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The Essentials of a Manufacturing Organization in a Complete Plant Factory

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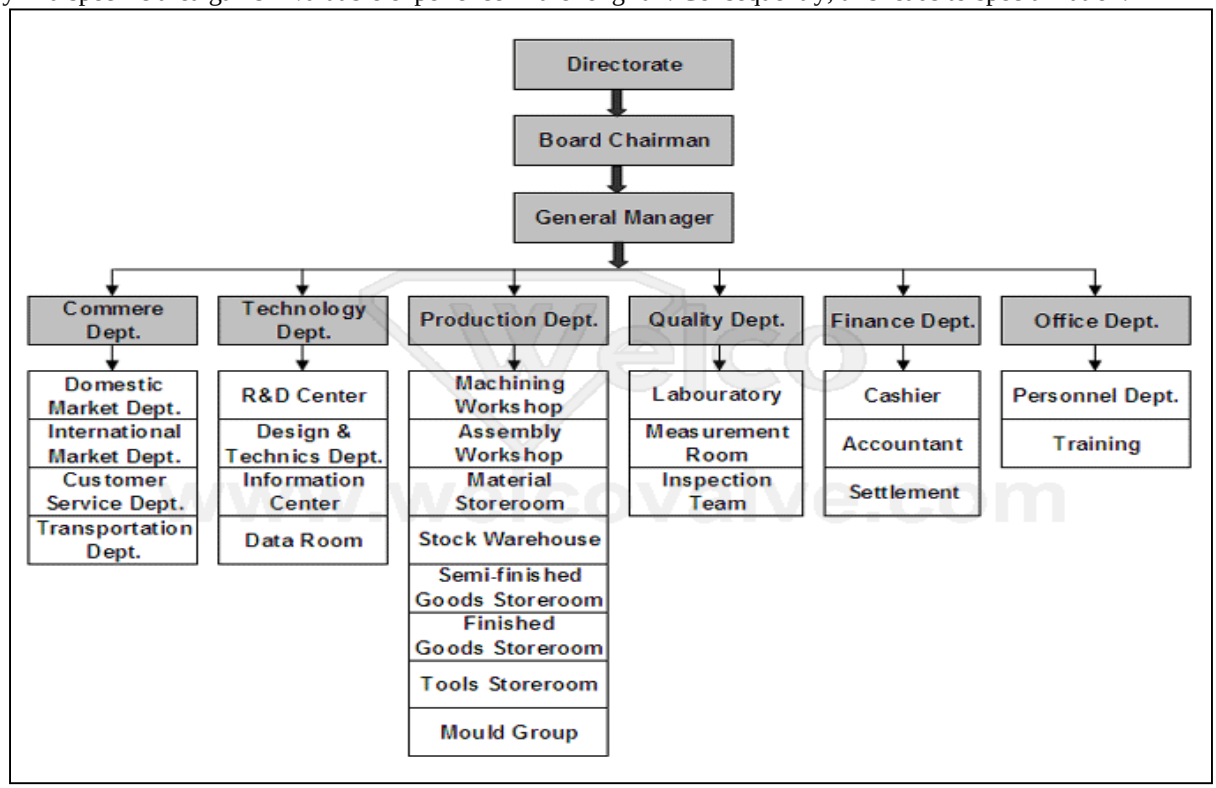
Abstract

We now know that organisation is one of the major functions of management. One can look at organising as an activity to eliminate chaos and introduce a systematic functioning in the enterprise. Technically, the organisation helps in establishing authorities, dividing workloads, assigning responsibilities, grouping tasks and allocating resources. This is of utter importance because once the plans have been laid there is a need to allocate resources, divide tasks, workforce, ensure optimal utilisation of resources etc. so that the objectives are fulfilled. Further, it facilitates the collective working of the various members of the enterprise in an ordered manner. Also, organisation involves defining various roles that need to be filled by suitable employees and establishing relationships between these defined goals to eliminate ambiguities in performance. In turn, this groups the activities clarifies the amount of power and authority in the hands of different employees and clarifies the responsibility for various activities within the enterprise. In a nutshell, an organisation can be defined as a process that defines the resources as well as allocate them, coordinates human efforts and integrates both in order to achieve the defined goals. Organisation brings adaptability to the table for any enterprise. It helps in a smooth transition in accordance with the dynamic business environment. To point out, this is achieved by facilitating growth and survival. Organisation assigns work in a systematic manner to the diverse employees within an organisation. It ensures that suitable work is handed out repetitively to an employee who is a good performer in his field. An employee working regularly in a specific area gains invaluable experience in the long run. Consequently, this leads to specialization.



Keywords: Manufacturing Organization, Plant, Factory, Facility

I. INTRODUCTION

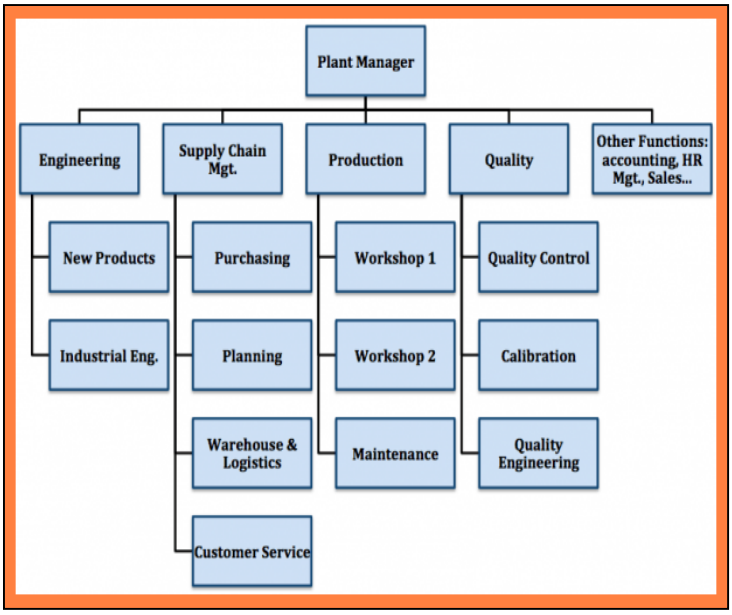
There are three main types of business organizations: sole proprietorship, partnership and corporation.
We can broadly list the steps in the process of organisation as follows:

Identification and Division of work: The organisational work commences with an identification of the extent and the amount of work that needs to be done and dividing this into manageable activities. The idea behind this is to eliminate duplication and share the burden of work.

Departmentalisation: Now as the work has been redefined as a number of manageable activities, the next step is to group activities according to a predefined basis. This basis decided what activities are similar to each other. All the similar activities are assigned to a particular department. All in all, a number of departments are defined that are concerned with their own set of activities.

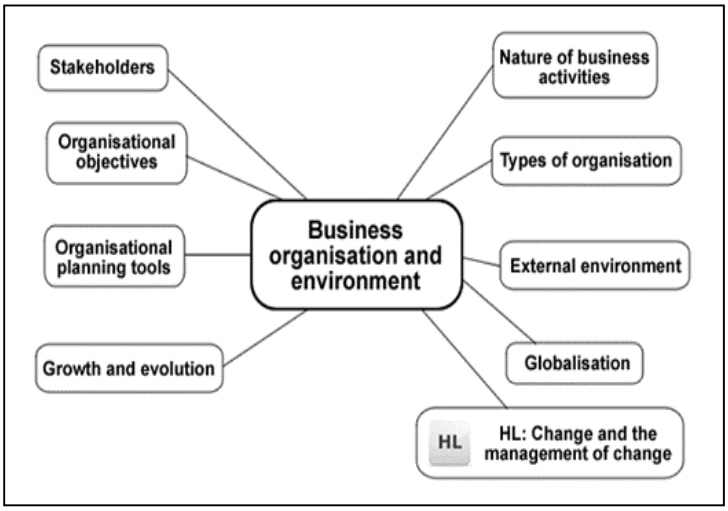
Assignment of Duties: The next step involves the distribution of work among the employees. The responsibility of looking after the functioning of each department is given to an individual. Further, jobs are allocated to the employees. It is important to realize that this assignment of jobs should be done in such a manner that the employees most suited for a particular type of job ultimately perform it. This ensures, a proper match between the ability and the type of job of the employee and subsequently effective overall performance.

Establishing Reporting Relationships: The final step is concerned with erecting a hierarchical structure and effecting communication among the diverse departments. This is done by establishing relationships. Effectively this means that every employee should be made aware of whom he has to take orders from and prove his accountability.



II. List of Departments in a Business Organization/Company

1) Plant Layout and Design	17) Procurement
2) Engineering Department	18) Supplying Chain Management
3) Research & Development	19) Manufacturing
4) Manufacturing Planner	20) Shipping
5) Financial Analyst	21) Human Resources or Personnel
6) Computer System Administration/IT	22) Employee Training Officer
7) Facilities Layout & Design	23) Accounts
8) Production & Operations Management	24) Payroll
9) Production Costs VS Manufacturing Costs	25) Stores
10) Tool Room	26) Sales
11) Fabrication Centre	27) Marketing,
12) Maintenance Department	28) Service
13) Quality Control/Assurance/Inspection	29) Export, Import
14) Material Control	30) Customer Support
15) Inventory Control	31) Public Relations Officer
16) Purchasing/Buying	32) Security



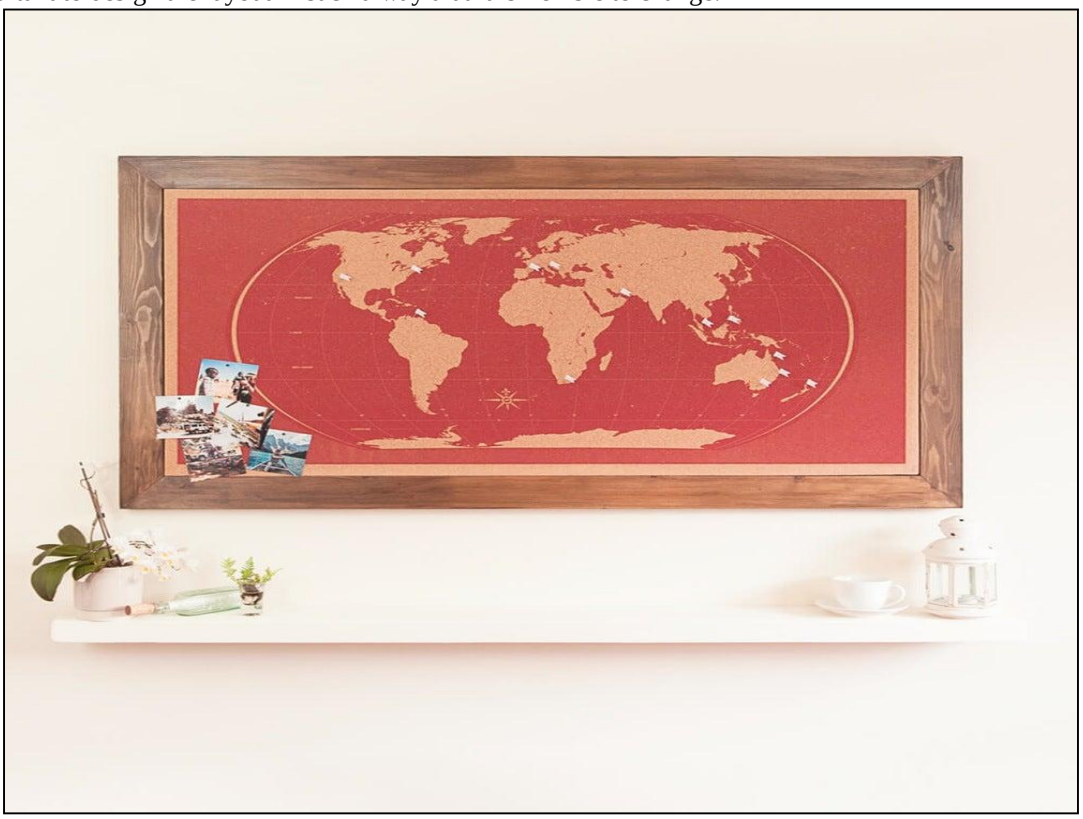
III. PLANT LOCATION & LAYOUT DESIGN

Once a suitable location of the plant has been decided upon, the next important issue is the design of the layout. Plant layout is the plan for arranging the physical facilities and manpower required to manufacture a product with the objective of utilizing them in an effective manner.

Plant Layout is also known as facilities design. Plant layout constitutes planning of the amount of space required for all kind of activities in an industry, i.e., equipment, machinery, furniture and fittings, offices, rest rooms, warehouses etc. The primary objective of plant layout is to minimize the movement of men and materials in the plant.

A. Importance of a plant layout

Designing a proper layout is important because it has a direct relationship with efficiency of operations and cost of production. A poorly designed layout will result in inefficiencies and losses throughout the existence of the plant. As Decisions regarding plant layout cannot be taken once and for all. Changes in process and techniques of production necessitate changes in plant layout. It is therefore important to design the layout in such a way that it is flexible to change.



B. Types of Plant Layout

1. Product or Line Layout
2. Process or Functional Layout.
3. Fixed Position Layout
4. Group layout or Cellular Layout

1) Product or Line Layout:

All the processing equipment and machines are arranged according to the sequence of operations of the product. It is appropriate for producing one standardized product, usually in large volume. It is also called as flow-shop layout or straight line layouts. The machines are arranged according to the progressive steps by which the product is made. •Example: chemical, paper, rubber, refineries, cement industry.

Advantages include

1) Lowers total material handling cost.
2) There is less work in processes.
3) Better utilization of men and machines,
4) Less floor area is occupied by material in transit and for temporary storages.
5) Greater simplicity of production control. Total production time is also minimized

Limitations of Product Layout:

1) No flexibility which is generally required is obtained in this layout.
2) The manufacturing cost increases with a fall in volume of production.
3) If one or two lines are running light, there is a considerable machine idleness.
4) A single machine break down may shut down the whole production line.
5) Specialized and strict supervision is essential.

2) Process or Functional Layout:

In this type of layout, the machines and not arranged according to the sequence of operations but are arranged according to the nature or type of the operations. The process layout is particularly useful where low volume of production is needed. This layout is commonly suitable for non repetitive jobs. Same type of operation facilities are grouped together such as lathes will be placed at one place.

Advantages of Process Layout:

1) There will be less duplication of machines. Thus, total investment in equipment purchase will be reduced.
2) It offers better and more efficient supervision through specialization at various levels.
3) There is a greater flexibility in equipment and man power thus load distribution is easily controlled.
4) Better utilization of equipment available is possible.
5) Break down of equipment can be easily handled by transferring work to another machine/work station.
6) There will be better control of complicated or precision processes, especially where much inspection is required.

Limitations of Process Layout:

1) There are long material flow lines and hence the expensive handling is required.
2) Total production cycle time is more owing to long distances and waiting at various points.
3) Since more work is in queue and waiting for further operation hence bottle necks occur.
4) Generally, more floor area is required.
5) Since work does not flow through definite lines, counting and scheduling is more tedious.
6) Specialization creates monotony and there will be difficult for the laid workers to find job in other industries.

3) Fixed Position Layout:

In this type of layout the major component remain in a fixed location, other materials, parts, tools, machinery, man power and other supporting equipment's are brought to this location. Due to size, shape and other characteristics constraints, the products cannot be moved, the machine and operators move around the product. Example: construction of a building, assemble of an aircraft or ship.

Advantages Of by Fixed Position Layout:

1) Material movement is reduced
2) Capital investment is minimized.
3) The task is usually done by gang of operators, hence continuity of operations is ensured
4) Production centers are independent of each other. Hence, effective planning and loading can be made. Thus total production cost will be reduced.
5) It offers greater flexibility and allows change in product design, product mix and production volume.

Limitations of Fixed Position Layout:

1) Highly skilled man power is required.
2) Movement of machines equipment's to production center may be time consuming.
3) Complicated fixtures may be required for positioning of jobs and tools. This may increase the cost of production.

4) Group Layout (or Cellular Layout):

There is a trend now to bring an element of flexibility into manufacturing system as regards to variation in batch sizes and sequence of operations. A grouping of equipment for performing a sequence of operations on family of similar components or products has become all the important. It combines the advantages of both layout systems. • In process layout, the objective is to minimize the

total cost of materials handling. In-group technology layout, the objective is to minimize the sum of the cost of transportation and the cost of equipments Cellular Layout

Advantages of Cellular Layout

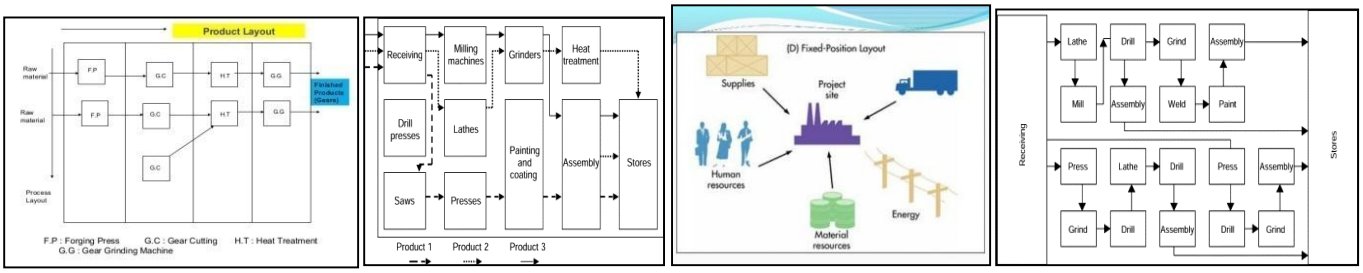
Group Technology layout can increase..

1) Component standardization and rationalization.
2) Reliability of estimates.
3) Effective machine operation and productivity.
4) Customer service.

It can decrease the..

1) Paper work and overall production time.
2) Work-in-progress and work movement.
3) Overall cost.

Limitations of Group Technology Layout This type of layout may not be feasible for all situations. If the product mix is completely dissimilar, then we may not have meaningful cell formation.



C. Objectives of Plant Layout

The primary objective of plant layout is to maximize production at minimum cost. The layout should be designed in such a way that it is flexible to change according to new processes and production techniques. The layout should be able to satisfy the needs of all those who are associated with the production system such as workers, supervisors, managers etc., to fulfill the above goals, the plant layout should be designed with the following objectives:

1) Minimizing handling of materials.
2) Maintaining flexibility of operations.
3) Ensuring optimum utilization of men, materials, equipment and available space.
4) Achieving good work flow and avoiding accumulation of work.
5) Minimizing delays and bottlenecks in the production system.
6) Ensuring safety of workmen
7) To provide better quality products at lesser costs to the consumers.
8) Should help in effective utilization of labour.
9) To provide for adequate storage and packing facilities.
10) Providing for effective supervision and production control.
11) Minimizing work-in-process inventory.
12) Providing sufficient and conveniently located service centres.
13) Flexibility in design to adapt to the changing future requirements.

D. Steps Involved In Designing A Plant Layout

Since decisions regarding layout design have considerable impact in the efficiency and profitability of a firm it requires careful consideration. The following are the steps involved in designing a layout:

1) Collection of required data

Data about the size of the plant, type of products to be produced, method of production to be adopted, extent of space available, extent of mechanization etc are to be collected.

2) Preparation of Plant floor plan layout

Based on the data gathered, a blue print has to be prepared for the floor plan. Care should be taken to ensure,that the layout provides for unhindered movement of men and materials with minimum possible effort and time.

3) Preparation of process chart and flow diagram

The process chart and flow diagram depicting the various activities to be performed and the linkages between them has to be prepared.

4) Preparation of draft layout

A draft layout needs to be prepared clearly depicting the positioning of men and materials and the process flow. The draft layout should be circulated and discussions held with employees inviting suggestions for improvement. Flaws pointed out need to be corrected and suggestions received incorporated after due discussions.

5) Test run

A test run is important to understand the efficiency of the layout in a real time work environment. Problems not noticed in the earlier stages can occur at this stage. The initial problems noticed need to be modified and test runs should be continued for at-least a few times to ensure that the layout is able to facilitate maximum production at minimum cost.

a) *Advantages of Layout to Worker*

1) Reduction in the effort of the worker.
2) Fewer material handling operations.
3) Extension of the process of specialization.
4) Ensuring maximum efficiency.
5) Better working condition and reduction in the number of accidents.

b) *Advantages of Layout In Labour Costs*

1) Reduction in the number of workers.
2) Increase in production per-man-hour.
3) Reduction in the length of haul.
4) Minimum lost motions between operations.

c) *Advantages of Layout in Other Manufacturing Costs*

1) Maintenance and tool replacement costs are reduced.
2) 2. Spoilage and scrap is minimized.
3) 3. Greater saving in the waste of raw material consumption.
4) 4. Improved quality of product due to reduction in the number of handling.
5) 5. Saving motive power.
6) 6. Effective cost control.

d) *Advantages of Layout in Production Control*

1) Provision of adequate and convenient storage facilities.
2) Better conditions for receipts, shipment and delivery.
3) Increased pace for production.
4) Achievement of production targets unfailingly.
5) Reduction in the number of stock-chasers who are employed to get the work done on time.

e) *Advantages of Layout in Supervision*

1) Helps in easing the burden of supervision.
2) Reduces the level of inspection and this minimizing the cost of inspection.

f) *Advantages of Layout In Capital Investment*

1) Investment in machinery and equipment is reduced because of
   a) Increase in production per machine
   b) utilization of idle machine time and
   c) reduction in the number of operations per machine
2) Permanent investment is kept at the minimum
3) Floor space and shop areas required for manufacturing are reduced.
4) Reduction in the number of material handling equipment, work-in-process and reduced stock of finished products.

Thus, an efficient layout is necessary for achieving the objectives of the business i.e., higher production, turnover and profits by minimizing the cost of manufacturing.

E. Effects of Bad Plant Layout

A bad layout results in unnecessary handling of materials and movement of men and equipment. Actually, the quality of the product may come down due to damage suffered in production process thus reducing the value added. Further, loss due to breakage, pilferage, deterioration, etc., add to costs being incurred. All these factors increase the cost of manufacturing.

F. Symptoms Of Bad Layout

The symptoms of bad layout are as follows:

1. Congestion of machines, materials, part assemblies and even workers.
2. Excessive number of work-in-process.
3. Poor utilization of space.
4. Long material flow lines.
5. Excessive handling by skilled workers and increased handling costs.
6. Increase in maintenance time.
7. Long production cycles.
8. Delay in delivery schedules.
8. Increase in handling costs.
10. Difficulty experienced in supervision and control.
11. Increase in breakage of materials and products.

IV. ENGINEERING DEPARTMENT

The following are the list of engineering departments related a business organnization

A. Mechanical engineering

Mechanical engineering is a discipline of engineering that applies the principles of physics and materials science for analysis, design, and manufacturinization. and maintenance of mechanical systems. It is the branch of engineering that involves the production and usage of heat and mechanical power for the design, production, and operation of machines and tools. It is one of the oldest and broadest engineering disciplines.

The engineering field requires an understanding of core concepts including mechanics, kinematics, thermodynamics, materials science, and structural analysis. Mechanical engineers use these core principles along with tools like computer-aided engineering and product lifecycle management to design and analyze manufacturing plants, industrial equipment and machinery, heating and cooling systems, transport systems, aircraft, watercraft, robotics, medical devices and more.

B. Industrial Engineering

Industrial engineers (IEs) apply science, mathematics, and engineering methods to complex system integration and operations. Because these systems are so large and complex, IEs need to have knowledge and skills in a wide variety of disciplines, the ability to work well with people, and a broad, systems perspective. Industrial engineers use their knowledge and skills to improve systematic processes through the use of statistical analysis, interpersonal communication, design, planning, quality control, operations management, computer simulation, and problem solving. It eliminates waste of time, money, materials, energy and other resources. Industrial Engineering is also known as Operations management, Production Engineering, or Manufacturing Engineering depending on the viewpoint or motives of the user. In lean manufacturing systems, Industrial engineers work to eliminate wastage of time, money, materials, energy, and other resources

C. What does a Industrial Engineer do?

Industrial engineers typically use computer simulation, especially discrete event simulation, for system analysis and evaluation.
Industrial engineers study how workers perform their jobs, the goal is to reduce the time it takes to perform a certain job and redistribute work so as to require fewer workers for a given task.
Industrial Engineer in the manufacturing industry will be responsible for Quality control, Statistical process control and to increase productivity through management of people and methods of business organization.
Industrial Engineers evolve management control systems to assist in financial planning, cost analysis, production planning and physical distribution of goods and services

D. Electrical Department

The duties of the Electrical Maintenance Department is to perform the maintenance for the production facilities of each field of work and check the maintenance of the air compressor which is a primary power source. In addition, to the energy saving activity applicable to machines, and the lighting setup.

The Electrical Maintenance Department requires varied abilities such as supporting the problems of each factory on-site plant , the compressors, the inspection of the emergency generator, the inventory control of the electrical components, the review of the electric circuit with single ability board electric equipment OH or the production of the panel, safety lockout placards etc.,

E. Electrical Engineering

Electrical Engineers are some of the most skilled professionals in the modern world. There is no doubt that the need for Electrical Engineering is growing practically. If you are thinking to enter into this field, then this branch is going to benefit you with the most acquainted firms in both - Private & Govt. Sectors.

F. Civil Engineering

Civil is for those who love buildings & skyscrapers. It is for those also, who are passionate about designing, buildings constructions, making physical and naturally built Environment including works like roads, bridges, dams, canals, buildings & towers.

The branch includes various fields such as – Mathematics, Physics, Town & City Planning, Geo Technical, Structural, Environmental, Earthquake, Transportation, Disaster Assessment & Management Structural Design, Maintenance of Structures, Restoration of Structures, Irrigation Engineering, Surveying Technology, Concrete Technology, and Computer Aided Planning & Design.

Civil is the Best Engineering Branch for future of the young graduates as construction tasks are getting popular across India. You can see the construction work going on in every street of India, so nothing can be better than this.

Design Engineer is a general term which comprises multiple engineering disciplines like mechanical, electrical, chemical, aeronautical, civil and structural /building/architectural/industrial engineers. Design Engineer usually works with a team of engineers and other designers to develop conceptual and detailed designs.

G. Computer Science & Engineering

Computer Science is one of the most popular branches among B-tech Aspirants, especially for female candidates. Those who like to deal with coding and decoding of software, computer programming, networking & designing, CSE is the best branch in Engineering for them.

This field comprises of various jobs in India and outside India too. Many Software Engineers work in Multinational Companies mostly. Some of the major examples of their positions and companies are given below.

H. Electronics Engineering

It is a branch of electrical engineering in which students work on application of electronic devices as IC or transistors. Electronics engineering includes fields like analogue electronic engineering, radio frequency engineering, digital development engineering, programmable logic engineering, software engineering, systems engineering.

I. Chemical Engineering

Chemical Engineer works in Pharmaceuticals, Health Care, Design, Food Processing Chemicals Fertilizers & Petrochemicals Fields. Being the best branch in Engineering, Chemical Engineering is mainly focused on the development of the solutions to the Environment Problems such as Environmental Pollution & remedies.

J. Agricultural Engineering

It is the branch of engineering which helps in planning and supervising to develop the agricultural production. In this,engineer suggests the best ways to optimize the resources and makes the process smoother.

K. Aeronautical Engineering

Likewise, the name this branch deals in aircrafts, technology and business associated with it. It is a branch of Aerospace Engineering. The main task assigned to an aeronautical engineer is designing the aircrafts, machines and operating rockets.

L. Architecture Engineering

This branch of engineering is multitasking as it includes designing, planning, maintain the space, material and providing a proper structure to the building. Also, the field research, selecting the site, safety, quality, costing as well as the overall construction comes under Architecture Engineering.

M. Automobile Engineering

Automobile Engineering is all about designing vehicles like bus, car, truck as well as its various internal parts. It is considered as a combination of Mechanical, Electrical and Material Sciences. If it comes to process then it can be defined as design, manufacture and operation.

N. Biomedical Engineering

It is a multi-disciplinary subject. Along with Biology it requires the knowledge of different fields of engineering like Electronics, Electrical and Computer. As far as Biology is concerned, candidate should have the knowledge about tissue engineering, cell biology, genetic engineering and biomaterials.

O. Mining Engineering

Mining engineering is basically a part of engineering that deals with the techniques used for extraction of the minerals from earth. The minerals include metallic and non-metallic ores, energy sources, solid fuels etc. The techniques being used in Mining Engineering are processing, blasting, drilling and extraction.

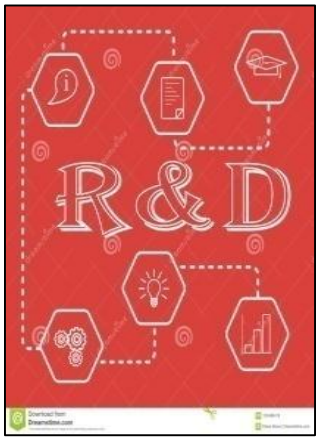
As the minerals are vital resources for everyday life, the process of extraction, production and development of these mineral is vital and hence the Mining Engineers are in a very high demand across the globe.

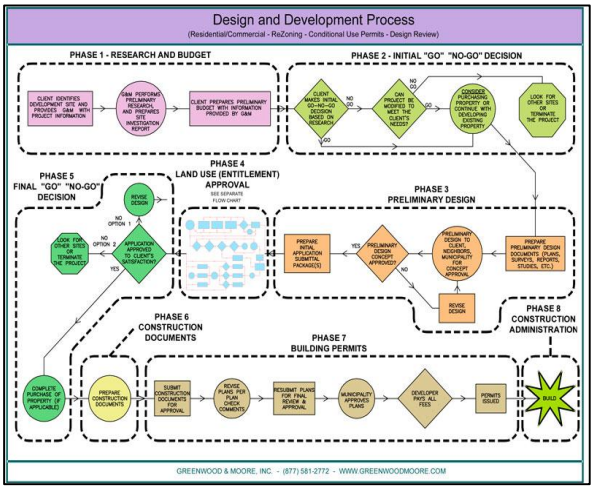
V. RESEARCH AND DEVELOPMENT

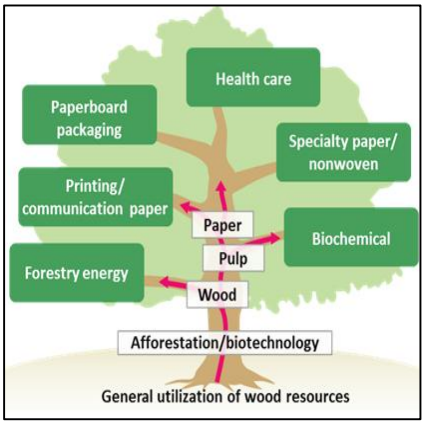
Research and development – R&D – is the process by which a company works to obtain new knowledge that it might use to create new technology, products, services, or systems that it will either use or sell. The goal most often is to add to the company's bottom line.

Many people think of pharmaceutical and technology companies when they hear "R&D," but other firms, including those that produce consumer products, invest time and resources into R&D as well. For example, a spaghetti sauce brand's many variations on the original product – "Chunky Garden," "Four Cheese," and "Tomato Basil Garlic"– are the results of extensive R&D.

It takes place in companies of all sizes. Any business that creates and sells a product or service, whether it's software or spark plugs, invests in some level of R&D.







A. Basic or Applied

Research is usually basic or applied. Basic research helps the company acquire new knowledge, but doesn't have any specific application or use in mind.

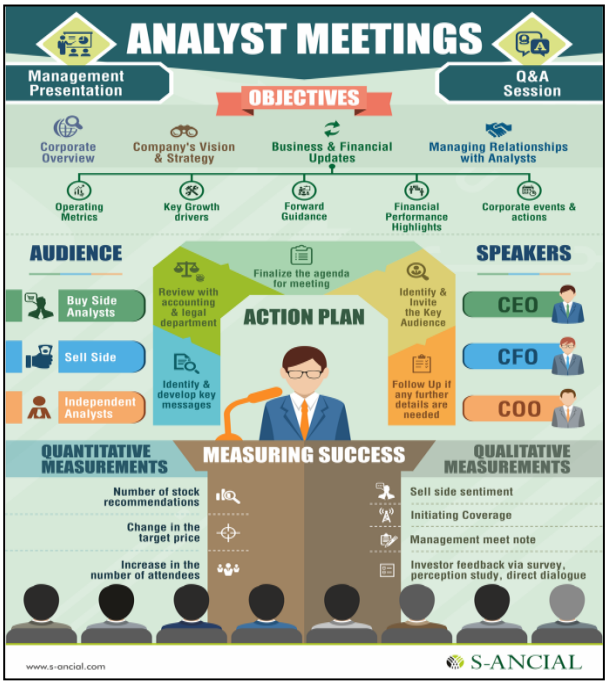
B. Who Does It

R&D often takes place in an internal department in a company, but it can also be outsourced to a specialist or a university. Large multinational companies might do all three, and some of the outsourced work might be done in another country so that the company leverages both the talent and local market knowledge there. Outsourced R&D is especially appealing to the small business owner who has a new product concept but lacks the design or engineering staff needed to create and test options.

– R&D represents the activities companies undertake to innovate and introduce new products and services or to improve their existing offerings.
– R&D allows a company to stay ahead of its competition.
– Companies in different sectors and industries conduct R&D; pharmaceuticals, semiconductor, and technology companies generally spend the most.

VI. MANUFACTURING PLANNER

1) Support manufacturing by managing production output and delivering time-critical components to execute on master schedule as well as respond to unanticipated changes in production schedule
2) Maintain accurate open Work Order lines to define target build quantities, identify system demand or BOM issues, and resolve inventory discrepancies
3) Support maintenance of MRP master data parameters to ensure accurate signals for quantity and dates generated by MRP (i.e. production lead times, lot sizing, and safety stock) to minimize excess
4) Monitor KPIs for assigned areas of production in order to track materials and prevent excess inventory
5) Collaborate with Purchasing and Engineering to coordinate Engineering Change Orders (ECOs) to plan for material and product end of life (EoL) and minimize obsolescence
6) Identify potential production risks to align processes with production plan milestones
7) Assist in implementing systematic solutions to control inventory flow, minimize shortages, and maintain inventory accuracy
8) Provides planning support to various tasks/projects including performance monitoring, materials analysis, reporting, and expediting
9) Creates and updates manufacturing work instructions
10) Creates and updates routing to support work instructions



11) Expected to work in a safe manner in accordance with established operating procedures and practices
12) Creates and updates rework/repair planning to support rejection tags
13) Provide Development and Mentoring
14) Manage Oracle EBS Work Orders to ensure timely completion, ensuring batch transactions are completed
15) MRP knowledge/experience
16) Shop floor control experience
17) Experience using Microsoft Office Tools to include Word, PowerPoint, Excel
18) Knowledge of manufacturing processes
19) Understand specifications, diagrams and engineering drawings
20) Team player who is able to manage differing opinions an come up with the best solution
21) MS Office experience (Word, Excel)
22) Capable of adopting and implementing Continuous Improvement activities
23) Experience with Planning & Scheduling tools (ex: SAP, MS Office, MS Project)
24) Organization and Multi-tasking Skills

VII. FINANCIAL ANALYST

An analyst is a person who is well versed with the fundamental working principles of a particular domain or area of study. He is expected to analyze various scenarios including but not limited to current situations in the market and come up with intelligent inferences for the company and help them develop strategies for doing business in that current scenario.

Similarly, a 'financial analyst' is one who 'studies' a company and tries to make predictions about the financial health of the company in the future. As we mentioned earlier, an analyst has to look at multiple factors before making his/her decisions, similarly, a financial analyst also has several factors to analyze and understand before reaching any conclusions about that particular company.

Financial Analyst supports and analyzes company financials monthly, quarterly as well as annual and assists in preparing and forecasting annual budget. Below are some of the key responsibilities of a Financial Analyst –

1) Support monthly and year-end accounting
2) Analyze business units, its performance on a monthly basis and provide budget vs variance analysis as well as forecasts
3) Financial modeling resulting in forecasting of revenue, expenses, headcounts, balance sheet and cash flows
4) monitor the key financial metrics of the company
5) perform performing ad-hoc analysis and new project break-even analysis
6) Provide key business analyses and strategic recommendations on pricing, investment, make vs. buy, ROI cost reduction and controls.
7) Assist in due diligence and identification of business acquisition targets Qualifications – Financial Ana Desc

VIII. COMPUTER SYSTEM ADMINISTRATOR

System administration refers to the management of one or more hardware and software systems. The task is performed by a system administrator who monitors system health, monitors and allocates system resources like disk space, performs backups, provides user access, manages user accounts, monitors system security and performs many other functions.

System administration is a job done by IT experts for an organization. The job is to ensure that computer systems and all related services are working well. The duties in system administration are wide ranging and often vary depending on the type of computer systems being maintained, although most of them share some common tasks that may be executed in different ways.

Computer systems administrators are in charge of configuring and maintaining all computer software, hardware and telecommunications operations within a specific firm or corporation. They install hardware and software and make sure all systems are running properly. They add users and train them to use the hardware and software in the manner for which they are intended. They solve problems and use data to test a system's performance.

Common tasks include installation of new hardware or software, creating and managing user accounts, maintaining computer systems such as servers and databases, and planning and properly responding to system outages and various other problems. Other responsibilities may include light programing or scripting to make the system workflows easier as well as training computer users and assistants.

IX. FACILITIES LAYOUT AND DESIGN

Facility layout and design is an important component of a business's overall operations, both in terms of maximizing the effectiveness of the production process and meeting the needs of employees. The basic objective of layout is to ensure a smooth flow of work, material, and information through a system. The basic meaning of facility is the space in which a business's activities take place. The layout and design of that space impact greatly how the work is done, the flow of work, materials, and information through the system. The key to good facility layout and design is the integration of the needs of people (personnel and customers), materials (raw, finishes, and in process), and machinery in such a way that they create a single, well-functioning system. Some of the goals in designing the facility are to ensure a minimum amount of materials handling, to avoid bottlenecks, to minimize machine interference, to ensure high employee morale and safety, and to ensure flexibility.

A. Factors In Determining Layout And Design

Small business owners need to consider many operational factors when building or renovating a facility for maximum layout effectiveness. These criteria include the following:

1) Ease of future expansion or change: Facilities should be designed so that they can be easily expanded or adjusted to meet changing production needs.
2) Flow of movement: The facility design should reflect a recognition of the importance of smooth process flow.
3) Materials handling: Small business owners should make certain that the facility layout makes it possible to handle materials (products, equipment, containers, etc.) in an orderly, efficient—and preferably simple—manner.
4) Output needs: The facility should be laid out in a way that is conducive to helping the business meet its production needs.
5) Space utilization: This aspect of facility design includes everything from making sure that traffic lanes are wide enough to making certain that inventory storage warehouses or rooms utilize as much vertical space as possible.
6) Shipping and receiving: "While space does tend to fill itself up, receiving and shipping rarely get enough space for the work to be done effectively," it said in How to Run a Small Business.
7) Ease of communication and support: Facilities should be laid out so that communication within various areas of the business and interactions with vendors and customers can be done in an easy and effective manner.
8) Impact on employee morale and job satisfaction: Since countless studies have indicated that employee morale has a major impact on productivity, Some ways layout design can increase morale are obvious, such as providing for light-colored walls, windows, space.
9) Promotional value: If the business commonly receives visitors in the form of customers, vendors, investors, etc., the small business owner may want to make sure that the facility layout is an attractive one that further burnishes the company's reputation.
10) Safety: The facility layout should enable the business to effectively operate in accordance with Occupational Safety and Health Administration guidelines and other legal restrictions.

X. PRODUCTION, LOGISTICS & OPERATIONS MANAGEMENT

1) Production management is a process of planning, organizing, directing and controlling the activities of the production function in an organization to achieve the goals of an organization.
2) Production management is the management of an organization's production systems, which converts inputs into the desired product and services. A production system takes given inputs which include raw material, people, machines, tools, building, technology, cash, information and other resources whereas the outputs include the product and services.

3) Production management is the study (practices) of planning, designing, and production systems and subsystems to achieve the organization goals.
4) Production management is a function of management, related to planning, coordinating and controlling the resources required for production to produce specified product by specified methods, by optimal utilization of resources.
5) Production management is defined as management function which plans, organizes, coordinates, directs and controls the material supply and processing activities of an enterprise, so that specified products are produced by specified methods to meet an approved sales programme. These activities are being carried out in such a manner that labor, plant and capital available are used to the best advantage of the organization.

A. Objectives of Production Management:

The four objectives of the production management is to produce goods services of right quality and quantity at the right time and right manufacturing cost.

1) Right Quality: The quality of the product is established based on the customer needs in the market. The right quality is not necessarily the best quality of the product. It is determined by the cost of the product and the technical characteristics as suited to the specific requirements of the customers in the market environment.
2) Right Quantity: The manufacturing organization should produce the products in the right number. If they are produced more than demand the capital will block up in the form of inventory and if the quantity is produced in short of demand, leads to a shortage of products.
3) Right Time: Timeliness of delivery of the product to the consumer or wholesaler is one of the critical parameters to judge the effectiveness of the production department. So, the production department has to make the optimal utilization of input resources to achieve its desired objectives.
4) Right Manufacturing Cost: Manufacturing costs are incurred before the product is manufactured and released into the market. Hence, all attempts should be made to the duce the products at a pre-established cost, to reduce the variation between the actual and the standard (pre-established) cost.
5) Produce the desired product or specified product by specified methods so that the optimal utilization of available resources is met with.
6) To produce goods that has marketability at the cheapest price by proper planning of the manpower, material and processes.
7) To deliver right goods of right quantity at right place and at right price.
8) When the above objective is achieved, we say that we have effective Production Management system.

1) Some of the key features of production management are as follows.

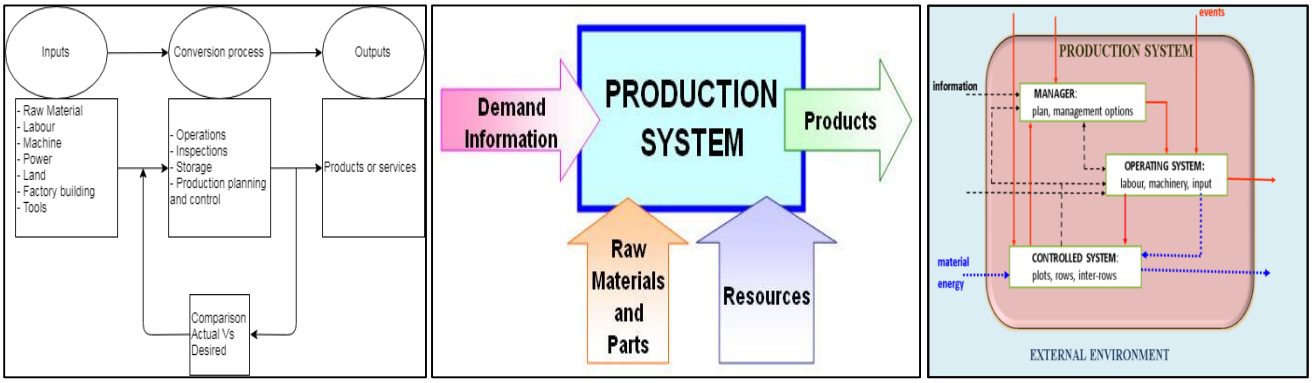
1) Production management deals with processes. It is not possible for a single person to perform the function of production management. Production management includes some staff such as supervisors, materials managers and store managers or anyone who manage staff, equipment, or materials.
2) The management term in broad interpretation includes the design of the system and performance of all the activities mandatory to operate the system, that encompasses the directions to staff and acquiring material and equipment.
3) The term highlights the fact that to manage the production of the organization's final products; there are many subsystems as parts of the production system. For example, the cost accounting department in a manufacturing company is part of the production system.
4) The goal of production management is to minimize costs, for most of the organizations. It also helps to improve the efficiency and productivity of the production system.

2) Types of Production Management

There are four different types of production process that are distinct and require different conditions for their working. Selection of production process is also a strategic decision. Therefore the production / manufacturing process is selected at the stage of planning for any industry. It should meet the basic two objectives i.e. to meet the specification of the final product and should be cost effective.

The manufacturing process is classified into four types.

1) Job production: Herein one or few units of the products are produced as per the requirement and specification of the customer. Production is to meet the delivery schedule and costs are fixed prior to the contract.
2) Batch production: In this, limited quantities of each of the different types of products are manufactured on same set of machines. Different products are produced separately one after the other.
3) Mass or flow production: Under this, the production is conducted on a set of machines arranged according to the sequence of operations. A huge quantity of same product is manufactured at a time and is stocked for sale. Different product will require different manufacturing lines.
4) Continuous or Process Production: Under this, the production is conducted for an indefinite period for constant market demand.



B. Functions of Production Management Department

The functions of Production Management depend upon the size of the firm. In small firms the production manager may have to look after production planning and control along with personnel, marketing, finance and purchase functions. In medium sized firms, there may be separate managers for Personnel, marketing and Finance functions. But the production "planning & control" and "Purchase and stores" may be under the control of production management department. In large sized firms the activities of Production Management is confined to the management of production activities only.

1) Materials: The selection of materials for the product. Production manager must have sound knowledge of materials and their properties, so that he can select appropriate materials for his product.
2) Methods: Finding the best method for the process, to search for the methods to suit the available resources, identifying the sequence of process are some of the activities of Production Management.
3) Machines and equipment: Selection of suitable machinery for the process desired, designing the maintenance policy and design of layout of machines are taken care of by the production management department.
4) Estimating: To fix up the production targets and delivery dates and to keep the production costs at minimum, production management department does a thorough estimation of production times and production costs.
5) Loading and scheduling: The production management department has to draw the time table for various production activities, specifying when to start and when to finish the process required. It also has to draw the timings of materials movement and plan the activities of manpower. The scheduling is to be done keeping in mind the loads on hand and capacities of facilities available.
6) Routing: This is the most important function of production management department. The Routing consists of fixing the flow lines for various raw materials, components etc., from the stores to the packing of finished product, so that all concerned know what exactly is happening on the shop floor.
7) Dispatching: The Production Management department has to prepare various documents such as Job Cards, Route sheets, Move Cards, Inspection Cards for each and every component of the product.
8) Expediting or follow up: Once the documents are dispatched, the management wants to know whether the activities are being carried out as per the plans or not.
9) Inspection: Here inspection is generally concerned with the inspection activities during production, but a separate quality control department does the quality inspection, which is not under the control of Production Management
10) Evaluation: The Production department must evaluate itself and its contribution in fulfilling the corporate objectives and the departmental objectives. This is necessary for setting up the standards for future.

XI. PRODUCTION COSTS VS. MANUFACTURING COSTS

Production costs reflect all of the expenses associated with a company conducting its business while manufacturing costs represent only the expenses necessary to make the product. Both of these figures are used to evaluate the total expenses of operating a manufacturing business. The revenue that a company generates must exceed the total expense before it achieves profitability.

A. Production costs

Costs of production include many of the fixed and variable costs of operating a business. Raw materials and labor are production costs.

1) A factory's production costs are the total expenses of doing business.
2) Its manufacturing costs are the expenses directly related to building the product.
3) Both must be included in the calculation of the per-item cost of doing business.

Fixed costs typically include:

1) Building rent
2) Advertising budget
3) Business equipment

4) Other miscellaneous expenses that do not go up or down with moderate changes in the volume of business

Variable costs increase or decrease as production volume changes. Some variable costs are:

1) Supplies
2) Wages
3) Any other expenses that change with the level of production

Manufacturing businesses calculate their overall expenses in terms of the cost of production per item. As the rate of production increases, the company's revenue increases while its fixed costs remain steady. Therefore, the per-item cost of manufacturing falls and the business becomes more profitable.

A lower per-item fixed cost motivates many businesses to continue expanding production up to its total capacity. This allows the business to achieve a higher profit margin after considering all variable costs.

B. Manufacturing Costs

Manufacturing costs, for the most part, are sensitive to changes in production volume. Total manufacturing expenses increase as production increases.

The opportunity to achieve a lower per-item fixed cost motivates many businesses to continue expanding production up to total capacity.

Manufacturing costs fall into three broad categories of expenses: materials, labor, and overhead. All are direct costs. That is, the salary of the company accountant or the accountant's office supplies are not included, but the salary and supplies of the foreman are.

XII. MAINTENANCE DEPARTMENT

It is responsible for the way equipment runs and looks and for the costs to achieve the required level of performance.

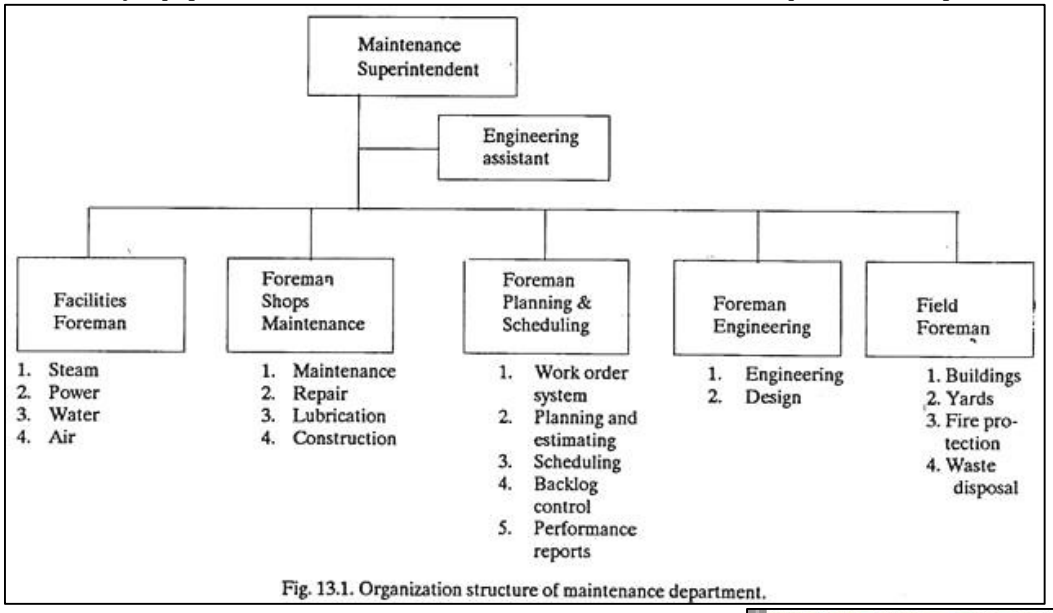


Fig. 13.1. Organization structure of maintenance department.

A. Types of Maintenance

There are different types of maintenance that organizations use to increase the uptime of their assets and utility of their facilities. Based on an organization's budget, amount of resources, level of combined experience, and maintenance goals, one or more of the following maintenance types are used.

B. Proactive type of Maintenance

1) Preventive maintenance: Preventive maintenance is the most popular type of proactive maintenance However, with preventive maintenance, the organization runs the risk of over-scheduling maintenance tasks because tasks are scheduled based on time rather than actual conditions. That said, preventive maintenance achieves 12% to 18% cost savings over reactive maintenance.
2) Predictive maintenance: The major barrier to PdM is the time it takes to implement rather than the cost of the technology itself. For those that do allocate the time, PdM provides an 8% to 12% cost savings over preventive maintenance.
3) Condition-based maintenance: Condition-based maintenance (CBM) is at the core of predictive maintenance but, on its own, does not rely on technology to determine the condition of an asset like PdM does. For instance, a manager may instruct an operator to monitor the condition of an asset and submit a work request when a specific condition is met. This approach may, or may not be, as reliable as predictive maintenance. An organization that has highly-trained operators may spot hazardous conditions better than an organization using PdM technology that doesn't know what to look for.
4) Scheduled maintenance: Scheduled maintenance includes work that is scheduled on a calendar for completion. The most common type of scheduled maintenance is calendar-based preventive maintenance tasks. These are scheduled well in advance of completion.
5) Planned maintenance: Planned maintenance is work that's prepared for in advance of it taking place.. A high planned maintenance percentage indicates that a maintenance team will have resources available to complete work for the time/day the work is scheduled for. Having a high planned maintenance percentage also helps boost other maintenance KPIs like schedule compliance. More planned maintenance means more successful completion of scheduled maintenance.
6) Routine maintenance: Routine maintenance is a form of time-based maintenance and preventive maintenance, though some organizations differentiate between routine maintenance and preventive maintenance. They use the latter for smaller tasks (i.e. cleaning) performed at higher frequencies (hourly, daily) and the former for larger tasks (i.e. inspections) performed at lower frequencies (weekly, monthly, annually).
7) Reactive types of maintenance
8) Emergency maintenance: Emergency maintenance occurs when an asset requires immediate attention in order to keep a facility operational or safe. This is the most reactive and intrusive type of maintenance as it pulls technicians away from other jobs and lowers schedule compliance.
9) Corrective maintenance: Corrective maintenance is inherently part of emergency maintenance because, when there is an emergency, something needs corrected or fixed. In this way, corrective maintenance is mostly reactive.
10) Other types of maintenance
11) Deferred maintenance: Deferred maintenance includes repairs and inspections that are put into a backlog due to limited budget and resources.
12) Total productive maintenance: Total productive maintenance (TPM) is the broadest type of maintenance that targets more than the assets that need maintained. It also aims to improve employee satisfaction and overall morale in the workplace, specifically in manufacturing plants. TPM does this by increasing overall equipment effectiveness (OEE) and the amount of planned maintenance.

1) Legal Maintenance:

Some equipment are subjected to rules or regulations by the Administration. Above all, there are equipment that are hazardous to people or the environment.

Some of the equipment subjected to this type of maintenance are:

- Equipment and devices under pressure
- Installation of High and Medium Voltage
- Cooling Towers
- Certain lifts: service or people
- Vehicles
- Fire Prevention Facilities
- Storage tanks of certain chemicals

2) Subcontracted Maintenance To A Specialist

When we talk about a specialist, we refer to an individual or a company specialized in a particular equipment. As we said, we must turn to a specialist when:

- We do not have sufficient knowledge
- We do not have the necessary resources

If there are these circumstances, some or all of maintenance work must be outsourced to specialized companies.

XIII. TOOL ROOM

Tool Room centres focus towards making it a perfect apparatus space for any Tool maker. All tool rooms are furnished with ultramodern, state-of-the-art machines and CNC machinery that enable the centres to handle commercial job assignments for mould fabrication, high precision machining and manufacturing of standard mould bases for plastic products of any profile, shape or complexities. Besides, the tool rooms also undertakes job orders of varying magnitude such as repair of moulds and dies, CNC machining, CNC spark erosion, grinding, drilling, designing, development of jigs and fixtures, tool parts etc.

A. CNC Machines

1) Universal milling and boring Machine
6) HAAS USA Make turning Centre

2) Die sinking - EDM
3) Universal lathe with hydrobar feeder
4) High precision surface and profile grinder
5) Wire cut EDM
7) HAAS USA High Speed 5 Axis machining centre
8) HAA USA High Speed 3 Axis Machining Centre
9) CNC EDM Spark erosion Machine

B. Special Purpose Machines

1) Jig boring machine
2) Co-ordinate drilling and boring machine
3) Rigid die sinking machine Center lathe with hydro copying attachment
4) Rotary surface grinding Cylindrical grinder
5) Optical profile grinding machine

C. Inspection Facilities

1) Co-ordinate measuring machine
2) Profile projector
3) Ultrasonic flaw detector Surface tester

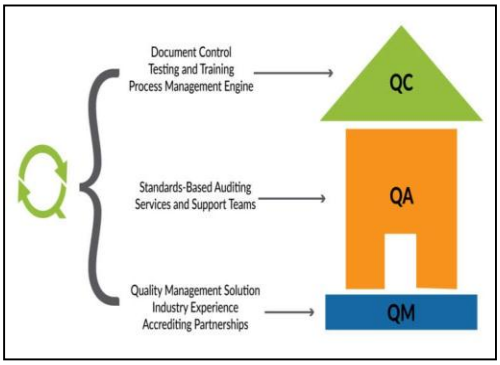
XIV. FABRICATION

Manufacturing process in which an item is made (fabricated) from raw or semi-finished materials instead of being assembled from ready-made components or parts. Fabrication is the act of taking raw stock material and turning it into a part for use in an assembly process. There are many different types of fabrication processes. The most common are

1) Cutting.
2) Folding.
3) Machining.
4) Punching.
5) Shearing.
6) Stamping.
7) Welding.
8) Painting

XV. QUALITY CONTROL & QUALITY ASSURANCE

1) Quality has been defined as fitness for use, conformance to requirements, and the pursuit of excellence. Even though the concept of quality has existed from early times, the study and definition of quality have been given prominence only in the last century. It examines the quality of the "end products" and the final outcome.
2) Quality is extremely hard to define, and it is simply stated: "Fit for use or purpose." It is all about meeting the needs and expectations of customers with respect to functionality, design, reliability, durability, & price of the product.
3) Quality control can be defined as "part of quality management focused on fulfilling quality requirements." While quality assurance relates to how a process is performed or how a product is made, quality control is more the inspection aspect of quality management. An alternate definition is "the operational techniques and activities used to fulfill requirements for quality."
4) Quality control is the set of measures and procedures to follow in order to ensure that the quality of a product is maintained and improved against a set of benchmarks and that any errors encountered are either eliminated or reduced. The focus of quality control is to ensure that the product and product manufacturing are not only consistent but also in line with customer requirements. The main aim of Quality control is to check whether the products meet the specifications and requirements of the customer. If an issue or problem is identified, it needs to be fixed before delivery to the customer.
5) Assurance is nothing but a positive declaration on a product or service, which gives confidence. It is certainty of a product or a service, which it will work well. It provides a guarantee that the product will work without any problems as per the expectations or requirements.
6) Quality Assurance is popularly known as QA Testing, is defined as an activity to ensure that an organization is providing the best possible product or service to customers. QA focuses on improving the processes to deliver Quality Products to the customer. An organization has to ensure, that processes are efficient and effective as per the quality standards defined for software products.



7) Quality assurance can be defined as "part of quality management focused on providing confidence that quality requirements will be fulfilled." The confidence provided by quality assurance is twofold—internally to management and externally to customers, government agencies, regulators, certifiers, and third parties. An alternate definition is "all the planned and systematic activities implemented within the quality system that can be demonstrated to provide confidence that a product or service will fulfill requirements for quality."

Quality assurance has a defined cycle called PDCA cycle or Deming cycle. The phases of this cycle are:

1) Plan
2) Do
3) Check
4) Act

XVI. MATERIAL CONTROL

Materials constitutes major portion of the total cost of the product. Supplies are also used for the manufacture of product. Both materials and supplies are collectively called as stores. The finished goods are termed as stock.

Commodities that are supplied to an undertaking to be utilized in the manufacturing process or to be transformed into products are called “Materials”.

The terms materials and stores are sometimes used interchangeably, but they are not identical. Stores is a wider term and covers items like sundry supplies, maintenance stores, tools, jigs, equipment besides material consumed in production. The raw materials and supplies are equivalent to cash. Hence, the management should exercise control over the materials and stores.

D. Materials Control

Materials control refers to managerial activities relating to giving instructions or directions to ensure maintaining adequate quality and quantity of materials for uninterrupted production process with the objective of minimizing material cost per unit.

Materials control can be defined as a systematic control over purchasing, storing and consumption of materials. Materials control helps to maintain a regular and timely supply of materials by avoiding over and under-stocking. Materials control ensures that the right quality and quantity of materials is available to the company at the right time. Materials control helps to reduce the losses and wastage of materials by maintaining their efficient purchase, storage and use or consumption in the factory. The importance of materials control lies in its role in reducing the cost of production and increasing the profitability of the company.

Materials control is a wider term, which includes inventory control. Moreover, cost of production, planning of materials, purchase procedure, transportation and usage control are parts of materials control.

Objectives Of Materials Control

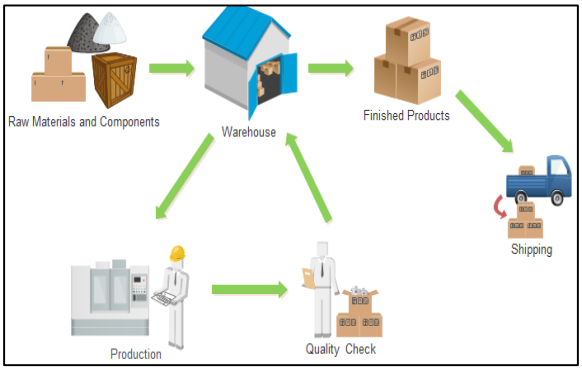
The main objectives of materials control are presented below:

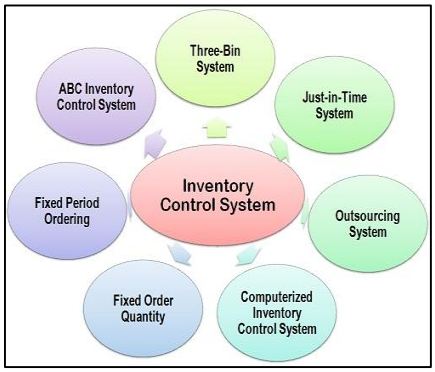
1) Ensures adequate supply of materials as and when required for smooth production process.
2) Prevents over stocking and under stocking of materials.
3) Quick identification and supply of materials to the production department.
4) Prompt issue of materials.
5) Safeguarding of materials from loss of stock by theft and fire.
6) Protection of materials from unnecessary wastage of materials.
7) Protection of stores against pilferage.
8) Minimization of storage cost.

Advantages Of Material Control

The following benefits are available to the company if the company exercises proper control on the materials.

1) Materials control eliminates wastage in use of raw materials and supplies in course of purchase, storage, handling and use.
2) It ensures uninterrupted flow of right quality and quantity of materials to the production department.
3) It reduces the risk of fraud and theft.
4) It facilitates the preparation of various monthly financial statements.
5) The valuation of materials is very easy.
6) It requires minimum amount of capital to buy materials.
7) It fixes the responsibility on the part of the employers who are handling the materials at the maximum.





XVII. INVENTORY CONTROL

Inventory control is the portion of your inventory management system that involves what's currently on hand. Essentially, it's about effectively managing where your stock is and what condition it's in — taking when it arrives and departs your warehouse into account.

Inventory control is confined to the techniques of maintaining stocks at desired levels whether they are raw materials, work in progress or finished goods with the primary objective of minimizing the cost.

Keeping control of your stock so that you're able to hold the least amount of inventory in your warehouses makes for easier organization, lower holding costs, better cash flow, and more space within your warehouses. When it comes to inventory control procedures, less is definitely more.

A. Economic order quantity (EOQ)

EOQ is the optimum inventory you should purchase to minimize the costs of ordering and holding. You'll need to know your annual fixed costs (D), demand in units (K), and carrying costs per unit (H).

Sound inventory control processes enable stockroom and supply managers to:

- Reduce time spent looking for inventory items.
- Prevent overstock and out-of-stock situations.
- Monitor item consumption.
- Increase accountability and prevent shrinkage.

XVIII. PROCUREMENT

Procurement is the process of getting the goods and services your company needs to fulfil its business model. In summary, Procurement is the process of getting the goods you need, while Supply Chain is the infrastructure (extensive, in many cases) needed to get you those goods.

The tasks involved in procurement include:

1) The development of quality standards
2) Financing purchases
3) Negotiating price
4) Goods and services purchases
5) Aligning purchases to company ethics and policies
6) Inventory control
7) Disposal of waste products like the packaging

In the overall supply chain process, the procurement function stops once your company has possession of the goods. For a business to make a profit, the cost of procuring your goods must be less than the amount you can sell the goods for, minus whatever costs are associated with processing and selling them.

Procurement is an umbrella term that includes several core business functions and should form a key role in corporate strategy. Four key aspects are:

1) Company Identity
2) Market Placement
3) Company Capabilities
4) Management Issues

Procurement involves the process of selecting vendors, establishing payment terms, strategic vetting, selection, the negotiation of contracts and actual purchasing of goods. Procurement is concerned with acquiring (procuring) all of the goods, services, and work that is vital to an organization. Procurement is, essentially, the overarching or umbrella term within which purchasing can be found.

B. Steps in the Procurement Process

Aligning your procurement function with your corporate strategy is only one part of the ultimate goal of procurement. Goods and services also need to be purchased.

The process of purchasing these good and services is known as the Procure-To-Pay Cycle. The entire Procure-To-Pay Cycle can be an involved process with numerous steps:\

1) Identification of Requirement
2) Authorization of Purchase Request
3) Approval of Purchase Request
4) Procurement
5) Identification of Suppliers
6) InquiriesReceipt of the Quotation
7) Negotiation
8) Selection of the Vendor
9) Purchase Order Acknowledgement
10) Advance Shipment Notice
11) Goods Receipt
12) Invoice Recording
13) 3 Way Match
14) Payment to Supplier

Therefore, to be truly effective, procurement needs to have a broad view of company needs, values and direction.

XIX. Supply Chain Management

A supply chain is defined as Everybody involved in getting your product into the hands of a customer. It includes raw material gatherers, manufacturers, transportation companies, wholesale warehouses, in-house staff, stock rooms right down to the employee at the register. It also includes the tasks and functions that contribute to moving that product, such as quality control, marketing, procurement, and sourcing.

A supply chain is the network of manufacturers, suppliers and logistics providers needed to get a specific product to your business and, subsequently, your customers.

At its core, supply chain management is the act of overseeing and managing a supply chain to ensure it is operating as efficiently as possible. Predominately it is ensuring that all suppliers and manufacturers are maintaining the desired quality of production and are engaged in ethical business practices.

XX. Manufacturing

Manufacturing process is basically a complex activity, concerned with people who've a broad number of disciplines and expertise and a wide range of machinery, tools, and equipment with numerous levels of automation, such as computers, robots, and other equipment. Manufacturing pursuits must be receptive to several needs and developments.

Beside above, all the future technicians must understand the basic needs of workshop routines in terms of man, equipment, material, methods, revenue and other infrastructure conveniences needed to be placed properly for maximum shop or plant layouts and other support solutions effectively regulated or positioned in the field or industry within a properly planned manufacturing firm.

List of manufacturing prcesses include Casting, Imaging and coating, Moulding, Forming, Machining, Joining, Additive Manufacturing, Others

A. 12 Steps in Manufacturing From Product Concept to Manufacturing

1) Step 1: Product Concept
2) Step 2: Research
3) Step 3: Product Design Development

At this stage, you can begin to develop your product design. There are a number of things you must consider here:

1) Have a firm idea of your product's function
2) Think about how strong and long-lasting your product will be
3) How reliable is the product?
4) What will the manufacturing costs be, and does this allow room for profit without a price that will put buyers off?
5) Think about the complexity of manufacture, factoring in how many parts each unit is made from
6) Is your product single-use, or long lasting?
7) What are the materials needed for production? This point may require further research, so allow for this

4) Step 4: Research and development of the final design
5) Step 5: CAD - Computer-aided design.
6) Step 6: CAM - Computer-aided manufacturing.
7) Step 7: Prototype Testing
8) Step 8: Manufacturing
9) Step 9: Assembly
10) Step 10: Feedback and Testing
11) Step 11: Product Development
12) Step 12: Final Product

XXI. THE PURCHASING PROCESS

Purchasing is a subset of procurement. Purchasing refers to buying goods or services and often includes receiving and payment. The steps related to purchasing within the procurement cycle are:

1) Purchase Order Acknowledgement
2) Advance Shipment Notice
3) Goods Receipt
4) Invoice Recording
5) Three Way Match
6) Payment to Supplier

Purchasing is a subset of procurement. Purchasing generally refers simply to buying goods or services. Purchasing often includes receiving and payment as well.

Unlike the entire Procure-To-Pay Cycle, the steps explicitly related to purchasing should not be tailored to suit the size and scope of each individual business. These are fundamental steps of good purchasing and should be employed routinely as a best practice in all businesses.

Because purchasing is a process within the overarching procurement process, both procurement and purchasing are often used interchangeably. In the business world, the practice of using similar terminology in either conversation or printed materials is routine, although it is often confusing and should be avoided.

Procurement deals with the sourcing activities, negotiation and strategic selection of goods and services that are usually of importance to an organization. Purchasing is the process of how goods and services are ordered. Purchasing can usually be described as the transactional function of procurement for goods or services.

A. Important Factors That Influence The Buying Decision

1) Economic Factor: The most important and first on this list is the Economic Factor. This one is the main foundation of any purchasing decision. The reason is simple people can't buy what they can't afford. The need of a product also doesn't play a role here, but the most important thing is affordability.
2) Functional Factor: The factor is totally about needs, backed by a logic that what makes sense and also fits in the best interest of the customer. This one factor also plays a very important role in the buying decision.
3) Marketing Mix Factors: There are 4 components in the marketing mix, i.e. product, pricing, promotion and place of distribution and each of these components have a direct or indirect impact on the buying process of the consumers. The consumers consider various things like the characteristics of the product, price charged, availability of the product at the required location and much more.
4) Personal Factors:The personal factors include age, occupation, lifestyle, social and economic status and the gender of the consumer. These factors can individually or collectively affect the buying decisions of the consumers.
5) Psychological Factor: When it comes to the psychological factors there are 4 important things affecting the consumer buying behaviour, i.e. perception, motivation, learning, beliefs and attitudes.
6) Social Factors: Social factors include reference groups, family, and social status. These factors too affect the buying behaviour of the consumer. These factors in turn reflect an endless and vigorous inflow through which people learn different values of consumption.
7) Cultural Factors: Cultural factors have a subtle influence on a consumer's purchasing decision process. Since each individual lives in a complex social and cultural environment, the kinds of products or services they intend to use can be directly or indirectly be influenced by the overall cultural context in which they live and grow. These Cultural factors include race and religion, tradition, caste and moral values.
8) SWOT Analysis(Strength, Weakness, opportunity, Threat)

Consumer behaviour can indicates different things like how individuals or groups choose to buy, use and dispose goods or services, to satisfy their needs and desires. Hence it is important to understand that the consumer behaviour is affected by several factors.

XXII. SHIPPING

The physical moving of goods from one point to another, such as the moving of merchandise from the warehouse to the customer. The shipping process follows the manufacture and the packing of goods and will be controlled by a shipping or logistics company.

Shipping can take several forms depending on the distance covered and the speed of delivery necessary. The most cost effective type of shipping is ground shipping, although it is also the slowest form. Basic discounted ground shipping could take up to 10 days or longer at peak holiday shipping times. For quick deliveries air freight would be used, however this is also more expensive. In the case of international shipments freight can be sent via ocean shipping, and while this is very cost effective, it is also extremely slow, taking up to 6 weeks or longer in some cases. While air freight gets around this, international air freight can also be very expensive.



The process of transporting an item, usually through the mail. Shipping is a very basic, common way of getting an item from one place to another, or from one person to another.

When starting out in eCommerce business you may like to cut costs by handling your shipping yourself; however, as your business venture grows it will no longer be viable to handle the shipping of your goods yourself. In this instance, you will employ a shipping and logistics company.

XXIII. ACCOUNTS

1) Accounting can be defined as the production of financial information. It means that accounting allows us to see things like how much money you are earning, how much you are worth, how much money you spend and where you can improve to make even more money!
2) A record of debit and credit entries to cover transactions involving a particular item (as cash or notes receivable) or a particular person or concern
3) A statement of transactions during a fiscal period showing the resulting balance —sometimes used in the pl.trustees filed annual accounts as required by statute— W. M. McGovern, Jr. et al.
4) periodically rendered reckoning (as one listing charged purchases and credits)
5) A sum of money or its equivalent deposited in the common cash of a bank and subject to withdrawal at the option of the depositor

- Financial records of an organization that register all financial transactions, and must be kept at its principal office or place of business.
- The purpose of these records is to enable anyone to appraise the organization's current financial position with reasonable accuracy.
- Firms present their annual accounts in two main parts: the balance sheet, and the income statement (profit and loss account).
- The annual accounts of a registered or incorporated firm are required by law to disclose a certain amount of information.
- And have to be certified by an external auditor that they present a 'true and fair view' of the firm's financial affairs.

XXIV. HUMAN RESOURCE MANAGEMENT

Human Resource Management is the process of recruiting, selecting, inducting employees, providing orientation, imparting training and development, appraising the performance of employees, deciding compensation and providing benefits, motivating employees, maintaining proper relations with employees and their trade unions, ensuring employees safety, welfare and healthy measures in compliance with labour laws of the land.

Human resource management as a department in an organisation handles all aspects of employees and has various functions like human resource planning, Conducting Job analysis, recruitment and conducting job interviews, selection of human resources, Orienting , training, compensating,Providing benefits and incentives, appraising, retaining,Career planning, Quality of Work Life, Employee Discipline, black out Sexual Harassments, human resource auditing, maintenance of industrial relationship, looking after welfare of employees and safety issues , communicating with all employees at all levels and maintaining awareness of and compliance with local, state and federal labor laws.

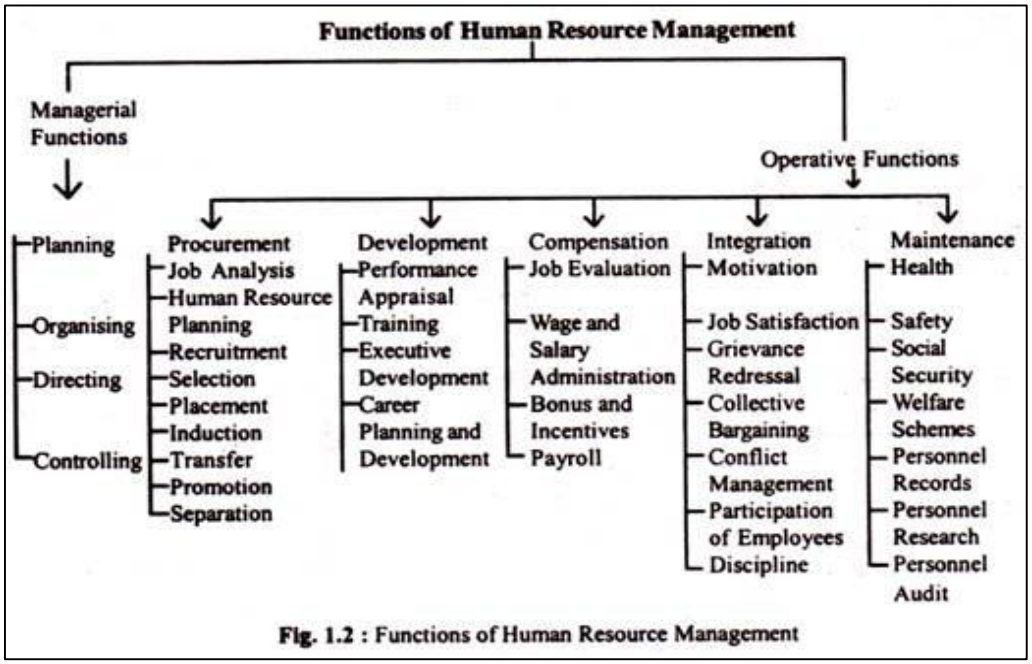


Fig. 1.2 : Functions of Human Resource Management

A. Employee Training, Development & Orientation

Training is a program that helps employees learn specific knowledge or skills to improve performance in their current roles. Development is more expansive and focuses on employee growth and future performance, rather than an immediate job role. Good training and development programs help you retain the right people and grow profits.All the newly hired employees of a company get exposure and get introduced to already existing employees of company for better communication from the beginning.

XXV. PAYROLL

Payroll is a list of employees who get paid by the company. Payroll also refers to the total amount of money employer pays to the employees. As a business function, it involves:

1) Developing organization pay policy including flexible benefits, leave encashment policy, etc.
2) Defining payslip components like basic, variable pay, HRA, and LTA
3) Gathering other payroll inputs (e.g., organization's food vendor may supply information about the amount to be recovered from the employees for meals consumed)
4) The actual calculation of gross salary, statutory as well as non-statutory deductions, and arriving at the net pay
5) Releasing employee salary
6) Depositing dues like TDS, PF, etc. with appropriate authorities and filing returns

In short, we can say that payroll process involves arriving at what is due to the employees also called as 'net pay' after adjusting necessary taxes and other deductions.

A. Actual payroll process:

At this stage, the validated input data is fed into the payroll system for actual payroll processing. The result is the net pay after adjusting necessary taxes and other deductions. Once payroll process is over, it is always a good practice to reconcile the values and verify for accuracy to avoid any errors.

B. Payroll Deductions:

Payroll deductions include many different items, including:

1) Federal income taxes
2) Social security taxes
3) State income taxes
4) Local tax withholdings
5) Health insurance
6) Dental insurance
7) Charitable contributions
8) Garnishments

C. Stores:

Department or function associated with the holding and issuance of inventory items.

XXVI. MARKETING

Marketing is a business term that experts have defined in dozens of different ways. In fact, even at company level people may perceive the term differently. Basically, it is a management process through which products and services move from concept to the customer. It includes identification of a product, determining demand, deciding on its price, and selecting distribution channels. It also includes developing and implementing a promotional strategy.
Marketing covers a vast area of business, including:

1) How you communicate
2) The brand
3) The design
4) Pricing
5) Market research
6) Consumer psychology
7) Measuring effectiveness

At the core of marketing is an understanding of what customers need and value. A company's long-term success depends on learning what its customers' needs are. It then finds ways to add value through different approaches.

XXVII. SALES

1) Sales include "operations and activities involved in promoting and selling goods or services."
2) A "sales-qualified lead" adds to the initial stipulations set forth by marketing to help find the highest value prospects.
3) At times, a sales department may complain that marketing leads do not meet the standard set forth by the sales team. However, the potential for conflict also represents an opportunity for collaboration.

XXVIII. SERVICE

A service is something that the public needs, such as transport, communications facilities, hospitals, or energy supplies, which is provided in a planned and organized way by the government or an official body. You can sometimes refer to an organization or private company as a particular service when it provides something for the public or acts on behalf of the government.

If an organization or company provides a particular service, they can do a particular job or a type of work for you.

Services are activities such as tourism, banking, and selling things which are part of a country's economy, but are not concerned with producing or manufacturing goods.

XXIX. EXPORTS & IMPORTS

Exports are the goods and services produced in one country and purchased by residents of another country. It doesn't matter what the good or service is. It doesn't matter how it is sent. It can be shipped, sent by email, or carried in personal luggage on a plane. If it is produced domestically and sold to someone in a foreign country, it is an export.

Exports are one component of international trade. The other component is imports. They are the goods and services bought by a country's residents that are produced in a foreign country. Combined, they make up a country's trade balance. When the country exports more than it imports, it has a trade surplus. When it imports more than it exports, it has a trade deficit.

XXX. CUSTOMER SUPPORT

Customer support is the range of services you offer to help your customers get the most out of your product and to resolve their problems. Customer support includes things like answering customer questions, providing assistance with onboarding, troubleshooting, and upgrading customers to a new product or service.

Depending on the industry, these services can range from call centers (phone support) to ticket-based helpdesks and email support, from self-serve knowledge bases to increasingly personal types of customer support using tools such as Intercom.
Fundamentally, we believe that to grow a great product company you need:

- Happy customers
- Highly engaged customers
- Customers who stick around
- Customers who continuously provide feedback to improve the product

"Customer happiness, engagement, loyalty and feedback can be influenced by support more than any other function of your business"

A. Key features of your customer support

Here are some of the key features of your support that you get to design and that you should address as early as possible.

1) Style
2) Voice and tone
5) Coverage
6) Language

3) Quality
4) Speed
7) Process

The following examples are the good customer service skills that all customer service professionals strive to master:

1) Smile, literally
2) Mirror a customer's' language and tone
3) Listen first, then validate the problem
4) Acknowledge the customer
5) Summarize your help
6) Communicate hold times
7) Use templates, not boilerplates
8) Make a template your own (with a personal spin)
9) Be considerate of timeframes
10) Imitate the customer's language and phrasing in text
11) Always use a considerate tone over email or text
12) Be comfortable with multitasking
13) Look for cues if something is unclear
14) On social media, (almost) always respond
15) Don't take obvious bait
16) Determine if something should be handled by support or another department

XXXI. PUBLIC RELATIONS

Public relations is a strategic communication process that builds mutually beneficial relationships between organizations and their publics.

PR can be used to protect, enhance or build reputations through the media, social media, or self-produced communications. ... Public relations people working for a company may handle consumer relations, or the relationship between parts of the company such as the managers and employees, or different branch offices.", (staff, dealers, distributors, support staff, masters etc.)

"Public relations is a strategic communication process that builds mutually beneficial relationships between organizations and their publics." Public relations can also be defined as the practice of managing communication between an organization and its publics.

XXXII. SECURITY

There's a long way to go to achieve secure plant operations and efficiency through the lifecycle. You need to be well-equipped and have enough stamina to go down that road, and maintain an appropriate pace and be prepared.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place, installation of CCTV at required locations, scattering security guards as per security requirement etc.,

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