

UNIT-2

OPERATIONS MANAGEMENT

TYPES OF MANAGEMENT

Management is doing things right. It's the discipline of planning, organizing, leading and controlling an organization.

Management has many faces. That is to say that managers have many and management has many types. These are the most common types of management.

1. Strategic Management

Strategic management looks at an organization's overall strategy formation and execution with the goal of growing and sustaining .Strategic management is an executive function that may report to the owners of a firm.

2. Sales Management

Management of sales territories, teams or accounts.

3. Marketing Management

Management of marketing strategies, products, brands and promotions.

4. Public Relations

Managing communications between an organization and the public.

5. Operations Management

The management of production of goods and services. Operations management is a broad field that describes everything from manufacturing management to retail management.

6. Supply Chain Management

Managing the process of moving a product or service from supplier to customer.

7. Procurement Management

Managing the acquisition of goods and services from external sources.

8. Financial & Accounting Management

Managing financial and accounting processes and teams.

9. Human Resource Management

Responsible for attracting, hiring, training, compensating, rewarding and managing the performance of employees. Human resources places a key role in forming and overseeing an organization.

10. Information Technology Management

Managing information technology teams and processes.

11. R&D Management

The management of research & development processes and teams.

12. Engineering Management

Managing the application of engineering to business solutions. For example, new product development, manufacturing and construction.

13. Program Management

Program management is the management of an ongoing portfolio of projects.

14. Project Management

Project management is the planning, organization and control of projects.

15. Risk Management

Risk management is the discipline of identifying, assessing and controlling the chance that objectives and processes will have negative consequences.

16. Change Management

Change management applies a structured approach to business change. The goal of change management is to help organizations and teams make smooth transitions to target states.

17. Quality Management

The management of planning, control, assurance and improvement.

18. Innovation Management

The management of such as strategy, research & development or organizational change.

19. Design Management

The management of design processes such as new product design.

20. Facility Management

The management of facilities such as offices and data centers.

21. Knowledge Management

Knowledge management enables the identification, creation, representation, distribution and use of knowledge. In a knowledge driven economy, this has become a critical field.

WORK STUDY:

work study is concerned with finding better ways of doing and avoiding waste in all forms. It is the study of work which examines both the method of work duration.

Work study on one hand examines the method of doing the work and on the other hand determines the time required to do the work.

There are two branches of work study-

1. method study (motion study)
2. work measurement (time study).

OBJECTIVES OF WORK STUDY:

The prime function of work study is to increase productivity and reduce wastages through the optimum usage of human, machine and material resources available to the organization.

The specific objectives are-

- Efficient use of human effort.
- Reduce manufacturing cost.
- Fast and accurate delivery dates.
- To reduce training time and improve safety to workers.
- To standardize method, material and equipment used in production process.
- Uniform and improved production flow.
- Saving and efficient use of resources by increasing output and reducing wastage.

METHOD STUDY(MOTION STUDY) :

The means of improving ways and means of doing things is called method study. Motion study is basically concerned with findings the best way of doing work.

The study of methods of accomplishing a job by the movement of human limbs and eyes etc is termed as study. This a part of method study.

STEPS IN METHOD STUDY:

- Select the method to be studied.
- Collection, recording and presentation of necessary information and relevant facts of the present method.

- Analyze the facts of the existing method critically.
- Developing new methods. This is the most important step in method study. This can be done in four ways.
 - ✓ Eliminating all unnecessary movements or activities.
 - ✓ Combine operations or elements.
 - ✓ Change the sequence of operation so that the work delay is reduced.
 - ✓ Simplify the necessary operations activity to reduce the work content or time consumption.
- Install new improved method.
- Maintain the method as a standard practice.

OBJECTIVES OF METHOD STUDY (ADVANTAGES):

- Optimum utilization of materials, manpower, machine and equipment.
- Improved methods and standardized procedures.
- Better working conditions and neat and clean environment.
- Less fatigue to workers.
- Better workplace layout.
- Efficient planning of the section.
- Efficient utilization of men, machines and materials
- Efficient and fast material handling.
- Better product quality.
- Reduce health hazards.

TYPES OF CHARTS USED IN METHOD STUDY:

1. charts indicating process sequence:

- Outline process charts
 - Considers only operations and inspections
- two handled process chart (left and right process chart)
 - records activities of both hands of workers
- flow process chart (detailed chart which records all the events it is three types
 - flow process chart (material type) – shows the sequence of flow of materials.
 - Flow process chart (man type) – movements of employees
 - Flow process chart (equipment chart) – sequence of usage of equipments.

2. charts using same style:

- multiple activity chart
 - activities of men, machines or both on a common time scale
- man machine chart
 - movements of men and machines on a common time scale.
- SIMO chart(simultaneous motion)
 - Body movements of men on a common time scale)

- Travel chart
 - Movement of material between departments

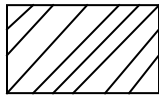
3. Diagrams Indicating movements:

- Flow diagrams
 - Path of men, materials and equipments
- String diagrams
 - Use of string, colored lines to trace the path of men, materials, machines etc.,
- Two and three dimensional models
 - Layout of work place or plant
- Cycle graph
 - Movement of hand obtained through the light emitted by small bulbs attached to the operators fingers.
- Chrono cycle graph
 - cycle graph using flash lights, usually a camera is used record high speed, short cycle operations.

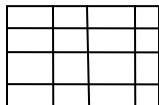
Symbols used in activity charts:



---- blank rectangle is used to show that one of the two, either man or machine is idle.



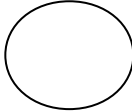
---- a striped rectangle shows a combined activity i.e., man and machine are busy.

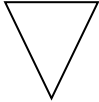
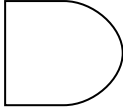
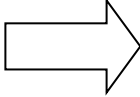
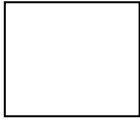
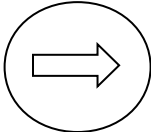


--- rectangle with parallel and vertical lines shows period of independent activity for man/machine is busy.

The charts are generally represented by symbols to produce a better picture and quick understanding of the process.

THE SYMBOLS USED IN PROCESS CHARTS ARE:

Event	Symbol	Description
Operation		It represents an action. It indicates a main step in the process. Ex . pressing, grinding, polishing.

Storage		Representing stage when material awaits an action. Ex. Holding, storing, stocking, or retaining.
Delay or temporary storage		Indicates delay or a temporary hurdle in the sequence of operations. Ex. waiting for transport or operation etc.,
Transport		Indicates movement of men, materials from one place to another. Eg: movement, travelling etc.,
Inspection		Represents an action of inspection or checking for quality and quantity. Verification or checking
Operation and transportation		

WORK MEASUREMENT (TIME STUDY):

Once the method is established, the next thing to do would be to set the standard times for the work. This aspect of work study is called the time study.

It is concerned with the determination of the amount of time required to perform a unit of work._

OBJECTIVES OF TIME STUDY (ADVANTAGES):

- It determines the most efficient method which takes the least time besides the man power required for the job.
- It results in effective labour control.
- Provides a basis for proper balancing of the work distribution.
- It helps in calculating delivery dates.
- It helps to compare the work efficiency of different operators.
- It provides basis for manpower planning.
- It is used for arriving at job schedules for production planning purpose.
- It helps in dividing equipments.

WORK MEASUREMENT PROCEDURE:

- Select or identify the job to be timed.
- Obtain all the necessary information.
- The whole job is broken down into smallest possible measurable elements.
- Time is determined for each of the elements using appropriate technique and recorded.
- Calculate the standard or allowed time.

TECHNIQUES OF WORK MEASUREMENT:**Stop Watch Method:**

Measuring time by stop watch is a good old method and is adapted to measure time for elements. Presently instead of mechanical watches, electronic watches are being used.

Synthesis from standard data:

It is estimating the standard time on the basis of previous experience of similar jobs. In this method, work is subdivided into elements for which standard times are available from previously established time studies and these predetermined elements times are totaled with appropriate allowances to compute the standard time for the job as a whole.

Pre determined motion:

It is the technique where times established for basic human motion are used to compute the time for a job at a define level of performance.

Analytical estimation:

It is a technique where time establishment from knowledge and practical experience of the elements concerned are used to compute the time for a job at a defined level of performance.

Comparative estimating:

It is a technique in which the time for a job is evaluated by comparing the work with the work in a similar series of jobs or bench marks, the work content of which has been measured.

MATERIALS MANAGEMENT

Material control is accomplished through functional organization, assignment of responsibility, and documentary evidence obtained in various stages of operations from the approval of sales and production budgets to the competition of products which are ready for sale and shipment.

Inventory control is defined as the scientific method of providing the right type of material at the right quantities and at right price to sustain the given production schedules.

NEED FOR (OBJECTIVES) MATERIAL CONTROL:

1. **Availability of materials:-** there should be continuous availability of all types of materials in the factory so that the production may not need up for want o any material. Minimum quality of each material is fix to permit production to move on schedule.
2. **No excess investment in materials:-** there should not be investment in stocks. Investment in material must not tie up funds that would better use in other activities.
3. **Reasonable price:-** while purchasing it is seen that it is purchased at a reasonably low price. Quality is not to be sacrificed at the cost of the lower price. The materials purchased should be of that quality alone which is needed.
4. **Minimum wastage:-** there should be minimum possible wastage of materials while these are being stored in the go downs by shop keepers are used in the factory by the workers.
5. Risk of spoilage and absolance of the materials must be avoided. for this purpose a maximum quantity of each material is determined and a proper method of issue of materials if followed.
6. To contribute directly to overall profitability of the enterprise.
7. To ensure economy of cost by processing EOQ.

FACTORS AFFECTING INVENTORY CONTROL FUNCTION:

Inventory control function gets increasingly complex due to following factors:

- Sudden changes in the production plans.
- Increase in the material prices.
- Excessive storage costs.
- Stock-out (cost of break down in the production line as a result of non-availability of inventory)
- Increasing lead time.

THE PROCESS OF INVENTORY CONTROL:

The following are the stages in the process of inventory control.

- Formulate a clear-cut purchase procedure.
- Classify, in a comprehensive manner, the items of inventory and codify the same.
- Maintain store records to ensure continuous stock taking.
- Minimize the costs of each order by determining economic order quantity (EOQ)
- Monitor each category of the stocks through ABC analysis.

- Set stock levels for different items.
- Replenish the stocks as and when required.

TECHNIQUES OF MATERIAL CONTROL:

1. level setting:

In order to have paper control on materials, the following levels are set.

- Reorder level
- Minimum level
- Maximum level
- Danger level
- Average stock level

a.) Reorder level :-

It is the point at which if stock of particular material in store approaches, the store keeper should initiate the purchase reputation for fresh supplies of that material.

Recorder level = minimum level + (consumption during the time required to get the fresh delivery.)

Recorder level= maximum consumption x maximum recorder period.

b.) Minimum (or safety stock) level;-

This represents the minimum quantity of the material which must be maintained in hand at all times.

Minimum stock level= recording level –(normal consumption x normal recorder period)

c.) Maximum level:-

It represents the maximum quantity of an item of material which can be held in stock at anytime.

Maximum stock level= recording level+ recording quantity – (minimum consumption x minimum re-ordering period.)

d.) Danger level:-

This means a level at which normal issues of the material are stopped and issues are made only under specific instructions.

Danger level = average consumption x maximum re-order period for emergency purchases.

By VALLISRI

e.) Average stock level= minimum stock level + $1/2 \times$ (reorder quantity)

2. Economic Order Quantity:

Economic order quantity is defined as that quantity of material, which can be ordered at one time to minimize the cost of ordering and carrying cost.

The total cost of material consists of:

Total acquisition cost + total ordering cost + total carrying cost.

1. Carrying Cost:-

It is the cost of holding the materials in the store and includes.

- Cost of storage space.
- Cost of bins and tracks.
- Cost of maintaining the materials.
- Cost of spoilage.
- Cost of transportation.

2. Ordering Cost:-

It is the cost of placing the order for the purchase of materials and includes

- Cost of staff posted in the purchase department.
- Cost of stationary, postage and telephone charges.

$$\therefore \text{EOQ} = \sqrt{2DC_0/CH}$$

D= average consumption

C_0 = ordering cost per order

C_H = holding cost/unit

Assumptions:

1. There are dynamic condition of the supply which enable a firm to place as many orders as it needs.
2. Price of the items remain stable which keep carrying cost constant.
3. The quality of the item to be consumed

3. just-in-time inventory system:

Jit purchasing is the purchase of material or goods in such a way that delivery of purchased items is assured before their use or demand.

Jit purchasing recognizes too much carrying costs associated with holding high inventory level. Therefore, it advocates developing a good relations with suppliers and making timely purchases from proven suppliers who can make ready delivery of goods available as and when need arises. JIT purchasing takes into consideration all these costs and move outside the assumptions of EOQ model.

Advantages :

- Investment in inventory is reduced
- Carrying cost is reduced.
- Reduction in number of suppliers to be dealt with is possible.
- Quality inspection costs are reduced.

4. Stock control through ABC analysis:

Manufacturing organizations find it useful to divide material into three categories for the purpose of exercising selective control on materials. An analysis of the material costs will show that a smaller percentage of items of materials in the stores may contribute to a large percentage of the value of consumption and on the other hand, a large percentage of items may represent a smaller percentage of the value of items consumed. Between these two extremes will fall there items the percentage no. of which is more or less equal to their value of consumption.

Items falling in the first category are treated as 'A' items of the second category as 'B' items of the third category are taken as 'C' items. Such an analysis of material is known as 'ABC' analysis. This technique of stock control is also known as stock control according to value method (or) always better control method or proportional parts value analysis method (or) control by importance and exception.

group	% of items	% of costs
A	8	75
B	25	20
C	67	5

Application of ABC Analysis

ABC analysis can be applied in various situations and stages such as

- Information of items which require higher degree of control.
- Stock records
- Determination of safety stock limits

- Stores layout
- Value analysis
- To evolve useful re ordering strategy.
- Priority treatment to different items.

Advantages of ABC Analysis

- Helps in reducing clerical costs and result in better planning and improved inventory turnover.
- Helps to rationalize number of orders and reduce average inventory.
- This kind of categorization of inventory helps to manage the entire volume and assign relative priority to the right category.
- By controlling 'A' item and doing proper inventory analysis , obsolete stocks are automatically pin pointed.
- This approach helps the materials manager to exercise selective control and focus attention only on a few items.
- Store personnel are placed better with the analysis, their time can be utilized better.
- Storing ,handling and delivery of materials to the production department become better.

Types of ABC analysis

Type of control	basis	Main use
ABC	Value of consumption of items	To control raw material components & work in process.
HML	Unit price of material	Mainly to control purchases
XYZ	Value of item in storage	To review the inventories and their uses
VED	Criticality of the item	To determine the stocking levels of spare parts.
FSN	Consumption of item	To determine the stocking levels of spare parts.
SDE	Problem faced in procurement	Lead time analysis and purchasing strategies
GOLF	Sources of supply material	Procurement strategies
SOS	Nature of supplies	Procurement and holding strategies for seasonal items like agricultural products.