

Unit-2

Production Design, Planning, Control

Contents:-

- **Production Design:** Meaning, Objectives, product policy, Techniques of product development.
- **Production Planning** - Meaning, Definition, Objectives, Scheduling, Routing, Despatch, follow up.
- **Production Control** –Meaning, Objectives, Factors affecting production control.
- **Case lets on design, planning and control.**

Product Design (Meaning):-

- Product design means determination of a shape, standard and pattern of the product.
- Indian Patents and Design Act explains that, “Design means the feature of shape, configuration, pattern, applied to any article by any industrial process whether manual, mechanical or chemical, which in the finished article appeal to and are judged to solely by the eye, but does not include any mode or principle of construction or anything which is a mere mechanical device and does not include any trade mark.’
- Product design includes specifications, experimental and developmental work calculation of estimates and instruction to the production department.
- According to C. S. Deverell, “Product design in the broadest sense, includes the whole development of the product through all the primary stages until actual manufacturing begins.”
- In the absence of design of the company’s product, the production activities will not be carried out smoothly.
- Product design is the process of creating a new product to be sold by a business to its customers.

Developing Product Policy:

Product development is the first and most significant step in the product planning. It is a continuous activity. It involves the following elements:

(a) Product Innovation: Product innovation is the development of a new product resulting into an increase in the product line. The changes in the market, technological changes in customer needs and styles are taken into consideration.

(b) Product Improvement: Product improvement involves improvement in quality, size, form, design and packing of the existing product.

(c) Packaging Improvement: This is also an important form of product development. The attractive packing helps to increase the sale of the product.

Techniques of product development :-

There are various Techniques of Product Development:

- (a) Product Differentiation
- (b) Product Positioning
- (c) Product Simplification
- (d) Product Diversification
- (e) Product Elimination

(a) Product Differentiation:

- Product differentiation is the process of distinguishing a product or service from others, to make it more attractive to a particular target market.
- This involves differentiating a product from competitor's products as well as firm's own product.
- The concept of product differentiation was proposed by Edward Chamberlin in his 1933 'Theory of Monopolistic Competition'.

Parameters of Product Differentiation:

(a) Differentiation as to Form: Here, the product is differentiated on the basis of size, colour, shape, physical structure etc. For example, Aspirin, it is a physical commodity yet it can be differentiated by size, dosage, colour, coating, shape or action time.

(b) Differentiation as to Features: Most products can be offered with varying features that supplements the product's basic function e.g. 'Oral-B' toothbrushes were introduced with a line of blue bristles within the white bristles that fade later and indicate that brush should be retired.

(c) Performance Level: Most products are established at performance levels viz. low, average, high or superior.

(d) Durability: It is a measure of the product's expected operating life under natural or stressful conditions. It is a valued attribute for certain products e.g. Godrej Cupboards

(e) Reliability: Buyers prefer to buy more reliable products and are normally ready to pay premium for the same.

(f) Repairability: Buyers prefer to buy repairable products as when the product dis functions, it should be repairable and not necessarily thrown away.

(g) Style: It describes the product's look and feel to the buyer. It attracts the buyer and the buyer readily purchases the product.

(b) Product Positioning:

Positioning is an act of designing the company offering and image to occupy a distinctive place in the target market mind. Product positioning is the management's ability to bring attention to a product.

Definition of Product Positioning:

- Product Positioning is the act of designing the company's offering and image to occupy a distinctive place in the target market's mind.
- Product positioning is the way the product is to be perceived in the minds of the consumer. It is a platform which facilitates the product brand to get through the

target customer. Product positioning is not what one does to the product, it is about what one does to the mind of the prospect with the product.

Objectives of Product Positioning:

- (a) To position the product in the market so that it stands apart from competing brands.
- (b) To position the product so that it tells customers what you stand for, what you are, and how you would like the customers to evaluate you.
- (c) To position the multiple brands.
- (d) To seek growth by offering varied products in differing market segments.
- (e) To avoid competitive threats to a single brand.

Procedure of Product Positioning:

- (a) Analyses product attributes that are salient to customers.
- (b) Examine the distribution of these attributes among different segments.
- (c) Determine the optimal position for the product in regard to each attribute, taking into consideration the position occupied by existing brands.
- (d) Choose an overall position for the product based on overall match between product attributes and their distribution in market and the position of existing brands.

(c) Product Simplification:-

(Meaning):

- In the words of John L. Burbidge, “Simplification is mainly concerned with the reduction of diversity among products (the product range), assemblies, parts, materials and design features.”
- It can be done at two places namely, for product or for work. It is large on economic process. It can be beneficial to both producer and the consumer of a product.
- W. R. Spriegal and R. H. Lansburge defined “Simplification refers to the elimination of superfluous varieties, sizes, dimensions etc.
- The process of avoiding or stepping a particular product line is called ‘simplification.’
- Standardization and simplification are interrelated to each other.
- Simplification of product means elimination of unnecessary types, sizes and grades of products. Thus, simplification is the process of avoiding or stopping the production of a particular product.
- Simplification of product lines is just opposite to the practice of diversification.

(d) Product Diversification:-

(Meaning):

- Diversification itself means to add something new. It may be new products, new markets, new technologies or even a new company. Diversification occurs when a firm seeks to enter into new areas or new markets different from the existing areas of operation.
- A product diversification is the introduction of products that are of a different type from those previously manufactured by the company.
- Many times, to expand its business and to utilize the marketing opportunities, a firm may expand the depth of its product line by diversifying a new product from existing or present product.
- The firm may adopt a daring strate' by erecting new products for entirely new markets, so that its business and profits come from a number of courses and from diverse products that differs in market or production characteristics. Only innovating marketers venture to go in for diversification of products.

Definition of Product Diversification:

- The process of expanding business opportunities though additional market potential of an existing products .
- Diversification may be achieved by entering into additional markets and /or pricing strategies.

(f) Product Elimination:-

- Product elimination means withdrawal of product or cancellation of product.
- The process of product withdrawal from the market is technically known as 'Product Elimination'.

Process of Product Elimination:

(a) Selection of the Product for Elimination: To select the products, which are to be considered for elimination.

(b) **Collection and Analysis of Necessary Information:** Necessary information would be collected and analyzed. If the analysis, finds that the product cannot be modified to the aspiration of the customers, a decision should be taken to eliminate it.

Reasons / Causes of Product Elimination:

(a) **Continuous Decrease in the Sale of the Product:** If the company feels that the sales of the product cannot be increased in spite of company's best efforts, decision may be taken to eliminate it.

(b) **Reduction in Product Effectiveness :** Certain products lose their Effectiveness for providing the benefits for which they were produced originally.

(c) **More Administrative Time:** If management devotes disproportionately excess time on one product in comparison to the other products of the product mix only due to the product being sick, it is better to decide elimination of the product.

(d) **Product Life Cycle:** If the product is in its last stage of product life cycle, it would be a wise step to eliminate the product timely to restrict the fall in profits otherwise the product will eliminate itself within a short time.

Production Planning (Meaning):

- Production planning involves deciding in advance what to produce, when to produce, how to produce and so on.
- Production planning is the collection and maintenance of data regarding materials, tools, layout, etc.
- Production planning ensures that the various factors of production are made available at the right place and right time.
- . Production planning consists of the evaluation and determination of production inputs such as labour, machinery and equipment, materials and utilities to achieve the desired goal.

Important Definitions of Production Planning:

- (a) 'Production planning involves the co-ordination and integration of the factors of production for optimum efficiency. Overall sales orders or plans must be translated into specific schedules and assigned jobs so as to occupy all work centres but overload none. When the job can be done formally elaborate charting and filing techniques are used, or it can be done informally, with individual's thoughts and retention thereof sub planting tangible aids.' - James Lundy

(b) “Production planning comprises the planning, routing, scheduling, despatching and follow-up functions in the productive process, so operators of labour however, sub-divided are directed and co-ordinated as to quantity, quality, time and place. It amounts to adopting a business principle, plan your work and work your plan.”

- Alford and Beatly

Objectives of Production Planning:

- (a) To maintain the balance between various production activities, and these connected activities are integrated and co-ordinated in a systematic manner for efficient production.
- (b) To facilitate optimum use of the resources.
- (c) To ensure reasonable profit to the concern by proper planning.
- (d) To capture the market. Production can be increased to establish a control over the market by introducing a new product as per the demands of the customers.
- (e) To provide a constant and regular flow of production activities and maintains a co-operative spirit among various departments.
- (f) To provide alternative production strategies in the case of emergencies, to determine raw material, machines, equipment etc. and other input requirements for desired output,
- (g) To utilize production facilities to the maximum for minimum operating costs.
- (h) To co-ordinate the labour, machines and equipment in the most effective and economic manner.

Routing:-

- Routing is the first step in production planning and control. Routing is concerned with the flow of materials from one stage of production to another stage, i.e. from the raw materials to the finished product stage.
- Routing means the determination of routes through which the material in the process are being transformed from raw materials to finished goods and are required to travel.
- Routing aims at the removal of the unnecessary movement of materials and reducing the cost of handling materials, time and labour involved in unnecessary repetition of movements.
- Routing aims at discovering the most convenient and shortest route of travel of materials.
- Routing is based on the principle of division of labour. It is essential for the smooth and economical production of goods.

Characteristics or Features of Routing:

- (a) Routing is concerned with the place of performance of process and the person concerned with the performance.
- (b) Routing is concerned with the flow of raw materials from one section to another.
- (c) Routing is concerned with the sequence of productive processes.
- (d) Routing is the most important element in production planning and control.

Procedure of Routing :

There are seven stages in the procedure for routing explained by writers like Banchel Al - Walter, Smith and Stockman.

- (a) Analysis of the product in order to determine what is to be purchased and what processes are to be performed.
- (b) Analysis of a product in order to know what type of material is required.
- (c) Determine what processes are important and essential and their logical sequence.
- (d) Determining the number of products in a lot.
- (e) Determining the nature of wastage at each stage of production.
- (1) Analyzing the cost of production.
- (g) Determining the nature of production control.

Advantages of Routing:

- (a) Improvement in the quality of a product and the product is made available at a low price because of the low cost of production resulting from routing. As a result of the most economical method of production, the cost of production is minimized and the producer is in a position to offer the product at the lowest price. This increases the competitive capacity of a producer.
- (b) Because of routing, supervision over different processes and working groups is easy.
- (c) There is economy in labour cost and the efficiency of the labourers improves because of lesser physical strain resulting from unnecessary movements of materials.
- (d) Routing enables the producers to utilize machinery and equipment in an optimum manner.

Scheduling:

- This is the second step after routing in the process of production planning and control. Scheduling is concerned with one important element in planning, i.e. the time element.
- Scheduling means preparing a time table for different workers processes, sections or departments in a factory.
- Scheduling indicates the period of standard time in which each operation or processes must be completed. It enables the comparison of actual time taken for production and the standard time.
- Scheduling means deciding when each particular operation in a process should be executed and completed. In other words, it is the act of drawing up a time table in order to accomplish an object in an most efficient way.
- Scheduling indicates the method of preparing a time table of manufacturing activities indicating the time required for the production of units at each stage.

Definitions of Scheduling:

(a) Spriegal and Lansberg: “The term scheduling involves the procedure of establishing the quantity of work to be performed and the time when each element of work will start.”

(b) Kimball and Kimball: “The term scheduling means the act of determining the time that is required to be reserved in order to perform each operation and also the time required to perform the entire sequence of operations as routed in scheduling or is nothing but scheduling.”

Advantages of Scheduling:

- (a) Production can be planned in advance.
- (b) Orders can be executed on time and goodwill can be maintained.
- (c) It is possible to utilize machinery and manual labour in an optimum manner and reduce the cost of production.
- (d) Scheduling leads to the co-ordination of mechanical work with manual labour and possible conflicts or bottlenecks can be avoided.
- (e) The efficiency of the workers can be improved because a worker cannot avoid work when working hours are fixed.

Despatching (Issuing Orders and Instructions):

- Despatching is concerned with the actual issuing of orders for performing operations in different sections or units.
- The person who is concerned with despatching is known as the “despatcher”

Features of Despatching:

- (a) Despatching is an internal process in planning and control.
- (b) Despatching enables the implementation of production processes as per schedule.
- (c) Despatching is concerned with issuing orders and instructions to machines and workers.

Essential Elements of Despatching :

- (a) Issuing Materials: From Stores department to the first process and movement of materials from process to process.
- (b) Issuing Instructions: To tool department to collect and keep the tools, jigs, fixtures etc. ready for the use of the production departments in advance and on time when the operation will start.
- (c) Issuing Orders : Authorizing the commencement of operation according to the predicted dates and times which are recorded on the machine loading charts, route sheets and progress sheets.
- (d) Issuing Time Tickets: Instruction cards, drawing and such other materials required by them for the performance of various types of operations.
- (e) Issuing the Orders: To the inspection department in order to control the quality to make detailed study of defectives.
- (f) Collecting Time Tickets: Instruction cards, drawings etc. and to return them to production control department.
- (g) Routing: Routing of the work-in-progress and forwarding finished products to store room.
- (h) Recording: Recording of time of the beginning and ending of each job and the time duration of processing.
- (I) Sending Time Ticket: Sending time tickets to Payroll Department for the calculation of the wages and then return them to Production Control Department.
- (j) Idel Time Recording: Recording of the idle time of machines and operators and to report about it along with the reasons for such idle time.

Types of Despatching:

(a) Centralised Despatching:

- (j) In the case of centralised despatching, the central section of the factory issues instructions.
- (ii) These instructions are issued to each machine unit at the work centres.
- (iii) The orders of instructions cannot be changed by the foreman.
- (iv) Centralised despatching is not suitable for big industries.
- (v) Centralised despatching has the defects of red-tape and it leads to wastage of power, time and money.
- (vi) Centralised despatching is not suitable in the case of the job order system.

(b) Decentralised Despatching:

- (i) Despatching may be done at two level :
 - (1) At the level of the Despatching Section, and (2) Foreman.
- (ii) In the case of decentralized despatching, the foreman has the freedom to adjust materials and tools.
- (iii) The foreman can exercise his discretion.

Follow-up (Periodical Evaluation):

- Follow-up is concerned with the periodical evaluation of the production plant. Follow-up function is an important phase of production planning and control.
- The persons who are assigned this function are known 'Follow-up Men', 'Expeditors' or 'Stock Chasers'.

Objectives of Follow-up:

- (a) To implement production plan.
- (b) To check whether the orders are given on time.
- (c) To maintain the schedule of production.
- (d) To control the quality of production.
- (e) To control production at different stages.
- (f) To check whether the production targets are achieved or not. To remove discrepancies.
- (g) To make available machinery and materials.
- (h) To bring about co-ordination in different machine units.
- (i) To maintain the continuous and smooth flow of materials.

Production Control (Meaning) :

- Production control is a primary function of the production management that follows other functions. It is a scientific procedure to regulate an orderly flow of material and co-ordinate various production operations to accomplish the objectives of producing desired item in right quantity and quality.
- Production control is a function of management which plans, directs and controls the material supply and processing activities of an enterprise. It ensures that the activities are carried in such a way that the available labour and capital are used in the best possible manner.
- Production control includes guiding and direction production along the times set by the plans and integration of different factors of production with a view to optimizing efficiency through routing, scheduling, despatching and follow -up techniques.

Objectives of Production Control:

- (a) To make necessary provision of raw material, equipment, machines and labour.
- (b) To arrange for the production of goods and services according to the predetermined demand.
- (c) To ensure regular and timely supply of raw materials at proper time, place and in proper quality so that delays in production may be eliminated.
- (d) To utilise the production facilities - buildings, plants, men, materials etc. in such a way that the cost of production is minimized.
- (e) To arrange the activities of quality control so that the goods may be produced according to the pre-determined specifications.
- (f) To ensure proper co-operation of the operations of various sections / departments responsible for production.

Factors affecting Process Planning and Control:

(a) Types of Product:

- The complexity of the product is important, and not what the product is, except as this may in turn relate to the market being served.
- Production control procedures are much more complex and involve many more complexities.
- According to the nature and type of product, the function of PPC may change.

(b) Type of Manufacturing:

- The PPC function is largely affected by the type of manufacturing process adopted by the organisation.