Production Planning and Control (PPC)

Unit-I

Introduction:

Production planning and control is one of the most important areas of Industrial management. It is a tool available to the management to achieve the stated objectives. It is aimed at achieving the efficient utilization of resources (material, men, facilities etc.) in any organization through planning, coordination and control of production activities that transform the raw material into finished products. To achieve the stated objectives the production system is encompassed by the four factors i.e., quantity, quality, cost and time. Production Planning starts with the analysis of the given data i.e. demand for products (what to produce, How much to produce, what production facilities are required, How these production facilities should be laid out in the space available for production, how they should be used to produce the desired products at the desired rate of production), delivery schedule (when to produce) etc., and on the basis of information available, a scheme of utilization of firms resources like machines, materials, and men are worked out to obtain the target in the most economical way.

Production planning is concerned with two main aspects:

i. Routing or planning work tasks
ii. Layout or Spatial relationship between the resources.

Production planning is dynamic in nature and always remains in fluid state as plans may have to be changed according in circumstances.

Once the plan is prepared, the execution of plan is performed in line with the details given in the plan. Production control comes into action of there is any deviation between the actual and planned. The corrective action is taken so as to achieve the targets set as per plan by using control techniques.

Production control is a mechanism to monitor the execution of the plans. It has several important functions.

1. Making sure that production operations are started at planned places and planned times.
2. Observing progress of operations and recording it properly
3. Analyzing the recorded data with the plans and measuring the deviations.
4. Taking immediate corrective actions to minimize the negative impact of deviations from the plans.
5. Feeding back the recorded information to the planning section in order to improve future plans.

Thus production planning and control can be defined as the “direction and coordination of firm’s resources towards attaining the prefixed goals”. Production planning and control helps to

achieve un-interrupted flow of materials through production line by making available the materials at right time and required quantity.

Need for production planning and control:

The present techno economic scenario of India emphasize on competitiveness in manufacturing. Indian industries have to stream line the production activities and attain the maximum utilization of firm's resources to enhance the productivity. Production planning and control serves as a useful tool to coordinate the activities of the production system by proper planning and control system. Production planning and control is needed to achieve:

1. Effective utilization of firm's resources.
2. To achieve the production objectives with respect to quality, quantity, cost and timeliness of delivery.
3. To obtain the uninterrupted production flow in order to meet customers varied demand with respect to quality, and committed delivery schedule.
4. To help the company to supply good quality products to the customer on the continues basis at competitive rates.

Production planning is a pre-production activity. It is pre-determination of manufacturing requirements such as manpower, materials, machines and manufacturing process.

Ray wild defines "production planning is the determination, acquisition and arrangement of all facilities necessary for future production of products". It represents the design of production system. Apart from planning the resources, it is going to organize the production.

Based on estimated demand for company's products, it is going to establish the production programme to meet the targets set using the various resources.

Production control:

In spite of planning to the minute details, most of the time it is not possible to achieve production 100 percent as per plan. There may be innumerable factors which affect the production system and because of which there is a deviation from the actual plan. Some of the factors that affect are:

1. Non-availability of materials (due to shortage, etc.);
2. Plant, equipment and machine breakdown;
3. Changes in demand and rush orders;
4. Absenteeism of workers; and
5. Lack of coordination and communication between various functional areas of business.

Thus, if there is a deviation between actual production and planned production, the control function comes into action. Production control through control mechanism tries to take corrective action to

match the planned and actual production. Thus, production control reviews the progress of the work, and takes corrective steps in order to ensure that programmed production takes place.

Objectives of production planning and control:

Production planning and control is mainly concerned with optimization of the manufacturing activities in order to achieve the desired profit.

To run an industrial unit effectively whether in private sector or public sector, to stay in business and provides profit plus dynamic growth efficient of production planning and control.

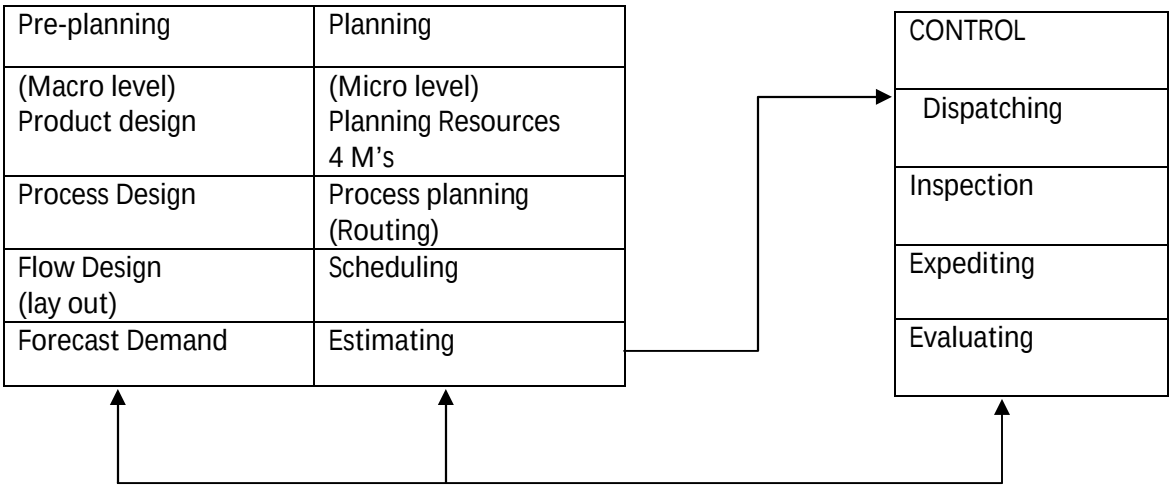
1. Systematic planning of production activities to achieve the highest efficiency in production of goods/services.
2. To organize the production facilities like machines, men, etc., to achieve stated production objectives with respect to quantity and quality, time and cost.
3. Optimum scheduling of resources.
4. Coordinate with other departments relating to production to achieve regular balanced and uninterrupted production flow.
5. To conform to delivery commitments.
6. Materials planning and control.
7. To be able to make adjustments due to changes in demand and rush orders.
8. Expediting the system under production.
9. To find out the magnitude and nature of various inputs for the manufacture of desired output.
10. Establishing the goals and checking the performance against set targets.

Functions of production planning and control:

Production planning and control acts like the brain behind all the production activity, as it acts like thought process in a human brain. Elion defines it as “the direction and coordination of the firm’s material, and physical resources towards the attainment of pre-specified production goal in the most effective available way”. In other words of G.B. Carson it is defined as “a system of organization and planning of the manufacturing process. Specially it consists of planning of routing, scheduling, dispatching and inspection, co-ordination and control of materials, methods, machines, tooling and operating times. The ultimate and labor, machine utilization and related activities in order to bring about the desired manufacturing results in terms of quantity, time and place”.

Functions of production planning and control is classified into:

1. Pre-planning function
2. Planning function
3. Control function



Functions of production Planning and Control

1. pre-planning function:

Pre-planning is a macro level planning and deals with analysis of data and is an outline of the planning policy based upon the forecast demand, market analysis and product design and development. This stage is concerned with process design (new processes and development, equipment policy and replacement and work flow (plant layout). The pre-planning function of PPC is concerned with decision making with respect to methods, machines and work flow with respect to availability, scope and capacity.

2. Planning function:

The planning function starts once the task to be accomplished is specified, with the analysis of four M's i.e., machines, methods, materials and manpower. This is followed by process planning (routing). Both short-term (near future) and long term planning and processes are given due consideration.

3. Control function:

Control phase is effected by dispatching, inspection and expediting, materials control, analysis of work in process. Finally, evaluation taken through a feedback from analysis. A good communication, effectiveness of PPC.

-parameters of PPC

The functions of PPC can be explained with the following parameters:

1. Materials:

Raw materials, finished parts and brought out components should be made available in required quantities and at required time to ensure the correct start and end for each operation resulting specification of materials (quality and quantity) delivery dates, variety reduction (standardization) procurement and make or buy decisions.

2. Machines and equipment:

This function is related with the detailed analysis of available production facilities, equipment down time, maintenance policy procedure and schedules. Concerned with economy of jigs and fixtures, equipments of facilities and making their availability with minimum down times because of breakdowns.

3. Methods:

This function is concerned with the analysis of alternatives and selection of the best method with due consideration to constraints imposed. Developing specifications for processes is and important aspect of PPC and determination of sequence of operations.

4. Process planning (routing):

It is concerned with selection of path or route which the raw material should follow to get transformed into finished product. The duties include:

a) Fixation of path of travel giving due consideration to layout.
b) Breaking down of operations to define each operation in detail.
c) Deciding the setup time and process time for each operation.

5. Estimating:

Once the overall method and sequence of operations is fixed and process sheet for each operation is of operations along with methods and routing and a standard time for operation are established using work measurement techniques.

6. Loading and scheduling:

Scheduling is concerned with preparation of machine loads and fixation of starting and completion dates for each of the operations. Machines have to be loaded according to their capacity of performing the given task and according to their capacity. Thus the duties include:

a) Loading, the machines as per their capacity and capability.
b) Determining the start and completion times for each operation.
c) To coordinate with sales department regarding delivery schedules.

7. Dispatching:

This is the execution phase of planning. It is the process of setting production activities in motion through release of orders and instructions. It authorizes the start of production activities by releasing materials, components, tools, fixtures and instruction sheets to the operator. The activities involved are:

a) To assign definite work to definite machines, work centers and man.
b) To issue required materials from stores.
c) To issue jigs, fixtures and make them available at correct point of use.
d) Release necessary work orders, time tickets, etc., to authorize timely start of operations.
e) To record start and finish time of each job on each machine or by each man.

8. Expediting:

This is the control tool that keeps a close observation on the progress of the work. It is logical step after dispatching which is called 'follow-up'. It co-ordinates extensively to execute the production plan. Progressing function can be divided into three parts, i.e.,

a) Identification of bottle necks and delays and interruptions because of which the production schedule may be disrupted.
b) To device action plans (remedies) for correcting the errors.
c) To see that production rate is in line with schedule.

9. Inspection:

It is a major control tool. Though the aspects of quality control are the separate function, this is of very much important to PPC. Both for execution of the current plans and its scope for future planning. This forms the basis for knowing the limitations with respects to methods, processes etc., which is very much useful for evaluation phase.

10. Evaluation:

This stage though neglected is a crucial to the improvement of productive efficiency. A thorough analysis of all the factors influencing the PPC helps to identify the weak spots and the corrective action with respect to pre-planning and planning will be effected by a feedback. The success of this step depends on the communication, data and information gathering and analysis.

Functions of Production Control Department:

The success of an industrial unit or enterprise is dependent on the performance of its production control department. Generally it performs the following functions:-

i) Provision of resources i.e., materials, machines and manpower.
ii) Preparation of production schedules in confirmation with demand forecast.
iii) Utilization of resources in such a way that cost of production is minimized and delivery dates are met.
iv) To determine the economic lot size of production so as to reduce the setup costs.
v) To provide co-ordination of the operations of various departments involved in production activities.
vi) In order to avoid products on delays, to ensure the regular and timely supply of materials at desired place of specified quantity and quality.
vii) To maintain the requisite quality standards by performing inspection at various stages of manufacturing and of finished products.
viii) It is also responsible for proper product development and design according to market demand.

Functions of Production Planning:

- Product selection and design.
- Process selection and planning.
- Facility location.

Facility layout and materials handling.

- Capacity planning.
- Systems and procedures.
- Estimating quantity/costs of production, men.
- Routing operation sequence.
- Job scheduling and leading.

Functions of Production Control:

- Inventory control MRP; JIT
- Time management.
- Quality control.
- Maintenance and replacement.
- Cost reduction and cost control.
- Dispatch.
- Expediting/follow-up/progressing.

Scope of Production Planning and Control:

- Material: RM, components, spares; right quantity; right time.

- Methods.
- Machines and equipments.
- Manpower.
- Routing.
- Estimating.
- Loading and scheduling
- Dispatching.
- Expediting.
- Inspection.
- Evaluating.
- Cost control.

Benefits of Production Planning and Control:

- Higher quality.
- Better resource utilization.
- Reduced inventory
- Reduced manufacturing cycle time
- Faster delivery
- Better customer services
- Lower production costs
- Lower Capital Investment
- Higher customer service
- Improved sales turnover
- Improved market share
- Improved profitability
- Competitive advantage
- Flexibility
- Dependability
- Lower prices

Limitations of Production Planning and Control:

- Based on Assumptions
- Resistance to change
- Time consuming
- Difficult to rapid environment changes

Elements of successful production procedure:

The following are the elements.

i) Control of Activities:

It is concerned with release of dispatch orders for setting the plans in motion at assigned times.

ii) Control materials:

It is related with issuing materials/goods and movements within the shops and in relation to planned and actual dates of delivery of products.

iii) Control of Tooling:

It is connected with checks on progress of tool design, if necessary on purchase or manufacture of tools. It is also concerned with issue of tools to various departments from the tool room.

iv) Control of Due dates:

It is related with observation of machine loading and recognition of delays or breakdown if any which may interfere with due dates of work load assigned to various machines.

v) Control of quantity and quality:

It is concerned with determination of the work progress whether the planned target regarding quantity is being met and if the product has been processed in accordance with pre-planned standards of quality.

vi) Control of replacements:

It is the observation of quality of input materials and work in process that falls in the various stages of inspection and is connected with issuance of orders for replacing such materials or products (finished or semi finished).

vii) Adjustment of Ideal quantity:

It is the check off the completed works as per scheduled and route sheets and adjustment semi finished jobs to idle machines in order to achieve production targets.

viii) Control of material handling:

Observation and check on movement of work by various means of inter departmental transportation.