  (*i*) Workers lose their wages.

  (*ii*) Management loses its profit.

  (*iii*) Public suffers due to shortage of goods in the market.

  (*iv*) Nation suffers due to loss of production.

Causes of Industrial Disputes

Some of the common causes of Industrial Disputes have been listed below :

(i) Psychological causes

- Difficulty in adjusting with each other (*i.e.*, employer and worker).
- Clash of personalities.
- Authoritarian Leadership (administration).
- Demand for self-respect and recognition by workers.
- Strict discipline.

(ii) Institutional causes

- Non recognition of the labour union by the management.
- Matters of collective bargaining.
- Unfair conditions and practices.
- Pressing workers, not to become members of union, etc.

(iii) Economic causes

(a) Terms and conditions of Employment

- More hours of work.
- Working in night shifts.
- Promotion, lay off, retrenchment, dismissal, etc.

(b) Working conditions

- Environmental conditions such as too hot, too cold, noisy, dirty, messy, etc.
- Improper plant and workstation layout.
- Old and trouble giving machines.
- Frequent changes in products, etc.

(c) Wages and other benefits

- Inadequate wages.
- Undesired deductions from wages.
- Poor fringe benefits.
- No bonus or other incentives, etc.

(iv) Denial of legal and other rights of workers

- Not proceeding as per labour laws and regulations, standing orders etc.
- Violation of already made mutual agreements (*i.e.* between employer and workers).

21.4. STRIKES

Introduction

- Whenever workers feel any grievance and if the same is not removed by the management, the workers unite together to fight it out and this causes industrial unrest, conflict and dispute. The industrial disputes generally result in **Strikes, Lockouts, Picketing or Gherao.**
- The word *strike* is an innovation of the early 19th century but the phrase *to strike work* was used in the eighteenth century.
- Strike is the ultimate weapon of the trade union by which it can threat the employer.
- Strike implies that,

(*i*) there shall be cessation of work or refusal to work by a body of workmen ; and

(*ii*) workmen should be acting in concert in order to enforce a demand against the employer during an industrial dispute.

– Success of strike depends upon the ability of the workmen to stop the employer from continuing to operate.

Causes of Strikes

– Finding the causes of strikes means searching the causes that lead workers to strike in preference to other methods available to achieve their objectives.

– The various causes of strikes are,

(*i*) Wage disputes (including bonus, etc.)

(*ii*) Working arrangement and conditions.

(*iii*) Discipline and other factory rules.

(*iv*) Demarcation, dismissals, suspension, retrenchment, etc.

(*v*) Dispute over hours of work.

(*vi*) Trade union recognition.

(*vii*) Internal union disputes.

(*viii*) Victimisation of membership.

(*ix*) The closed shop.

(*x*) Undeserved punishments.

(*xi*) Assaults, abuses and misbehaviours (from supervisors or management).

(*xii*) Sympathetic strikes.

Effects of Strikes

(i) Strikes are costly to workers. They may not have money to feed themselves and their families.

(ii) Strikes cause emotional tensions and mental strains.

(iii) Strikes deplete trade union funds.

(iv) Strikes result in mass unemployment.

(v) Strikes may result in violence and thus injuries to many workmen.

(vi) Strikes result in loss of output and profits.

(vii) Strikes involve loss of valuable man hours.

(viii) Strikes sometimes lead to damage to property and costly equipments.

(ix) Public suffers from shortage of products of the striking industry.

(x) If the strike fails, it :

– brings misery, dismissal and even withdrawal of already given privileges ;

– terrorises workmen and degrades their morale.

Forms of Strikes

(i) Official and unofficial strikes

– An official strike is one which is called by the union,

– An unofficial strike is one which has not been approved by the union.

(ii) General and Particular strikes

– A general strike is one where there is concert or combination of workers in stopping or refusing to resume work.

A general strike covers a wide range of industries and is over quite a large part of the country, *e.g.* General strike of 1926 in Great Britain.

- Particular strikes have smaller coverage, *e.g.* they may remain confined to one or a few factories in a city.

(iii) Go-slow strikes

- Workers come to the factory, but they work at pace slower than the normal ; this lowers down the production and results in loss to employer.

(iv) Quickie strike

- Workers come to factory but they stop work for few minutes or few hours.

(v) Sit-down strikes

- Workers come to factory, report to their duties but do not work.

(vi) Sympathetic strikes

- A sympathetic strike for a day or so is conducted in sympathy with another group of workers who are already on strike, in order to boost their morale.

21.5. LOCK-OUT

Introduction and Definition

- Just as strike is a weapon in the hands of workers to force employers to accept their demands ; similarly *lock-out* is the weapon of employer to pressurize workers to come down in their demands.
- A lock-out means,

  "Closing the place of employment or suspension of work or the refusal by an employer to employ any number or persons employed by him".
- As the employer declares a lock-out, he tells workers to keep away from the work.
- Lock-out is the outcome of an industrial dispute.

21.6. PICKETING

Introduction and Definition

- Picketing is almost a standard practice when a union strikes against an employer.
- some workers are placed at the factory gate to discourage others from entering the work premises.
- Pressure on the employer increases when employees of other companies refuse to cross picket line to deliver or pick up goods from the struck employer.
- In picketing, workers may parade with banners to inform public about the dispute with the employer and to enlist popular support for the workers or unions.
- Picketing may be designed to interfere with business and thus to pressurize the employer to comply with union demands.
- Picketing by one group of employees often stops other employees from working in the same factory.
- In doing so, the pickets sometimes insult and even block physically the path of those (employees intending to) enter the factory.

21.7. GHERAO

- Like strike and picketing, Gherao is also a method to pressurize employer to fulfil union demands.

- In gherao workers force the employer or managers to remain confined in their offices for hours or even days. The employer sometimes is forced to remain without water and food ; he is not allowed to go out even for natural calls.
- Workers encircle the office of the employer, close all the exits and sit around in batches.
- In contrast to strikes which put economic pressure on the employer, a gherao involves physical coercion, *i.e.* it tends to inflict physical duress on the employer or manager.
- Thus a gherao besides endangering industrial harmony, creates problems of law and order also.
- Actually gherao is a primitive method which used to be employed in England by early trade unions.

21.8. SETTLEMENT OF INDUSTRIAL DISPUTES

- Industrial disputes, their causes and ill effects have been discussed under section 21.3.
- The ill effects of industrial disputes pressurize employees, employers and the state to settle such disputes for the betterment and welfare of all the parties involved.
- The different **methods** employed for **settling the disputes are :**

(a) Without state intervention

1. Collective bargaining.
2. Voluntary arbitration.

(b) With state intervention

3. Compulsory collective bargaining.
4. Bipartite committees.
5. Compulsory arbitration.
6. Compulsory conciliation and Mediation.
7. Compulsory investigation.

21.9. COLLECTIVE BARGAINING

Introduction

- Collective Bargaining constitutes the negotiations between the management and the union with the ultimate objective of agreeing on a written contract covering the terms and conditions of settlement of the disputed issues.
- Collective bargaining is basically a give-and-take process involving proposals and counter proposals.
- Meetings between management representatives and union leaders are conducted in an attempt to arrive at an agreement or at the settlement of the dispute.
- In such meetings, the two parties bargain with each other on disputed issues (which may be such as salary and fringe benefits, terms and conditions of employment, etc.) to arrive at an agreement.
- The agreement is signed by both the parties and the length of time the treaty will operate may be specified.
- Collective bargaining introduces an element of democracy in the field of Industrial Relations and Management.
- Collective bargaining imposes certain restrictions upon the employer. Unilateral action is prevented. The employer is no longer free to make and enforce employment decisions. Management must bargin with the union on appropriate subjects.
- The collective bargaining is not an easy process and it is often exasperating.

Procedural steps

The steps involved in collective bargaining process are :

(*i*) Putting up before the management, by the employees, their demands and grievances collectively.

(*ii*) Discussing and negotiating with the management representatives, with a view to settle the disputed issues.

(*iii*) Signing a formal or informal agreement mutually arrived at.

- The mutual agreement may be as regards the following :

(*a*) Union security.

(*b*) Wages, bonus and other benefits.

(*c*) Terms and conditions of employment:

Hours of work.

Holidays.

Safety and health.

Promotion, transfer and discharge, etc.

(*d*) Grievance procedure.

(*e*) Incentives.

(*f*) Management responsibilities, etc.

- If either of the party, later on, feels reluctant in abiding by its commitments under the mutual agreement, the other party can employ economic pressures to force that party to meet its obligations.

(*iv*) In the event of no agreement, various pressures are brought to bear upon the management by the union (such as strikes, picketing, gheraos, etc.) or on union by the management (such as lock-out) to reconcile.

But both the parties, *i.e.*, management representatives and union officials have a basic obligation to establish a constructive relationship of working harmony in the settlement of disputes and in the advancement of labour-management peace.

Voluntary Arbitration

- In this method of settling disputes, a third neutral party as a judge (to decide the disputed issue) hears and collects the facts from the two primary parties and proceeds to make a decision which is usually binding upon the union *i.e.* one primary party and the management (*i.e.* the second primary party).
- Many industrial disputes have been (*e.g.* those between union and management of Rohtas Industries Ltd., Dalmia Nagar etc.) and are being settled today through voluntary arbitration.
- The Industrial Dispute Act 1947 recognises voluntary arbitration as a method for settling industrial disputes.

Establishment of Compulsory Collective Bargaining

- If, either union or management resists the establishment of voluntary collective bargaining, but the state feels that collective bargaining will be useful, it may advise, encourage or even impose collective bargaining compulsorily on the two parties to settle their disputes through negotiations and discussions.

Compulsory Establishment of Bipartite Committee

- A bipartite committee consists of representatives of workers as well as of the employer (at the factory level).

- Such committees work on the principle of 'nip the evil in the bud' and settle labour-management disputes as soon as they appear and do not permit them to grow large and take an unmanageable shape.
- The main purpose of such *Bipartite committees or works committees is to*
  - (i) promote measures for securing and preserving amity and good relations between workers and employers ;
  - (ii) comment upon matters of their common interest ;
  - (iii) compose any material differnce of opinion in respect of such matters and to
  - (iv) encourage workers and management to settle their differences without the *Arbitrator*.

Compulsory Arbitration or Adjudication

- Unlike voluntary arbitration, in Adjudication, the Arbitrator or Adjudicator is appointed by the government.
- In adjudication, the industrial dispute is referred for arbitration by the government and both the parties have to accept the decision of the arbitrator.
- The objective of adjudication is to maintain industrial peace by stopping the parties from causing work-stoppages and providing a method for settling the industrial dispute.

Compulsory Conciliation (machinery) and Mediation

- Conciliation is a process by which the discussion between workers and employer is kept going on through the activities of a conciliator *i.e.*, third party.

  A conciliator aids resolving the differences between two parties and keeps them to understand and appreciate the situation better.
- Mediation is a process by which the third party attempts to stimulate labour and management to reach some type of agreement. The mediator cannot decide the issue. He is strictly neutral who can only listen, suggest, communicate and persuade.
- What has been described above, it is voluntary conciliation and mediation.
- In compulsory conciliation and mediation, the government imposes an obligation on the workers and management to refer their disputes to the conciliation and mediation service. The government also prevents both the parties from work-stoppages till the conciliation or mediation is going on.
- Conciliators and Mediators are asked to furnish their report within a time period. If the efforts to reconcile fail, workers are free to go on strike and the employer is free to declare a lock-out.

Compulsory Investigation

- Government may set up a machinery to investigate into any dispute. Machinery may be a *Court of Inquiry* to explore facts and issues involved. A wide publicity may be given to it because, quite possible, the public opinion may compel the two parties to leave their rigid and obstinate attitudes and try to arrive at a settlement.
- Moreover, the period during which Court of Inquiry is being conducted, may serve as a cooling off period for the two primary parties to reconsider their stands coolly.
- Court of Inquiry is given almost same powers as remain with a civil court.

21.10. HANDLING OF WORKERS' GRIEVANCES AND GRIEVANCE PROCEDURE

Introduction and Definition of Grievances

- Individual employees generally have some complaints called *grievances* against the working rules of the business enterprise, *e.g.* wages, bonus, working conditions, behaviour of supervisors etc.

- The one thing which is very harmful to good relations between workers and management is the feeling among workers that the management does not look into their problems and difficulties.
- This results in dissatisfaction in the minds of workers and distrust towards management which in turn introduces inefficiency and lack of co-operation from the worker's side.
- Hence, if no systematic way exists for bringing workers' complaints or grievances to the surface, they may pile up and explode into an industrial Dispute.
- **A Grievance** may be defined as any feeling of discontent or dissatisfaction, whether expressed or not and whether valid or not, arising out of anything connected with the company that an employee thinks, believes or even feels is unfair, unjust or inequitable. A grievance may be :

(*i*) unvoiced or stated by the worker,

(*ii*) written or unwritten, and

(*iii*) valid or ridiculous, and may arise out of something connected with the company, *e.g.*, company policy or actions.

Examples of Workers Grievances

1. Regarding wage structure, wage calculation, deduction, incentive, etc.

2. Regarding factory working conditions such as light, noise, smoke, fumes, too hot or too cold, environments, dampness, inadequate toilet facilities, lunch rooms, impure drinking water etc.

3. Regarding supervision such as rigid rules, regulations not clearly posted, foreman being partial, inadequate job instruction, etc.

4. Regarding partial attitude of management towards deciding seniority, promotions, transfers, discharges, lay-offs, penalties, night shifts, etc.

5. Regarding collective bargaining, *e.g.*, management violating agreements, not attending to union grievances, penalising workers who belong to union, etc.

Grievance Procedure

- If an enterprise wants to get maximum out of its workers/employees, it must attempt to satisfy them by providing good working conditions, fair wages, settling grievances and taking them into confidence.
- Thus, an adequate and effective procedure must be developed by the management to handle and settle grievances of its employees. A good grievance procedure is essential to develop sound labour relations.
- **A good grievance handling procedure should**

(*i*) be simple, easy to understand and to operate;

(*ii*) settle grievances at lower level ;

(*iii*) systematically handle the grievances and promptly remedify the conditions complained of ;

(*iv*) depending upon the nature of grievance, refer it to appropriate authority ;

(*v*) ask the employee to give his complaint in writing ;

(*vi*) permit the worker to appeal against the decision taken at lower level, and lastly

(*vii*) the grievance procedure should be made, realising the importance of industrial harmony and good labour relations.

- **Steps involved in grievance handling prodedure**

Fig. 21.1 shows steps involved in a grievance procedure.

Step 1. The aggrieved employee presents his grievances in writing to his foreman or supervisor ; he puts his grievance to union representative who also is a full time employee of the company. If the foreman,

aggrieved employee and the union representative fail to work out a settlement of grievance, the dispute in the written form is sent to a higher step in the procedure.

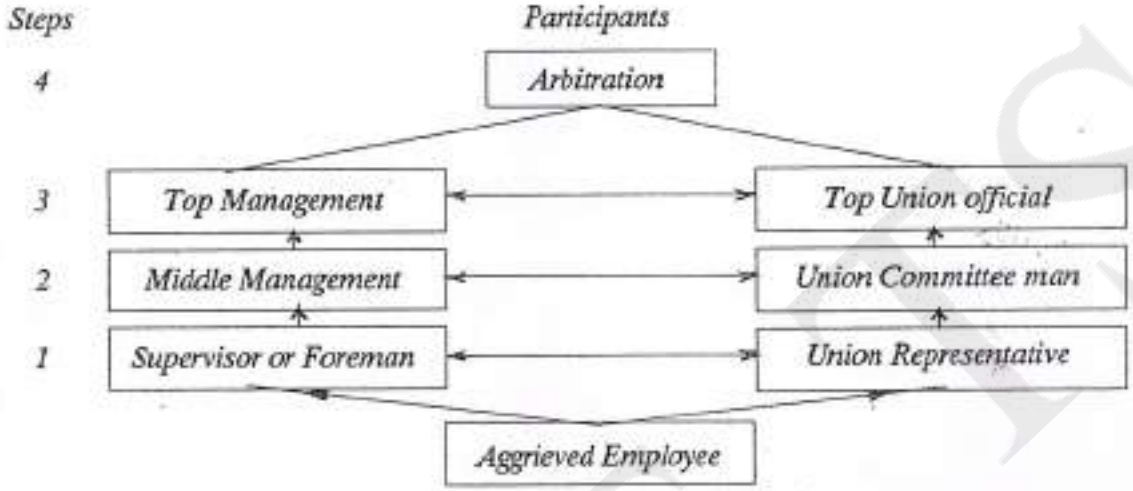

Fig. 21.1. A Grievance Procedure.

Step-2. The grievance is looked into by the middle management and the union committee man ; a union committee man supervises several union representatives and is specialist in union management negotiations. If the situation still remains unsettled, as the third step, the case is forwarded to top management and top-union officials.

Step-3. Top management representatives and top union official discuss the grievance which by this time has now become issue that has political implications. Thus it is very difficult to secure an integration of interests at this high level.

Step-4. If top management and union leaders fail to settle the issue, the fourth step, then, is to submit the same to an impartial Arbitrator for a final decision as to the action required.

A failure to settle the issue at step-4 may result in strike, picketing, Gherao or lockout.

It is the best if the grievance gets settled at the level of supervisor and union representative.

21.11. WORKER'S (EMPLOYEE'S) PARTICIPATION IN MANAGEMENT

Concept

- Worker's participation in management can be in any shape, from establishing work-committee to auto-management by the employees.
- The aim of management is to get work through others. Workers, if they are permitted to participate and involve themselves in some of the decisions relating to work situation, etc., perhaps more effectively the company objectives can be achieved.

Objectives or Necessity. The objectives or the necessity of permitting workers to participate in management can be :

(*i*) To achieve industrial peace and harmony.

(*ii*) To develop internal motivation in the workers.

(*iii*) To boost the morale of employees.

(*iv*) To raise the levels of the employee production, productivity and product quality.

(*v*) To satisfy workers by making them feel that they have their voice in the management.

(*vi*) To give workers a better understanding of their role in the working of industry.

(*vii*) To develop better mutual understanding so that the workers do not resist a change for the

betterment of the concern (*e.g.*, introduction of work study, etc.).

(*viii*) To reduce labour turn-over, absenteeism and tardiness.

(*ix*) To minimize the number of grievances and therefore industrial disputes.

(*x*) To make managing the subordinates easy.

Types of Worker's Participation

Worker's participation in management may take many forms, *e.g.*

(*a*) Formal participation.

1. Ascending participation
2. Descending participation.

(*b*) Informal participation.

(*a*) **Formal Participation.** It consists of some plan for labour-management cooperation, *i.e.*, to some degree, recognised as a *modus operandi* between management and workers, frequently through a union.

- Workers and management may work together on such plans as
  - Accident prevention
  - Elimination of waste and defective work
  - Attendance & Absenteeism
  - Employee insurance plans, etc.
- In **Ascending** type of participation, the elected representatives of workers participate in managerial decisions at higher levels such as in the board of directors of the enterprise.
- In **Descending** type of participation, workers participate in the planning and deciding their own work on the shop floor.
- **Collectively**, workers can participate in
  - (*i*) *Works Committees* which are meant for promoting measures for securing and preserving amity and good relations between workers and management. A works committee comments upon matters of common interest and attempts to settle any material difference of opinion between the two parties.
  - (*ii*) *Joint-councils* of workers and management may decide the issues on which interests of management and workers are identical, *e.g.*, accident prevention and safety measures, determination of production standards, worker's training, welfare measures etc.
  - (*iii*) *Information sharing* in which workers are told about certain aspects of the company, *e.g.*, plans for expansion, financial position of the company, etc.
  - (*iv*) *Employee's director*, *i.e.*, an elected representative of the (employee's or) worker's is one of the Board Directors.
- Individually workers can participate in management through
  - (*i*) *Suggestion System* (Refer Chapter-20).
  - (*ii*) *Delegation and job enlargement* in which workers plan and decide their own work.

(*b*) **Informal Participation**

- It is more typically at the work-group level, where the foreman develops the opportunity for the group of workers to take part in a problem-solving or decision making process. Typically, the matters on which decisions are taken are those within the prerogatives of the foreman or supervisor.

Conditions for the Success of Worker's Participation in Management

(*i*) There should be an atmosphere of cooperation and trust between the management and the workers.

(*ii*) Workers those who are participating must be capable of understanding the problems, their complicacies and interactions.

(*iii*) The participating workers should be able to express themselves to their own satisfaction.

(*iv*) Workers should be permitted to participate in the decision on maximum of company matter, *e.g.*, introducing new machinery, newer methods of operation, etc.

(*v*) The participation of a worker must not adversely affect his status or role.

(*vi*) Discussions should be frank and free and without any reservation.

(*vii*) Besides caring for the immediate interests of itself, both the parties should respect each other's interests also. For example, workers need not remain solely interested in their wages and welfare and employers in raising efficiency and reducing cost of production.

(*viii*) It is generally commented that "most of the relatively rare successes of such consultations seem to occur where an unusually progressive manager is blessed with unusually competent union officials".

21.12. UNION-MANAGEMENT RELATIONS

- Union organisations, when studied in regard to group concepts of human relations, offer a key to improved union-management contacts.
- In large business organisations where the channels of communication are often blocked in vertically upward direction, union provides the channels of communication for the workers.
- Unions are more concerned than management with the feelings and attitudes of workers.
- Union-management relations can be good as well as bad, this depends upon the attitude of one towards the other.
- Many successful firms have enjoyed peaceful union-management relations on the basis of acceptance of collective bargaining, union's widespread creative participation, negotiations conducted in a problem solving atmosphere and an effective grievances procedure.

Management gave unions the chance to participate in discussions of problems affecting workers, *e.g.*, safety studies, workstudy, promotion, etc.

Grievance procedure provided excellent communication channels which further improved union-management relations and gave union the opportunity to carry out its function of representing the workers.

- On the other hand, if union thinks management as unintelligent, stubborn, arrogant and hypocritical; and Management calls union leaders as dishonest, greedy, emotional and unscrupulous, and thus they mutually develop sharp divergence in attitude, resistance to participation, lack of understanding, failure to communicate, etc., naturally the union-management relations cannot become cordial and peaceful.
- It is agreed that the conflicts or disputes between workers/union and management is inevitable, because both management and union want something. it is actually the selfishness of the management as well as of union that gives rise to disputes and prevents cooperation and good relations being established between the two.
- Development of semi-automatic and automatic equipments and machines is also responsible for spoiling (worker) union-management relations. Earlier, workers used to respect their supervisors because the supervisors possessed some definite skill to teach to workers, but later on when the machines became all important, the supervisor's job was simply to enforce a set of rules. Moreover, it became a practice to import personnels for higher levels from outside the factory. The existing staff, thus, could not work its way up in the factory organisation and this created discontentment in their minds.

22

Industrial (Labour) Legislation

22.1. INTRODUCTION

- There has always been struggle, conflict and clashes between the employees (labour) and the employer on the matters of (more) wages, allowances, other facilities etc.
- During the last fifty years with the increase in cost of living, the employee-employer conflicts also increased thereby resulting in strikes, lockouts, picketings and gheraos.
- Ultimately, the government which initially was a silent observer of such conflicts, had to intervene to minimize employee-employer disputes, for the welfare and economy of the country ; and thus the government contributed to the personnel field by legislation. Since 1920's there has been a growing stream of protective labour laws regulating wages, compensation, disputes, safety etc.

22.2. IMPORTANCE AND NECESSITY OF LABOUR LEGISLATION (i.e., LABOUR ACTS)

Labour legislation,

1. Improves industrial relations, *i.e.*, employee-employer relations.
2. Helps pay fair wages to workers.
3. Minimize unrest among the workers.
4. Gives compensation to workers, victims of accidents.
5. Reduces conflicts, strikes etc.
6. Procures job security for the workers.
7. Promotes wholesome environmental conditions in the industry.
8. Fixes hours of work, rest pauses, etc.

22.3. PRINCIPLES OF LABOUR LEGISLATION

Labour legislation is based upon the following principles:

1. *Social justice.* Social justice implies proper distribution of business profits and benefits between employer and employees. Labour acts which base themselves on social justice are,

(*a*) Factories Act

(*b*) Minimum Wage Act

(*c*) Workmen's Compensation Act, etc.

2. *Social equality*

3. *National economy*

4. *International uniformity and solidarity.* To keep international uniformity in all labour matters, different countries seek guidance from International Labour Organisation (ILO) conventions and recommendations for making Labour Laws.

22.4. TYPES OF LABOUR LAWS

1. ***Laws connected with working conditions in factories:***

(*a*) Factories Act, 1948.
(*b*) Industrial Employment Act, 1946.
(*c*) The Mines Act, 1952.
(*d*) Indian Merchant Shipping Act, 1923.

2. ***Laws related to specific matters, e.g., wages, welfare, etc.***

(*a*) The Payment of Wages Act, 1936.
(*b*) The Minimum Wages Act, 1948.
(*c*) The Workmen Compensation Act, 1923.
(*d*) The Employee State Insurance Act, 1948.
(*e*) The Employee Provident Fund Act, 1952.

3. ***Laws related to worker's associations***

(*a*) Trade Union Act, 1926.
(*b*) Industrial Dispute Act.

4. ***Laws related to social insurance***

(*a*) The Maternity Benefit Act, 1961.
(*b*) The Workmen Compensation Act, 1923.
(*c*) Employee's State Insurance Act, 1948.

Some of these laws will be discussed briefly in this chapter.

22.5. THE FACTORIES ACT, 1948

22.5.1. Object and Scope

- The factories act regulates conditions of work (health, safety etc.) in factories, it safeguards the interest of workers and it is for the welfare of factory workers.
- This act received the assent of Governor-General of India on September 23, 1948 and came into force on April 1, 1949. This act was further amended in 1950, 1951, 1954,etc.,and lately in 1987.
- This act is applicable to any factory in which ten or more than ten workers are working.
- The factories act has a provision in respect of
  1. Employee health and safety,
  2. Hours of work,
  3. Sanitary conditions and wholesome work environments,
  4. Employee welfare,
  5. Leave with wages, etc.

22.5.2. Important definitions

(*a*) *Factory.* A place wherein ten or more persons are working and in which a manufacturing process is going on using electricity, steam, oil, etc.

(*b*) *Manufacturing process.* A process for

- making, altering, repairing, finishing, packing, washing, cleaning, or otherwise treating a substance for its use, sale, transport, disposal, etc. ;
- pumping oil, water or sewage, or
- generating, transforming, or transmitting power, or
- composing types for printing, printing for letterpress, lithography, photogravure or other similar process or book binding ;

– constructing, reconstructing, repairing, refitting, finishing or breaking up ships or vessels.

(*c*) *Worker.* Worker means a person employed directly or through any agency, whether for wages or not, in any manufacturing process or in cleaning any part of the machinery or premises used for a manufacturing process or in any other kind of work incidental to or connected with, the manufacturing process or the subject of manufacturing process.

(*d*) *Adult.* A person who has completed his eighteenth year of age.

(*e*) *Child.* A person who has not completed his fifteenth year of age.

(*f*) *Power.* Electrical energy or any other form of energy which is mechanically transmitted and is not generated by human or animal agency.

(*g*) *Machinery.* It includes

– Prime movers : engine, motor, etc.
– Transmission machinery : shaft, wheel, drum, pulley, belt etc.
– And all other appliances whereby power is generated, transformed or transmitted.

(*h*) *Occupier of factory.* A person who has ultimate control over the affairs of factory and where the said affairs are entrusted to a managing agent, such agent will be considered as the occupier of the factory.

22.5.3. Approval, Licensing and Registration of Factories

– Before starting a factory,

1. Take permission of the state government or chief inspector for the site on which factory is to be made.
2. Get the factory plans and specifications approved by the inspector of industries.
3. Pay the necessary fees and get the registration and licensing of the factory.

– If on an application to chief Inspector to use a particular site for a factory, nothing is heard within three months, the permission is deemed to have been granted.
– In case of refusal from chief inspector or state government, the applicant within 30 days of the date of such refusal may appeal to central government in this connection.
– An occupier should, atleast 15 days before he occupies a place as a factory, send to Chief Inspector a written notice containing--name and address of occupier and factory, nature of manufacturing process, nature of power to be used, name of factory manager, number of workers required, etc.

22.5.4. Inspectors. State government appoints Chief Inspector and other Inspectors who

(*i*) may enter any factory ; and

(*ii*) may make examination of premises, plants, machinery and any documents related to factory.

– Certifying Surgeons

State government may appoint qualified medical practitioners as certifying surgeons for

(*i*) the examination and certification of young workers, and

(*ii*) the examination of workers engaged in dangerous occupation or processes.

22.5.5. Main Provisions of the Act. They are as follows :

22.5.6. Health

1. **Cleanliness**

– Removal and disposal of dirt and refuse from floors, benches etc., everyday.
– Washing of floors of work room at least every week, using disinfectant.
– Effective means to drainage to avoid collection of water, etc., on the work floor.
– All inside walls and partitions, all ceiling tops of rooms, passage and staircase

(*i*) to be repainted once in 5 years if they are already painted ; and

(*ii*) to be white-washed and the white-washing to be carried out at least once in fourteen months.

2. Disposal of Wastes and Effluents

Effective and suitable arrangements should be made for the disposal of wastes and effluents due to the manufacturing process.

3. Ventilation and Temperature

In every factory, effective and suitable provision shall be made for securing and maintaining in every workroom,

(*i*) Adequate ventilation by fresh air circulation,

(*ii*) Suitable temperature to provide conditions of comfort and prevent injury to the health of workers.

4. Dust and Fumes

Employer shall take necessary steps to keep workrooms free from dust or fumes offensive or injurious to the health of the workers.

5. Artificial Humidification

In factories (*e.g.*, textile) where humidity of air is artificially increased, state government may make rules

(*i*) Prescribing standard of humidification ;

(*ii*) regulating the method of artificially increasing humidity ;

(*iii*) directing prescribed test for determining humidity ; and

(*iv*) Prescribing method for achieving adequate ventilation and cooling the air in workroom.

The water employed for humidification shall be from a source of drinking water.

6. Overcrowding

- No workroom should be overcrowded to an extent, which is injurious to the health of workers.
- The minimum space provided for a worker should be 4.2 cu. m.

7. Lighting

- Light whether artificial or natural or both, should be sufficient and suitable in all workrooms.
- Sky lights and glazed windows for lighting the workrooms should be kept clean and unobstructed.
- Glares and shadows which cause eye strain or risk accidents should be prevented.

8. Drinking Water

- Drinking water should be available at suitable points conveniently situated in the factory. All such points shall be legibly marked *drinking water*. No such points shall be located within 6 metres of any latrine, urinal, etc.

9. Latrines and Urinals

- Sufficient latrine and urinal accommodation of the prescribed type should be provided. It should be conveniently situated and accessible to workers.
- Separate enclosed accommodation shall be provided for male and female workers.
- Latrines and urinals should be adequately lighted, ventilated and maintained clean at all times.
- State government may prescribe the number of latrines and urinals to be provided in proportion to the number of workers.

10. Spittoons

- There should be a sufficient number of spittoons at convenient places and maintained in clean hygienic condition.

– No worker shall spit except in a spittoon and if a person contravenes this, he shall be punishable with a fine not exceeding rupees five.

22.5.7. Safety

1. Encasing and fencing of machinery

– In every factory the following shall be securely fenced unless they are in such position as to be safe for each worker

(*i*) Moving parts of prime-mover and flywheel connected to it.

(*ii*) The head race and tail race of water wheel and water turbine.

(*iii*) Any part of a stock bar projecting beyond the lathe head-stock.

– The following parts should be securely fenced by safeguards which shall be kept in position while the parts are rotating,

(*i*) Parts of electric generator, motor, etc.

(*ii*) Parts of transmission machinery.

(*iii*) Dangerous parts of any other machinery.

2. Work on or near machinery in motion

– Any part of machinery if it is required to be examined while it is in motion shall be examined only by a specially trained adult male worker wearing tight fitting clothing.

– No woman or young worker shall be permitted to clean, lubricate or adjust any part of a moving machinery which involves a risk of injury.

3. Employment of young persons on dangerous machines

No young person shall work on a dangerous machine unless

– he has got sufficient training to work at that machine ; and

– he is under adequate supervision of an adult experienced worker/supervisor.

4. Hoists and lifts

– Every hoist and lift shall be

(*i*) of good mechanical construction, adequate strength and sufficiently protected and fitted with gates ; and

(*ii*) adequately maintained and periodically (at least once in six months) examined.

– Hoists and cranes meant for carrying persons shall have at least two ropes or chains separately connected with the cage. Each rope or chain with its attachments shall be able to carry weight of the cage together with its maximum load (*e.g.*, weight of persons).

– Devices should be provided to support cage in the event of breakage of the ropes or chains.

5. Lifting machine, chains, ropes and lifting tackles

Factory cranes and other lifting machines such as crab, winch toggle, pulley block, etc., shall be of good construction, sound material, adequate strength, properly maintained and thoroughly examined atleast once a year.

6. Pressure plants

It should be ensured that the working pressure of such parts does not exceed the safe value.

7. Floors, stairs and means of access to different places

They should be of sound construction, properly maintained and provided with handrails.

8. Pits, sumps, openings in floors, etc., shall be either securely covered or suitably fenced.

9. Excessive weights

No person shall be asked to lift, carry or move any load so heavy as to cause him an injury.

10. Protection of eyes

To protect the eyes of workers from the flying particles (such as in fettling, rivet cutting, scale removal, etc.) or from exposure to welding rays, each worker shall be provided with effective screens or suitable goggles.

11. Precautions against dangerous fumes

No person shall be allowed to enter any confined space, chamber, tank, pit, etc. in which dangerous fumes are likely to be present so as to involve risk to the entering person.

12. Explosive or inflammable dust, gas, etc.

If a manufacturing process is producing dust, gas, fumes or vapour which can explode on ignition,

(*i*) the plant should be effectively enclosed ; and

(*ii*) such dust, gas fume, etc., should not be allowed to accumulate.

13. Precautions in case of fire

Every factory shall be provided with means as follows and others to help escape in case of fire :

(*i*) Fire warning signal.

(*ii*) Unlocked doors and openings towards outside the workroom.

(*iii*) Free passageways and easily openable windows.

22.5.8. Welfare

1. Washing facilities

- Washing facilities adequately screened for male and female workers should be provided in the factory.
- Washing facilities shall be easily accessible and kept clean.

2. Facilities for sitting

Suitable sitting facilities shall be provided for all workers obliged to work in standing position so that they may take rest if an opportunity occurs in the course of their work, without affecting the work.

3. First aid appliances

- For every 150 workers, minimum one fully equipped first-aid box shall be kept available during all working hours.
- A factory employing more than 500 workers shall have a properly equipped ambulance room.

4. Canteens

A canteen shall be provided in each factory in which more than 250 workers are ordinarily employed.

5. Shelters, rest-rooms and Lunch-rooms

Every factory in which more than 150 workers are ordinarily employed, adequate, suitable, clean, sufficiently lighted and ventilated rest and lunch rooms shall be provided.

6. Creches

Every factory shall provide clean, adequately lighted and ventilated rooms for the use of children (under the age of six years) of women workers, if the number of such women workers exceeds 30.

7. Welfare officers

- Every factory employing 500 workers or more shall employ welfare officers.
- The state government may prescribe the duties, qualifications and conditions of service of welfare officers so employed.

22. 5.9. Working Hours

1. **Weekly hours**

An adult worker shall be required to work in the factory for not more than 48 hours a week.

2. **Weekly holidays**

No adult worker shall be required to work on Sunday unless the factory manager substitutes Sunday by a holiday one or three days immediately before or after Sunday.

3. **Daily hours**

No adult worker shall be required to work for more than nine hours on any day.

4. **Intervals for rest**

No adult worker shall be required to work for more than 5 hours continuously, *i.e.*, after five hours, the worker shall have a rest for atleast half an hour.

5. **Extra wages for over-time**

If a worker works for more than nine hours on any day or for more than 48 hours in any week, he will get his overtime wages at the rate of twice his ordinary rate of wage (*i.e.* basic wages + allowances).

6. **Restriction on double employment**

No adult worker shall be allowed to work in a second factory on any day on which he has already been working in one factory.

7. **Register of adult workers**

Factory manager shall maintain a register of adult workers (stating their names, nature of work, group work, etc.) and make it available to the Inspector at all times during work hours.

8. **Restrictions on employment of women**

No women shall be employed in any factory except between the hours of 6 A.M. and 7 P.M.

22.5.10. Employment of Young Persons

1. **Prohibition of employment of young children**

No child under 14 years of age shall be allowed to work in any factory.

2. **Non-adult workers**

A child who has even completed his 14 years of age shall not be allowed to work in a factory unless he carries while at work a token giving reference to certificate of fitness.

3. **Certificate of fitness**

It is a certificate of fitness for working in a factory which is given to a young person by a certifying surgeon after examining him (*i.e.* the young person).

4. **Working hours for children**

No child shall be permitted to work

(*i*) for more than four and a half hours on any day ; and

(*ii*) during the night, (*i.e.* 10 P.M. to 6 A.M.)

5. **Register of child workers** indicating their particulars and nature of work shall be maintained by the factory manager and be made available to Inspector at all times during hours of work.

ANNUAL LEAVE WITH WAGES

– A worker who has worked for 240 days or more during a calender year shall be permitted during the subsequent calender year, leave with wages for a number of days at the rate of

1. One day for every 15 days of work performed by a *child* worker.

2. One day for every 20 days of work performed by an *adult* worker.

– A worker interested to take leave shall apply 15 days in advance.

SPECIAL PROVISIONS

1. Dangerous operations

Where the state government feels that any operation is of serious risk or bodily injury, poisoning or disease, it may make rules :

(*i*) declaring the operation dangerous;

(*ii*) stopping employment of women and children in this operation ;

(*iii*) providing protection of all concerned with that operation ; and

(*iv*) periodical medical check-up of all concerned with that operation, etc.

Notice of accidents

An accident causing death or bodily injury due to which the worker cannot work for a period of 48 hours or more immediately after the accident, shall be brought to the notice of such authorities, within such time as may be prescribed.

Notice of disease

If a worker is suffering from any disease specified in the schedule, a report immediately shall be sent to Chief Inspector giving particulars of the worker and the disease from which he is suffering.

Power to take samples

An inspector, during working hours, after informing the manager may take samples of any substance being used in the factory.

22.5.11. Penalties and procedure

General Penalty for Offences

– In case of any contravention of any of the provisions of this Act, the occupier and factory manager shall each be guilty of an offence and punishable with up to 2 years of imprisonment or fine up to Rs. 100,000 or both.

– If contravention continues after conviction, there will be a fine of Rs. 1000 per day.

After being convicted for an offence,if the person does contravention of the same provision again, he shall be punishable with imprisonment up to 3 year, a fine up to Rs 10000 to 3 lakhs or both.

Penalty for Obstructing Inspector

– An Occupier/Manager shall be punishable with imprisonment up to 6 months or fine up to Rs. 10,000 or both if he

(*i*) fails to produce registers or other documents on demand by Inspector ; and

(*ii*) prevents any factory worker from being examined by the Inspector.

Offence by Workers

– If any worker contravenes any provisions of the act, he shall be punishable with fine up to Rs. 500.

Appeals

An occupier/manager on whom a written order by an Inspector has been served under the provisions of the Act may within 30 days of the service of order, appeal against it to the prescribed authority.

Obligations of Workers

– No factory worker will misuse any appliance provided for the purpose of securing health, safety and employee welfare.

– A worker who contravenes this provision shall be punished with up to 3 months imprisonment or a fine of Rs. 100, or both.

Restriction on Disclosure of Information

No inspector will ever disclose any information relating to manufacturing processes, etc., which comes to his knowledge in course of his official duties. An inspector who does so shall have up to 6 months of imprisonment, or a fine of Rs. 1000, or both

22.6. THE PAYMENT OF WAGES ACT, 1936 (Amended up to 1982)

22.6.1. Aim

To regulate the payment of wages to persons employed in industry and drawing less than Rs. 1,000 per month.

This act is about :
(*i*) the date of payment of wages ; and
(*ii*) deductions (fines or otherwise) from wages.

22.6.2. Definitions

1. **Factory,** refer the Factories Act, 1948.

2. **Industrial establishment**

It means any :
– Motor transport service carrying passengers or goods or both on hire,
– Air and water transport service,
– Mine or oil field,
– Workshop, etc.

3. **Wages**

Wages include all remunerations (salary+allowances, etc.) payable to an employee in respect of his employment. Wages also include over-time remuneration, bonus, gratuity, pension, provident fund contribution by the employer, etc.

Responsibility for Payment of Wages

– An employer shall be responsible for the payment of wages to all his employees.
– An employer shall fix wage period (not exceeding one month) by which he shall pay wages to his employees.
– If the number of employees is less than one thousand, wages have to be paid before the expiry of the seventh day after the last day of wage period. In the other case, payment shall be made before the expiry of tenth day after the last wage period.
– Wages shall be paid on a working day.
– Wages shall be paid in current coins or currency notes or in both.

Deductions from Wages

– Only those deductions as authorized by the Payment of Wages act will be made from the wages of an employee. Deductions may be such as
  (*i*) fines ;
  (*ii*) those for absence from duty ;
  (*iii*) due to damage to or loss of goods ;
  (*iv*) for house-accommodation supplied by employer ;
  (*v*) for amenities and services supplied by the employer ;
  (*vi*) for recovery of advance and loan given to the employee ;
  (*vii*) for income tax ;

(*viii*) provident fund; and

(*ix*) those by the order of a court.

Imposition of Fines

- Fine shall be imposed only after an employee has been given an opportunity of showing cause against the fine.
- Total fine shall not be more than an amount equal to 3% of the wages payable to an employee in respect of that wage period.
- No fine will be imposed on an employee below 15 years of age.
- Every fine shall be imposed on the day of the act and shall be recovered within sixty days from the day on which it was imposed and that too in one instalment only.
- All fines and their realization shall be recorded in a register and kept by the employer.

22.6.3. Enforcement of the Act

- Inspectors of Factories or otherwise appointed shall be responsible for the enforcement of the Act.

Powers of Inspectors

- Such an inspector may examine or make enquiry to ascertain whether the provisions of this act are being observed.
- Inspector may enter, inspect or search any factory premises and supervise the payment of wages for the purpose of carrying out the objects of the Act.
- The inspector can seize such registers or other documents relevant in respect of an offence under this Act.

Authority to Hear Claims

- To hear claims made by the workers in respect of unauthorized deductions from wages or delay in payment of wages, State Government may appoint an authority (who may be a presiding officer of a Labour Court, a judge of civil court, etc.) to dispose of such claims.
- After hearing, the authority may direct the employer to refund the deduction to the employee alongwith such compensation as the authority may feel proper but not more than ten times the amount deducted.
- If after hearing, it is found that the employee's application was malicious, he may be punished to pay up to Rs. 50, to the employer.
- An appeal can be made against the decisions of authority within 30 days of the date on which decision was told to the employer.

Penalty for Offences under this Act

- Whoever being required under this act to maintain any records of registers

(*i*) fails to do so ;

(*ii*) wilfully refuses to furnish such information ;

(*iii*) wilfully furnishes an information which he knows is false ;

(*iv*) refuses to answer, or gives false answer, shall be punishable with fine of Rs. 200 to 1000.

- Whoever,

(*i*) wilfully obstructs an Inspector from doing his duty ;

(*ii*) refuses or wilfully neglects to afford an Inspector any reasonable facility, for making any entry, inspection, examination, etc. ;

(*iii*) wilfully refuses to produce on the demand of Inspector any register or other document ;

(*iv*) prevents any employee from appearing before the inspector, shall be punishable with a fine from 200 - 1000 rupees.

- A person found guilty of the same offence second time shall be punishable with imprisonment up to 6 months and a fine of, from 500 to 3000 rupees.
- An employer who wilfully does not pay wages of an employee by the date fixed by the authority in this behalf, he shall without prejudize to any other action that may be taken against him, be punishable with an additional fine of up to Rs. 100 for each day for which such neglect continues.

22.7. THE MINIMUM WAGES ACT, 1948

This act has been amended in its local application by many states. For example, Bihar State amended it recently in 1988.

22.7.1. Objects

To prevent exploitation of the employees (workers), this act aims at fixing minimum wages which they must get.

22.7.2. Important Aspects of the Act

(*i*) The act lays down for fixation of

- A minimum time rate of wages,
- A minimum piece rate,
- A guaranteed time rate,
- An overtime rate, for different occupations, classes of work, for adults, children, etc.

(*ii*) The minimum wage may consist of a basic rate of wages and a cost of living allowance.

(*iii*) Cost of living allowance shall be computed by competent authority such as the Director, Labour Bureau.

(*iv*) Wages shall ordinarily be paid in cash.

(*v*) The act empowers the appropriate government to fix number of working hours in a day, a weekly holiday, and payment of overtime wages.

(*vi*) The employer is required to maintain registers and office records in proper manner.

(*vii*) Inspectors may be appointed to hear and decide claims arising due to payment of less than minimum wages.

(*viii*) Penalties shall be imposed for violating the provisions of the act.

22.7.3. Fixation and Revision of Minimum Wages

(*i*) Appropriate government shall fix the minimum rates of wages for persons employed.

(*ii*) Appropriate government shall review at interval not exceeding five years, the minimum rates of wages so fixed and revise the minimum rates.

(*iii*) In fixing or revising rates of wages:

- different minimum rates of wages be fixed for different scheduled employments, different classes of work and for adults, children and apprentices,
- minimum rates of wages may be fixed either by hour, by day, by month or by other longer wage period as may be prescribed.

(*iv*) For fixing or revising minimum rates of wages, the appropriate government shall,

(*a*) either appoint committees and sub-committees; and

(*b*) or publish its proposals for the information of persons likely to be affected and consider all representations received from those persons.

(*v*) The appropriate government shall appoint an Advisory Board for,

(*a*) coordinating the work of committees and sub-committees; and

(*b*) advising it as regards fixing and revising minimum wage rates.

22.7.4. Payment of Minimum Wages

(*i*) Minimum wages shall be Payable in cash.

(*ii*) An employer shall not pay less than the minimum wage rate fixed.

(*iii*) The government may

- fix number of working hours in a day ;
- provide a day for rest in every period of seven days ;
- provide payment for work on a day of rest at a rate not less than the over--time rate.

These provisions shall apply to

- employees engaged on urgent work, preparatory or complementary work ;
- employees whose employment is essentially intermittent, etc.

(*iv*) If an employee does two or more classes of work, each having a different minimum wage rate, he shall get payment in respect of time spent in each class or work.

22.7.5. Maintenance of Records

- Every employer shall maintain registers and other records giving details of employees, nature of work performed by them, wages paid to them, receipts given by them, etc., in such a form as may be prescribed.

22.7.6. Inspectors and their Powers

- Appropriate government may appoint Inspectors for the purpose of this act.
- The Inspectors shall have the following powers:

(*i*) To enter at all reasonable hours, any premises for examining registers, records of wages, etc.

(*ii*) To examine any person.

(*iii*) To seize relevant records in respect of an offence.

22.7.7. Claims

- An employee, an official of registered trade union on behalf of the employee or an Inspector can apply to the Authority (*e.g.*, commissioner for Workmen's Compensation, Labour commissioner, etc.) appointed by appropriate government to hear and decide claims:

(*i*) arising out of payment of less than minimum wage rate,

(*ii*) in respect of wages at the over-time rate,

(*iii*) in respect of payment of remuneration for days of rest, etc.

- Application for claim should be presented within six months from the date on which the claimed amount becomes payable.
- After receiving the application, the Authority shall hear both the employee (*i.e.* applicant) and the employer.

(*i*) If employee's stand is found correct, for claims arising out of payment of less than minimum wages, the employee shall get the extra amount plus a compensation not exceeding 10 times the amount of such excess.

(*ii*) In cases other than that of minimum wages, employee shall get the amount due towards him plus a compensation not more than Rs. 10.

(*iii*) If employee's application is found to be malicious or vexatious, he may be penalised to pay to the employer an amount up to Rs. 50.

22.7.8. Offences and Penalties

- An employer who contravenes any provision of the act, be punishable with fine extending up to Rs. 500 and an imprisonment for a term up to six month or both.
- An employer charged with an offence under this act, can file a complaint against the actual offender and if he succeeds in proving the offence by the other person, the actual offender (*i.e*, the other person) shall be liable to punishment.

22.8. THE WORKMEN'S COMPENSATION ACT,1923 (Amended upto 1986)

22.8.1. History

- The Workmen's Compensation Act came into force in 1924. Before this act, it was a lengthy and costly process for a worker who had got injured in the course of employment to get proper compensation from the employer.
- Originally the act covered workers of certain specified industries, not drawing more than Rs. 300 p.m.
- The Act was amended subsequently in 1933, 1938, 1939, 1946, 1958, 1962, 1976 and 1986).

The details of this act are as follows :

22.8.2. Main Features of the Act

- The worker (or his dependents) can claim compensation if the injury has been caused by an accident in the course of the employment ; provided he was not under the influence of drink or drug and the accident was not due to his wilful disobedience of the rules.
- The amount of compensation depends upon the result of the injury and the nature of disablement.
- All fatal accidents are to be brought to the notice of the commissioner and the employer shall deposit the amount of compensation with him (*i.e.* the commissioner) within 30 days.

22.8.3. Important Definitions

1. Dependents mean

- A widow, a minor son, unmarried daughter or a widowed mother, and
- If wholly or in part dependent on the earnings of the worker at the time of his or her death,

(*i*) a widower, a minor brother and unmarried sister ;

(*ii*) a widowed daughter-in-law ; and

(*iii*) A minor child of predeceased daughter, etc.

2. Minor. A person below 18 years of age.

3. partial disablement means disablement of temporary nature and which reduces the earning capacity of a workman.

4. Total disablement implies such disablement which (temporarily or permanently) incapacitates a workman for all work and he cannot earn at all (for a period or for ever).

5. Workman means a person (other than one whose employment is of casual nature and who is employed ortherwise than for the purpose of the employer's trade or business) who is

(*i*) a railway servant and not permanently employed in any administrative capacity ;

(*ii*) getting wages not exceeding

Rs. 500-As per Act of 1923

Rs 1000-As per Act modified in 1976.

22.8.4. Employer's Liability for Compensation

- The employer is liable to compensate if

(*i*) injury has been caused by accident :

(*ii*) during the course of employment ;

(*iii*) and has resulted in workman's death ; permanent or temporary, total or partial disablement.

– The employer is not liable to pay compensation if

(*i*) the injury disables a workman for less than 3 days ;

(*ii*) the injury is caused by an accident which occurred while the workman was under the influence of drink or drugs ;

(*iii*) the injury is caused due to wilful disobedience of the rules by the workman ; or

(*iv*) the injury is caused owing to the wilful removal of any safety guard by the workman.

22.8.5. Employer's Liability in Case of Occupational Diseases

If the disease contracted is an occupational disease peculiar to the employment (such as silicosis to foundry workers), the employer shall give compensation to the workman.

22.8.6. Amount of Compensation

(*a*)	Where death results from the injury	An amount equal to 40% of the monthly wages of the deceased workman multiplied by the relevant factor (Schedule iv) or An amount of 20,000 rupees, whichever is more.
(*b*)	Where permanent total disablement results from the injury	An amount equal to 50% of the monthly wages of the injured workman multiplied by the relevant factor or An amount of 24000 rupees, whichever is more.

Where the monthly wages of a workman exceed one thousand rupees, the monthly wages for the purpose of classes (*a*) and (*b*) above shall be deemed to be 1000 rupees only.

SCHEDULE IV

Completed years of age on the last birth day of the workman immediately preceding the date on which the compensation fell due	Factors
Not more than 16	228.54
20	224.00
24	218.47
28	211.79
32	203.85
36	194.64
40	184.17
..	..
..	..
50	153.09
..	..
60	117.41
..	..
..	
65 or more	99.37

(c) Where temporary disablement whether total or partial results from the injury, a half monthly payment of the sum equivalent to 25% of monthly wages of the workman, to be paid.

22.8.7. Distribution of Compensation

- Payment of compensation in respect of death of a workman or under legal disability shall be deposited by the employer with the commissioner. Employer should not make payment of compensation directly.
- An employer of course can give advance to any dependent on account of compensation not exceeding Rs. 100.
- The commissioner, after deducting this advance, may allot the entire amount of the compensation to any one dependent.

22.8.8. Notice and Claims of Accident

- A workman injured in an accident should first of all give in writing a notice of the accident to the employer.

The purpose of giving a notice is to enable the employer to check the facts of the accident and also to enable the workman to take steps to mitigate the consequences of the accident.

- The notice should contain particulars of the workman, date of accident and cause of accident.
- A claim for compensation must be made within two years of the occurrence of the accident or within two years of the date of death.
- In case of occupational diseases the period of two years is counted from the day the workman gives notice of the disablement to his employer.
- Where the commissioner receives an information about fatal accident, he may send a notice to workman's employer asking the circumstances which led to workman's death, about deposition of compensation, etc.

22.8.9. Medical Examination

- An injured workman who has submitted a notice, shall present himself for the medical examination, if the employer wants.
- Such an offer by the employer must be free of charge and within 3 days from the time at which service of notice has been affected.
- If a workman does not present himself for the medical examination, his right for compensation shall be suspended for the period of refusal and he will get full compensation only after he provides sufficient cause for not presenting himself for the medical examination.
- If a workman whose right to compensation has been suspended, dies without presenting himself for the medical examination, the commissioner, if he thinks fit, may direct the amount of compensation to the dependents of the deceased workman.

22.8.10. Appointment of Commissioner

The State government may, by notification in his Official Gazette appoint any person to be commissioner for workmen's compensation for such areas as may be specified in this notification. Every commissioner is deemed to be a public servant within the meaning of the Indian Penal Code.

22.9. THE INDUSTRIAL DISPUTE ACT, 1947 (Amended Up to 1987)

20.9.1. Introduction and scope of Act

- The whole history of labour struggle indicates the continuous demand for fair return to labour.
- Industrial disputes are mainly the result of dissatisfaction amongst the labour as regards their existing labour conditions.
- With the above in mind, the Industrial Dispute Act came into force in 1947 and it aims at settling

the industrial disputes on a new pattern known under the Act as adjudication machinery.

- This act aims at making industrial peace through voluntary negotiations and compulsory adjudication.

The act makes provision for settlement of industrial disputes between employees (workers) and employer.

22.9.2. Important Aspects of the Act

(*i*) An industrial dispute may be referred to an Industrial tribunal.

(*ii*) An award shall be binding on both the disputing parties for a period not exceeding one year.

(*iii*) Strikes and lockouts are prohibited during the pendency of,

- conciliation and adjudication proceedings ;
- settlement reached in the course of conciliation proceedings,
- awards of industrial tribunals declared binding by the appropriate government.

(*iv*) In public interest or emergency, appropriate government can declare the following industries to be a public utility service for a maximum period of 6 months,

Transport by land, air, and water,
Foodstuff,
Coal,
Cotton textile, and
Iron and Steel.

22.9.3. Important Definitions

1. Award means an interim or a final determination of an industrial dispute. Decisions of Labour Court and Industrial Tribunals are awards.

2. Average pay means the average of wages payable to workman:

- in case of monthly paid workman, in the 3 calendar months ;
- in the case of weekly paid workman, in the 4 completed weeks ; and
- in the case of daily paid workman, in the 12 full working days.

3. Industry means any business undertaking, manufacture, etc. It includes any calling, service, employment, handicraft or industrial occupation or a vocation of workman.

4. Industrial dispute means

- any dispute or difference,
- between employers and employers,
  employers and workmen,
  Workmen and workmen ; and
- connected with employment, or
  non-employment, or
  terms of employment or
  conditions of labour, or any person

5. Lay-off means

- Failure, refusal or inability of an employer,

  on account of shortage of coal, power, raw material, accumulation of stock, breakdown of machinery or for any other reason,

  to continue to employ workers (in his industry) whose names are borne on the muster-rolls and who have been retrenched.

Lay-off is a temporary phase ; the employee-employer relations do not come to an end, but are simply suspended for some period (of emergency).

6. *Lock-out* means the closing of a place of employment or suspension of work or the refusal by an employer to continue to employ any number of workers employed by him.

7. *Public utility services* mean

Railway or transport service,
Postal, telegraph or telephone service,
Any industry supplying power, light or water,
Sanitation,
Foodstuffs, and
Coal, textile, etc.

8. *Retrenchment* means the termination of the services of a worker by the employer for any reason whatsoever other than due to disciplinary action. Retrenchment does not include,

- Voluntary retirement of the worker,
- Termination of services on reaching the age of superannuation, and
- Termination of services on the ground of continued illhealth.

9. *Strike* means refusal to work or cessation of work by a body of workmen for enforcement of a demand against the employer during an industrial dispute.

10. *Settlement*. It implies a settlement arrived at in the course of conciliation proceeding. It includes a written agreement between the workers and employer.

11. *Workmen* means any person (including an apprentice) employed in any industry for hire or award to do manual, technical, supervisory or clerical work.

22.9.4. Authorities Under This Act

Works Committee

- Any industry, in which 100 or more workers are and have been employed on any day in the preceding 12 months, shall constitute a works committee.
- Works committee shall have representatives of workers and employer both. Workmen representatives will not be less than those of employer in number.
- Works committee shall promote measures for securing and preserving amity and good relations between the workers and employer. It will comment upon matters of their common interest and try to compose any material difference of opinion in respect of such matters.
- Works committee shall smooth away frictions that might arise between the workers and the employer in day-to-day work.

Conciliation Officers

Conciliation officers will be appointed by any Appropriate Government and they shall mediate and promote the settlement of industrial disputes.

Board of Conciliation

Appropriate Government may constitute a Board of Conciliation to promote settlement of an industrial dispute.

- Board of conciliation will be headed by a chairman (an independent person) and shall have two or four other members which will be representatives of the parties to dispute. Both parties, *i.e.*, workers and employer shall have equal number of representatives.

Courts of Enquiry

- Appropriate Government may constitute a court of enquiry to look into any matter connected with industrial dispute.

- Court (of enquiry) may consist of one or more independent persons.
- The court shall inquire and submit a report ordinarily with in six months from the commencement of inquiry.

Labour Court

- The appropriate government may constitute Labour Court consisting of one person only for adjudication of industrial disputes relating to any matter specified in the 2nd Schedule.
- The matters within the jurisdiction of Labour Court as per *2nd schedule* are :
  - (*i*) The propriety or legality of any order passed by employer under the standing orders.
  - (*ii*) The application and interpretation of standing orders.
  - (*iii*). Illegality or otherwise of a Strike or Lock-out.
  - (*iv*) Dismissal of workers including reinstatement or relief to workers wrongly dismissed.
  - (*v*) Withdrawal of any concession or privilege.
- Presiding officer of one man Labour Court shall be,
  - (*i*) a judge of a high court ; or
  - (*ii*) a district judge who has worked for more than 3 years, etc.

Industrial Tribunals

Appropriate Government may constitute one person Industrial Tribunals for the adjudication of Industrial Disputes relating to matters specified in,

- (*i*) Schedule II (refer to Labour Court for details of Schedule II),
- (*ii*) Schedule III-Matters such as
  Wages,
  Compensatory and other allowances,
  Hours of work and rest pauses,
  Holidays and leave with wages,
  Bonus, provident fund, gratuity,
  Rules of discipline, and
  Retrenchment of workers, etc.
- (*iii*) Presiding officer of the tribunal shall have the same qualification as that of a Labour Court.

National Tribunals

- Central Government may constitute National Industrial Tribunals for the adjudication of the industrial disputes which involve questions of national importance.
- The presiding officer of the National Tribunal shall be
  - (*i*) an independent person ;
  - (*ii*) less than 65 years of age ; and
  - (*iii*) an existing or retired judge of a high court, etc.

Prohibition of adjudication by other tribunals

If any reference has been made to a National Tribunal, no Labour Court or Tribunal, shall have jurisdiction to adjudicate upon any matter which is under adjudication before the National Tribunal.

22.9.5. Strikes and Lock-out

1. No employee of a public utility service shall go on strike,
   (*i*) Without giving notice of strike, within six weeks before striking ; or
   (*ii*) within fourteen days of giving such notice ; or

(*iii*) before the expiry of date of strike mentioned in the notice ; or

(*iv*) during the pendency of conciliation proceeding.

2. No employer of any public utility service shall lock-out,

(*i*) without giving notice of lock-out within six weeks before locking out, or

(*ii*) before the expiry of date of lockout mentioned in the notice, or

(*iii*) during the pendency of conciliation proceeding.

The employer shall send information of strike or lock--out to the specified authority on the day on which it is declared.

3. **prohibition of financial aid to illegal strikes and lock-out**

- A strike or lock-out is illegal if it is declared in contravention of points 1 & 2 above (*i.e.*, section 22 and 23 of the act, respectively).
- No body shall knowingly expend any money in direct support of an illegal strike or lock-out.

22.9.6. Lay-off and Retrenchment

- For definition of Lay-off and retrenchment refer *Important Definitions* given earlier in this Act.

Right of Workmen laid off for compensation

- A worker having more than one year of continuous service under an employer, if is laid off, shall get compensation equal to 50% of the total of his basis wages and dearness allowance, subject to the following limitations :

  Provided that if during any period of 12 months, a workman is so laid-off for more than 45 days, no such compensation shall be payable in respect of any period of the lay-off after the expiry of the first 45 days, if there is an agreement to that effect between the workman and the employer, etc.

Workmen not entitled to compensation in certain cases

No compensation shall be paid to a worker laid-off under following conditions :

(*i*) If he refuses to accept alternative employment involving same wages, offered to him in the same concern or in any other concern of the same employer.

(*ii*) If the lay-off is due to a strike, etc.

Conditions precedent to retrenchment

No worker who has a continuous service of more than one year shall be retrenched by the employer until :

(*i*) The worker has been given one month's written notice stating the reason for retrenchment and the period of notice has expired or the worker has been paid in lieu of such notice, wage for the period of notice.

(*ii*) At the time of retrenchment, the worker has been paid compensation equivalent to 15 days average pay for every completed year of service.

Closing down the undertaking

- An employer who intends to close down an undertaking shall serve, atleast 60 days before the date on which he intends closure to become effective, a notice to Appropriate Government stating clearly the reasons for closing the undertaking.
- Compensation by reference to section 25-FFF of the Act is provided to workers who are in continuous service for not less than a year with the undertaking.

22.9.7. Penalties

- Workers who commence illegal strike shall be punishable with imprisonment extending up to one month and a fine of up to Rs. 50, or both.

- An employer who commences an illegal lock-out shall be punishable with imprisonment up to one month or with a fine up to Rs. 1000, or both.
- The act also specifies *penalties* of up to 6 months imprisonment or a fine of up to Rs. 1000 or both, for :
  - (*i*) Instigating for illegal strike or lay-out,
  - (*ii*) Giving financial aid to illegal strike or lock-out,
  - (*iii*) Breach of settlement or award, and
  - (*iv*) Disclosing confidential information, etc.

22.10. THE EMPLOYEES' STATE INSURANCE ACT, 1948 (Amended up to 1989)

22.10.1. Introduction

The Employee's State Insurance Act was passed (in 1948), because the Workmen's Compensation Act of 1924 could not do as much as was thought it (*i.e.*, the Act) would benefit the industrial workers. The Workmen's Compensation Act

- did not cover many diseases ;
- involved much delay in payment of compensation; moreover it was not easy to prove that the worker got injury because of lackness on the part of the employer, etc.

22.10.2. Object of Employee's State Insurance Act

To provide certain benefits to employees in case of sickness, employment injury, maternity and for certain other matters in relation thereto.

22.10.3. Important Definitions

1. *Contribution* means the sum of money payable to the corporation by the principal employer in respect of an employee. It includes any amount payable by or on behalf of the employee.

2. *Corporation* means the Employee's State Insurance Corporation set up under this Act.

- The corporation shall consist of

  A chairman

  A vice-chairman, and

  Not more than 5 persons nominated by Central Government.
- The corporation can
  - (*i*) sell, hold or otherwise transfer any movable or immovable property ;
  - (*ii*) invest any money which is not immediately required ;
  - (*iii*) raise loans ; and
  - (*iv*) employ necessary staff for the administration of its business.
- The corporation shall maintain correct accounts of income and expenditure.

3. Employment injury means a personal injury to an employee caused by an accident or an occupational disease arising in course of employment.

4. Principal employer means

- the owner or occupier of the factory and includes the Factory Manager ;
- any person responsible for supervision and control of the undertaking.

5. Sickness means a condition which needs medical treatment and requires absention from work on medical grounds.

22.10.4. Medical Benefit Council

- A medical benefit council is set up to advise on matters relating to administration of medical

benefits.

- Such council can investigate complaints against medical practitioner (attending the workmen) in connection with medical treatment and attendance.

22.10.5. Finance and Audit

- The Act makes provisions for creation of a fund called Employee's State Insurance Fund.
- The fund is created mainly by the contribution made by the employer and the employees.
- The fund is held and administered by the corporation.
- The fund is utilized for
  - (*i*) payment of benefits and provisions of medical treatment to workmen and their families ;
  - (*ii*) establishment and maintenance of ESI hospitals and dispensaries, etc. ;
  - (*iii*) payment of fees, allowances, salaries, etc., to officers and servants of the corporation ; and for
  - (*iv*) many other purposes related to proper functioning of ESI corporation.

Contribution

- Contributions towards making the fund is mainly from the Employer and Employees of the undertaking ; though Central and State Governments also give grants and donations in the fund.
- The employer, deducts employee's contribution from their salaries and the same along with his own share, shall submit in a bank nominated for the purpose.
- The ESI corporation may appoint Inspectors to check the particulars about the amount (of fund) submitted by the employer.

22.10.6. Benefits

The Act provides the following benefits

1. Sickness benefit

It is in the form of periodical payment to any insured person when his sickness is certified by a duly appointed medical practitioner or by another person having qualifications as prescribed in regulations.

2. Maternity benefit

An insured woman employee is entitled to periodical payment in case of confinement or miscarriage or sickness arising out of pregnancy, confinement or premature birth of a child or miscarriage.

3. Disablement benefit

An insured person suffering from disablement as a result of injury in course of employment (*i.e.*, employment injury) is entitled for disablement benefit.

4. Dependents benefit

Where insured person dies of employment injury, dependents' benefit shall be payable.

5. Medical benefit

An insured person whose condition demands medical treatment is entitled to receive medical treatment and medical benefit.

22.10.7. Adjudication of Dispute and Claims

1. Employee's Insurance (EI) Court

State government shall constitute Employee's Insurance court to decide all matters, questions and disputes arising from the insurance of workmen.

2. Matters to be decided by E.I. court

- Whether any person is an employee within the meaning of this Act and if he has to pay the

contribution.

- Rate of contribution to be paid by principal employer.
- Rate of wages of an employee.
- Right of any workman to any benefit and as to the amount and duration thereof.
- Any dispute between the employer and ESI corporation.

22.10.8. Penalties

Punishment for false statements

- Imprisonment up to six months or fine not exceeding Rs. 2000 or both.

Punishment for failure to pay contributions

- Imprisonment extending up to 3 years or fine up to Rs. 10,000.

Prosecutions

- Prosecution shall be instituted only with the previous sanction of the Insurance Commissioner.
- No court inferior to that of a Presidency Magistrate or a First Class Magistrate shall try any offence under this Act.

22.10.9. Miscellaneous

- The appropriate government may exempt certain factories or employees from the operation of this Act, under certain conditions.
- Central Government, State Government and the Corporation has powers to make rules and regulations consistent with this Act.

32.20. EXPORT PROMOTION

- Export development in the small scale sector has been accorded high priority in the economic strategy of the country as it results in creation of more employment opportunities, ensures utilisation of capacity for production and improves the quality of products, apart from bringing the much needed foreign exchange.
- Apart from direct exports, products of a large number of small scale units are exported indirectly through merchant exporters, export houses, etc. Parts and components from small scale sector which are part of the finished products are also being exported by large units.
- Small Industries Development organisation (SIDO) through its network of Small Industries Service Institutes (SISIs) and Extension Centres throughout India provides assistance for promotion of exports of SSI (Small Scale Industry) products.

  The activities in this regard include dissemination of information about (1)foreign markets (2) consultancy services in matters of export procedures for claiming replenishment (3) identification of small scale units already possessing necessary equipments and skills to undertake production of items having export potential (4) organising of training programme on export marketing (5) maintaining liaison with concerned export development agencies (6) meetings and seminars on export promotion etc.

  Small Industry Export Bulletin covering important areas of interest to exporters continued to be brought out by SIDO. Information on export prospects, Govt. policy announcements and procedures relevant to small industry exports, market/commodity reports prepared by professional agencies, etc. were included in these bulletins.

32.21. EXPECTATIONS OF ENTREPRENEURSHIP

It is expected from the entrepreneurs that they will help :-

1. Increase number of industries.
2. Increase production.
3. Increase employment opportunities.
4. Earn foreign exchange through exports.
5. Develop the underdeveloped parts of the country.
6. Economic development.

32

Small Scale Industries and Entrepreneurship

32.1. INTRODUCTION

- The role of small scale industries is significant in the over all growth of the economy of our country.
- The role of small scale industries has been emphasised, from time to time, keeping in view the over all plan objectives of economic growth coupled with social justice. *The small scale sector has a distinct advantage of low investment with high potential for employment generation.*
- In order to create substantial employment opportunities, the Industrial policy laid stress on effective promotion and development of cottage and small scale industries in the country.
- The small scale sector continued to show impressive growth. The production of small scale industries during 1988-89 was estimated to be Rs 106875 crores at current prices (Rs 82400 crores, at 1984-85 prices) and provided employment to about 113 lakh persons during the same period.

  Exports from this sector were estimated at Rs 4535.01 crores (provisional) during 1987-88 as against Rs 3617.33 crores (estimated) during previous year. The exports of small scale sector in 1987-88 constituted about 29% of the total exports from the country.
- Table 32.1 shows the growth trend of small scale industries during the first four years of the Seventh Plan.

TABLE 32.1

Seventh five year plan period

	1985-86	1986-87	1987-88	1988-89
	1	2	3	4
No. of units (lakhs Nos.)	13.55	14.76	15.76	17.01
(Cumulative)	(9.09)	(8.93)	(6.78)	(7.93)
*Production at current prices	61228	72250	87300	106875
(Rs in Crores)	(21.20)	(18.00)	(20.83)	(22.42)
*Production at 1970-71 prices	17840	20187	22326	25790
	(12.84)	(13.16)	(10.60)	(15.52)
Employment (in lakhs Nos)	96.00	101.40	107.00	113.00
	(6.67)	(5.62)	(5.52)	(5.61)
Export at current prices	2753.23	3617.33@	4535.01@@	Not
(Rs in Crores)	(7.84)	(31.38)	(25.37)	available

N.B. Figures in Brackets indicate percentage increase over the previous years.

*Estimated, @ Revised, @@ Provisional

32.2. ROLE AND SCOPE OF SMALL SCALE INDUSTRIES

(1) Small Scale industries provide vast scope for increasing employment.

(2) They are labour intensive and require comparatively little capital to start with.

(3) They help production of consumer goods and therefore can meet the demand for consumer products.

(4) They help reduction of prices.

(5) They accelerate the rate of industrial growth.

(6) They help in equitable distribution of national wealth.

Everyone, who has the spirit of enterprise in him, can contribute to the prosperity of the country by starting a small industrial unit.

32.3 CONCEPT OF SMALL SCALE AND ANCILLARY INDUSTRIAL UNDERTAKINGS

– A *Small Scale Industrial Undertaking* shall mean an industrial undertaking in which the investment in fixed assets in plant and machinery, whether held on ownership terms or by lease or by hire purchase, does not exceed Rs 35 lakhs.

– An *Ancillary Industrial Undertaking* shall mean an industrial undertaking which has both the following features, that is to say :-

(a) The investment in fixed assets in plant and machinery whether held on ownership terms or by lease or by hire purchase, does not exceed Rs 45 lakhs; and

(b) The undertaking is engaged or is proposed to be engagad in the manufacture or production of parts, components, subassemblies, tooling or intermediates or the rendering of services* and the undertaking supplies or renders or proposes to supply or render at least 30% of its production or services*, as the case may be to one or more other industrial undertakings.

Provided that no small scale or ancillary industrial undertaking referred to above shall be subsidiary of, or owned or controlled by, any other industrial undertaking.

– All such industrial units will be eligible to avail facilities such as credit on liberalised terms, allotment of factory sheds/plots in industrial estates, supply of machinery on hire purchase, participation in Government stores purchase programme, training and industrial extension services, allocation of indigenous raw material etc.

– A *tiny unit* is an undertaking having investment in fixed assets in plant and machinery not exceeding Rs 2 lakhs.

– When manufacture is carried out by the owner himself with the help of his family members or relatives or a few wage earners, it is said to be a *cottage or household industry*. Some such industries are handloom-cotton, Khadi, Gur, and Khandasari etc.

– A small scale industry, whether a tiny unit, a cottage unit or an ancillary industry, when set up in rural areas is referred to as a *village industry.*

32.4. HOW TO START A SMALL SCALE INDUSTRY

The steps involved in starting a small scale industry are :

1. Product Indentification : Conduct Market Survey and study the products as regards their demand in the market.

– Check whether it is a seasonal product or it has demand throughout the year.

– Study similar products available in the market that can be probable competitors. Analyse them as regards their utility, quality and cost.

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* Such as sand-blasting, machining, grinding or pressure cleaning facilities, etc.

- Find whether the product can be exported.
- Explore the possibility whether some product can be manufactured in collaboration with a foreign country. This provides ready made technical know-how and saves a lot of time and money otherwise wasted in developing a suitable method of manufacture.
- Decide the product that you are going to manufacture, on the basis of

(*a*) Market survey (as explained above).
(*b*) Financial implications involved.
(*c*) Technical know-how available.
(*d*) Experience in the line, etc.

2. Preparation of preliminary project report to get rough idea on Machinery, raw material and financial requirements.
3. To decide form of ownership which may be sole-proprietorship or partnership etc.
4. To decide factory location.
5. To buy land or take built-up shed.
6. To invite quotations for machinery and equipment.
7. To prepare detailed project report which will include: Analysis of Industry, present demand, future demand, requirement of equipment, raw material, labour, power, finance, breakeven analysis, profitability etc.
8. Apply for registration.
9. Plan finance.
10. Follow up sanction of loan.
11. Open bank account.
12. Place order for machinery.
13. Apply for Power.
14. Plan layout of machinery.
15. Apply for Income tax and Sales tax numbers.
16. Apply for (imported) raw material.
17. Recruit personnel.
18. Plan buying of raw material.
19. Conduct trial run to see whether the desired quantity and quality of product is Coming.
20. Decide on pricing policy.
21. Organise marketing.
22. Plan account keeping.
23. Plan commercial production.

12.5. PROCEDURE FOR REGISTRATION OF SMALL SCALE INDUSTRIES

Registration of Small Scale Industrial undertakings would be done in two stages;

(*a*) *Provisional registration*
(*b*) *Permanent registration*

(*a*) *Provisional registration*

- Provisional registration helps the party to take necessary steps to bring the unit into existence. It should be converted into a permanent registration once the unit comes into existence.

- The provisional/permanent registration are granted at the state/UT/district level by state D.I. or his designated authority.
- A provisional registration is valid for one year in the first instance and thereafter may be renewed for a period of two more years in four six monthly extensions by the designated authority on submission of satisfactory proof that the party is taking concrete steps to establish the unit.
- The issue of provisional registration certificate normally should be automatic and should be given within a period of seven days after the receipt of the application.
- *The provisional registration may entitle the party to* :
  (1) Apply for a shed in an industrial area.
  (2) Apply for power connection.
  (3) Apply for financial assistance to State financial corporation/Nationalised Banks or other financial institutions on the basis of a project report as may be required by them.
  (4) Apply to the NSIC/SSIC/other institutions for procuring machinery on hire purchase basis
  (5) Obtain sales tax, excise tax registration etc.
  (6) Take other steps such as obtaining import licence for capital goods/raw material etc.

(b) ***Permanent Registration***

- When the party has taken all steps to establish the unit *i.e.*, (1) factory building is ready, (2) all requisite machinery, testing equipment, etc., is installed, (3) power connection is obtained, application for permanent registration can be made.

  On being satisfied after inspection that the unit is capable of production, a permanent registration certificate may be issued by the Directorate of Industries within one month of the receipt of application for permanent registration.
- All registered units should submit half yearly reports of the raw materials received/utilized stocks on hand, production and sales to the Directorate of Industries in triplicate.
- The Director of Industries will maintain a list of all registered small scale units at his headquarters office.

De-registration of units

- A small scale unit already registered may be de-registered on any one or more of the following grounds:-

(1) If the unit remained closed continuously for a period exceeding one year.
(2) If the unit failed/refused or avoided to give full and truthful information as called upon by the registering authority.
(3) If the unit has misutilised the raw materials allocated to it.
(4) If a unit is found to be a subsidiary of or owned or controlled by medium and large scale undertakings.
(5) If the fixed investment in plant, machinery etc, exceeds the ceiling prescribed for the unit.

- Any unit aggrieved by the order of de-registration authority may appeal to the next higher prescribed authority as notified by the state Government within one month of the receipt of the order of de-registration.

32.6. LIST OF ITEMS RESERVED FOR EXCLUSIVE MANUFACTURE IN SMALL SCALE SECTOR

A few of the many items reserved for exclusive manufacture in small scale sector are listed below. Detailed list can be had from Ministry of Industry, New Delhi.

(1) *Food and Allied Industries*
Ice-cream, pickles and chutneys, vinegar, bread, biscuits, poultry feed, synthetic syrups etc.

(2) *Textile products including hosiery*
Cotton vests knitted, cotton socks knitted, cotton under garments knitted, woollen cloths, under garments etc.

(3) *Art silk/Man-made fibre hosiery*
Synthetic knitted socks and stockings, vests, briefs cardigans, pullovers etc.

(4) *Wood and wood products*
Sawn timber, wooden crates, sewing machine covers, tent poles,handles, furniture etc.

(5) *Paper products*
Waxed paper, decorative papers, corrugated papers and boards, paper bags etc.

(6) *Leather and Leather products including footwear*
Sole leather, hides, shoes, leather garments, purses, hand bags, watch straps etc.

(7) *Rubber products*
Rubberized cloth, canvas hoses, cycle and rickshaw tyres and tubes etc.

(8) *Plastic products*
Full PVC footwear chappals, sandals, shoes, acrylic sheets, spectacle frames etc.

(9) *Injection moulding thermo plastic products*
Handles, soap cases, cups, lunch boxes, water jugs, tumblers, hair brushes etc.

(10) *Chemicals*
Ammonium sulphate, cadmium acetate, cobalt nitrate, ferrous sulphate etc.

(11) *Dye stuff*
Basic dyes—basic yellow, basic green, basic blue etc.

(12) *Organic chemicals and drugs*
Tartrates, sterate of zinc, paracetamol, resin etc.

(13) *Glass and Ceramics*
Fire clay, bricks and blocks containing less than 40% alumina.

(14) *Roofing and flooring tiles*
Wooden, clay and granite tiles.

(15) *Mechanical Engineering excluding transport equipment*
C.I. manhole covers, weights, circlips, bright bars,etc.

(16) *Electrical machines, appliances and apparatus including electronics*
Transformers, boosters, voltage stabilizers, PVC wires etc.

(17) *Bicycle parts, survey instruments, sports goods, stationery items, clocks and watches* etc.

11.7. FINANCIAL ASSISTANCE

A net-work of

1. State financial corporations,
2. National Small Industries Corporation (NSIC) and
   State Small Industries Corporations (SSICs),
3. State Directorates of Industries,
4. Commercial Banks,
5. Industrial Development Bank of India, and
6. Regional Rural Banks, provide financial assistance to small scale units.

Industrial Development Bank of India provides re-finance to the industrial loans advanced by these institutions to small scale sector.

1. **State Financial Corporations (SFCs)**

- State Financial Corporation grants term loans for the *purchase* of *land*, construction of *factory* premises and purchase of *machinery* and *equipment* for the setting up of new industries or for *expansion* or *modernisation* of the existing ones.
- SFCs generally prescribe a margin of 25% and allow an initial holiday of two years for the loan repayment (this period can be increased to five years in backward districts).

2. **NSIC and SSICs**

- NSIC and SSICs supply machinery on hire-purchase basis to small scale and ancillary industries, the value of which should not exceed Rs 35 lakhs and Rs 45 lakhs, respectively, inclusive of the value of machinery and equipment already installed.
- The payment for the machinery and equipment is made directly to the suppliers.
- The hire-purchase value is generally recovered in 13 half-yearly instalments and a rebate of 2% allowed if the instalments are paid before the due date.
- While NSIC supplies both imported and indigenous machinery, SSICs supply only indigenous machinery.

3. **State Directorates of Industries**

State Directorates of Industries extend assistance ranging between Rs 10,000/- and Rs 50,000/- for the construction of a factory premises, purchase of machinery and equipment and working capital. These loans are repayable in five to seven years.

4. **Commercial Banks**

- Commercial banks provide *short term* and *medium term* financial assistance.
- The *short term* credit facilities are granted for working capital requirements of the units like those for raw materials, goods-in-process, finished products, bills receivables and book debts.
- The *medium term* loans are granted for the acquisition of land, construction of factory premises, purchase of machinery and equipment and operative expenses.
- These loans are generally granted for periods ranging from five to seven years.
- They also establish letters of credit on behalf of their clients favouring suppliers of raw material/ machinery (both Indian and foreign) which extend the bankers' assurance for payment and thus help their delivery.
- Certain transactions, particularly those in contracts of sale to government departments, may require guarantees being issued in lieu of security/earnest money deposits for release of advance money, supply of raw materials for processing, full payment of bills on assurance of performance, etc. Commercial banks issue such guarantees also.

5. **Industrial Development Bank of India (IDBI)**

- The IDBI, the apex development body for small, medium and large industries, extends assistance to SSI units through two major schemes :-

(*a*) *Bills Re-discounting Scheme*, under which the manufacturers of indigenous machinery/capital equipment can offer deferred payment facilities to their buyers (the period of such payment being not less than six months and not more than five/seven years), the relative bills accepted/ guaranteed by the buyer and or his bankers, can be discounted by the manufacturer with his own bank to realise the cost of machinery immediately. The latter, in turn, rediscounts the bills with the IDBI and obtains the amount paid. Subsequently he takes them back before their due dates and presents them for payment before the buyer/his guarantor.

(*b*) *Refinance scheme* under which IDBI refinances eligible term loans granted by banks to the SSI borrowers.

6. **National Bank for Agricultural and Rural Development (NABARD)**

The National Bank for Agricultural and Rural Development was set up in July 1982 to provide re-finance assistance to State Co-operative Banks, Regional Rural Banks and other approved institutions for all kinds of production and investment credit to small scale industries, artisans, cottage and village industries, handicrafts and other allied activities.

32.8. OTHER ASSISTANCE PROVIDED TO SMALL UNITS

(1) Supply of machine and equipment on hire-purchese.
(2) Supply of scarce raw materials and imported components.
(3) To demonstrate to them the use of modern technical processes and equipments.
(4) To train small industrialists.
(5) To render marketing (including export) assistance.
(6) Allotment of sheds.
(7) To provide power, water and transport facilities.
(8) To provide subsidy on fixed capital investment (*i.e.* land, building and machinery).
(9) To provide interest free loans.
(10) To provide loans at concessional rate of interest.
(11) Reservation of items for exclusive production in small scale sector.
(12) Reservation of items for exclusive purchase from small scale sector.
(13) Export promotion of specific commodities or groups of products such as chemicals, Gem and Jewellery, Handloom, Leather products etc.

32.9. SPECIAL INCENTIVES

(*a*) Special inducements are offered for development of entrepreneurship among the persons in *hilly, rural and backward areas*. For example, transport subsidy is given in remote and hilly backward areas in selected states/union territories. Capital subsidy up to 15% is also given to persons setting up their units in specified backward areas.

(*b*) New entrepreneurs are *exempted* for five years from *income tax payment* on their profits, up to 7.5% P.A. of the capital invested.

(*c*) Entrepreneurs are entitled to *deduction of depreciation* (on building, plant and equipment) out of the net profit.

(*d*) Entrepreneurs are completely or partially *exempted* from payment of *central excise duty*.

(*e*) *Concessions* are also given *in stamp duty* payable on the agreements and mortgage deeds executed to take loans from the government.

(*f*) Sales tax is not charged on machines purchased for setting up small scale industries in certain states.

(*g*) *Import licences* are given to those entrepreneurs who require raw material, machines and their spares to be purchased from other countries for running their units successfully.

(*h*) Training courses are organised exclusively for *women entrepreneurs* in technical and management subjects, in order to provide them opportunities for self-employment. They are also assisted in preparing projects on specific industries.

(*i*) *Indians residing abroad* and desirous of starting industries in India can bring machinery up to C.I.F. value of Rs. 25,00,000 and raw materials worth Rs. 5,00,000 or annual requirement of the unit,

whichever is less. In addition to this, they are also given all the facilities normally available to all other prospective entrepreneurs in the country.

32.10. ASSISTANCE TO EDUCATED UNEMPLOYED

- With a view to help the educated unemployed to set up their own small industrial units, the state provides assistance in a package form so that they may take minimum possible time to set up their ventures. The following types of assistance is made available, under this scheme.

1. Project profiles

In order to help the entrepreneurs to choose items of manufacture, the Directorate gets project profiles prepared from reputed consultants on items of manufacture having scope for sale. This enables the entrepreneurs to know the viability of manufacture of various items at the first instance.

2. Training

The training enables the entrepreneurs to prepare the project report according to their requirement, government documentation and various other aspects of the manufacture/marketing of the items of manufacture.

- The trainees are also given a stipend.
- In-plant training is also provided to the entrepreneurs through the State Government Quality Marking Centres and Industrial Development Centres.
- Besides *Entrepreneurship Courses, Management* (marketing, export, production, finance, personnel, etc.) and Technical Courses (tool maker, machinist, foundrymen, electroplating, foot wear manufacture, etc.) are also run by Small Industries Service Institutes (SISI).

3. Seed money

The educated unemployed after getting their major loan sanctioned from financial institutions are provided seed money to the extent of 10% of the cost of their project. This 10% is recoverable in 5 instalments after their major liability of financial institution is over. This proportion of financial assistance is given at a nominal rate of 4% only and is counted as entrepreneurs own equity for the purpose of financial appraisal of their scheme.

4. Interest subsidy

- Degree and Diploma holders is Engineering, who pass three month entrepreneurship course from the Institutions prescribed by the Government of India are eligible for the interest subsidy.
- The entrepreneurs have to pay only 7% rate of interest on loans sanctioned by financial institutions. The difference between 7% and the rate of interest to be charged by the financial institutions is reimbursed to the entrepreneurs by the state government. This facility is available only for a period of three years.

5. Educated unemployed are given industrial accommodation on priority.

This scheme covers all educated unemployed youth who are matriculate and are within the age group of 18-35 years. Women and technically trained persons are given due consideration/weightage. From 1986-87, a minimum of 30% of the total sanctions has been reserved for Scheduled castes/Scheduled Tribes persons. ITI passed youth are also now eligible to set up industry/service ventures.

32.11 A MODEL SCHEME TO START A SMALL SCALE INDUSTRY FOR EXAMPLE A JOBBING WORKSHOP

Introduction

- A jobbing workshop can undertake *job order work* which is available in plenty from large and medium scale industries, for example, a large or medium industry manufacturing Tractors can give job orders to make fuel tanks, silencers, etc.

Basis and Presumption

- The scheme has been made on the basis of 75% efficiency on single shift considering 25 working days in a month.
- The rate of interest has been taken on 15% at an average.
- The job work will be procured from outside industries along with raw material.

Process outline

(*a*) Turning (*b*) Boring
(*c*) Milling (*d*) Drilling
(*e*) Heat-treatment if required from local units.

Rate of Machine

Lathe	Rs 60 per hour
Milling	Rs.90 per hour
Shaper	Rs 50 per hour
Drilling machine	Rs 38 per hour

Land and Building

Covered area 80 sq.metre @ Rs.40/-per sq.mt (rented) — Rs 3200.00 ...(*i*)

Machinery and Equipment

1.	*Precision Lathe Machine all geared* Max. swing over bed Distance between centres Width of bed Width of gap Motor 5 HP, 1500 RPM speed Coolant pump.	2 Nos each 90,000 500 mm 1,000 mm 300 mm 160 mm	Rs 1,80,000.00	
2.	*Milling Machine* Working surface of table No of spindle speeds Motor 3 HP, 1420 RPM speed.	1 No. 1064 ×254 mm 16	1,00,000.00	
3.	*Shaper* 610 mm stroke (geared)	1 No.	50,000.00	
4.	*Drilling Machine* 18 mm capacity	1 No.	25,000.00	
5.	*Bench grinder* 25 mm wheel size	1 No.	7,000.00	
		Total	Rs 3,62,000.00	...(*ii*)

Precision Instruments

1.	Micrometer	2 Nos.	500.00
2.	Vernier calliper 15 cm, 30 cm	2 Nos.	1,000.00
3.	Surface plate 60 cm size	1 No.	5,000.00
4.	Marking block	1 No.	200.00

5.	Height gauge 45 cm size	1 No.	5,000.00
6.	Dial indicator with stand		500.00
		Total	Rs 12,200.00 ...(iii)
	Electrification and Installation		33,000.00
	Tools, jigs and fixtures		10,000.00
	Office furniture and equipment		20,000.00
		Total	Rs 63,000.00 ...(iv)
	Total of (*ii*), (*iii*) & (*iv*) =		4,37,200.00 ...(v)
	Working Capital per month		
	Staff and labour		
1.	Skilled workers	4 Nos @ 2000/-	8000.00
2.	Semi-skilled workers	2 Nos @ 1500/-	3000.00
3.	Helper	1 No @ 800/-	800.00
		Total	Rs 11800.00 ...(vi)
	Overhead Charges		
1	Repair & Maintenance		750.00
2	Postage and Stationery		300.00
3	Travelling expenses		1500.00
4	Transportation		750.00
5	Consumable stores		700.00
6	Miscellaneous		1000.00
		Total	5000.00 ...(vii)
	Utilities		
	Electricity and power		2000.00 ...(viii)
	Total Working Capital (as calculated above)		
	Staff and Labour		11800.00 ...(vi)
	Overhead charges		5000.00
	Utilities		2000.00 (viii)
	Rent		3200.00 (i)
		Total	Rs 22000.00 (ix)
	Capital Investment		
	Fixed Cost-machinery and equipment		4,37,200.00 (v)
	Working Capital for 2 months		44,000.00 (x)
	2×22000	Total	Rs 4,81,200.00 (xi)
	Cost of production (per year)		
	Working Capital, 22000 ×12		2,64,000.00

Depreciation on Machinery @ 10% [of (*ii*) + (*iii*)]		37,420.00	
Interest on capital investment @ 15% [of (*xi*)]		72,180.00	
	Total	3,73,600.00	(*xii*)

Turnover (per year)

– Lathe output @ Rs 60/- per hour for 6 hours a day for 25 days	2 Nos.	2,16,000.00
– Milling output @ Rs 90/- per hour for 6 hours a day for 25 days	1 No.	1,62,000.00
– Drilling out put @ Rs 38/- Per hour for 6 hours a day for 25days (∵38×6×25×12×1)	1 No.	68,400.00
– Shaper output @ Rs 50/- per hour for 6 hours a day for 25 days.	1 No.	90,000.00
	Total	Rs 5,36,400.00

Profit = Turnover – cost of production

= 5,36,400.00 – 3,73,600.00 = 1,62,800.00

$$\text{Rate of Return} = \frac{\text{Profit}}{\text{Capital investment}} \times 100 = \frac{162800}{481200} \times 100$$

= 33.83%

Machinery Suppliers

1. Hindustan Machine Tools, Pinjore.
2. R.K. Machine Tools, Ludhiana.
3. ----------
4. ----------

32.12. ENTREPRENEURSHIP

- Doing new things or doing things that are already being done, in a new way is, a simple difinition of *entrepreneurship*.
- *Entrepreneurship* can be described as a creative and innovative response to the *environment*. Such responses can take place in any field of social endeavour - business, agriculture, education, social work and the like.

  Knowledge about the economic – political *environment*, more particularly about the economic policies of the government and the financial as well as commercial institutions, is important for the entrepreneur.

32.13. ENTREPRENEUR, CONCEPT OF

- The word *entrepreneur* has its origin in the French language. It refers to the organiser of musical or other entertainments.
- An entrepreneur is one who organises, manages, and assumes the risks of an enterprise.

  An entrepreneur visualises a business, takes bold steps to establish undertaking, coordinates the various factors of production and gives it a start.
- *Entrepreneurs* are the owners of the business who contribute the capital and bear the risk of uncertainties in business life.

- Entrepreneur is action - oriented and highly motivated. He has the ability to evaluate business opportunities, to gather the necessary resources to take advantage of them and to initiate appropriate action to ensure success.
- Entrepreneur is associated with innovations. He is the main factor of production.
- Entrepreneur takes decision regarding what to produce, how to produce, where to produce and for whom to produce. He mobilises other factors of production namely, land, labour, capital, organisation and initiates production process. He is responsible for both the profit or the loss.
- In India, Birla, Tata, Modi are big entrepreneurs.

32.14. PROFILE OF AN ENTREPRENEUR

The following list of characteristics and Traits provides a working profile of entrepreneurs :-

Characteristics	Trait
Self confidence	Confidence, independence, individuality, optimism.
Task-result oriented	Need for achievement, profit-oriented persistence, perseverence, Determination, hard-work, drive, energy, initiative.
Risk-taker	Risk taking ability, likes challenges.
Leadership	Leadership behaviour, gets alongwith others, responsive to suggestions and criticisms.
Originality	Innovative, creative, flexible, open minded, resourceful, versatile, knowledgeable.
Future oriented	Foresight perceptive.

The list includes traits that an entrepreneur should possess. He may not need all these traits, but the more he has, the greater chance there is of his being a successful entrepreneur.

32.15. ENTREPRENEURIAL PHILOSOPHY

1. To take calculated risk.
2. Willingness to accept responsibility for one's own work.
3. Failure must be accepted as a learning experience.
4. Goal orientedness.
5. Acceptable results are more important than perfect results.
6. Personal growth.

32.16. FUNCTIONS OF AN ENTREPRENEUR

1. He manages business and takes decisions.
2. He studies the market and selects the business.
3. He makes a selection of plant size.
4. He selects plant site.
5. He organises sales and holds the customers.
6. He promotes new inventions.
7. He coordinates different factors of production.

8. He arranges raw material, machinery and finance.
9. He employs labourers.
10. He deals with government departments such as sales tax, labour, electricity, export-import, railways etc.
11. He decides pricing policies.
12. He distributes wages of labourers, interest to the capitalist etc.

32.17. QUALITIES OF ENTREPRENEUR

1. Risk taking ability.
2. High level of motivation,
3. Business acumen.
4. Self confidence and positive self concept.
5. Leadership qualities.
6. Flexibility.
7. Managerial Competence.
8. Problem solving.
9. Ability to perceive opportunities and threats.
10. Realistic approach to planning.
11. Independence of thought and action.

32.18. ENTREPRENEURIAL FAILURE

Different *factors* contributing to the failure of entrepreneurial ventures are as follows:-

1. **Poor Management**
   (*a*) Incompetence.
   (*b*) Unbalanced experience.
   (*c*) Inexperience in management.
   (*d*) Inexperience in line.
2. **Production problems**
   (*a*) Lack of production planning and control.
   (*b*) Frequent Machine breakdowns.
   (*c*) Poor raw material.
   (*d*) Power cuts.
   (*e*) Labour problems.
   (*f*) Lack of technical knowhow.
   (*g*) Insufficient quality control.
   (*h*) Wastage in material.
   (*i*) High rate of rejection, etc.
3. **High fixed cost**
   (*a*) Heavy investment in land and building.
   (*b*) Increased administrative and other overheads.
   (*c*) Market borrowing at high interest rate, etc.

4. **Marketing problems**
   (*a*) Competition from larger and already established units.
   (*b*) Insufficient sales force.
   (*c*) Low quality of finished goods.
   (*d*) Recession etc.
5. **Financial problems**
   (*a*) Allowing long credits to the purchasers of finished goods.
   (*b*) Diversion of short term funds into long term uses.
   (*c*) Wilful diversion of funds for investments in assets not connected with production.
6. **Neglect of business.**
7. **Fraud.**
8. **Disaster.**

32.19. ENTREPRENEURIAL DEVELOPMENT

- The main objective of the entrepreneurial development schemes is to motivate and assist prospective and potential entrepreneurs to set up small scale units of their own and thereby become self-employed and continue to contribute significantly to production and employment in the country.
- Entrepreneurial development programmes increase entrepreneurial spirit and provide scope for self-development by focusing attention on the self and on self-directed motivational change
- In order to motivate *engineers* to take up industrial ventures, an interest subsidy scheme was started in 1974 as one of the follow-up assistance measures of the engineers training programme. It envisages financial assistance to the trained engineers in the form of subsidy on interest payments on loans taken by them from any of the recognised financial institutions for the acquisition of fixed assets.

  The scheme was subsequently liberalized in 1976 to cover non-trained engineers also for setting up their units.
- With the new Thrust for the development of Industries in backward areas and for promoting the weaker sections Small Industries Development organisation (SIDO) diversified its entrepreneurship training programmes in the year 1978-79 to serve new categories of entrepreneurs like rural artisans, educated unemployed, weaker sections of the society, women entrepreneurs, students and physically handicapped persons and Defence personnel. The entrepreneurial development training programmes for the non-engineers are broadly divided into two categories

  (*a*) Indentification, selection and motivation of entrepreneurs and

  (*b*) Entrepreneurial development training programme for
   (*i*) Women,
   (*ii*) Rural artisans,
   (*iii*) Weaker sections of society,
   (*iv*) Educated unemployed,
   (*v*) Physically handicapped, including blind persons,
   (*vi*) Defence personnel,
   (*vii*) Students, etc.

32.20. EXPORT PROMOTION

- Export development in the small scale sector has been accorded high priority in the economic strategy of the country as it results in creation of more employment opportunities, ensures utilisation of capacity for production and improves the quality of products, apart from bringing the much needed foreign exchange.
- Apart from direct exports, products of a large number of small scale units are exported indirectly through merchant exporters, export houses, etc. Parts and components from small scale sector which are part of the finished products are also being exported by large units.
- Small Industries Development organisation (SIDO) through its network of Small Industries Service Institutes (SISIs) and Extension Centres throughout India provides assistance for promotion of exports of SSI (Small Scale Industry) products.

  The activities in this regard include dissemination of information about (1)foreign markets (2) consultancy services in matters of export procedures for claiming replenishment (3) identification of small scale units already possessing necessary equipments and skills to undertake production of items having export potential (4) organising of training programme on export marketing (5) maintaining liaison with concerned export development agencies (6) meetings and seminars on export promotion etc.

  Small Industry Export Bulletin covering important areas of interest to exporters continued to be brought out by SIDO. Information on export prospects, Govt. policy announcements and procedures relevant to small industry exports, market/commodity reports prepared by professional agencies, etc. were included in these bulletins.

32.21. EXPECTATIONS OF ENTREPRENEURSHIP

It is expected from the entrepreneurs that they will help :-

1. Increase number of industries.
2. Increase production.
3. Increase employment opportunities.
4. Earn foreign exchange through exports.
5. Develop the underdeveloped parts of the country.
6. Economic development.

10

Industrial Relations, Trade Union and Collective Bargaining

10.1. INDUSTRIAL RELATIONS

Industrial relations, also called employee relations, labour relations and personnel relations, represent the relationship that exists between the employer and employees in an industrial undertaking. If these relations are strained, industrial disputes occur and industrial progress suffers. The employers suffer losses, the workers do not get wages and there is shortage of goods and services for community.

Hence, it is in the interest of both the employers and employees as well as of the society in general that industrial relations should be cordial and harmonious.

Industrial relations is the management aspect which deals with the manpower of the enterprise. It is essential that Industrial Relations between the employees and employer remain co-ordial and peaceful, as enterprise can advance only if industrial relations are good. Industrial Relations is the relations between the employees and the management that grows during the employment.

For any industrial relation programme following are the basic requirements :

- To have the support of top management.
- To adopt proper practices.
- To adopt and follow sound personnel policies.

Goal of industrial relations system has been 'industrial peace'. Industrial peace means harmony or 'absence of conflict' between employers and employees in an industrial concern. It is generally felt that industrial piece leads to higher productivity, however it is not the only factor for increased productivity.

Industrial Relations System

Different components of the Industrial relation system are:

(*i*) **Actors.** These are (*a*) hierarchy of managers and supervisors, and (*b*) hierarchy of trade union *i.e.*, workers and their representatives, (*c*) concerned Government agencies.

(*ii*) Rules, regulations and their implementation procedure.

(*iii*) **Contexts.** These are (*a*) technological characteristics, (*b*) the market and budgetary constraints, (*c*) distribution of power.

(*iv*) **Ideology.** Ideas and believes held by actors.

Resultant interaction of the above mentioned components determine the industrial relations. Industrial relations system can be understood in terms of interaction between two sets of organisations, namely, (*a*) industrial organisation (management and workers), and (*b*) union organisation (union leaders and workers). Interaction among persons within each of these two organisations can be understood with the help of following elements :

— Objectives about productivity, economy, efficiency, welfare etc.
— Rules, regulations and conventions *i.e.* government rules, organisational rules and traditions etc.
— Distribution of authority and power, as it influences the attitude of employees.
— Values and beliefs.
— Culture.
— Motivation.
— Personalities.

10.2. INDUSTRIAL PSYCHOLOGY

Industrial psychology is that branch of psychology which studies human behaviour under industrial business circumstances. **Industrial psychology is simply the application or extension of psychological facts and principles to the problems concerning human beings operating within the context of business and industry.** It applies the techniques of psychology to the industrial field and the problems confronting it. Psychology is the study of man with the aid of scientific methodology. It uses the experimental method *i.e.* observation under controlled conditions to gather data. Datas can also be collected by following other methods like case history method.

Objectives (or Functions) of Industrial Psychology

— To find out as to how a suitable individual can be selected to perform a particular task.
— Care of workers health by discovering and then providing ideal conditions in which the best mental and physical health of the worker can be maintained.
— Protection of worker's economic interests.
— Humanistic approach in the organisation.
— Search for proper method of working.
— Removing reasons for lack of adjustment between workers and the circumstances and conditions in which he works.
— Improvement in working conditions.
— Using latest technology of machines to avoid accident chances and fatigue during working.
— Improving the human relationship.
— Imparting training where needed.

— Arrange vocational guidance. — Maintaining Morale.
— Creating proper leadership.

Definitions

'Industrial Psychology' is the application and extension of psychological facts and principles to the problems concerning human beings working in industrial, business, service and research organisations.

Thus industrial psychology may be termed as applied psychology, as it is mainly concerned with the applications of the facts and principles of psychology to the behaviour of man working in industry.

Since industrial psychology is the application and extension of facts and principles of psychology, it is necessary to understand the psychology. 'Psychology' can be defined as the study of man and his behaviour with the aid of scientific methodology. It uses many scientific methods to collect facts about human behaviour.

Classification

Industrial psychology can be classified into following :

(a) *Personnel psychology.* It concerns with the application of psychology to the selection, training, and supervision of people. It is also concerned with the improving communication, counselling.

(b) *Managerial psychology.* It concerns with the problems of management.

(c) *Human Engineering psychology.* It is known as ergonomics, and dealt at length in the book.

(d) *Consumer psychology.* It deals with the relationship between the organisation providing goods or services and the consumer.

(e) *Organisational psychology.* It deals with the complete functioning of a company, and is concerned with workgroup dynamics, motivation, leadership, communication, design of organisation structure.

Applications of Industrial Psychology

1. Personnel Selection
2. Personnel Development
3. *Human Engineering.* It suggests changes, innovations in the design of machines, work place layout, and operations with a view to achieve greater ease in operation.
4. *Productivity Study.* It is concerned with the fatigue reduction, improving working conditions such as lighting, humidity, ventilation etc. so as to maximise the efficiency.
5. Developing managerial skills..
6. Accident prevention and safety measures.
7. Motivation
8. Labour relations, Organisational Behaviour
9. Attitude and Moral
10. Counselling.

10.3. BASIC CONCEPTS OF INDUSTRIAL PSYCHOLOGY

In order to understand the subject 'Industrial Psychology' thoroughly, we must first understand following basic concepts, which have considerable affect on the subject :

1. *Causation of behaviour.* Always there is a cause for some particular behaviour. are certain conditions which make a person to behave in a certain fashion.

2. *Individual differences.* No two individuals are alike in physical characteristics, gence, interests, aptitudes, and personal qualities like integrity, honesty, sincerity, aggr ness, introversion etc. These individual differences may be in physical or psychological teristics form the basis of industrial psychology.

3. *Learning.* Human beings, greatest asset is their capacity to learn through their ences with the things encountered in life. The individual is developed according to his ab learn. Because of this learning, we speak language, acquire customs, attitudes, develop dislike, learn skills, develop personality traits etc. Thus behaviour of a person is largely mined by the way he has learned in life. Learning can be defined in psychology as a rel permanent change in behaviour which occurs as a result of experience or practice. Chang be for better or worse behaviour.

4. *Perception.* The persons differ in the ways, they perceive the world around them. things when seen by two persons may not be perceived in the same way. They also differ rapidity with which they perceive. The perception can be improved upto some extent by ing.

5. *Attitudes.* Some kinds of behaviour like believes, opinions, prejudices are closel nected with attitudes. Attitude can be defined as learned orientation or disposition towa object, person, situation or issue which makes an individual to react to them in a favoura unfavourable manner. A person will always react to a thing, person or situation depe upon the intensity of his attitude.

6. *Motivation.* Discussed in detail in a separate chapter.

7. *Frustration.* Every man has certain motives, but fulfilment of motives is always easy as one may hope for. He may has to face difficulties, barriers or obstacles. These ba or obstacles in the way of satisfying one's desired goals, create in human beings a st frustration. The frustrated man may become angry and hostile or abusive. An indu psychologist pin points the sources of frustration and suggests remedies to eliminate or m them. A frustrated man may spread discontent to his fellow employees and may resu bringing down the production, industrial relations etc.

8. *Personality.* Personality of a person is the sum total of all the physical and m characteristics, capacities, and abilities available in him. Behaviour of a person is based personality and depends upon environment. Thus behaviour is the function of personali environment.

9. *Role Behaviour.* In real life, every body is playing certain roles. These roles may b membership role (social community, religion, caste etc.), sex role, age roles (child, adoles youth, adult, old etc). These roles are imposed upon us by fate or circumstances. Some roles are adopted due to combination of heridatory and environmental circumstances, our ties, aptitudes and choices. Occupational organisational roles are of this type and we ar quired to behave according to these occupational and organisational roles.

Important Terms used in Industrial Psychology

1. Psycho-Analysis. Psycho-analysis of an individual removes the conditions for his abno and abnormal behaviour, by modifying the nature of his mental conflict.

2. Intelligence. It is the man's ability to think and regulate his relations with re Human intelligence grows in accordance with man's cognition of the world.

3. Attention. It is concentrated of the consciousness on some perceived or recalled objects.

4. Feeling. A feeling is pleasant or unpleasant, and is generally based on the presence of some sense experiences. It has been observed that, usually some changes occur in respiration, blood circulation etc.

5. Mood. It is the weakest and at the same time longest manifestation of emotions.

6. Perception. The perception of an individual is influenced mainly by his social environment than by his physical environment. He perceives any situation, or thing according to his frame of reference and attitude which he develops from the socio-economic and cultural factors.

7. Traits. These are the characteristics of an individual, and are based on heriditary foundations.

8. Attitude. It is a bent of mind and predisposition to certain actions.

9. Personality. Personality is what a man realy is. It is the totality of a man and sum total of various tendencies of an individual inherited and acquired by experience. It is combination of body and mind. A human personality is determined by following four interconnected aspects:

(*a*) Moral qualities (*b*) Temperament

(*c*) Individual characteristics of sensation, perception, attention, thinking, memory, emotions etc., and

(*d*) Knowledge and skills.

10.4. MOB PSYCHOLOGY

Mob is a large number of people who are not related to each other but come to contact with each other by chance for a particular work. Mob is temporary and generally do not have a recognised leader. Mobs may be :

- Aggressive mobs.
- Fear driven mobs (*e.g.*, created due to accident).
- Welcoming mobs (for welcoming some leader).
- Acquisitive mobs (for acquiring something not available in the market).

Characteristics of Mobs

- Mob is emotional.
- Mob has common object of interest and attention.
- Mob is irrational.
- Mob has low level of intelligence.
- Mob behaviour is unpredictably and identity of individual cannot be found out.
- Mob has no personal inter-relationship.

10.5. INDUSTRIAL DISPUTES (CONFLICTS)

Disputes between individuals and between groups in characteristics of human behaviour. **Conflict or dispute is a type of behaviour which occurs when two or more parties are in opposition or in battle.** These disputes, (*i*) adversely affect the effectiveness of individuals or groups, (*ii*) may break down the relationship between individuals or groups and (*iii*) may result in acute neurosis of strike. This makes difficult to achieve objectives of the organisation.

Organisational conflict is a disagreement between two or more members or groups of the organisation. The conflict may arise due to

(*a*) sharing of scarce resource or work activities,

(*b*) different statuses, goals, values or perceptions,

(*c*) disagreement over facts, methods,

(*d*) social economical and psychological reasons.

It is very essential to eliminate disputes by

(*i*) adequate job definition,

(*ii*) detailed specifications of relationship between various positions,

(*iii*) careful selection of people to fill up various posts and

(*iv*) thorough training of people for the job assigned to them.

Stages of Conflict

(1) *Latent conflict.* It may be due to competition for scarce resources, role conflict, drive for autonomy or ego problem.

(2) *Perceived conflict.* This is due to misunderstandings, and can be sorted out by improving communications.

(3) *Felt conflict.* When official differences become personalised, such conflicts arise.

(4) *Manifest conflict.* At this stage, conflict takes the form of open aggression, sabotage, apathy or withdrawal etc.

(5) *Conflict aftermath.* If the conflict is resolved to the satisfaction of all, it may become the base for more cooperative relationship. But if the conflict is merely suppressed, the latent condition of conflict may be aggrevated and explode in more serious or violent form at a later date.

Resolution of Conflict

(*i*) find out full details of conflict, then

(*ii*) analyse the issues involved in the conflict, then

(*iii*) conflict may be solved by mediation, bargaining, politics etc.

Preventive Measures for Conflict Resolution

(1) Develop effective leadership.

(2) Develop effective communication.

(3) Adopt participative decision-making.

(4) Improve interpersonal relationship.

(5) Review facilities etc.

Types of Conflicts

1. Conflict within an individual.
2. Conflict between individuals.
3. Conflict between an individual and a group.
4. Conflict between Groups within an Organisation.
5. Conflict between Organisations.

Results of the Conflicts

Following are some of the serious results which arise out of these disputes :

1. Strike

A common form of Industrial disputes is the 'STRIKE' which means abstaining from work until the demands are met or a compromise is affected.

Reasons for the occurrence of strikes are :

(i) Labour unions try to maximise the wage gains of their members.
(ii) Desire of the workmen to protect the conditions of their work in the long run.
(iii) To fight against exploitation at the hands of capitalists.
(iv) Recognition of unions, rivalries of the unions.
(v) Lack of communication and understanding between management and workers.

A strike is considered to be the last resort of the workers to express their discontent. Strike may be in the following forms :

(i) **Sit down Strike.** In this, the workers go to the work place but refuse to work. They do not leave the premises of the factory until the strike is over.

(ii) **Go slow or slow down.** In this, the workers continue to work but do so at much slow rate, thus slowing down the progress of work. Since, they do not totally abstain from work, they are entitled to pay for the period of slow down.

(iii) **Picketing.** In order to call to the attention of the public that a strike is going on, and disallow others from entering the plant or doing business in the undertaking. The workers or their sympathizers place themselves at the entrance of the factory causing obstruction to people who want to go in or come out. These persons are termed "PICKETS" and the method as a whole, Picketing.

(iv) **Gherao.** It is a form of dispute, in which workers do not allow the officer to leave his room or working place for a considerably long period so as to press for their demands. The officer can't even go for make off water.

2. Lockout

It is just opposite procedure of strike and consists in the closing of factory by the employer because of a dispute with the employees and is the refusal of entry to them.

Causes of Industrial disputes

The following are some of the important factors, which disturb industrial relations and cause dispute. These arise mainly due to economic, social and psychological reasons.

(i) If industrial work is done under serve restrictions and control, the worker loses his freedom and he is, therefore, discontented.
(ii) The most important are wages and allowances, if the workers feel the remuneration they get for their labour is not sufficient.
(iii) If the employer refuses to pay bonus, it gives rise to many disputes.
(iv) If the employer refuses to recognize trade unions and does not accept the legal demands of the workers.
(v) A large number of workers are engaged as temporary hands. The slightest depressing conditions in industry leads to the retrenchment of many of them. Retrenchment and discharge of employees, particularly, have caused many disputes.
(vi) Unsatisfactory working condition, hours of work, lack of welfare measures, harsh treatment by bosses are among other causes of disputes.

10.5.1. Conflict Management

As we have discussed by now, conflict has both beneficial and harmful aspects. It is, therefore, necessary to manage both these aspects. When conflict level is too low, the performance is also likely to be low, and at this stage, manager needs to stimulate conflict in order to enhance

the performance of the group. Similarly, when conflict level is too high, it needs to be reduced so as to restore high performance.

1. Stimulating Productive Conflict

Symptoms/situations where conflict stimulation is needed.

(*i*) 'Yes men' are filled in the organisation.
(*ii*) Employees are afraid to admit ignorance.
(*iii*) Compromise is emphasized in decision making.
(*iv*) Managers put too much stress on harmony and piece.
(*v*) People do not express their opinion as they are afraid of hurting the feelings of others
(*vi*) Popularity is given more importance than technical competence.
(*vii*) New ideas are not forthcoming.

Techniques for stimulation

(*i*) Manipulate communication channels. (*ii*) Alter organisation structure.
(*iii*) Alter personal behaviour factors.

2. Resolving Interparty Conflict

In case of stimulating conflicts we have seen the circumstances when there is apathy, non responsiveness, lack of enthusiasm etc. But in Indian atmosphere, conflicts are excessive, hence different strategies are needed to be applied : These strategies may be :

(A) Conflict Avoidance Strategies

(*i*) Ignoring the conflict (*ii*) Imposing a solution.

(B) Conflict-diffusion Strategies

(*i*) Smoothing
(*ii*) Focusing attention on the higher goals that the group shares or the long-range aims that have in common.

(C) Conflict-containment Strategies

(*i*) Using representatives (*ii*) Structuring the interaction
(*iii*) Bargaining.

(D) Conflict-Confrontation Strategies

(*i*) Problem solving (*ii*) Organisational Redesign.

10.5.2. Views about Conflict

Different schools of thoughts about conflict are :

(A) Traditional View

According to this theory conflicts are viewed negatively and associated with violence, turbulence, agitation, destruction and irrationality. In this theory of 1930s and 1940s, it was believed that, conflict indicated a malfunctioning within the organisation and is due to management's failure to bind the employees and the organisation together.

(B) Behavioural View

According to this view, the conflict is the logical and inevitable outcome in an any organisation. This theory was prominant from late 1940s and 1970s. This theory maintained that since individuals in an organisation had different perceptions of goals and differing values, conflicts are bound to arise, may be over priorities, time schedule, resource allocation, or way of doing a

job. The conflict may also lead to creativity in problem solving. The manager's role in resolving conflict is to restore understanding, trust and openness between parties.

(C) Interactionist View

This theory not only accept conflict but also encourage it. It states that conflict must be regulated in such a manner so that its beneficial effects are maximised and harmful aspects are minimised.

10.5.3. Sources of Conflict

In any organisation, large number of potential sources of conflict exist. Some of such sources of conflict are :

1. Competition for Limited Resources
2. Diversity of Goals
3. Task interdependence
4. Organisational ambiguities
5. Differences in values and perception.
6. Poor Communication
7. Aggressive nature of people
8. Introduction of change.

10.6. LABOUR-POLICY

Directive principles of labour policy of government is equal pay for equal work, provision for just and human conditions of work, and a living wage to all worker. In early years of industrialisation, labour policy was pre-occupied namely with the organised sectors of the labour source. Growing attention is now being paid to the interest of the workers in unorganised sector.

Following are the important efforts made by the Govt. for making good industrial relations:

(A) By legislations. Following legislations were made :

- Minimum Wages Act, 1948
- Payment of Wages Act, 1936
- Payment of Bonus Act, 1965
- Industrial Disputes Act, 1947
- Workmen's Compensation Act, 1923
- Employees State Insurance Act, 1948
- Employees' Provident Funds and Miscellaneous Provisions Act, 1952
- Payment of Gratuity Act, 1972
- Factories Act, 1948.

(B) Other Welfare Measures

(*a*) **Work Committees.** These are set up in industrial establishment employing 100 or more workers, and comprise equal number of representatives of employers and workmen and aim at promoting measures for securing and preserving amity and good relations.

(*b*) **Workers Participation in Management.** Govt. introduced a voluntary scheme in 1965 for workers participation in management in manufacturing and mining industries employing 500 or more workers. In 1977, another scheme for workers participation in commercial and service organisations, employing 100 or more persons, was also introduced for public sector.

(*c*) **Workers Education.** The Central Board for Workers Education was set up in 1958 for organising educational programmes, which includes the integrated education about the country, their industry, the philosophy and management of trade unions, industrial relations, communal harmony, ways and means for improving quality of their lives and their upliftment, sense of their duties and social responsibilities while making them aware of their rights.

(*d*) **Social Security.** A feeling of social security is introduced by means of following legislations :

(*i*) *Workmen's Compensation Act* was passed in 1923 providing for the payment of compensation to the workmen and their families in case of industrial accidents, and of certain occupational diseases arising out of and in the course of employment and resulting in death or disablement whether temporary or permanent.

(*ii*) *The Maternity Benefit Act 1961*, regulates the employment of workmen before and after the child birth and provides for maternity and other benefits.

(*iii*) *Employees State Insurance Act 1948*, provides for medical care in kind and cash, employment injury, and pension for dependents on the death of a worker because of injury.

(*iv*) *Employees Provident Funds and Miscellaneous Provisions Act 1952*, made available the retirement benefits to the employees.

(*v*) *Gratuity Act 1972*, entitles the employees the payment of gratuity at the rate of 15 days wages for each completed year of service.

(*vi*) *Factories Act 1948*, provides various facilities for the workers regarding working conditions, welfare, and safety.

10.7. WORKERS' GRIEVANCES

Individual employees, many times, have some or the other complaints, called grievances, against the working rules or decisions in an organisation. It is necessary that there should be some system to remove these grievances, otherwise the employees will have a feeling that management does not look into their problems and difficulties, which is very harmful for attaining good industrial relations. As distrust and dissatisfaction in the minds of employees will result in inefficiency and lack of coordination. A grievance redressal system is, therefore, essential to remove the feeling of discontentment or dissatisfaction.

A good grievance redressal procedure is one which is :

(*i*) Adequate and effective, (*ii*) Simple to understand and operate, (*iii*) Prompt and (iv) Permit to appeal.

10.8. SUGGESTION SYSTEM

Use of suggestion system is most successful bridges between plant improvement efforts and good industrial relations. Suggestion system taps the tremendous store of ideas for the performance improvement, which otherwise lying in the minds of the employees. Most employees feel satisfied by volunteering their ideas but they feel reluctant. Therefore, it is necessary to set up a suitable suggestion system so that employees can give way to their feelings, ideas and valuable suggestions. Most companies give awards for valuable and useful suggestions.

This not only enable management to receive ideas for improving the efficiency, but reduces the complaints and enhances the morale of the employees.

10.9. TRADE UNIONS

Workers are poor and hence they cannot afford to remain without job for a longer period. Most of them are ignorant and require advice and guidance from persons who have the genuine interest of the workers at heart. Each worker by himself is unable to fight against the injustice done to him. Almost all the civilized countries have recognised the rights of the workers to organise themselves. As a group, they can settle terms with the employers in a better way. In other words, the workers have been granted the right to bargain collectively.

The associations formed by workers have come to be known as 'Trade Unions'.

A trade union may be defined as an association or union of workers engaged in a particular trade and formed chiefly with the object of helping the members in times of distress and getting their grievances settled and legitimate rights established.

According to Webbs, **"Trade union is a continuous association of wage earners for the purpose of improving conditions of employment"**. Trade unions are also seen as moral institutions which will uplift the weak and downtrodden and render them the place, dignity and justice they deserve. Trade unions generally raise demands for higher wages, better working conditions, fringe benefits, promotional opportunities and safeguards. In most cases, demands are directed against the management.

In India, most of the prominent trade union leaders are 'outsiders' i.e., they are educated, middle class individuals who come into Union work from outside instead of belonging to the wage earning ranks. These union leaders are activists and politically more active than the ordinary members. They combine political interests with union work and hence they do not focus their attention on the internal functioning of the workplace.

Managerial unionism (generally known as associations) is spreading rapidly. The purpose of managerial unions is almost similar to that of trade unions except that these are relatively soft in dealing with the management.

Why Workers Join Trade Unions ?

Workers join trade unions in order to protect their various job interests to which they feel that management do not adequately guarantee. These job interests can be of following categories :

1. Economic — to get livable wage
2. Job safety — job security and freedom from management's arbitrary actions.
3. Social affiliation.
4. Self-esteem — to have voice in the 'system'.
5. Status and self-fulfillment.

Functions of Trade Unions :

- Social service.
- Wage bargaining.
- Safety of job.
- Development cooperation amongst employees.
- Protect workers from delay in payments, poor working conditions etc.
- Bargain for shear in profit, and participation in management.

10.10. COLLECTIVE BARGAINING

Collective Bargaining is the method of negotiation between the representatives of labour and management to solve some labour dispute and to enter some agreement to prevent a dispute. As we know that strike and lockouts go against the interests of the society, therefore genuine collective bargaining is important in promoting industrial harmony. Collective bargaining is a preventive method to prevent the situations arising for strikes and lockouts.

Collective bargaining can be defined in several ways, some of them are :

43

Industrial Legislations

43.1. THE INDIAN FACTORIES ACT, 1948

This Act safeguards the interest of the workers engaged in factories. The Act is now applicable in whole of India. It came first into force form Ist April, 1949 and was extended to the Union Territories of Goa, Daman and Diu in 1963, and to the State of Jammu an Kashmir in 1970.

The Factories Act, 1948, is a labour welfare legislation, and is enacted with the prime object of protecting workmen employed in factories against industrial and occupational hazards, and with this intention, it imposes upon the owners and occupiers certain obligations protect the workers.

The object of Act is ;

(i) to protect the workers from being subject to unduly long hows of bodily strain and manual labour ;

(ii) to provide that employees should work in healthy and sanitary conditions one precautions should be taken their safety and for prevention of accidents.

(iii) to regulate the labour and protect the workers from being exploited.

The Act provides for the healthy, safety, welfare and other aspects of workers in factories. In order to ensure that the objects are carried out, the State Government are empowered to appoint Factory Inspectors and to frame rules.

Definitions

Following are some of the important definitions described in the Act:

1. *Adult.* A person who has completed the age of 18 years.
2. *Adolescent.* A person who has completed his 15th year of age, but not completed 18 years of age.
3. *Child.* A person who has not completed his 15th year of age.
4. *Calendar Year.* A period of 12 months from 1st January.
5. *Young Person.* Either a child or an adolescent.

6. *Week.* A period of 7 days beginning at midnight on Saturday night.

7. *Power.* Electrical energy or any other form of energy, which is not generated by human or animal agency.

8. *Prime Mover.* Any engine, motor or other appliance, which generates or other wise provides power.

9. *Transmission Machinery.* Any shaft, wheel, drum, pulley, system of pulleys, coupling, clutch, driving belt or any other device by which the motion of prime-mover is transmitted to or received by any machinery or appliance.

10. *Manufacturing Process.* Any process for:

(*a*) making, altering, repairing, ornamenting, finishing, packing, oiling, washing, cleaning, breaking up, demolishing, treating or adopting any article or substance with a view to its use, sale, transport, delivery or disposal, or

(*b*) pumping oil, water or sewerage, or any other substances or

(*c*) generating, transforming or transmitting power, or

(*d*) composing types for printing by letter press, lithography, photogravure or other similar process or book binding.

(*e*) constructing, reconstructing, repairing, refitting, finishing or breaking up ships or vessels.

(*f*) preserving or storing in cold storage.

11. *Worker.* A person employed directly or through any agency, whether for wages or not, in any manufacturing process or in cleaning any part of the machinery or premises used for manufacturing process or in any other kind of work incidental, to or connected with, the manufacturing process.

12. *Factory.* Any premises:

(*i*) wherein 10 or more workers are working, or were working on any day of the preceeding 12 months, and in any part of which a manufacturing process is being carried on with the aid of power, or

(*ii*) wherein 20 or more workers are working, on any day of the preceding 12 months, and in any part of which a manufacturing process is being carried on without the aid of power; but does not include a Mine or a Railway running shed.

13. *Occupier.* Occupier of factory means the person who has ultimate control over the affairs of the factory and where the said affairs are entrusted to a managing agent, such agent shall be deemed to be occupier of the factory.

Licence and Registration

1. The Act specifies that before a factory can be started;
   (*a*) Prior permission for the site of the factory construction or extension has to be obtained form the Chief Inspector;
   (*b*) Plans and specifications should have been approved by the Factory Inspector; and
   (*c*) The factory has to be registered and the licence fees has to be paid.
2. If an application for permission referred at item (*a*) above accompanied by the plans and specifications required by rules referred at item (*b*) above sent to the State Government or the Chief Inspector by registered post, and no order is communicated to the applicant within 3 months from the date on which it is so sent; the permission applied for the said application shall be deemed to have been granted.

3. Where a State Government or a Chief Inspector refuses to grant permission to the site, construction or extension of factory or to the registration and licensing of a factory, the applicant may within 30 days of the date of such refusal appeal to the Central Government if the refusal is from the State Government and to the State Government in any other case.

pecting Staff

The act permits the State Government:

(a) To appoint Chief Inspector and other Inspectors to supervise the conditions in factories and to see that the provisions of the act are practised;

(b) To appoint certifying surgeons to examine medically the young persons and to examine the conditions in factory to find out whether any process or action in manufacturing is harmful to cause any injury to the health of workers.

1.1.1. Health Provisions

This act prescribes the following provisions for maintaining the health of the workers and ducing the possibilities of injuries to their bodies:

Cleanliness

Every factory shall be kept clean and free from gases arising from any drain or their nuisance. For this purpose, following steps should particularly be taken;

(a) The dirt and refuse shall be removed daily by sweeping from the floors, benches of workrooms, staircases and form passages.

(b) The floor of every workroom shall be cleaned at least once in every week by washing using disinfectant where necessary.

(c) Effective means of drainage shall be provided and maintained.

(d) All inside walls, partitions, ceilings of rooms and passages;

(i) where they are painted or varnished, shall be repainted or revarnished at least once in every five years;

(ii) where they are whitewashed, or colourwashed, shall be whitewashed or colourwashed at least once in every period of 14 months.

2. Ventilation and Temperature

(a) Effective and suitable provisions shall be made for-

(i) securing and maintaining adequate ventilation by the circulation of fresh air in the workroom, and

(ii) securing reasonable conditions of comfort and preventing injury to health of worker.

(b) Walls and roofs should be of such material and so designed that temperature shall not be exceeded but kept as low as practicable. Effective arrangement should also be made to protect the workers from processes producing excessively high temperature. Hot parts of the machinery shall be insulated.

3. Artificial Humidification

(a) If there is an artificial humidification, it shall be of prescribed standard and created by the prescribed methods.

(b) The water used for such humidification shall be clean and free from dirt.

4. Overcrowding

No room in the factory shall be overcrowded, for this at least 9.9 m^3 of space for every worker is necessary in the factories which were in existence before the date of commencement of this Act and at least 14.2 cm. m of space for every worker shall be provided in the factories built after the commencement of this Act. For this purpose, any space which is more than 4.2 cu. m from floor shall not be taken into consideration.

5. Lighting

(*i*) Sufficient and suitable lighting whether natural or artificial or both shall be maintained at the working place or passages.

(*ii*) All glazed windows and skylight shall be kept clean on both the inner and outer surfaces.

(*iii*) Glare and formation of shadows should be prevented to avoid eye strain or risk of accident.

6. Drinking Water

Drinking water should be made available to all workers at all working hours and should be provided and maintainded at suitable points. All such points shall be marked "drinking water" in a language understood by a majority of workers. Such points shall not be situated within 6.0 m of any washing place, urinal or latrine or any other source of contamination.

In every factory employing more than 250 workers, provision shall be made for cooling drinking water during hot weather.

7. Bath Rooms

If the work in the factory is of such a nature whic involves dirt, a sufficient number of bath rooms shall be provided.

8. Latrines and Urinals

(*a*) Sufficient number of latrines and urinals of prescribed type, separate enclosed accommodation for male and female workers shall be provided. The accomodation shall be adequately lighted and ventilated and shall be maintained in clean and sanitary conditions at all times.

(*b*) In the factories employing more than 250 workers, all the latrines and urinals shall be of prescribed sanitary types and the foors and internal walls upto a height of 0.90 m and the sanitary blocks shall be laid in glazed tiles or otherwise finished to provide a smooth polished impervious surface.

(*c*) (*i*) One latrine shall be provided for every 20 female workers; and one latrine shall be provided for 20 to 100 male workers and thereafter one additional for every 50 male workers.

(*ii*) There shall be one urinal for every 50 workers upto 500 workers and thereafter for every 100 workers.

9. Spittoons

Sufficient number of spittoons shall be provided at convenient places. These shall be washed regularly and kept clean.

Safety Provisions

Following important provisions ... are provided in the Act:

Fencing of Machinery

Following items shall be fenced in every factory:

(a) Every moving part of prime-mover, every flywheel;

(b) Head race and tail race of every water-wheel and water-turbine;

(c) Following items should be properly safeguarded;

every part of an electric generator, a motor, or a rotary convertor;

every part of transmission machinery; and

every dangerous part of other machines.

2. Work on or near machinery in motion

The work on or near moving machinery shall be done by a specially trained adult male ...ther wearing tight fitting clothing. No woman or youg person shall be allowed to clean, ...ncate or adjust any part of a prime-mover or of any transmission machinery when it is in ...tion.

3. Devices for cutting off power form running machines in emergency shall be provided.

4. Casing of machinery

In all the machines driven by power and installed in any factory after the commencement of ...s Act—

every set screw, bolt or key on any revolving shaft, spindle, wheel or pinion shall be so sunk, ...sed or otherwise effectively guarded as to prevent danger;

every toothed or friction gearing shall be completely encased.

5. Hoists and lifts

In every factory:

(a) Every hoist and lift shall be of good mechanical construction and of adequate strength. They shall be properly maintained and thoroughly examined at least once in every six months, and record maintained. It shall be marked with maximum safer working load.

(b) Every hoistway and liftway shall be sufficiently protected by an enclosure fitted with gates.

(c) Hoists and lifts used for carrying persons shall have atleast 2 ropes or chains separately connected with the cage and balance weight and each rope or chain with its attachment shall be capable of carrying the weight of the cage together with its maximum load.

(d) The maximum safe working load shall be marked on every hoist or lift.

6. Lifting machines, chains, ropes and lifting tackles

All parts including the working gears, lifting machines, chains, ropes or lifting tackles shall ...of good construction and of adequate strength; properly maintained and thoroughly exam... and at least once in every period of 12 months.

Lifting machine means a crane, crab, winch, pulley block etc.

7. Revolving machinery

A notice shall be affixed to every grinder, indicating the maximum safe working peripheral

speed of every grind stone or abrasive wheel, the speed of the shaft or spindle upon which the wheel is mounted.

8. Excessive weights

No person shall be employed in any factory to lift, carry or move any load so heavy as to be likely to cause him injury. State Government may make rules prescribing the maximum weight which may be lifted or carried by adult men, adult women, adolescent and children.

9. Protection of eyes

To protect the eyes, screens or goggles shall be provided to the persons engaged in the following manufacturing processes:

(*a*) Welding or cutting the metal with electric or oxyacetylene flame or any other such process.

(*b*) Fettling, rivet cutting, removal of scales or dressing of metals or stones or any other such process involving risk of injury to the eyes from particles thrown off in the course of process.

11. Precautions against Fire

(*i*) Every factory shall be provided with safe means of escape in case of fire as may be prescribed, and the necessary equipment and facilities for extinguishing fire.

(*ii*) Doors affording exit from any room shall not be locked or fastened so that they cannot be easily and immediately opened from the inside while any person is inside room.

(*iii*) Every window, door or other exit affording means of escape in case of fire, other than the means of exit in ordinary use shall be marked in language understood by majority of the workers.

(*iv*) Effective means of giving warning in case of fire to every person shall be provided.

(*v*) A free passage-way giving access to escape in case of fire shall be maintained.

43.1.3. Welfare Provisions

1. Washing Facilities. Adequate and suitable facilities for washing shall be provided separately for male and female workers and maintained for their use. Suitable palce for keeping clothing not worn during working hours and for the drying of wet clothings should be marked.

2. Sitting Facilities. Suitable arrangements for sitting shall be provided and maintained for all workers, who work in standing position.

3. First-Aid Appliances. First-aid boxes or cup-boards equipped with the prescribed contents shall be provided and maintained so as to be readily accessible during all working hours. At least one such box shall be provided for every 150 workers.

In every factory employing more than 500 workers, an ambulance room of the prescribed size with prescribed equipment shall always be available in the charge of medical and nursing staff.

4. Canteens. A canteen or canteens shall be provided and maintained in every factory wherein more than 250 workers are ordinarily employed.

5. Shelter, Rest-rooms, Lunch-rooms. In every factory where more than 150 workers are ordinarily employed, adequate and suitable shelter, rest rooms and lunch-rooms with provision of drinking water, where the workers can take the meals brought by them, shall be provided and maintained.

6. Creches. Every factory employing more than 30 female workers, shall be provided and

maintained a suitable room or rooms for the use of children under the age of 6 years of such women. Its incharge shall be a women trained in this aspect.

7. **Welfare Facilities.** Welfare officers shall be employed in every factory employing more than 500 workers. The Governement may prescribe the duties, the qualification and conditions of service and number of such officers.

43.1.4. Working Hours

1. **Hours of Work.** No adult worker shall be required or allowed to work in factory for more than 48 hours in a week and for more than 9 hours in a day. No worker shall work for more than 5 hours before he has an interval of atleast half an hour. The period of work shall be so arranged that inclusive of rest intervals, it shall not spread over more than 10½ hours in any day. Chief Inspector may, for reasons to be specified in writing, increase this spread-over time to 12 hours.

2. **Holidays.** No adult worker shall be required or allowed to work in a factory on Sunday, unless he has or will have a holiday for a whole day on one of the 3 days immediately before or after the Sunday. Thus no worker shall work for more than 10 days continuously without a holiday.

3. **Overtime Wages.** When a worker works for more than 9 hours in any day or for more than 48 hours in any week, he shall be entitled to wages at the rate of twice his ordinary rate of wages, in respect of overtime work. Here ordinary rate of wages means the basic wages plus such allowances as the worker is for the time being entitled to, but does not include a bonus.

4. **Restriction on double Employment.** No worker shall be required or allowed to work in any other factory.

5. **Employment of Women.** This provision provides a further resitriction to female workers that no women shall be employed in any factory except between 6 A.M. and 7 P.M. State Governement may vary this limit, but variation shall not authorise the employment of any women between 10 P.M. and 5 A.M.

43.1.5. Employment of Young Persons

1. No child who has not completed his 14th year, shall be allowed to work in any factory.
2. A child who has completed his 14th year or an adolescent shall not be allowed to work unless a certificate of fitness is granted to him. This certificate shall be renewed every year.
3. An adolescent, who has been granted a certificate of fitness to work in a factory and who while at work in a factory carries a token giving reference to the certificate, shall be deemed to an adult. Female-child shall not be permitted to work between 7 P.M. and 8 A.M.
4. No child shall be permitted to work for more than 4½ hours in a day and he will also not be allowed to work in the night.

43.1.6. Annual Leave with Wages

The Act provides a paid weekly holiday in a week. Besides the weekly holiday, every worker after completion of service of 240 days in a calendar year is entitled to get annual leave with wages in the subequent year at the rate not less than:

(a) One day per 20 days for actual work for adults;
(b) One day per 15 days of actual work for a child.

These are known as earned leaves and can be accumulated upto 30 days in case of an adult and 40 days in case of a child.

For granting leaves the worker should apply 15 days before or immediately in case of illness. The Act further provides that the number of times which leaves may be taken during any year shall not exceed 3.

43.1.7. Special Provisions

Dangerous Operations

If any operation carried on in the factory exposes any worker to a serious risk of bodily injury poisoning or disease, the State Government may declare that operation to be dangerous andmay ask for the provision of proper safeguard and if necessary, may prohibit or restrict the use of any materials or processes.

It also prohibits or restricts women, adolescent and children to be employed therein and asks for the periodical medical examination of workers employed.

Notice of Certain Accidents

1. In a factory accident resulting in death or causes any bodily injury due to which the person injured is prevented from working for a perid of 48 hours or more immediately following the accident, the Manager of the factory shall send an intimation to the Factory Inspector within the prescribed time.
2. (*a*) Where any worker suffers from any disease specified in the schedule, the Manager of the factory shall send its intimation to Factory Inspector within the prescribed time.

   (*b*) If a medical practitioner attends to a person who is or has been employed in a factory, and suffering from any disease specified in the schedule, he shall without delay send a report in writing to the Chief Inspector stating the name and address of the patient and the factory mentioning the name of disease.

43.1.8. Penalties

1. On any contravention of any of the provisions of this Act or of any rules made thereunder or of any order in writing given thereunder, the occupier and the manager of the factory shall each be guilty of an offence, and punishable with imprisonment upto 2 years or with a fine upto Rupees one lakh or with both if the contravention is continued after conviction, with a further fine upto Rs 1000 per day.

   If he is again guilty of an offence involving in contravention of the same provision, he shall be punishable on subsequent conviction with imprisonment upto 3 years or with fine from Rs 10,000 to Rs 2.50 lacs.
2. If any worker contravenes any provision of this Act or Rules or Orders made thereunder imposing any duty or liability on workers, he shall be punishable with fine upto Rs.500.
3. If a child works in two factories on one day, his parent or guardian or the person having custody of or control over him or obtaining any direct benefit from his wages, shall be punishable with fine upto Rs. 1000.

43.1.9. Miscellaneous Provisions

1. Appeals. The manager of a factory on whom an order in writing has been served by pector under the provisions of this Act or the occupier of the factory may, within 30 days of serving of the order, appeal against it to the prescribed authrity.

2. Obligations of Workers

(a) No worker in a factory:

(i) shall wilfully interfere with or misuse any appliance, convenience or other thing provided in a factory for the purposes of securing health, safety or welfare of the workers therein;

(ii) shall wilfully and without reasonable cause do any thing likely to endanger himself or other; and

(iii) shall wilfully neglect to make use of any appliance or other thing provided for the purposes of securing health or safety of the workers therein.

(b) If any worker contravenes any of the provisions of this section or of any rule or order made thereunder, he shall be punishable with imprisonment upto 3 months or with fine upto Rs. 100 or with both.

43.2. INDUSTRIAL DISPUTES ACT, 1947

This is an Act to make provision for the investigation and settlement of industrial disputes and for certain other purposes.

In the age of modern industries, direct contact between the employer and the employees has diminished. This results disputes and differences of opinion between the two, which need investigation and settlement by a third independent agency. Here government involvement is essention, and therefore the *Industrial Disputes Act, 1947* is Government's effort to regulate industrial relations in India. It seeks to ensure progress of industry through harmony and cordial relations between employers and employees.

To regulate industrial relations, and to ensure uninterrupted production and supply of services to society, and thereby contribute to growth and development of the national economy, the Government has enacted the Industrial Disputes Act to observe some terms and conditions of employment, by employers and workmen and to maintain harmony between the employer and workmen and to prevent an industrial dispute.

The Act has following objectives.

(a) Investigation and settlement of industrial disputes between employers and employees; and employees and employees.

(b) Promotion of measures for securing and preserving amity and good relations between employers and employees.

(c) Prevention of illegal strikes and lock outs.

(d) Payment of compensation to workmen in the event of day-off and retrenchment.

(e) Promotion of collective bargaining.

Some Definitions

(i) *Average pay.* It is the average of the wages payable to the workmen:

(a) in 3 complete months for monthly paid workman;

(b) in 4 complete weeks for weekly paid workman;

(c) in 12 full working days for daily paid workman; preceding the date on which the average pay becomes payable. When the worker has worked for less than this period, the, the average pay is calculated as the average of the average of the wages payable to a workman during the period he actually worked.

(ii) *Award.* "Award" means an interim or a final determination by any Labour Court,

Industrial Tribunal or National Industrial Tribunal.

(*iii*) *Employer.* Employer means:

(*a*) in relation to an industry carried on by or under the authority of any department of the Central or State Government, the authority prescribed in this behalf or where no authority prescribed in this behalf or where no authority is prescribed, the head of the department.

(*b*) in relation to an industry carried on by or on behalf of a local authority, the chief executive officer of that authority.

(*iv*) *Industry.* Industry means any bussiness, trade, undertaking, manufacture or calling of employers. It includes any calling service, employment, handicraft or industrial occupation.

(*v*) *Industrial Dispute.* " Industrial Dispute" means any dispute or differences between:

1. Employers and employers or
2. Employers and workman or
3. Workman and workman or which is connected with:
   (*a*) the employment, or
   (*b*) non-employment, or
   (*c*) terms of employment, or
   (*d*) the conditions of labour.

(*vi*) *Dismissal of Workers.* A worker dismissed after obtaining the written permission from the Regional Conciliation Officer by the employer does not validate the dismissal but only removes the ban on the right of the employer, his agent or manager to dismiss the worker, even then dismissal may be industrial dispute.

(*vii*) *Suspension of Workman.* A workman may be suspended pending enquiry and disciplinary action. If after enquiry misconduct is proved, the worker is dismissed and is not entitled to any wages of the suspension period. In case when a worker is fully exonered after the enquiry, he would remain in service and would be entitled to his full wages of the suspension period.

(*viii*) *Closure.* In case of "Closure" employer closes the business, and not the closure of the business itself, as in "closure". Experience has shown the "Lock-out" is weapon of employees to compel the employer to accept their demands.

(*ix*) *Retrenchment.* It is the termination of the service of a workman for any reason whatever except as a punishment inflicted by way of disciplinary action. It does not involve retirement of worker or termination of the service of a worker on the ground of continued ill health.

(*x*) *Settlement.* "Settlement" means a settlement, arrived at during the conciliatin proceedings and includes a written agreement between the employer and workmen.

(*xi*) *Strike.* "Strike" is refusal under a common understanding of any number of workers to continue to work or to accept employment.

(*xii*) *Workman.* "Workman" means any person (including an apprentice) employed in any industry to do any skilled or un-skilled, manual, supervisory, technical or electrical work for hire or reward.

43.2.1. Authorities Under The Act

(*a*) Works Committees

A Works Committee is constituted in any industrial establishment in which 100 or more workers are employed and have been employed on any day in preceding 12 months by an em-

er. This committee consists of representatives of employer and workers but the number of resentatives of the employer should not be more than that of workers.

(b) Conciliation Officers

Conciliation officers are appointed by the State Governements for the industries in a speci- l area permanently or for a limited period. Main duty of conciliation officer is to mediate in settlement of industrial disputes.

(c) Board of Conciliation

A Board of Conciliation is constituted by the State Governements by notification in the ficial Gazette. It consists of a Chairman and two or four other members. Chairman is an dependent person and other members are persons appointesd in equal numbers to represent e parties of the dispute. The duty of the board is to promote the settlement of an industial pute.

Power of the Board. (i) A member of a board can enter the premises of the establishment for e purpose of enquiry into any industrial dispute after any reasonable notice.

(ii) Every Board has the same powers as vested as in a civil court.

(iii) Every enquiry by a Board is treated to be a judicial proceeding within the meaning of sections 193 and 228 of the Indian Penal Code.

(d) Courts of Inquiry

These courts of inquiry are also appointed by the State Government by notification in the)fficial Gazette, to inquire into any matter appearing to be connected with industrial dispute fter conducting the inquiry into the matters referred, they report to the Government within 6 nonths from the commencement of its inquiry.

(e) Labour Courts

State Governments constitute Labour Courts for the adjudication of industrial disputes for ny matter specified in the second schedule.

The matters specified in the second schedule are:

(i) The legality of an order passed by an employer.

(ii) The application and interpretation of standing orders.

(iii) Discharge or dismissal of workers including reinstatement or grants of relief to workmen wrongly dismissed.

(iv) Withdrawal of any customary privilege.

Labour court shall consist of one person only and who should have any of the following qualifications:

(a) he is, or has been a Judge of a High court, or

(b) he has been a District Judge for at least 3 years.

(f) Industrial Tribunals

State Governments may also constitute one or more Industrial Tribunals for the adjudication of industrial disputes. A tribunal shall consist of one person only to be appointed and he should have the minimum qualifications as required for that of labour courts.

The tribunal adjudicates of industrial disputes relating to any matter in the second schedule (jurisdiction of labour courts) or the third schedule. The third schedule mentions the following matters:

1. Wages, including the period and mode of payment.

2. Compensatory and other allowances.
3. Hours of work and rest intervals.
4. Leave with wages and holidays.
5. Bonus, profit-sharing, provident fund and gratuity
6. Classification by grades.
7. Rules or discipline.
8. Rationalisation.
9. Retrenchment or workers and closure of establishment.

(*g*) **National Tribunals**

Central Government may constitute one or more National Industrial Tribunals for adjudication of industrial disputes involving question of national importance. It consists of only one person and who should have the qualifications as mentioned for that of Labour Courts. It can also take up the industrial disputes which are of such a nature that industrial establishments situated in more than one state are likely to be increased in or affected by such disputes.

No person can continue in the office of the presiding officer of a Labour Court Tribunal or National Tribunal after he has attained the age of sixty five years.

43.2.2. Strikes and Lock Outs

(*a*) **Strikes.** No person employed in public utility services shall go on strike:

(*i*) without giving a notice of strike to the employer within 6 weeks before striking;or
(*ii*) within 14 days of giving such notice; or
(*iii*) before the date mentioned in the notice; or
(*iv*) during the pendency of conciliation proceedings.

(*b*) **Lock Outs.** No employer carrying on any public utility service shall lock out:

(*i*) without giving a notice of lock-out to the workers in a prescribed manner within 6 weeks before locking out;
(*ii*) within 14 days of giving such notice;
(*iii*) before the date specified in the notice;
(*iv*) during the pendency of any conciliation proceedings.
(*v*) during the period of operation of a settlement of award.

Illegal Strike and Lock-Out.

A strike or lock-out is illegal in following circumstances, in public utility services like railways, postal and telephone service, industry supplying power, light or water to public, transport for the carriage of goods or passengers by air, any system of public conservancy or sanitation or any industry specified in the first schedule of the Act;

(*i*) If it has begun without notice to the employer or workmen, as the case may be , within six weeks before striking, or
(*ii*) If it has begun within 14 days of giving notice; or
(*iii*) If it has begun during the pendency of conciliation proceedings and seven days after the conclusion of such proceeding.

A strike or lock-out in public utility service is illegal, if it is commenced;

(*i*) during the pendency of conciliation proceedings and seven days after the conclusion of such proceedings; or

(ii) during the pendency of proceedings before a Labor Court, Tribunal or National Tribunal or Arbitrator and two months after the conclusion of such proceedings; or

(iii) during the period of operation of a settlement of award.

Penalty of Illegal Strikes and Lock-Outs

Any worker, who commences or continues strike, which is illegal under this Act, shall be punishable with imprisonment upto one month or fne upto Rs. 50 or both.

Penalty for instigation. Any person who instigates other to take part in strike or lockout, which is illegal under this act, shall be punishable with imprisonment upto 6 months or a fine upto Rs. 1000 or both.

10.2.3. Lay-off and Retrenchment

1. **Continuous Service.** As per section 25-B, a workman shall be deemed to be in continuous service under an employer, if during a period of twelve calender months preceding the date with reference to which calculation is to be made actually worked for not less than:

(a) 190 days in the case of a workman employed below the ground in a time; and

(b) 240 days in other cases.

The number of days in which a workman has actually worked under an employer shall include the days on which:

(i) he has been on leave with full wages earned in the previous years.

(ii) he has been absent due to temporary disablement caused by accident arising out of and in the course of his employment.

(iii) in the case of a female, she has been on maternity leave upto 12 weeks.

2. Lay-off. "Lay-off" means the failure, refusal or inability of an employer on account of shortage of coal, power or raw materials, of the accumulation of stock or the breakdown of machinery or for any other reasons, to give employment to a workman and who has not been retrenched.

(A) Right of Workmen laid off for Compensation

Whenever a workman who has completed more than one year of continuous service under an employer is laid off, he shall be paid by the employer for all days during which he is so laid off (for a maximum period of 45 days), compensation equal to 50% of the total of the basic wages and dearness allowance.

Provided that if a person so laid off is retrenched, then the compensation paid to the workmen for having been laid off during the preceding 12 months may be set off against compensation payable for retrenchment.

(B) Workmen not entitled to compensation in certain cases

No compensation shall be payable to a workman who has been laid off in following conditions:

(i) If he refuses to accept any alternative employment in the same establishment or in any other establishment belonging to the same employer situated within 5 miles (8 km) from the establishment to which he belongs.

(ii) If he does not present himself for work at the establishment at the appointed time during normal working hours at least once a day.

(iii) If such laying off is due to strike or slowing down of producion on the part of workmen in another part of the establishment.

3. Retrenchment. As per section 25-F, no workman employed in an industry who had put in more than one year's continuous service under an employer shall be retrenched until:

(*i*) The workman has been given one month's notice in writing indicating the reason for retrenchment and the period of notice has expired or the workman has been given in lieu of such notice wages for the period of notice:

Provided that not such notice shall be necessary if the retrenchment is under an agreement which specifies a date of the termination of service.

(*ii*) The workman has been paid at the time of retrenchment, compensation which shall be equivalent to 15 day's average pay for every completed year of continuous service or any part thereof in excess of 6 months.

4. Closure of an undertaking. Where an undertaking is closed down for any reason whatsoever, every man who has completed the continuous service of at least one year in that undertaking, is entitled to notice and compensation in accordance with the provisions of section 25-F(*i.e. as if the workman had been retrenched*). This compensatin shall be paid before such closure. He should also be served with a notice as mentioned earlier.

43.3. WORKMEN'S COMPENSATION ACT, 1923

It is an Act to provide for payment by certain classes of employers to their workmen of compensation for injury by accident. Thus this Act protects the workers as far as possible from hardship arising from accidents. The object of awarding compensation is to replace the actual loss suffered by the workmen. It came into force from 1st July, 1924.

Definitions.

Following are some definitions given in this Act:

Dependent. Dependent means any of the following relatives of a deceased workman namely:

(*i*) a wife, a minor legitimate or adopted son an unmarried legitimate or adopted daughter, or a widowed mother; and

(*ii*) if wholly or in part dependent on the earnings of the workman at the time of his death, a widower, a parent other than a widowed mother, a minor illegitimate son, and unmarried illegitimate daughter, a daughter illegitimate or illegitimate of married and a minor or if widowed, a minor brother, an unmarried or widowed sister, a widowed daughter-in-law, a minor child of deceased son, a paternal grand parent if no parent is advice

Partial Disablement. This disablement is of temporary nature and the earning capacity is reduced due to disablement is of permanent nature. List of injuries resulting permanent partial disablement is given in Schedule I.

Total Disablement. It means such disablement whether of a temporary or permanent nature, which incapacitates a workman from all work which he was capable of performing at the time of accident resulting in such disablement.

Permanent total disablement shall be deemed to result from injuries where the aggregate percentage loss of earning capacity (as specified in Schedule I) amounts to one hundred percentage or more.

Wages. It includes any privilege or benefit which is capable of being estimated in money other than a travelling allowance or any other contributions paid towards pension etc.

Workman. It means any person who is employed in any such capacity specified in Schedule II on monthly wages.

Employer's Liability of Compensation

If a personal injury is caused to a workman by accident arising out of and in the course of his employement, his employer shall be liable to pay compensation in accordance with the provisions of this Act.

Provided that the employer shall not be liable:

(a) in respect of any injury which disables the workman for a period less than three days;

(b) in respect of any injury not resulting in death caused by an accident which is directly attributed to:

(i) the workman was under the influence of drink or drugs; or

(ii) wilful disobedience of the worker to an order issued for the purpose of securing safety of the worker;

(iii) wilful removal or disregard of any safety guard.

But if the worker dies of an accident due to the above reasons, the employers have to pay compensation.

Amount of compensation

1. Subject to the provisions of this Act, the amount of compensation shall be as follows namely:

(a) **Where death results from the injury**	an amount equal to fifty per cent of the monthly wages of the deceased workman multiplied by the relevant factor; or an amount of eighty thousand rupees, whichever is more;
(b) **Where permanent total disablement results from the injury**	an amount equal to sixty percent of the monthly wages of the injured workman multiplied by the relevant factor; or an amount of ninety thousand rupees; whichever is more;

Explanation I. For the purposes of clause (*a*) and clause (*b*) "relevant factor", in relation to a workman means the factor specified in the second coloumn of Schedule IV against the entry in the first coloumn of the schedule specifying the number of years which are the same as the completed years of the age of the workman on his last birthday immediately preceding the date on which the compensation fell due.

Explanation II. Where the monthly wages of a workman exceed four thousand rupees, his monthly wages for the purposes of clause (*a*) and clause (*b*) shall be deemed to be four thousand rupees only.

(c) Where permanent partial disablement results from the injury.	(*i*) in the case of the injury specified in Part II of Schedule I such percentage of the compensation which would have been payable in the case of permanent

total disablement as is specified therein as being the percentage of the loss of earning capacity caused by that injury.

(*ii*) in the case of an injury not specified in Schedule I; such percentage of the compensation payable in the case of permanent total disablement as in proportionate to the loss of earning capacity (as assessed by the qualified medical practitioner) permanently caused by the injury.

Explanation. Any payment or allowance which the workman has received from the employer toward his medical treatment shall not be a payment or allowance received by him by way of compensation within the meaning of clause (*a*) of the provision.

3. On the ceasing of the disablement before the date on which any half-monthly payment falls due there shall be payable in respect of that half-month a sum proportionate to the duration of the disablement in that half-month.
4. If the injury of the workmen results in his death, the employer shall, in addition to the compensation shall pay a sum of Rs 2500 towards the expenditure of the funeral.

Compensation to be paid when due and penalty for default:

1. Compensation shall be paid as soon as it falls due.
2. In cases where the employer does not accept the liability for compensation to the extent claimed, he shall be bound to make provisional payment based on the extent of liability which he accepts, and such payment shall be deposited with the Commissioner or made to the workman, as the case may be, without prejudice to the right of the workman to make any further claim.
3. Where any employer is in default in paying the compensation due under this Act within one month from the date it fell due, the Commissioner may direct that, in addition to the amount of the arrears, simple interest at the rate of twelve percent annum on the amount due together with, if in the opinion of the Commissioner there is no justification for the delay, a further sum not exceeding fifty percent, of such amount, shall be recovered from the employer by way of penalty. in the circumstnces of the case and the injury resulted disablement then he shall not have the right for compensation of the disablement.

Distribution of Compensation

No payment of compensation in respect of workman whose injury has resulted in death and no payment of lump sum as a compensation to a woman or a person under a legal disability, shall be made except through commissioner. If any employer has made the payment directly, it shall not be considered to be payment of compensation.

However in the case of diseased workman, an employer may make an advance up 3 months wages to the dependents of the diseased worker for metting the immediate expenses. This advance shall be deducted by the commissioner from the amount of compensation and repaid to the employer.

Occupational diseases

If a worker suffers any of the specified occupational disease, (the list of which is given i Schedule III of the Act) and he has worked in factory for at least six months, the employer ha to pay compensation. Some of the occupational diseases are compressed air illness, poisoning b lead, phosphorus, mercury, benzene, arsenic, radium and other radioactive substances, X-ray etc.

Commissioner

State Government may by notification in official gazette appoint any person to be a commis- sioner for workmen's compensation for a specified area. The Commissioner has all the power of a civil court.

13.4. THE MINIMUM WAGES ACT, 1948

Introduction

The concept of minimum wages first evolved with reference to remuneration of workers in those industries where the level of wages was substantially low as compared to the wages for similar types of labour in other industries. As far back as 1928, the International Labour Con- ference of International Labour Organisation, at Geneva adopted a draft convention on mini- mum rates of wages can be fixed for workers employed in industries in which no arrangements exist for the effective regulation of wages and where wages are exceptionally low. The need of a legislation for fixation of minimum wages in India received an impetus and Bill to provide for machinery for fixing and periodical revising or minimum wages was prepared and discussed at the 7th session of the Indian Labour Conference in November, 1945. It was introduced in the Central Legislative Assembly in 11th April, 1946.

The justification for statutory fixation of minimum wage is obvious. Such provisions which exist in more covered by Schedule to the Bill. The items in the Schedule are those where there is a big chance of exploitation of labour. After sometime when some experience is gained, more categories of employment can be added and the Bill provides for addition to the Schedule. A higher period is allowed for fixation of minimum wages for agricultural labour as administra- tive difficulties in this case will be more than in other employments covered by the Schedule. The Bill provides for periodical revision of wages fixed.

In cases where an employer pays less than the minimum wages fixed by Provincial Govern- ment a summary procedure has been provided for recovery of the balance with penalty and subsequent prosecution of the offending party:

Important Provisions of the Act

1. **Interpretation.** In this Act, unless there is anything repugnant in subject or context,-
   (a) "adolescent" mean a person who has completed his fourteenth year of age but has not completed his eighteenth year;
   (aa) "adult" means a person who has completed his eighteenth year of age;
   (b) "appropriate government" means-
      (i) in relation to any scheduled employment carried on by or under the authodity of the Central Government or a railway administration or in relation to a mine, oil field or major port, or any corporation established by a Central Act, the Central Government, and
      (ii) in relation to any other scheduled employment, the State Government;

(*bb*) "child" means a person who has not completed his fourteenth year of age;

(*c*) "competent authority" means the authority appointed by the appropriate Government by notification in its Official Gazette to ascertain from time to time the cost of living index number applicable to the employees employed in the schedule employments specified in such notification;

(*d*) "employer" means any person who employs, whether directly or through another person,or whether on behalf of himself or any other person, one or more employees in any scheduled employment in respect of which minimum rates of wages have been fixed under this Act;

(*e*) "scheduled employment" means an employment specified in the Schedule, or any process or branch or work forming part of such employment;

(*f*) "wages" means all remuneration capable of being expressed in terms of money, which would if the terms of the contract of employment, express or implied, were fulfilled, by payable to a person employed in respect of his employment or of work done in such employment or of work done in such emplyment [and included house rent allowance], but does not include-

(*i*) the value of

(*a*) any house accommodation, supply of light, water, medical attendance, or

(*b*) any other amenity or any service excluded general or special order of the approriate Government;

(*ii*) any contribution paid by the employer to any Pension Fund or Provident Fund or under any scheme of social insurance;

(*iii*) any travelling allowance or the value of any travelling concession;

(*iv*) any sum paid to the person employed to defray special expenses entailed on him by the nature of his employment; or

(*v*) any gratuity payable on discharge;

(*g*) "employee" means any person who is employed for hire or reward to do any work, skilled or unskilled, manual or clerical, in a schedule employment in respect of which minimum rate of wages have been fixed; and includes an out-worker to whom any articles or materials are given out by another person to be made up, cleaned, washed, altered, ornamented, finished, repaired, adapted or otherwise processed for sale for the purposes of the trade or business of that other person where the process is to be carried out either in the home the out-worker or in some other premises not being permises under the control and management of that other person; and also included an employee declared to by employee by the appropriate Government; but does not include any member of the Armed Forces of the Union.

2. **Fixing of minimum rates of wages.** 1. The appropriate Government shall, in the manner hereinafter provided,-

(*a*) fix the minimum rates of wages payable to employees employed in an employment specified in Part I or Part II of the Schedule and in an employment added to either Part by notifiction:

Provided that the appropriate Government may, in respect of employees employed in an employment specified in Part II of the Schedule, instead of fixing minimum rates of wages under this clause for the whole State, fix such rates for a part of the State or for any specified class or classes of such employment in the whole State or part thereof;

(b) review at such intervals, as it may think fit, such intervals not exceeding five years, the minimum rates of wages so fixed and revise the minimum rates, if necessary.

(4) Notwithstanding anything contained in sub-section (1), the appropriate Government refrain from fixing minimum rates of wages in respect of any scheduled employment in there are in the whole State less than one thousand employees engaged in such employ- but if at any time, the appropriate Government comes to a finding after such inquiry, as make or cause to be made in this behalf, that the number of employees in any scheduled yment in respect of which it has refrained from fixing minimum rates of wages has risen thousand or more, it shall fix minimum rates of wages payable to employees in such ment as soon as may be after such finding.

2. The appropriate Government may fix-

(a) a minimum rate of wages for time work (hereinafter referred to as' a minimum time rate');

(b) a minimum rate of wages for piece work (hereinafter referred to as' a minimum piece rate');

(c) a minimum rate of remunertion to apply in the caseof employees employed on piece work for the purpose of securing to such employees a minimum rate of wages on a time work basis (hereinafter referred to as' a guaranteed time rate');

(d) a minimum rate (whether a time rate or a piece rate) to apply in substitution for the minimum rate which would otherwise be applicable, in respect of overtime work done by employees (hereinafter referred to as 'overtime rate').

3. In fixing or revising minimum rates of wages under this section-

(a) different minimum rates of wages may be fixed for -

(i) different scheduled employments;

(ii) different classes of work in the same scheduled employments

(iii) adults adolescents, children and apprentices;

(iv) different localities;

(b) minimum rates of wages may be fixed by any one or more following wage-periods, namely:-

(i) by the hour,

(ii) by the day

(iii) by the month, or

(iv) by such other larger wage-period as may be prescribed, and where such rates are fixed by the day or by the month, the manner of calculating wages for a month or for a day, as the case may be, may be indicated:

3. **Minimum rates of wages.** Any minimum rate of wages fixed or revised by the appropriate Government in respect of scheduled employments may consist of -

(i) a basic rate of wages and a special allowance at a rate to be adjusted, at such intervals and in such manner as the appropriate Government may direct, to accord as nearly as practicable with the variation in the cost of living index number applicable to such workers (hereinafter referred to as the 'cost of living allowance'); or

(ii) a basic rate of wages with or without the cost of living allowance, and the cash value of the concessions in respect of supplies of essential commodities at concession rates, where so authorised; or

(*iii*) an all-inclusive rate allowing for the basic rate, the cost of living allowance and the cash value of the conscessions, if any.

As defined by the Supreme Court minimum wage should ensure not only the sustenance of the employee and his family but should be enough to preserve his efficiency as a worker. This would include his medical needs, proper leisure and a decent standard of life.

4. Procedure for fixing and revising minimum ways. (1) In the fixing minimum rates of wages in respect of any scheduled employment for the first time under this Act or in revising minimum rates of wages so fixed, the appropriate Government shall either,

(*a*) appoint as many committess and sub-committees as it considers necessary to hold enquiries and advise it in respect of such fixation or revision, as the case may be, or

(*b*) by notification in the Offical Gazette, publish its proposal for the information of persons likely to be affected thereby and specify a date not less than two months from the date of the notification, on which the proposals will be taken into consideration.

(2) After considering the advice of the committee or committees appointed under clause (*a*) of sub-section 1, or as the case may be, all represetations received by it before the date specified in the notification under clause (*b*) of that sub-section, the appropriate Government shall, by notification in the Official Gazettee, fix, or, as the case may be, revise the minimum rates of wages in respect of each scheduled employment, and unless such notification otherwise provides, it shall come into force on the expiry of three months from the date of its issue.

5. Advisory Board. For the purpose of co-ordinating the work of committees and sub-commitees and advising the appropriate Government generally in the matter of fixing and revising minimum rates of wages, the appropriate Government shall appoint an Advisory Board.

6. Central Advisory Board. (1) For the purpose of advising the Central and State Governments in the matters of the fixation and revision of minimum rates of wages and other matters under this Act and for co-ordinating the work of the Advisory Board, the Central Government shall appoint a Central Advisory Board.

(2) The central Advisory Board shall consist of persons to be nominated by the Central Government representing employers and employees in the scheduled employments, who shall be equal in number, and independent persons not exceeding one-third of its total number of members; one of such independent persons shall be appointed the Chairman by the appropriate Government.

7. Composition of Committees, etc. Each of the committees, sub-committees and the Advisory Board shall consist of persons to be nominated by the appropriate Government representing employers and employees in the scheduled employments, who shall be equal in number, and independent persons not exceeding one third of its total number of members; one of such independent person shall be appointed the Chairman by the appropriate Government.

8. Fixing hours for normal working day, etc. (1) In regard to any scheduled employment minimum rates of wages in respect of which have been fixed under this Act, the appropriate Government may—

(*a*) fix the number of hours of work which shall constitute a normal working day, inclusive of one or more specified intervals;

(*b*) provide for a day of rest in every period of seven days which shall be allowed to all employees or to any specified class of employees and for the payment of remuneration in respect of such days of rest ;

(*c*) provide for payment for work on a day of rest at a rate not less than the overtime rate.

(2) The provisions of sub-section (1) shall, in relation to the following classes of employees, apply only to such extent and subject to such conditions as may be presecribed :

(a) employees engaged on urgent work, or in any emergency which could not have been foreseen or prevented;

(b) employees engaged in work in the nature of preparatory or complementary work which must necessarily be carried on outside the limits laid down for the general working in the employment concerned;

(c) employees whose employment is essentially intermittent;

(d) employees engaged in any work which for technical reasons has to be completed before the duty is over;

(e) employees engaged in work which could not be carried at times dependent on the irregular action of natural forces.

(3) For the purpose of clause (c) of sub-section 2, employment of an employee is essentially intermittent when it is declared to be so by the appropriate Government on the ground that the daily hours of duty of the employee, or if there be no daily hours of duty as such for the employee, the hours of duty, normally include periods of inaction during which the employee may be on duty but is not called upon to display either physical activity or sustained attention.

9. **Wages of worker who works for less than normal working day.** If an employee whose minimum rate of wages has been fixed under this Act by day works on any day on which he was employed for a period of less than the requisite number of hours constituting a normal working day, he shall, save as otherwise hereinafter provided, be entitled to receive wages in respect of work done by him on that day as if he had worked for a full normal working day :

Provided, however, that he shall not be entitled to receive wages for a full normal working day;

(i) in any case where his failure to work is caused by his unwillingness to work and not by the omission of the employer to provide him with work, and

(ii) in such other cases and circumstances as may be prescribed.

10. **Wages for two or more classes of work.** Where an employee does two or more classes of work to each of which a different minimum rate of wages is applicable, the amployer shall pay to such employee in respect of the time respectively occupied in each such class of work, wages at not less than the minimum rate in force in respect of each such class.

11. **Minimum time rate wages for piece work.** Where an employee is employed on piece work for which minimum time rate and not a minimum piece rate has been fixed under this Act, the employer shall pay to such employee wages at not less than the minimum time rate.

12. **Maintenance of registers and records.** (1) Every employer shall maintain such registers and records giving such particulars of employees employed by him, the work performed by them, the wages paid to them, the receipts given by them and such other particulars and in such form as may be prescribed.

(2) Every employer shall keep exhibited, in such maner as may be prescribed, in the factory, workshop or place where the employees in the scheduled employment may be employed, or in the case of out-workers, in such factory, workshop or place as may be used for giving out-work to them, notices in the prescribed form containing prescribed particulars.

(3) The appropriate Government may, by rules made under this Act, provide for the issue of wage books or wage slips to employees employed in any scheduled employment in respect of

which minimum rates of wages have been fixed and prescribed, the manner in which entries shall be made and authenticated in such wage books or wage slips by the employer or his agent.

13. Penalties for certain offences. Any employer who—

(*a*) pays to any employee less than the minimum rates of wages fixed for that employee's class of work, or less than the amount due to him under the provisions of this Act; or

(*b*) contravenes any rule or order made regarding fixing of work, shall be punishable with imprisonment for a term which may extend to six months, or with fine which may extend to five hundred rupees, or with both:

Provided that in imposing any fine for an offence under this section, the court shall take into consideration the amount of any compensation already awarded against the accused in any proceedings.

14. Exemption of employer from liability in certain cases. Where an employer is charged with an offence against this Act, he shall be entitled, upon complaint duly made by him, to have any other person whom he charges as the actual offender, brought before the court at the time appointed for hearing the charge; and if, after the commission of the offence has been proved, the employer proves to the satisfaction of the court<196>

(*a*) that he has used due diligence to enforce the execution of this Act; and

(*b*) that the said other person committed the offence in questions without his knowledge, consent or connivance,

that other person shall be convicted of the offence and shall be liable to the like punishment as if he were the employer and the employer shall be discharged:

Provided that in seeking to prove, as aforesaid, the employer may be examined on oath, and the evidence of the employer or his witness, if any, shall be subject to cross examination by or on behalf of the person whom the employer charges as the actual offender and by the persecution.

15. Power of State Government to add to Schedule. The appropriate Government, after giving by notification in the Official Gazette not less than three months' notice of its intention so to do, may, by like notification, add to either Part of Schedule any employement in respect of which it is of opinion that minimum rates of wages should be fixed under this Act, and thereupon the Schedule shall in its application to the State be deemed to be ammended accordingly.

16. Power of the Central Government to make rules. The Central Government may, subject to the conditions of previous publication, by notification in the Official Gazette, make rules prescribing the terms of office of the members, the procedure to be followed in the conduct of business, the methdo of voting, the manner of filling up casual vacancies in membership and the quorum necessary for the transaction of business of the Central Advisory Board.

QUESTIONS

1. Define the following as per Factories Act :
   (*a*) Manufacturing Process (*b*) Adolescent
   (*c*) Worker (*d*) Week
   (*e*) Factory (*f*) Occupier.
2. What is a factory? How can it be registered ?
3. What are different health provisions mentioned in the Factories Act ?

42

Industrial Safety

42.1 INTRODUCTION

Safety is very important aspect for any industry as an accident free work environment boosts the morale of the team members working in any hazardous situation. Recognizing these facts industries involving various hazards and risks prepare their own safety policy, safety manual and have a separate department/section for safety so as to create proper awareness and provide the know-how about the safety. Adherence to the useful information, rules and mandatory requirements governing the safety and guidelines will help prevent occupational injuries and accidents which constitute an unavoidable and needless waste of human and material resources.

Safety means continuing and healthful living without injury. Safety is freedom from harm or danger of harm. The word safety also refers to the precautions people take to prevent accidents, harm, danger, damage, loss and pollution. Safety also deals with improvements in working conditions for better health. Management is responsible to provide safe working condition and individual safety.

All undesired events in a workplace which can give rise to death, ill health, injury, damage or loss need to be thoroughly investigated, people be trained to safeguard against them, and need to be eliminated. Similarly, all hazards i.e. source/situation capable of injury, ill health, damage to property or workplace environment etc. should be identified and action plan drawn for safeguard against them.

It is not only sufficient to care of safety but other two inter-related aspects, *viz.*, health (well being of employees) and environment are also given equal importance and considerations. All these three elements i.e. safety, health and environment (also known as SHE) are inter-related and affect each other. For instance, if health of employee is not given due regards, it may lead to accidents. If industry pollutes the environment around workplace, it will affect health of employees which may ultimately affect production. It is only if health and environment are in control then safety can be ensured. Each industry, therefore, has certain obligations towards keeping good environment and also towards health of people.

Occupational health hazards means:

1. Conditions that cause legally compensable illness,
2. Any conditions in the workplace that impair the health of employees enough to make them lose time from work or to work at less than full efficiency.

Various health hazards that may cause sickness, impaired health or significant discomfort or inefficiency in workplace are:

(*a*) physical hazards like noise, vibration, thermal stress, radiations, ill-lighting;
(*b*) chemical hazards like dust, fumes, fibres, gases, vapours, mists and smoke;
(*c*) biological hazards;
(*d*) ergonomic hazards;
(*e*) mechanical hazards; and
(*f*) psychological hazards.

For works which by their very nature exposes workers to hazards, appropriate preventing measures should be taken to avoid any danger to safety and health of workers, the preventive measures should place emphasis on the need to eliminate or reduce the hazard at the source.

42.2. INDUSTRIAL SAFETY

Millions of Industrial accidents occur every year. In these accidents, lacs of workers lose their lives every year in the world. Accidents may cause injury which sometimes result in death or permanent total displacement. Accidents can be defined as "any occurrence that interferes with the orderly progress of activity".

Statistics shows that 98% accidents can be avoided and only 2% cannot be prevented.

Losses due to accidents

Now-a-days, serious attention is being paid is this matter, because now it has been clearly understood that these accidents cause heavy losses. In these losses, some are direct losses and are some indirect losses.

1. Direct losses. These are the losses to the employer, which he pays to the worker for compensation. Employer also pays for medical expenses incurred on the worker. This type of losses can be measured in terms of money.

2. Indirect losses. These losses arise form the following sources:

- Loss of time of the injured person.
- Loss of time of his fellow workers, who stop work at the time of accident to help him or to show sympathy or for curiosity.
- Loss of time of supervisors:
  - — in assisting injured worker;
  - — in investigation and preparing a report of accident;
  - — in making alternative arrangement;
  - — in selecting and training the new worker to fill the vacancy if accident causes death of the worker.
  - — Loss due to damage caused to machines.
  - — Loss due to reduction in the efficiency of worker when he returns after recovery
  - — Loss due to the reduction in the efficiency of the other workers due to fall in their morale.

- *Losses to the injured worker.* Injured worker suffers following losses
  - Loss of his income.
  - Loss due to medical expenditure.
  - Pain felt by worker, which cannot be compensated.

Causes of Accidents

To minimise the accidents it is necessary to know about the cause of accidents. General causes of accidents are given below:

1. *Accidents due to dangerous machines.* These accidents occur from boiler, pressure vessels, prime movers, transmission system etc.
2. *Unsafe physical condition.* It includes improper guards, improper illumination, improper ventilation, unsafe clothing.
3. *Moving objects.* Sometimes moving object or falling object causes accidents.
4. *Personal factors.* Sometimes accidents occur due to some personal factors like lack of knowledge, physical weakness.
5. *Unsafe acts.* It is violation of commonly accepted safe procedure. These include (*i*) working at unsafe speed, (*ii*) loading machines beyond capacity, (*iii*) not using safety devices, (*iv*) adopting unsafe procedure.
6. *Electrical causes.* Some of the important causes are:
   - Do not providing proper protecting devices.
   - Not obeying proper instructions and not following safety precautions.
   - Failure to use insulated pliers, screw-drivers and rubber gloves etc.
7. *Exposure to harmful substances.* Injuries are also caused due to exposure to harmful substances, like toxic gases, fumes, dust, vapours, mist and aerosols.

Types of Industrial Accidents

Industrial accidents may be divided in two general classes:

(a) ***Machinery Accidents.*** These accidents are caused by inadequate safeguards of machines. Machinery accidents can be reduced by providing safety guards on belts, gears etc., proper design and arrangement of machines.

(b) ***Non-Machinery Accidents.*** These accidents are caused due to personal reasons such as age, physical weakness, inexperience and carelessness or from the plant conditions such as poor ventilation and illumination etc.

Non-machinery accidents are generally caused by different factors, some of them are:

(*i*) **Age.** It has been seen that accidents are more frequent with younger persons.

(*ii*) **Experience.** Rate of accidents for more experienced workers is less than those of less experienced workers.

(*iii*) **Physical Condition.** Experiments have shown that minor illness like sore throat, headache etc. are responsible for accidents to a large extent. These small frequent illnesses are responsible for lowering general health.

(*iv*) **Rate of production.** This factor should also be considered while considering the causes of accidents. The study in this aspect shows that number of accidents increases with the increase in production rate.

(*v*) **Atmospheric Conditions.** Study has shown that accidents are found to be mini-

mum at a temperature of 67.5° F (nearly 20°C). At higher temperatures, rate of accidents increase and after 24°C, rate of accidents increases considerably.

(*vi*) **Illumination.** Illumination also affects the accident liability. Dim illumination raises frequency of accidents. In day light, accidents frequency is less as compared to artificial illumination.

42.3. FATIGUE

It is that state of the worker by which power to work is decreased and pleasure taken in work is reduced. There are so many factors which promote fatigue. Some of them are : repetition of the same work again and again, velocity of wheels, whirling of hammer, high speeds at which machines and tools are moving, the different types of sounds and vibrations. At the same time price-rate and financial incentive schemes encourage the worker to work at a faster rate. In such conditions of work tension is increased and these factors (namely tension, speed, repetition and more strain, etc.) promote fatigue.

Thus, the fatigue is responsible to reduce the power to work with the passing of time. In addition to reduction in the production, continued fatigue also affects adversely the psychology of the worker. When he is tired he cannot think clearly, he readily imagines injustice, he becomes nervous, he becomes angry very quickly and an angry men can do anything without hesitation, which he would have not done in the good state of mind.

It also affects the personal life of the worker because a physically exhausted and completely tired man cannot perform adequately the functions as head of the family . Thus fatigue not only affects the production but also psychological state of mind, temperament and his personal life.

It has been seen that suitably arranged rest pauses reduce the number of accidents to a large extent. As these reduce the fatigue, therefore accident which occur due to excess fatigue are reduced to a large extent.

Experiments have shown that when only one lunch-break is provided then accidents tend to increase with each successive hour or work in the morning and reaching a maximum approximately at 11 A.M., then reduces in the noon. Number of accident tend to increase with each successive hour of work in the morning and reaching an maximum approximately at 11 A.M., then reduces in the noon. Number of accidents again starts rising, reaching maximum value towards the later part of the afternoon but a slight drop in the last hour (probably it occurs due to the fact that in this hour, speed of work decreases and worker feels relaxed mentally thinking that shortly after sometime he will be free.

Necessary and Unnecessary Fatigue. The purpose of 'Fatigue Study' is to reduce its influence in decreasing production and unpleasant feelings. For this purpose fatigues have been characterise a necessary and unnecessary fatigues. As all the works involve fatigue therefore total elimination is impossible, it can be only reduced. Thus when work is carried out, fatigue will essentially be there.

The fatigue caused by unfavourable working methods and conditions of work is known as "Unnecessary Fatigue". This requires an avoidable discharge of energy hence capacity of work decreases unnecessarily. This type of fatigue can be avoided to a large extent.

Elimination of unnecessary Fatigue.

As explained earlier, unnecessary fatigue can be eliminated. Here some of the considerations in this respect are given as under:

(i) **Influence of Hours of Work.** Experiments have shown that average hourly output varies with length of the working day. If the length of working hours in a day is reduced (though upto certain limit) the the average hourly output increases. So many experiments have been conducted by varying the working hours, which shows that hourly output reaches maximum value at about seven to eight hours a day or 40 to 48 hours a week.

(ii) **Influence of Rest Pauses.** Production and fatigue are influenced considerably by the opportunity provided to the worker for rest during the course of work. Experiments have shown that when number of rest pauses are increased then production is also increased-sometimes upto 20%. While setting up the duration and number of rest pauses it should be considered that most favourable rest pause is that which will conserve all the the benefits of incitement or warming and at the same time eliminate fatigue as much as possible. Thus, too long rest pauses are disadvantageous because loss of warming will occur when worker remains away from work for a long time. Research in this regard has shown that 5 minutes rest pause after every 80 minutes work is most desirable.

(iii) **Influence of Illumination.** Insufficient illumination causes heavy strain on the eyes of worker and thus resulting unnecessary fatigue. Experiments have shown that illumination of 215 lumens/m^2 is most satisfactory.

(iv) **Influence of Atmospheric Conditions.** Atmospheric conditions have very important role in determining the efficiency and well being of the worker. An industrial worker spends most of his time in an environment where heat, moisture, fumes, smokes etc. ar constantly evolved in the manufacturing processes. The factor affects the health and comfort of the worker and hence the quality and quantity of production as well as general efficiency of the worker. Efficiency of the worker is also affected by the temperature, humidity, and air circulation.

(v) **Elimination of Unnecessary Efforts.** Inefficient working methods, bad arrangement of machines and tools are responsible for a waste of human efforts and thus dissatisfaction in work, reduced output and quality.

When methods are selected based on Time and Motion Study and machines arranged systematically then efforts and time of the worker can be saved to a large extent. Work should be carried out at a place and in a position of most comfort.

(vi) **Influence of Speed.** Speed of the belt, flywheel, gears, coupling etc. may effect the efficiency of workers. The speeds affect the work by increasing the fatigue and discomfort.

(vii) **Effect of Noise.** Observations have suggested that excessive noise may adversely affect output and fatigue. In the atmosphere of noise and vibrations workers feel discomfort.

42.4. WORKING CONDITIONS

Working conditions also affect the work. When a worker is allowed to work in good working condition then his efficiency increases a lot. Bad environment or working condition may ultimately lead to:

- Physiological Fatigue;
- Mental Fatigue *i.e.*, feeling of boredom; and
- Decreased efficiency.

In earlier days no attention was paid on the working conditions like illumination, humidity, air ventilation and temperature etc. But its importance is now being felt.

Good working conditions produce n good effect on the worker's psychology in addition to greater efficiency. In such conditions worker will always be ready to offer his services an co-operation. It is necessary for the success of an industry that workers should have good co-ordination.

A worker working in an atmosphere of badly **ventilated and hot conditions** feel discomfort and fatigue. His efficiency will decrease and he will not be able to take interest in the work.

Proper ventilation takes away the heat of human body, furnaces, boiler and other equipments thus reducing the effect of heat to some extent. Proper ventilation also removes dampness. Arrangement of air fans in a systematic way also helps to achieve this object. Some times, air fans placed in wrong direction send air through furnace, hot parts of machines, etc. Thus transmitting the heat to the workers which they would have not received otherwise.

As already discussed, **poor illumination** reduces the speed of work and results in strain on eyes and causes more accidents. Light should come from the right direction and of desired illumination.

In artificial light, glare is most common defect, it is harmful to the eyes. It also produces strain and headache. Spoilage of work also increases due to glare.

Working hours should be distributed uniformly over the week. A worker should get atleast one weekly holiday so that he can enjoy on that day and feelings of fatigue and boredom from his mind are removed, and thus he may return on duty as fresh in next week.

As explained earlier rest pauses also reduce mental fatigue of the worker as such they should be properly distributed, i.e. at least 5 minutes break in one working hour and one lunch break per shift should be allowed. Duration of rest my vary depending upon the nature of work and working.

It has been seen that too much noise and vibrations also produce mental fatigue and reduce the efficiency of the worker. Although noise can not be stopped totally for a running machinery but can be reduced by enclosing the source of noise, use of baffles and sound proof materials in construction etc. Its reduction is very necessary because it is very difficult to concentrate on the work in too much noise. Sometimes too much noise also adversely affect the hearing capacity of the workers.

Noise and vibrations can also be controlled to some extent by proper maintenance, checking, lubrication and proper functions etc. Following are some examples of noise reduction:

1. The closer a sound source is placed to reflecting surface, the noise of the sound radiated is directed back into the room. The worst position is against three surfaces *i.e.* in a corner. The best position is to keep the sound source away from the reflecting surfaces.
2. The motors, pumps etc. should be mounted on heavy bases to avoide noise transmission.
3. All structure borne nose can be significantly reduced by mounting vibration source on flexible supports (springs, cork, foam, rubber etc.).
4. As greater the mass and 'height for all', the louder the noise, therefore, the conveyer should be mounted in such a way that the material falls on edge of the hopper so that free height is maintained.

Common cases of vibrations in machines are imbalance, misalignment, bearing wear or its damage, mechanical looseness, coupling problem, gear problems etc. Solution to these problems is regular inspection and removal of defect before it is increased.

In this book, it has already been discussed that systematic layout is very helpful, [as far as number of accidents and movement or the products etc. is concerned]. If the shop layout is such that it look pleasant then worker will take more interest in his work. The layout should be such that material handling becomes economical and safe; and overcrowding is reduced. Passage for movement should be quite safe and space should be sufficient enough. It should be planned in such a way that every worker gets sufficient light in proper direction.

A well designed factory must look pleasing where worker feels proud in working and take more interest in his work. Therefore, factory should be kept clean, doors and window should be properly coloured and walls should be white-washed so that atmosphere in the factory looks cheerful. A good landscape gives pride in working.

42.5. PREVENTIVE MEASURES

To prevent the accidents, there is a need for consistent implementation of safety measures. Some of the important safety measures helpful for preventing accidents are:

1. Safe workplace and working conditions

(a) *Good layout:* Good layout includes sufficient space for movement, non-skid type floors,

(b) *Reduced noise level.* Use of such machines which produces less noise, provide separate space for such works which produces noise, make efforts for reducing the vibrations to help in minimising harmful effects of noise.

(c) Inflammable materials should be stored separately.

(d) By providing proper safeguards to the machines, accident can be prevented. Some guards are built into a permanent casing. while some are attached afterwards.

(e) Machines or their parts should be fenced when it is not possible to provide safeguards.

(f) All boilers and other pressure vessels must be kept in proper condition. Safety valves, pressure gauges and water gauges etc. must be examined thoroughly at regular intervals.

(g) *Physical conditions.* Sufficient illumination, ventilation and height should be provided. Floor should be free from oiliness and kept clean.

2. Safe Material Handling

(a) Hoists, Cranes, Lifts etc. must be of sound construction. They must be tested periodically and well maintained.

(b) Avoid fatigue of workers, use handling devices where possible.

(c) Good house-keeping.

(d) Ensure safety during handling.

(e) Separate passages for men and handling equipment.

3. Personal Protection Devices

(a) Use of Goggles, Helmets, Gloves, Apron, Safety shoes, Safety belts is necessary where required.

(b) Safety measures include special clothing for the protection of body,such as gloves, apron, mask, goggles etc. Loose clothing may be a source of danger.

(c) Repair work on machines should not done when it is running.

(d) All the tools should be kept at their proper places.

(e) Chips should not be removed by hand.

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(e) Chips should not be removed by hand.

(*f*) Workers should be trained about correct procedures and they should be educated about safety precautions. Constant warning, publicity and play cards carrying slogans (as 'Safety-First', 'Danger 440 Volts' etc.) are also helpful to reduce accidents.

(*g*) *Fire hazard* To avoid the danger, inflammable materials should be kept away from general storage at a safe distance (minimum 50 ft. or 15.25 m). Fire extinguishers should be kept at suitable places.

(*h*) *Prevention of electric accidents.* To prevent electric accidents. following measures should be taken:

(*a*) Electrical insulation should be periodically tested.

(*b*) Use proper tools for testing and repairing.

(*c*) Work should be done after switching the power off.

(*d*) Use such safety equipments as insulated tools and rubber gloves etc. whenever necessary.

4. Safe Activities in the Organisation

Each organisation has some peculiarities. On the basic of the working methods, its process, and other conditions, accident prone activities, and places etc. are identified are. Past records also help in identification of such activities or areas. All out efforts must be made to reduce chances of accidents in these accident prone areas or activities.

5. Good House-keeping

House keeping means cleanliness in buildings, work areas, rest areas, equipments, machinery tools etc. Cleanliness includes keeping them free from dirt, dust, filth etc. and keeping things in pleasant and systematic manner.

(*a*) This minimise fatigue and discomfort to the workers and motivate them.

(*b*) It reduces the chances of accidents.

(*c*) Reduces the fire and other hazards.

(*d*) Increase the life of machinery, equipment, tool etc.

(*e*) Improves productivity.

(*f*) Improves quality of the product.

(*g*) Enhances the morale of workers.

(*h*) Material handling and internal transport become faster.

(*i*) Better utilisation of floor space.

Good house-keeping includes:

(*i*) Clean and tidy working premises.

(*ii*) Clean and clear passages/aisles.

(*iii*) Well stacked and neatly placed material.

(*iv*) Proper illumination.

(*v*) Clean, well drained and well maintained roads.

(*vi*) No dangling of electric or phone lines in the working area.

(*vii*) Sufficient and safe clearances for aisles, at loading docks, through doorways, and wherever turns or passages are made.

(*viii*) Clearly marked aisles in factories or warehouses wherever mechanical equipment such as fork lift trucks, pallet jacks, tractor-trains, towconveyors and other similar moving equipment are used.

The more organised and orderly a plant appears to be , the more conducive this appearance of orderliness is to the promotion of improved morale and productivity.

Storage of materials should not create a hazard. Bags, containers, bundles etc. should be stacked, limited in height so that they are stable and secure against sliding or collapse.

Storage areas should be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion or pest harborage.

Covers and/or guard rails should be provided to protect personnel from the hazards of open pits, tanks, ditces etc.

6. General Measures

- *Safety.* By providing proper safeguards to the machines, accidents can be prevented. Some guards are built into a permanent casing, while some are attached afterwards.
- *Fencing.* Machines or their parts should be fenced it is not possible to provide safeguards.
- All boilers and other pressure vessels must be kept in proper condition. Safety valves, pressure gauges and water gauges etc. must be examined thoroughly at regular intervals.
- Hoists, cranes and lifts etc. must be of sound construction. They must be tested periodically.
- *Physical conditions.* Sufficient illumination and ventilation should be provided. Floor should be free from oiliness and should be kept clean.
- Safety measures include special clothing for the protection of body, such as gloves, apron, goggles, etc. Lose clothing may be a source of danger.
- Repair work on machines should not be done when it is running.
- All the tools should be kept at their proper places.
- Chips should not be removed by hand.
- Workers should be trained about correct procedures and they should be educated about safety precautions. Constant warning, publicity and play cards carrying slogans (as 'Safety-First', Danger '440 Volts'etc.) are also helpful to reduce accidents.
- *Fire hazard.* To avoid the danger, inflammable materials should be kept away from general storage at a safe distance (minimum 50 ft. or 15.25 m). Fire extinguishers should be kept at suitable places.
- *Prevention of electric accidents.* To prevent electric accidents following measures should be taken:
  - Electrical insulation should be periodically tested.
  - Use proper tools for testing and repairing.
  - Work should be done after switching the power off.
  - Use such safety equipment as insulated tools and rubber gloves etc. whenever necessary.

42.6 HAZARDS

Hazard is a source or a situation with potential to cause harm in terms of human injury or ill health; damage to property or environment or both. Hazards are identified in the performance of various activities, storage and handling of materials, and operation and maintenance of plants and equipments.

Hazard control is that function which is oriented towards recognizing, evaluating and working towards eliminating hazards and destructive effects found at the workplace.

Hazards may be classified as under:

1. Mechanical Hazards
2. Electrical Hazards
3. Chemical Hazards

1. Mechanical Hazards. These are responsible for the majority of accidents in work situations, therefore every workplace and equipment should be properly examined for identifying mechanical hazards and for taking mitigating measures.

Common sources of mechanical hazards are:

(*a*) Unguarded or inadequately guarded moving parts or pits etc.
(*b*) Machine tools, hand tools, handling materials, lifting and other appliances.
(*c*) Improper ventilation, unsafe dress or apparel etc.
(*d*) Improper use of tools.

2. Electrical hazards. These may be due to contact of body with wire, cable or rail or from stroke of lightening. The immediate effect of this is shock which may be relatively mild or severe so as to cause death (electrocution) depending upon the strength of the current and/or the path it takes passing the earth through the body. Another result is burning and the burns may be severe and deep, especially with higher voltage.

Causes of the electric hazards may be of the following types:

(*a*) Electric shocks may be caused by an exposed live conductor or a faulty piece of equipment.
(*b*) A mobile crane boom, a man carrying or climbing an aluminium ladder or vertical metal bars etc. come in contact with overhead power lines, electric crane rails, open-faced substation switchboards etc.
(*c*) Other causes may be unskilled electricians, improper instructions, defective wiring which may cause short circuit, poor installations, misuse or overloading.
(*d*) Ageing and attack by foreign materials cause insulation failure which causes electrical fires or cases of electrocution.

In such cases:

(*a*) Switch off the current.
(*b*) And/or remove casualty from the contact with current using insulated materials and avoid receiving shock by the person rescuing the victim.
(*c*) Artificial respiration be given, if breathing has stopped.

3. Chemical Hazards. The usage of chemicals with the resultant hazardous gases, vapours and fumes is one of the most dangerous industries. The hazardous chemicals may be metallic dusts and fumes, mineral dusts, volatile liquids and solids, gases etc. The effect of noxious gases are :

(*a*) Simple asphyxiants e.g. nitrogen gas, methane gas, carbon dioxide.
(*b*) Chemical osphysciants e.g. carbon monoxide, hydrogen sulphide, hydrocyanic acid.
(*c*) Irritant gases e.g. nitrogen dioxide or peroxide, fluorine, hydrogen fluoride, sulphur dioxide, ammonia.
(*d*) Organic metallic gases e.g. arsenic hydride
(*e*) Inorganic metallic gases.

Several toxic chemicals and fluids are found in industries using sulphuric acid, nitric acid, soda, chloride of lime, chloride of phosphorous, sulphur chloride, phosphene chloride of zinc, nitrous chloride, iodine, artificial fertilizers, rubber, petroleum, tar etc.

42.7 INDUSTRIAL HYGIENE

Industrial hygiene is the science of anticipating, recognizing, evaluating and controlling workplace conditions that may cause workers' injury or illness. In short, we can say that industrial hygiene is the science of dealing with job hazards. Industrial hygienists use environmental monitoring and analytical methods to detect the extent of worker exposure and employ engineering work practice controls, and other methods to control potential health hazards. Industrial hygienists analyze, identify, and measure workplace hazards or stressors that can cause sickness, impaired health or significant discomfort in workers through chemical, physical, ergonomic or biological exposures.

Industrial hygienist determine about the jobs and workstations which are the sources of the potential problems by using the worksite analysis. During the worksite analysis he measures and identifies exposure, problem tasks and risks. The industrial hygienist inspects, researches or analyses as to how the particular chemicals or physical hazards at the worksite effect worker's health. If a situation is found to be hazardous to health, industrial hygienist recommends the appropriate corrective actions.

Industrial hygienist in addition to engineering controls, recognizes work practice controls which are the primary means of reducing employee exposure to occupational hazards. Work practice controls include ;

(i) following proper procedures that minimize exposures while operating production and control equipment;

(ii) inspecting and maintaining process and control equipment on a regular basis;

(iii) implementing good house-keeping procedures;

(iv) providing good supervision;

(v) mandating that smoking and drinking in regulated areas be prohibited.

Major Job Risks (Hazards)

1. **Air Contamination.** The most common particulate contaminants include dusts, fumes, mists, aerosols and fibres. These are commonly classified as either particulate or gas vapour contaminants.

2. **Chemical Hazards.** Harmful chemical compounds are in the form of solids, liquids, gases, mists, dusts and vapours and exert toxic effects by inhalation, absorption (through direct contact with skin) or ingestion (eating or drinking).

3. **Biological Hazards.** These include bacteria, viruses, fungi and other living organisms that can cause acute and chronic infections by entering the body either directly or through breaks in the skin.

4. **Physical Hazards.** These include noise, vibration, illumination, temperature and excessive levels of radiation.

5. **Ergonomic Hazards.** These include excessive vibration, noise, eye strain, repetitive motions, repetitive shocks over prolonged period of time, heavy lifting problems and improperly designed tools or work areas. Ergonomic hazards are avoided primarily by the effective design of a job or jobsite and better designed tools or equipments. By adopting thorough worksite analyses, employers can set up procedures to correct or control ergonomic hazards, teaching

correct work practices, employing proper administrative controls (*e.g.* shifting workers among several different tasks and increasing rest breaks) and providing and mandating personal protective equipment.

Evaluating working conditions from an ergonomics standpoint involves looking at the total physiological and psychological demands of the job. Benefits of a well designed ergonomic work environment include increased efficiency, fewer accidents, lower operating costs and more effective use of personnel.

42.8. SAFETY EDUCATION AND TRAINING

There should be proper facilities to impart training in safety measures to the worker. This can be accomplished by safety posters, safety films, safety contests and suggestions. These are useful to increase the interest of employees in accident prevention. The purpose of this training is to induce care in the use of dangerous tools or in carrying out risky operations.

Training manager identifies the training need of every person in the organization with long range and short range planning. Training record is made for every employee and training requirements are reviewed regularly.

Safety training is an important factor in managing safety in any industry. Industrial concerns should provide as a minimum the following types of training:

1. **Induction Training** should be given to all the persons prior to permitting them to go to work. This training should include the following:
   (*a*) General safety awareness, (*b*) First aid,
   (*c*) Use of personal protective equipment, (*d*) Specific worksite hazards.

2. **Refresher Training** should be conducted at regular intervals to ensure that all workers are kept up-to-date with safety requirements.

3. **Specific Training** should be provided to the persons with safety related tasks such as crane operators, slingers, plant operators etc.

42.9. PLANT SAFETY PROGRAMMES

For effectiveness of the safety programmes in a plant, it is necessary to identify the causes of accidents, study them, and take effective steps for their prevention. For effectiveness of the plant safety programme, following areas should be covered:

- Plant layout
- House keeping
- Maintenance of the equipment
- Training programme for the employees
- Protective equipment requirement
- Separate safety department, with proper communication system
- Fire fighting facilities.

Lack of training has been identified as one the major causes of accidents. Safety awareness is the basic requirement for reducing accidents. Most of the accidents take place due to adoption of shortcuts and/or ignoring the safety guidelines. There is a need to prepare a safety manual which should include the mandatory use of personal protection equipment, safety awareness training programmes, fire protection, first aid, safety signages, accidents reporting procedure etc. Each operation has its own hazards and a safety programme should be developed to suit the particular hazards.

Safety programme in an industry must receive the full support of an entire organization coming with top management and continuing down through the ranks to include the managsupervisors and workers.

In any safety programme, following are essential:

1. Secure full support of top management.
2. Direct one executive of appropriate level to direct safety programme.
3. Give publicity to safety programmes.
4. Develop a safety programme for each job.
5. Install safety programme, creating the competition with appropriate rewards for outstanding performance.
6. Train new employees.
7. Safety practice be made effective.
8. Promote good house-keeping.
9. Maintain adequate first-aid facilities.
10. Seek assistance from insurance companies.

Safety programme is carried out in following three phases:

(1) **Safety Awareness.** This includes educational, on-the-job instruction training, ergonomics, job safety analysis training.

(2) **Safety Implementation.** Implementation of safety programme should be the responsibility of all concerns.

(3) **Safety Programme Maintenance.** This phase is necessary to maintain enthusiasm and energy levels which do not deteriorate with time.

Safety Factors

There are large number of factors affecting the safety, but they can be divided into following categories:

- Equipment related factors
- Environmental factors.
- Work area related factors

Now-a-days equipment are manufactured keeping all safety aspects in mind, therefore not much concentration is required for safety aspects related to equipment.

Factors related to other two categories are discussed here under:

1. **Working Environment.** Working environment is the single biggest factor affecting safety aspects. It varies from concern to concern, and on the type of industry, and not always possible to establish ideal conditions. However serious efforts should be made to arrive at them. Following are the range of ideal conditions for different environmental factors that which are conducive to ideal working conditions:

Item	*Desired values*
• Temperature	(*a*) 20—22°C in winter (*b*) 21—24°C in summer
• Humidity	25—50 percent relative humidity
• Noise	— Conversation from a distance of one metre should be possible without extra effort.
• Ventilation	— 0.6 cubic metre of fresh air per man or sufficient enough to remove odour.

2. **Lifting of Load.** Although most works are done mechanically in the process of manufacturing, still many material handling works involving load lifting are done manually. It has been experienced that a man can easily lift about 22 kg and woman about 16 kg. But while doing work continuously is a bent position even with a smaller load, there will be immense strains on spine and back muscles that may result in injury especially for edged workers. Therefore efforts must be made to keep the material at a certain height so as to minimise the strain and fatigue.

3. **Chemical Safety.** Many processing and manufacturing industries use chemicals in one or other form. The chemicals are hazardous mainly for their toxicity, flash point below <$E 100 symbol É roman F> Their reactions when mixed with other chemicals, and their decomposition under heat.

Therefore extra care should be made and recommended safe practices should be adopted for the receipts, storage, handling and disposal of chemicals and other hazardous materials. Where necessary respiratory devices, protective clothing, safety showers, and eye wash facilities should be used and located at suitable places; the use of exhaust hoods, air filtering to provide protection from gases and air borne hazards.

4. **Safety Equipment.** Personal, safety equipments are necessary to protect from any accident, like hard hats for construction workers, safety goggles and shields for welders etc. Safety shoes, protective clothing, respirators are also used to protect form hostile environment.

Manual Handling Injuries

Manual handling means a range of activities including lifting, lowering, pushing, pulling, moving, holding or restraining an object. It also covers activities which require the use of force or effort such as pulling a lever or operating power tools. It has been estimated that about a third of all work injuries occur during manual handling and most of them cause back injury. As explained earlier, a risk situation arise when tasks are poorly designed or where handling involves awkward or constrained postures. Following are the some examples of actions that may cause manual handling injuries:

(*i*) Work involving sudden, jerky or hard to control movements or which causes discomfort and pain.
(*ii*) Work involving too much bending, reaching or twisting.
(*iii*) Work where a long time is spent holding the same posture or position.
(*iv*) Work that is fast and repetitious.
(*v*) Heavy weights to be lifted and carried manually.
(*vi*) Work where force is needed to carry out a task.
(*vii*) The loads to be handled below your mid-thigh or above your shoulder.

Some of the solutions to deal with such problems are:

(*i*) Redesign the task or work area to make it safer, by
- modifying the object (shape, size or weight);
- modifying the work area or work station layout;
- eliminating unnecessary handling;
- ensuring that all heavy objects are at waist level where they can be handled comfortably;
- reducing the amount of bending, lifting, twisting, reaching and holding required to carry out a task;
- modifying the task by using tools such as levers, hooks, hoists, trolleys or by team lifting;

— providing the training and information about safe working practices.

vention Exercises

In order to neutralize the effect of wrong postures for long periods during working, it is sible to perform stretching exercises for neck, back, shoulders, upper body, full body etc. ic stretching care should be taken that move slowly and hold stretches for 5-10 seconds. ul type of exercise(s) can be selected and practiced under guidance of experts.

me Practical Solutions

In order to reduce chances of "Overuse Injuries" some of the following solutions are sug-ed:

(i) Reorganize work so that you can mix repetitive and non-repetitive activities.

(ii) Frequent short breaks should be introduced, if the job assigned to the worker cannot be varied or rotated. In such a case simple and gentle exercises performed at the workstation can reduce muscle tension.

(iii) Ergonomically designed furniture is available which can be adjusted to suit employees of different sizes.

(iv) The work area may be rearranged so that materials, equipment, tools and controls can be easily reached without stretching or twisting.

(v) Hand tools for repetitive tasks should be of comfortable size, shape and weight, well balanced with a comfortable grip and do not need more than reasonable force to operate.

10. BUREAU OF INDIAN STANDARDS (B.I.S.) AND SAFETY

To assure safety to workers and elimination of damages to the machinery and equipments, reau of Indian Standards has laid down:

- Safety precautions to be taken during working operations.
- Guidance on safe welding and cutting, use of powered industrial trucks, belt conveyers and fire fighting equipments.
- Standards and specifications of safe industrial operations and practices.
- Safety requirements for personal protective equipments.
- Standards for fire safety in workshops and safety procedures to be followed in electrical work and use of electrical appliances in hazardous area and explosives atmosphere.
- Specifications for protective clothing, safety helmets, face shields and safety equipments for eyes, ears, lungs, hands, feet and legs. These include eye and ear protectors, gas masks, gloves, safety boots and shoes for mines etc.

11. SAFETY THROUGH LEGISLATION

A number of legislations like, The Factories Act, 1948; Indian Explosives Act 1884; Mines ct 1952; Indian Boilers Act 1932; Indian Electricity Act 1910; Petroleum Act 1934 govern the ety of personnel and equipments in the country. But as we all know that legislation alone ot ensure safety in operations, unless effective approach to prevention of accidents and ulations of safety consciousness is achieved. This is possible by adopting proper control mea-

sures including safe designs of machines and processes, use of protection devices, personal protective equipments as well as creation of self-regulating system on the shop-floor.

Workmen's Compensation Act, 1923 provide for payment by certain classes of employers to their workmen of compensation for injury by accident. Thus this Act protects the workers as far as possible from hardship arising form accidents.

Indian Factories Act 1948 deals about safety in great details. The Act has separate chapters on Health measures, Safety,and welfare measures, Chapter on health measures include provisions on cleanliness; ventilation and temperature; artificial humidification; overcrowding; lighting; drinking water; bath rooms; latrines and Urinals; Chapter on safety measures include provisions on fencing of machinery; work on or near machinery in motions; casting of machinery; hoists and lifts; lifting machines, chains, ropes and lifting tackles, revolving machinery; excessive weights; protection of eyes; precautions against dangerous fumes; and precautions against fire. Welfare measures include the provisions regarding washing facilities, sitting facilities; first aid appliances, canteen; shelter, rest rooms and lunch rooms etc. The Factories Act also lays down provisions regarding hours of work; holidays; overtime wages etc.

Various acts have been dealt in detail in a separate chapter in the book.

QUESTIONS

1. Enumerate common causes of industrial accidents. Describe various measures to prevent them. Explain various losses which may occur due to an accident in a factory.
2. How "safety education and training" help in industrial safety? Explain
3. Explain different factor which causes/enhances the chances of accidents.
4. Write short notes on: (*a*) Effect working conditions on health and (*b*) efforts by Government towards industrial safety.
5. Mention important precautions which should be followed in an industrial establishment.
6. What is the importance of safety? Suggest different ways to minimise the accidents.
7. Explain, how the employer and employees both are affected by the accidents.
8. Comment on the statement, "safety promotes productivity".
9. State the measures of safety you would 'introduce in any manufacturing organisation with which you are familiar'.
10. Write short notes :
    (*a*) Safety
    (*b*) Occupational health.
    (*c*) Hazards
    (*d*) Accident.
11. What is SHE concept? Explain it in detail.
12. Write an essay on 'Safety' with an emphasis on integration of safety, health and environment.
13. Write short notes on : (*a*) Hazard identification, (*b*) Hazard control
14. Explain different types of hazards.
15. What is safety programme? Explain in detail.
16. How safety education and training is imparted in an industry?