**VALLUVAR COLLEGE OF SCIENCE AND MANAGEMENT, KARUR**

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UNIT 1

MEANING:

Production [management](http://kalyan-city.blogspot.com/2011/04/what-is-management-definitions-meaning.html) means planning, organising, directing and controlling of production activities.

Production management deals with converting raw materials into finished goods or products. It brings together the 6M's i.e. men, money, machines, materials, methods and markets to satisfy the wants of the people.

Production management also deals with decision-making regarding the quality, quantity, cost, etc., of production. It applies management principles to production.

Production management is a part of [business](http://kalyan-city.blogspot.com/2011/03/what-is-business-meaning-definitions.html) management. It is also called "**Production Function**." Production management is slowly being replaced by operations management.

The main **objective** of production management is to produce goods and services of the right quality, right quantity, at the right time and at minimum cost. It also tries to improve the efficiency. An efficient organisation can face competition effectively. Production management ensures full or optimum utilisation of available production capacity.

DEFINITION

According to **Elwood Spencer Buffa**,

"Production management deals with decision-making related to production processes so that the resulting goods or service is produced according to specification, in the amount and by the schedule demanded and at minimum cost."

SCOPE OF PRODUCTION MANAGEMENT:

1. [**Facility Location**](http://www.mbanetbook.co.in/2010/12/facility-location-planning-factors.html)**-** Selecting appropriate location for the production
2. **Plant layouts and material handling -** Deciding upon the machines, equipment and necessary devices which could lead to effectual and desired production in the most economic way. Preparation of plan layout for the establishment of machines in the required sequence. Storage of material and handling it in most effective way to avoid the wastage and delivery at the work centers as and when required.
3. **Product design -** Designing the product and conceive the idea about its production.
4. **Process design -**Determination of the production process which is most relevant and efficient in the given state of affairs.
5. [**Production and planning control**](http://www.mbanetbook.co.in/2010/05/pom-production-planning-and-control.html)**-** Planning the production and its various aspects how, when and where producing a particular product or its assembly will be done.
6. **Quality control -** Controlling the production and ensuring the quality by setting the check points and taking the periodic measurements of the current performance.
7. **Materials management**- Managing the inventories of raw material, semi-finished and finished goods in a way that neither excessive money may block in this non-productive operation nor the required material.
8. **Maintenance management -** Analysis the deviations and formulating the corrective measures to stay in track with planned quality, time-schedule and predetermined cost schedules.

SIGINIFICANCE OF PRODUCTION MANAGEMENT

1. **Accomplishment of firm's objectives** : Production management helps the business firm to achieve all its objectives. It produces products, which satisfy the customers' needs and wants. So, the firm will increase its sales. This will help it to achieve its objectives.
2. **Reputation, Goodwill and Image** : Production management helps the firm to satisfy its customers. This increases the firms reputation, goodwill and image. A good image helps the firm to expand and grow.
3. **Helps to introduce new products** : Production management helps to introduce new products in the market. It conducts Research and development (R&D). This helps the firm to develop newer and better quality products. These products are successful in the market because they give full satisfaction to the customers.
4. **Supports other functional areas** : Production management supports other functional areas in an organisation, such as marketing, finance, and personnel. The marketing department will find it easier to sell good-quality products, and the finance department will get more funds due to increase in sales. It will also get more loans and share capital for expansion and modernisation. The personnel department will be able to manage the human resources effectively due to the better performance of the production department.
5. **Helps to face competition** : Production management helps the firm to face competition in the market. This is because production management produces products of right quantity, right quality, right price and at the right time. These products are delivered to the customers as per their requirements.
6. **Optimum utilisation of resources** : Production management facilitates optimum utilisation of resources such as manpower, machines, etc. So, the firm can meet its capacity utilisation objective. This will bring higher returns to the organisation.
7. **Minimises cost of production** : Production management helps to minimise the cost of production. It tries to maximise the output and minimise the inputs. This helps the firm to achieve its cost reduction and efficiency objective.
8. **Expansion of the firm** : The Production management helps the firm to expand and grow. This is because it tries to improve quality and reduce costs. This helps the firm to earn higher profits. These profits help the firm to expand and grow.

PRODUCTION SYSTEM:

Production system consists of three main components viz., Inputs, Conversion Process and Output.

1. **Inputs** include raw-materials, machines, man-hours, components or parts, drawing, instructions and other paper works.
2. **Conversion process** includes operations (actual production process). Operations may be either manual or mechanical or chemical. Operations convert inputs into output. Conversion process also includes supporting activities, which help the process of conversion. The supporting activities include; [production planning](http://kalyan-city.blogspot.com/2012/01/what-is-production-planning-meaning.html) and control, purchase of raw-materials, receipt, storage and issue of materials, inspection of parts and work-in-progress, testing of products, quality control, warehousing of finished products, etc.
3. **Output** includes finished products, finished goods (parts), and service

TYPES OF PRODUCTION SYSTEM

1. Intermittent production system, and
2. Continuous production system.

**Intermittent production system**

Intermittent means something that starts (initiates) and stops (halts) at irregular (unfixed) intervals (time gaps).

In the intermittent production system, goods are produced based on customer's orders. These goods are produced on a small scale. The flow of[production](http://kalyan-city.blogspot.com/2012/02/what-is-production-system-definition.html) is intermittent (irregular). In other words, the flow of production is not continuous. In this system, large varieties of products are produced. These products are of different sizes. The design of these products goes on changing. It keeps changing according to the design and size of the product. Therefore, this system is very flexible.

The types of an intermittent production system include:

1. Project production flows,
2. Jobbing production flows, and
3. Batch production flows.

Now let's discuss each type of intermittent production system.

**1. Project production flows**

Here, in project production flows, company accepts a single, complex order or contract. The order must be completed within a given period of time and at an estimated cost.

Examples of project production flows mainly include, construction of airports, dams, roads, buildings, shipbuilding, etc.

## 2. Jobbing production flows

Here, in jobbing production flows, company accepts a contract to produce either one or few units of a product strictly as per specifications given by the customer. The product is produced within a given period and at a fixed cost. This cost is fixed at the time of signing the contract.

Examples of such jobbing production flows include, services given by repair shops, tailoring shops, manufacturer of special machine tools, etc.

## 3. Batch production flows

In batch production flows, the production schedule is decided according to specific orders or are based on the demand forecasts. Here, the production of items takes place in lots or batches. A product is divided into different jobs. All jobs of one batch of production must be completed before starting the next batch of production.

Examples of batch production flows include, manufacturing of drugs and pharmaceuticals, medium and heavy machineries, etc.

**Continuous production system**

Continuous means something that operates constantly without any irregularities or frequent halts.

In the continuous production system, goods are produced constantly as per demand forecast. Goods are produced on a large scale for stocking and selling. They are not produced on customer's orders. Here, the inputs and outputs are standardized along with the production process and sequence

**Mass production flows**

Here, company produces different types of products on a large-scale and stock them in warehouses until they are demanded in the [market](http://kalyan-city.blogspot.com/2010/11/what-is-market-types-and-classification.html).

The goods are produced either with the help of a single operation or uses a series of operations.

E.g. of mass [production](http://kalyan-city.blogspot.com/2012/02/what-is-production-system-definition.html) is the production of toothpastes, soaps, pens, etc.

 FACTORS INFLUENCING PLANT LOCATION:

The ten main factors that affect a plant location are as follows:

1. Law and order situation,
2. Availability of infrastructure facilities,
3. Good industrial relations,
4. Availability of skilled workforce,
5. Social infrastructure,
6. Investor friendly attitude,
7. Nearness to market,
8. Nearness to raw-materials' source,
9. Nearness to supportive industries and services, and
10. Must meet safety requirements.

Now let's discuss above factors affecting the location of a plant.

**1. Law and order situation**

Plant location must be at that place where law and order situation is in control.[Entrepreneurs](http://kalyan-city.blogspot.com/2010/11/what-is-entrepreneur-qualities-or.html) give a lot of importance to this factor while locating a business unit in any state or region. If a state has bad law and order situation, then the business must not be located within that state, unless it has other important factors such as availability of heavy or bulky raw materials.

**2. Availability of infrastructure facilities**

Plant location which is selected must have proper infrastructure facilities. Without good infrastructure facilities, it will be difficult to do business efficiently. The infrastructure facilities are the backbone of all industries. Without it, business cannot be done.

Crucial infrastructure facilities that help industries to grow:

1. Transport and communications,
2. Banking and insurance services,
3. Regular fuel supply,
4. Continuous supply of electricity and water, etc.

**3. Good industrial relations**

Plant location must be at those places where good [industrial](http://kalyan-city.blogspot.com/2011/03/what-is-industry-meaning-classification.html)-relations are maintained. Industrial relations become bad, because of militant and selfish trade unions. Entrepreneurs do not want to locate their business at places where anti-social elements are rampant, although there are other favorable factors such as good infrastructure facilities, cheap [labor](http://kalyan-city.blogspot.com/2010/11/what-is-labour-and-labourer-meaning-and.html), etc.

**4. Availability of skilled workforce**

Plant location must be convenient and easily accessible to skilled workforce. Most businesses require skilled-labor force such as engineers, management experts, computer programmers, etc. The entrepreneurs must consider the availability of competent and skillful-workforce at a particular place to locate their business.

**5. Social infrastructure**

Plant location must have good a social infrastructure. There is a need for social-infrastructure not only for employees but also for the development of their families. The availability of social-infrastructure will increase the employees' welfare.

There must be suitable social infrastructure facilities like;

* Education institutions,
* Hospitals and health centers,
* Community centers like worship place, garden, meditation center, etc.
* Recreation facilities like theaters, clubs, communication facilities, etc.

**6. Investor friendly attitude**

Plant location must be in those states whose governments have an investor-friendly attitude. Government must give attractive incentives and concessions to those who start business units in their states. There must not be any bureaucratic control for starting a business.

An investor-friendly attitude will not only attract investment, but will also result in the overall development.

**7. Nearness to market**

Plant location must be near a market. Every business unit depends on a market for selling its goods and services. The goods and services must reach the market on time, and it must be available to the consumers at a low price. Therefore, this factor is given importance while selecting location of a plant.

Locating a plant near the market is preferred, when the product is fragile (easily breakable), perishable, heavy or bulky and when quick service is required.

**8. Nearness to raw-materials' source**

Plant location must be usually near to the source of raw-material. Raw-materials' costs are about 50% of the total cost. So, it is important in the business to get the raw materials in time and at a reasonable price. Therefore, a business must be located close to the source of raw material, especially in the case of “Gross Materials.”

**Gross Materials** are those which lose weight in the production process. Examples of Gross Materials are sugarcane, iron ore, limestone, so on.

However, if the raw material is a “Pure Material,” then the business may be located away from the source of raw materials.

**Pure Materials** are those which add their weight to the finished product. Examples of Pure materials are cotton textiles, bakeries, silk fabrics, etc.

**9. Nearness to supporting industries**

Plant location must be near its supporting industries and services. If it purchases spare parts from an outside agency, then these agencies must be located very close to the business. If not, the business will have to spend a lot of extra [money](http://kalyan-city.blogspot.com/2011/07/what-is-money-meaning-definition.html) on transport. It will also be difficult, to control the quality of the spare parts because of the distant location.

**10. Must meet safety requirements**

Plant location must meet all essential safety requirements. Due to air, water and sound pollution, some factories have a bad effect on the health of the people. Therefore, these factories must be located away from residential areas. Safety of environment must also be given priority in this regards.

**10. Miscellaneous factors**

Following miscellaneous factors also affect a plant location:

* Availability and cost of land,
* Suitability of land - soil and topography,
* Climatic conditions,
* Location of a similar unit, etc.

PLANT LOCATION

MEANINNG:

 Plant layout is a mechanism which involves knowledge of the space requirements for the facilities and also involves their proper arrangement so that continuous and steady movement of the production cycle takes place.

DEFINITION:

 “Plant layout is the arrangement of machines, work areas and service areas within a factory”. —George R. Terry

“Plant layout involves the development of physical relationship among building, equipment and production operations, which will enable the manufacturing process to be carried on efficiently”. —Morris E. Hurley

“Any arrangement of machines and facilities is layout”. —F.G. Moore

**Objectives of a good plant layout**

1. Providing comfort to the workers .
2. Giving good and improved working conditions
3. Minimizing delays in production and makingefficient use of the space that is available
4. Having better control over the productioncycle by having greater flexibility for changesin the design of the product

**Principles of good layout**

* A good plant layout is the one which is able to integrate its workmen, materials, machines in the best possible
* A good plant layout is the one which sees very little or minimum possible movement of the materials during the operations
* A good layout is the one that is able to make effective and proper use of the space that is available for use.
* A good layout is the one which involves unidirectional flow of the materials during operations without involving any back tracking
* A good plant layout is the one which ensures proper security with maximum flexibility
* Maximum visibility, minimum handling and maximum accessibility, all form other important features of a good plant layout

KINDS OF LAYOUT

1. **Process layout** – These layouts are also called the functional layouts and are very suitable in the conditions, when the products being prepared are non – standard or involve wide variations in times of processing of the individual operations.

Such layouts are able to make better utilization of the equipment that is available, with greater flexibility in allocation of work to the equipment and also to the workers. Imbalance caused in one section is not allowed to affect the working of the other sections.

2. **Product layout** – These layouts are also known as the line layouts or the layout by sequence. In such layouts, the manufacturing cycle is small with minimum material handling. The space required is small and quality control is easy to exercise.

3. **Project layout** – Such layouts are also referred to as the fixed position layouts. In these layouts, the components, heavy materials, sub assemblies – all remain fixed at one place and the job is completed by movement of machines, men and tools to the location of the operations.

WORK STUDY

Work study uses techniques like method study and work measurement to understand human work potential in terms of time spend on completing a task, looking at ways to make the task simpler and easy, as to increase productivity and efficiency.

Work study is field used to finding ways of increasing on job performance, optimum usage of plant and machinery,standardization of work methods, etc…

OBJECTIVES OF WORK STUDY ARE AS FOLLOW:

* Scientific and controlled analysis of existing available methods of executing a task.
* Measuring performance of mentally and the physically qualified workers,establishing it as standard for performance measurement.
* Optimum utilization of workers, plant, machinery and other resources at minimum cost.
* Improved productivity and enhance worker mode.
* Increasing efficiency of organization.

ADVANTAGES OF WORK STUDY ARE AS FOLLOWS:

* Increase in production effiency.
* Higher levels of production and optimum utilization of resources.
* Efficient flow of material and products.
* Efficient handling of material and better layout.
* Decreased cost of production as times spend on the job is decreased.
* Increased morale of workers with an increase in safety and efficiency.
* Benchmark and standard performance level are established, thus providing targets for organization.
* Better job satisfaction and incentive planning due to work study.

TIME STUDY

Meaning of Time study.

Time study is concerned with the determination of the amount of time required to perform a unit of work. It consists of process of observing and recording th time required to perform each element of an operation.so as to determine the reasonable time inn which the work should be completed.

Ojectives of Time Study:

1. To furnish a basis of comparison for determining operating effectiveness.
2. To set labor standard for satisfactory performance.
3. To compare alternative methods in method study in order to select the best method.
4. To determine standard costs.
5. To determine equipment and labor requirements.
6. To determine the number of machines an operator can handle.

ADVANTAGES OF TIME STUDY:

* It provides basis for incentive wages plans. Stndard time for performing the job is fixed through this technique. Incentive wages are given only if the worker performs the job earlier than the standard time.
* It shows up incentive time during the operation due to the operator and the machine.the steps can be taken to remove it.
* It provides basis for planning and scheduling of product.
* It estimates for tenders, selling price etc. because time element in cost can be determined and thus labour cost can be ascertained.
* It steps up standard for machine utilization and labour performance.
* Standard labour cost Can be fixed with help of time study.

MOTION STUDY

According to Kimball and Kimball “ motion study may be defined as the study of the movements, whether a machine or an operator, in performing an operation for the purpose of eliminating useless motion and arranging sequences of useful motions in the most efficient order”

Principles of Motion Study:

1. Do not do jobs by hands if machines can do them
2. Materials and tools should be close to the point of works and remove them by gravity, if possible.
3. Use the fewest motions possible. Moves as little of the body as is necessary to do the job.
4. Both hands should be used. Hands and feet should be used side by side if they can be used to do some useful movement.
5. Mechanical devices should be used for heavy lifting.
6. Use the body to best advantages mechanically.
7. Eliminate working conditions that add to fatigue such as poor lighting, ventilation, full fame dust conditions etc.
8. Eliminate working conditions that add to fatigue such as poor lighting, ventilation, full fame dust conditions etc.
9. Allow rest on fatiguing jobs, on monotonous jobs provide occasional break.
10. Assign the jobs to the workers which well suited to them. Work should be divided in smaller operations and let them specialize.

Uses of Motion Study:

1. It reduces the unnecessary motion on the job and this avoid fatigue
2. It helps in reducing labour costs and increasing workers efficiently without causing fatigue.
3. It helps in systematic planning of the operation. It arranges the operations in order.

Disadvantages of Motion Study.

The motion study is objected by the workers and labourleaders.The describe it like time study a device for forcing the worker to do more than a reasonable amount of work. It treats workers as a machine. It is costly and time consuminig

DEFINITION OF WORK MEASUREMENT:

“Work measurement is the application of techniques designed to establish the time taken for a qualified worker to carry out a specified job (task) at a defined level (rate) of performance.”

WORK MEASUREMENT MEANS :

1. Find out the difference elements (parts) of the production process (job).

2. Find out the time taken by each element.

3. Fix the standard time for performing the production process.

For example, publishing a book is a production process. There are many elements, which are involved in the publication of a book. In other words, book publication involves production steps like typing a manuscript, editing the written matter, proof reading it, followed by printing and binding.

Work measurement involves finding out the time taken for doing each element. The time taken for each element is totaled. This is the standard time for publishing the book. Here, provision are also made for relaxation, breakdown of machines, etc.

THE MAIN PURPOSE OF WORK MEASUREMENT:

1.MANPOWER PLANNING work measurement data is used for manpower planning. This is because it gives information about the total hours required to perform the job. This helps to estimate the number and type of employees who are required to do the job. It ensures that there will not be any excess staff.

2. PRODUCTION PLANNING AND SCHEDULING work measurement data is used for production planning and scheduling. This is because this data is used for making production standard. This data is also used for scheduling. Scheduling means to fix starting and finishing time for each job. This cannot be done without work measurement data.

3.ESTIMATING PRODUCTIONS COSTS work measurement data helps to estimate the production cost. This because it gives management accurate data about production time. This data helps to estimate the labor costs. Secondly, indirect costs such as fuel and power consumption, rent and salaries of staff, etc. also depends on the production time factor.

4.COST REDUCTION AND CONTROL work measurement data is used to reduce and control costs. It helps to reduce the labor cost. This is because it provides a guideline to the employees to work efficiently and effectively. This helps to make optimum use of the available manpower. So the labor cost will reduce.

5. RATIONAL BASIS FOR INCENTIVES work measurement data is used for making incentive schemes for the employees. Incentive schemes motivate employees to work hard. The efficient employees are rewarded by giving them a higher wage rate.

Work measurement fixes the standard-time for doing the work. Those who complete their work within a standard time or faster than the standard –time are rewarded with higher wages. This encourages all employees to work fast and efficiently.

6. PERFORMANCE APPRAISAL performance appraisals are done to find out whether the employees are efficient or not. It is done to find strengths & weaknesses of employees.

Work measurement helps to do performance appraisals. This is because it fixes the standard output and standard-time for each employee. The employees who produce the standard –output within the standard-time are efficient and vice versa. Thus, it also helps to find out the strengths and weaknesses of the employees.

7. TRAINING OF EMPLOYEES work measurement helps to train the employees, especially the new employees. It divides the full job into small elements (parts). It gives complete details about each element of the job. It gives details about; how to do each element, the time taken for each element, the machines and tools involved in each element, etc. These details are used for training the employees.

8.COMPARING ALTERNATIVE METHODS

There are many methods for doing a job. Work measurement data helps to choose the best method for doing a job.

WORK MEASUREMENT TECHNIQUES ARE LISTED BELOW:

* Historical data method – it uses the past performance data to set performance standard.
* Time study- it uses stop watch and is best suited for short-cycle repetitive job.
* Work sampling – Here, workers are observed many times at random.
* Synthesis method – Here, the full job is divided into element or parts.
* Predetermined motion time system (PMTS) – Here, normally, three times are fixed for one job namely; normal, fast, and very-fast.
* Analytical estimating - it is used for fixing the standard time for jobs, which are very long and repetitive.

MAINTENANCE OF PLANT

Meaning:

Plant maintenance usually refers to the methods, strategies, and practices used to keep an industrial factory running efficiently. This can include anything from regular checks of equipment to make sure they are functioning properly.

Objectives of plant maintenance management:

1. Minimizing the repair time and repair cost
2. Minimizing the loss due to production stoppages.
3. Minimizing the loss of productive time because of equipment failure.
4. To keep all productive assets in good working conditions.
5. To maximize efficiency and economy in production through optimum use of facilities.
6. To minimize the accident through regular inspection and repair of safety devices

Types of plant maintenance:

1. Breakdown maintenance
2. Preventive maintenance
3. Periodic maintenance
4. Predictive maintenance
5. Corrective maintenance
* Breakdown maintenance

Breakdown maintenance occurs , when there is a work stoppage because of machine break down. In this sense, maintenance becomes repair work.

* Preventive maintenance

It is a daily maintenance, design to retain the healthy condition of equipment and prevent failure through the prevention of deterioration.

* Periodic maintenance

Time based maintenance consists of periodically inspecting, servicing and cleaning equipment and replacing parts to prevent sudden failure and process problems

* Predictive maintenance

This is a method in which the service life of important part is predicted based on inspection or diagnosis, in order to use the parts to the limit of their service life.

* Corrective maintenance

It improves equipment and its components so that preventive maintenance can be carried out reliably. Equipment with design weakness must be redesigned to improve reliability or improving maintainability.

QUALITY CONTROL

**Meaning:**

The term quality control consists of two words ‘quality’ and ‘control’. Quality is that charactertic or a combination of characteristics that distinguishes one article from the other or goods of manufacturer from that of competitors or grade of product from another when both are the outcome of the same factory.

‘Control’ may be referred to as the comparison of the actual results (finished goods) with a predetermined standards and specifications. It locates the deviation and tries to remove them. Control is the correction in the quality of the produce when deviations in the quality are more than expected in the process`

**Definition:**

 According to Alford and Beatty ‘Quality control may be defined as that industrial management technique or group of techniques by mean of which products of uniform acceptable quality are manufactured’

**Objectives of Quality control:**

* To assess the quality of raw materials, semi- finished goods and finished product at various stages of production
* To see whether the product confirms to the predetermined standards
* To suggest suitable improvements
* To develop quality consciousness
* To reduce the wastages

**Significance/ Importance of quality control:**

1. **Reduction in costs:** An efficient quality control system reduces the cost of production cost the product due to
* Reduction in wastages of raw materials, semi- finished goods and finished goods
* Large- scale production of standard quality product
* Rework cost of the substandard goods is the minimum
1. **Improvement in the morale of the employees:** By quality control programme, the employees become quality conscious. They understand the standards of the product well and try to improve the standards and produce the quality goods to the best of their efforts. Thus, it improves the morale of the employees.
2. **Maximum utilization of resources:** By establishing the quality control system. The necessary control over machines, equipment, men and materials and all other resources of the company is exercised. The system will also control the misuse of facilities. Wastage of all types and low standard production. Thus, the resources of the company put to maximum use.
3. **Increase in sales:** Increase of the sales of the product is the main objective of the quality control system. By introducing quality control programme in manufacturing process, a quality product is made available to the consumers and that too at lower rtes because of lower cost of production. It, in turn, increases demand of the company’s product.
4. **Consumer satisfaction:** Consumers always get the quality products of standard specifications which they find to their utmost satisfaction.

INSPECTION

**Meaning:**

 Inspection is the process of examining an object for identification or checking it for verification of quality and quantity in any of its characteristics. It is an important tool for ascertaining and controlling the quality of the product.

Definition:

 According to Sprigel and Lansburg“ Inspection is the process of measuring the qualities of a product or services in terms of established standards” The standard s can be in terms of strength, hardness, shape etc…

**Objectives of inspection:**

1. **Maintenance of quality:** The fundamental purpose of inspection is to maintain the quality of the product. This function is performed by comparing materials, semi- finished or finished products, men and machines and tools with the established standards.
2. **Improving product quality:** By comparing the quality of the products against the set standards, the effective items are located and probable reasons for the defects are established. Necessary adjustments are done for the defects and thus the quality of the product improved steadily and regularly. It helps in safeguarding the prestige and confidence of the organization in the eyes of the consumers**.**
3. **Reduction in costs:** As raw materials are inspected to see whether they are as per the standards or not the defective raw materials are thus not allowed to be used in production. Thus, saves the organization from loss if any and reduces the cost of production.

**Basic Areas to inspection:**

1. **Incoming materials:** Raw materials and component parts are rigorously checked. If they are not up to quality they can be returned to the supplier.
2. **Production :** Key stages in production are established and the relevant quality indicators are checked at Critical Control Points.
3. **Finishing:** The final product or service is thoroughly checked before it is dispatched to the customer.
4. **After sales:** After sales is a key point for any company. Quality control must be involved extracting data from sales returns, servicing, customer complaint etc..

**Types of inspection:**

* **Cent percent inspection:** Cent percent inspection means, the inspection of each and every piece of store or material. This type of inspection has the obvious advantage of giving complete assurance that all the defective material has been eliminated from the inspected lot. However, it has certain drawbacks, which makes it suitable for certain situations. Since each piece is to inspected, it proves very expensive and time consuming, particularly where the large quantities are involved.
* **Sample inspection:** Any inspection procedure involving 100% inspection needs huge expenditure of time, money and labor, expenditure on inspection is always considered as ‘ dead weight cost’. Moreover due to boredom and fatigue involved in the repetitive inspection process there is always a possibility to overlook some defective item even by most competent and efficient inspectors.

The alternative is statistical sampling inspection methods. Here from the whole lot some items are selected for inspection and a decision regarding the quality of the whole lot is taken on the basis of the sampled items. This item can be selected by various sampling methods. Here the whole lot is accepted if the sample item confirms to the inspection otherwise it is rejected. Thus sample item considered to be the representative of the whole lot. The method of rejecting or accepting a lot on the basis of a sample is known as Acceptance Sampling or Sampling Inspection.

**STANDARDISATION**

**Introduction:**

 Standardisation is the process of formulating and applying rules for an orderly approach to a specific activity for the benefit and cooperation of all concerned for the promotion of overall economy taking into account functional and safety requirements. In our country. Indian standards institution (ISI) is the national body which deals with standardization at the national level.

Standardisation means setting standard of quality. It assures quality and promotes uniformity of the products. It also widens the market of the product. Standardization has noe been accepted as an ethical basis of marketing. Standardisation assures the consumers that the good are pure and uniform in quality and performance.

Generally, there are four bases for determining standards:

1. Quality
2. Quantity,
3. Measurement and
4. Size

It facilitates purchase and sale of products because incase of standardization/ standard products, goods are purchased by their manufacturers to convey to the users that their products confirm to well definedstndards.

**Standardization mark:**

Standardisation mark is mark or symbol given to to a product, which meets certain standards with respect to the quality in terms if material used, methods of manufacturing. Labeling, packging and performance.

 The standardization mark on the products certifies not only the products comply with the requirements of a particular Indian standards but also that it guarantees that the producers are operating a quality control system in their production.

**Standardisation symbols:**

* **ISI Mark:** It is an standardization mark issued by the Bureau of Indian Standards (BIS) to certify the products conform to the minimum quality standards. It covers electrical goods, cement, mineral water, paper, paints, biscuts, instant baby foods,gas cylinders, soap and detergent powder.
* **AGMARK**: It is a logo prescribed by the agricultural marketing Department of Government of India for use an agricultural, horticultural, forestry and livestock products.
* **FPO:** FPO stands for Food Products Order. This order sets for standards for protection of quality of products made from fruits and vegetables.
* **Woolmark:** It is a certification mark that appears on woolen garments that use pure quality wool.
* **Ecomark**: To keep environment ‘ pollution free`, BIS has prescribed standards for eco- friendly products.
* **Hallmark:** Hall mark is the accurate determination and official recording of the proportionate content of precious metal in gold.
* **Vegetarian and Non- vegetarian mark:** These marks are used to indicate the presence of vegetarian and non-vegetarian ingredients in the processed food items.

**AGMARK**

**Meaning of Agmark:**

The word AGMARK is a derivative of assurance about the purity and quality of the agricultural procedure. A certificate of authorization to grade commodities under AGMARK is granted o organization having the requisite infrastructural facilities like hygienic premises, essential equipment and testing laboratory.

 The AGMARK is a voluntary certification mark the individual products continue to be sold under their own brand names. In case, any AGMARK product found defective, the consumer may get the product replaced or demand the money back as per the laid- down procedure.

**History of AGMARK:**

 The agmarkscheme initiated by the agricultural procedure Act 1937 to ensure the quality of agricultural procedure is enforced by the Directorate of marketing and Inspection. The mandatory label contains the logo including map of India with the word AGMARK inscribed vertically and horizontally and a rising sun on one side.

 The labels are affixed to the packages containing the graded agricultural procedure. The act regulates not the grade standards prescribed but also the specifications that are to be followed for packing, sealing etc. Only those who are willing to follow the regulations are given a Certificate of Authorisation.

 Random inspection of the products is done both packer’s level and also in market. AGMARK label ensures the quality procedure and consumers are rest assured of it. Commodities presently graded under AGMARK

* Rice
* Wheat
* Atta
* Spices
* Condiments
* Vegetable oil
* Butter
* Ghee etc

The quality of the product is determined with reference to characteristics like size, shape, variety, weight, colour, moisture, etc

**Functions Of AGMARK:**

1. Agmark has laid down same specification for the packing , ie.., which type of packing should be used for different type of products
2. Agmark also ensures that whatever is being packed should be properly weighted and measured before packing.
3. The agmark Standards have benefited both producers and the consumer. It is possible for the producer to realize better prices for the product with these certification marks, as it ensures quality and guarantees the wholesomeness of the productfor the consumer.

**ISI CERTIFICATION MARKS SCHEME**

A yardstick for estimating the extent of implementation of indian standards, which is voluntary in nature is the propagation of ISI certification marks. The scheme drives its authority from the Indian Standards certification marks Act, under which ISI grants lincenses to manufactures to use standard mark on their products. Provided they conform to the relvent Indian standards.

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| **Product Certification Schemes** |
| The **Product Certification Scheme of BIS** aims at providing Third Party Guarantee of quality, safety and reliability of products to the ultimate customer. Presence of ISI certification mark known as **Standard Mark** on a product is an assurance of conformity to the specifications. The conformity is ensured by regular surveillance of the licensee's performance by surprise inspections and testing of samples, drawn both from the market and factory. |
| **1.INTRODUCTION** |
| The Bureau of Indian Standards, empowered through a legislative Act of the Indian Parliament, known as the **Bureau of Indian Standards Act, 1986,** operates a product certification scheme, and has till date granted more than 30 000 licences to manufacturers covering practically every industrial discipline from Agriculture to Textiles to Electronics. The certification allows the licensees to use the popular **ISIMark**, which has become synonymous with Quality products for the Indian and neighbouring markets over the past 50 years. The Bureau's predecessor, the Indian Standards Institution began operating the product certification Scheme in 1955. Presently more than 19000 licences are in operation covering about 1000 products. 2. OPERATING PRINCIPLEThe BIS Product certification Scheme operates in an impartial, non discriminatory and transparent manner. The documents stating the powers, rights and responsibilities of BIS and the affected sectors of society are published by the Government of India as the Bureau of Indian Standards Act, 1986, Rules and (Certification) Regulations, 1988.  The specific procedure for operating a licence are given in another document called the [Scheme of Testing and Inspection](http://www.bis.org.in/cert/prosti.htm) (STI), described later. Procedures provide for maintaining a very high degree of confidentiality and integrity among its personnel who perform certification related tasks. A body called the ' Certification Advisory Committee' composed of persons from varied sectors like manufacturers, consumers, Government agencies, industries associations reviews the performance of the scheme and advises on key policy issues. Internally, a senior functionary designated as 'Additional Director General (Marks)' is responsible for ensuring that the scheme operates within the framework of rules and procedures established.**3.CERTIFICATION SYSTEM**The BIS product certification scheme is essentially voluntary in nature, and is largely based on ISO Guide 28, which provides general rules for third party certification system of determining conformity with product standards through initial testing and assessment of a factory quality management system and its acceptance followed by surveillance that takes into account the factory Quality management system and the testing of samples from the factory and the open market. All BIS certifications are carried out in accordance with Indian Standards, which are amenable to certification. A large number of operational elements of the BIS product certification scheme correspond with the requirements of ISO Guide 65. **4.TYPES OF LICENSING**Although, the scheme itself is voluntary in nature, the Government of India, on considerations of public health and safety, security, infrastructure requirements and mass consumption has enforced mandatory certification on various products through Orders issued from time to time under various Acts. While BIS continues to grant licences on application, the enforcement of compulsory certification is done by the notified authorities. For the list of items brought under mandatory certification, together with the corresponding Indian Standard Number, and the authorities responsible for enforcing the orders,Under separate arrangements with Statutory agencies, some products have been placed under special certification schemes of lot or batch inspection carried out by BIS Inspecting officers. A majority of Gas cylinders, regulators and valves are certified through such schemes. Under agreement with UNICEF, Deep well hand-pumps, a critical potable water supply source for rural areas is also certified under a lot inspection scheme.For all other products, the manufacturer is permitted to self certify the products after ascertaining its conformity to the Standard licensed for. Through its surveillance operations, the Bureau maintains a close vigil on the quality of certified goods.**5. OPERATIONAL AREAS** The BIS Product Certification Scheme is open to manufacturers in all countries without discrimination.  While a licence can be granted for any Indian Standard specifying product characteristics, which is amenable to certification, the broad areas of technologies now under certification are:

|  |  |  |
| --- | --- | --- |
|   |   | * Textiles
* Chemicals and Pesticides
* Rubber and Plastic products
* Cement and concrete products
* Building materials
* Pumping, irrigation, drainage and sewage equipment
* Pipes and fittings for water supply
* Basic metals and fabricated metal products
* Machinery and equipment
* Electrical, electronics and optical equipment
* Automotive components
* Agriculture, food and tobaccos
* Black tea and beverages
* Packaged drinking water and Natural mineral water
* Leather products
* Wood products
* Paper and pulp products
* Testing instruments
 |

**6. Resources:**The finances of the Bureau are self managed, with certification operations accounting for more than 90 percent of the revenue. The BIS employs a staff complement of engineers and scientists to cater to all its fields of operations. They are trained into evaluation and assessment techniques to a high degree of professional competence. All preliminary and surveillance inspections are carried out by qualified personnel only. BIS has set up eight laboratories in different cities of India for testing samples of products taken during preliminary and surveillance operations. In addition, independent laboratories having demonstrated ability and a quality system complying with ISO/IEC Guide 17025:1999 have been recognized for testing of samples.The certification scheme operates through a network of 33 Branch Offices set up in State capitals or major industrial towns and 5 Regional Offices overseeing the work of the Branch offices.PROCEDURE FOR GRANT OF BIS LICENCE FOR DOMESTIC MANUFACTURERSThe applicant has the option to choose any of the following two procedures for grant of BIS licence: i) Normal Procedure – In the normal procedure, the applicant is required to submit the filled in application along with required documents and requisite fee to the nearest BIS branch office. Subsequently, after recording of the application, a preliminary factory evaluation is carried out by BIS officer to ascertain the capability of the applicant/manufacturer to produce goods according to the relevant Indian Standard and to verify the availability of complete testing facility and competent technical personnel. Samples are tested in the factory and also drawn for independent testing. Grant of licence is considered by BIS provided the samples pass during independent testing, preliminary evaluation is satisfactory and the applicant agrees to operate the defined Scheme of Testing & Inspection and pay the prescribed marking fee. For details, ii) Simplified Procedure– In the simplified procedure, applicant is required to furnish the test report(s) of the sample(s) got tested by him in the BIS approved laboratories, along with the application. If the test report(s) and other documents are found satisfactory, a verification visit is carried out by BIS. The licence is granted thereafter if the verification report is found satisfactory. The applicant also has the option to get the documents and other details as specified in the application, certified by a Chartered Engineer and submit the same to BIS. The licence then shall be granted after scrutiny of the documents and report submitted by Chartered Engineer. By this procedure the licence is expected to be granted within 30 days of receipt of application by BIS, provided all required documents are furnished and found satisfactory. |

 ISO CERTIFICATION MARKS

ISO stands for International Organization for Standardization. It is an international body which consists of representatives from more than 90 countries. The national standards bodies of these countries are the members of this organization, BIS is the indian representative to ISO.

 ISI and IEC (international Electro Technical Commission) operate jointly as a single system. These are non- governmental organizations which exist to provide common standards on international trade of goods and services.

ISO 9000 standards expect firms to have a quality manual that meets ISO guidelines, document quality procedures and job instructions and verification of compliance by third part auditors.

ISO 900 series has five international standards on quality management which are listed below

1. ISO 9000
2. ISO 9001
3. ISO 9002
4. ISO 9003
5. ISO 9004

|  |  |
| --- | --- |
| STANDARD |  OBJECTIVES/ TASKS |
| ISO 9000 |  This provides guidelines on selection and use of quality management and quality assurance standards |
| ISO 9001 | It has 20 elements covering design, development, production, installation, and servicing |
| ISO 9002 |  It has 18 elements covering production and installation. IT is the same as ISO 9001 without two tasks , viz.., design and development. This applicable for the units excluding R& D functions. |
| ISO 9003 |  It has 12 elements covering final inspection and testing for laboratories and warehouses |
| ISO 9004 |  This provides guidelines to interpret the quality management and quality assurance. This also has suggestions which are not mandatory. |

**Benefits of ISO 9000 series:**

ISO 900 series provides several tangible and intangible benefits which are listed below:

1. This gives competitive advantage in the global market
2. Consistency in quality, since ISO helps in detecting non – conformity early which makes it possible to take corrective action
3. Documentation of quality procedures adds clarity to quality system
4. ISO 9000 ensures adequate and regular quality training for ll member of the organization.
5. ISO helps the customers to have cost effective purchase procedure.
6. The customers while making purchases from companies with ISO certificate, need not spend much on inspection and testing. This will reduce the quality cost and lead time.
7. This will help in increasing productivity.
8. This will aid to improved morale and involvement of the workers.
9. The level of job satisfaction would be more.

**Steps in ISO 9000 Registration:**

1. Selection of appropriate standard from ISO 9001, ISO 9002 and ISO 9003 using the guidelines given in ISO 9000
2. Preparation of quality manual to cover all elements in the selected model.
3. Preparation of procedures and shop floor instructions which are used at the time of implementing the system. Also document these items.
4. Self- auditing to check compliance of the selected model.
5. Selection of a registrar and making application to obtain certificate for the selected model.

A registrar is an independent body with knowledge and experience to evaluate any one of the three model of the company’s quality system. Registrars are approved and certify by accreditors.

STATISTICAL QUALITY CONTROL (SQC)

Statistical Quality Control is the application of statistical techniques to accept or reject products already produced, or to control the process and , therefore, product quality while the part is being made, while the latter is called **process control,** the former is named **acceptance sampling**.

Statistical quality control is the application of statistical techniques to determine how far the product conforms to the standards of quality and precision, and to what extent its quality deviates from the standard quality. The purpose of statistical quality control is to discover and correct only those force which are responsible for variations outside the stable pattern. The standard qulity is pre- determined through careful research and investigation.

Importance/ benefits of SQC:

1. **It saves on rejection**: In absence of statistical quality control technique , many products may be found defective and worthless at the end of manufacturing process and may be thrown away as scrap. The SQC avoids such a situation and saves the cost of labour and material involved in the production of defective products may be improved by re- working to the level of acceptable standards.
2. **Maintains High Standard of Quality:** The statistical quality control ensures the maintenance of high standard of quality because lower standard quality products are not put to the market.
3. **Reduced Expenses of Inspection :**It reduces the expenses of inspection to a great extent and enables the product to be manufactured at lower cost.
4. **Ensures Standard Price:**  If certain products are not put up to the desired standard of quality and can not be improved without expense, they can be downgraded and sold cheaper. SQC maintains the standard price for all standard products. Thus, it increases the profitability of the concern.
5. **Feelings of Responsibility among workers:** Among workers , a feeling of responsibility develops because they begin to understand that their work is being inspected very minutely, hence they work carefully. It helps increasing their morale.
6. **Time and Cost of Inspection is Reduced:** By using acceptance sampling plans, the cost of inspection is reduced. Also inspection tie is reduced. This helps delivery of finished products in time to customers.
7. **Product design can be Improved**: process capability is the ability of the process or machine to produce within the tolerance limit specified in design. By analyzing the process capability, the specification can be modified or improved. This helps in improvement of deign of the product.

UNIT-5

MATERIALS MANAGEMENT

According to International Federation of purchasing and materials Management “Materials management is a total concept involving an organizational structure unifying in to a single responsibility , the systematic flow and control of material from identification of the need through customer delivery”

OBJECTIVES OF MATERIALS MANAGEMENT:

* Primary objective
* Low price
* High inventory turnover
* Low cost acquisition and possession
* Continuity of supply
* Consistency of quality
* Low payroll cost
* Favorable supplier relations
* Development of personnel
* Good records
* Secondary objectives
* Reciprocal relations
* New materials and products
* Economic make- or- Buy
* Standardization
* Product improvements
* Inter departmental harmony
* Forecasts

## SIGNIFICANCE OF MATERIALS MANAGEMENT:

1. Regular supply of the raw material is ensured, reducing the chances of any interruptions inn production process.
2. Procurement costs and transportation costs associated with materials are checked.
3. Efficient store and stock control minimizes waste of material.
4. Inspection of material at the same time of procurement minimizes the possibility of finished product being rejected by the customer.
5. Timely supply of raw material other inputs can be assured.
6. Better utilization of labor, capital and equipment.
7. Le of manufacturing cycle is reduced to minimum.
8. Slight changes in materials cost exert a great impact on a firm’s profit picture.

# PURCHASING

MEANING:

 Purchasing is a the first phase of materials management. Purchasing means procurement of goods and services from external agencies.

DEFINITION:

 “Purchasing is a procuring of materials, supplies, machines, tools, and services required for equipment, maintenance, and operation of a manufacturing plant”- ALFORD and BEATTY.

OBJECTIVES OF PURCHASING

1. TO avail materials, supplies and equipment at the minimum possible cost.
2. Ensure continuous flow of production.
3. Increase assets turnover.
4. Develop alternative sources of supply.
5. Establish and maintain good relations with suppliers.
6. Achieve maximum integration with other departments of company.
7. Efficient record- keeping and management reporting.

PRINCIPLES OF PURCHASING:

* Right price
* Right quality.
* Right time.
* Right source.
* Right quantity.
* Right attitude.
* Right contracts.
* Right materials.
* Right transportation.
* Right place of delivery.

PURCHASING PROCEDURE/ CYCLE:

1. Purchase requisitions.
2. Potential sources of supply.
3. Issue of letter inviting quotations
4. Receipt and analysis of quotations
5. Selection of vendor/ supplier
6. Purchase order
7. Follow- up and delivery
8. Purchase order amendments.
9. Analysis of receiving reports
10. Scrutiny and approval of invoice`

#  STORES KEEPING

MEANING:

 Storekeeping is a service to production department. It is responsible for proper storage of material and then issuing it to respective departments on proper requisition. The various items such as raw materials, tools, work-in- progress, spare parts, supplies, finished goods, scrap, etc… are stored in the store room. The custodian of stores is generally known as **store keeper.**

**DEFINITION:**

Storekeeping may be defined as a function of receiving, storing and issuing of raw materials, tools, spares, consumables, etc. to the respective department.

OBJECTIVES OF STOREKEEPING:

1. Minimizing cost of production through minimizing cost on materials.
2. Maintaining the value of materials.
3. Services to user departments.
4. Establishing co- ordination with other departments.
5. Advising materials manager.

FUNCTIONS OF STORES DEPARTMENT:

1. **Receipt**: It receives and accounts inventories.
2. **Storage**: it stores and preserves the inventories protecting them from damage, pilferage and deterioration.
3. **Retrieval**: It helps easy accessibility to materials and ensures optimum space utilization. Materials can be located and retrieved with ease.
4. **Issue:** It satisfies the demands of consuming departments by proper issues of inventories on receiving the requisitions.
5. **Records**: it keeps proper records of the issue and receipts.
6. **Housekeeping** : The space is kept neat and clean so that material handling. Preservation, storage, issue and receipts is done satisfactory.
7. **Surplus stock**: Scrap and surplus disposal management is a function of store.
8. **Verification**: Physical verification and purchase initiation to avoid stock- outs.
9. **Co-ordination and Co- operation:** To interface with production and inspection department.