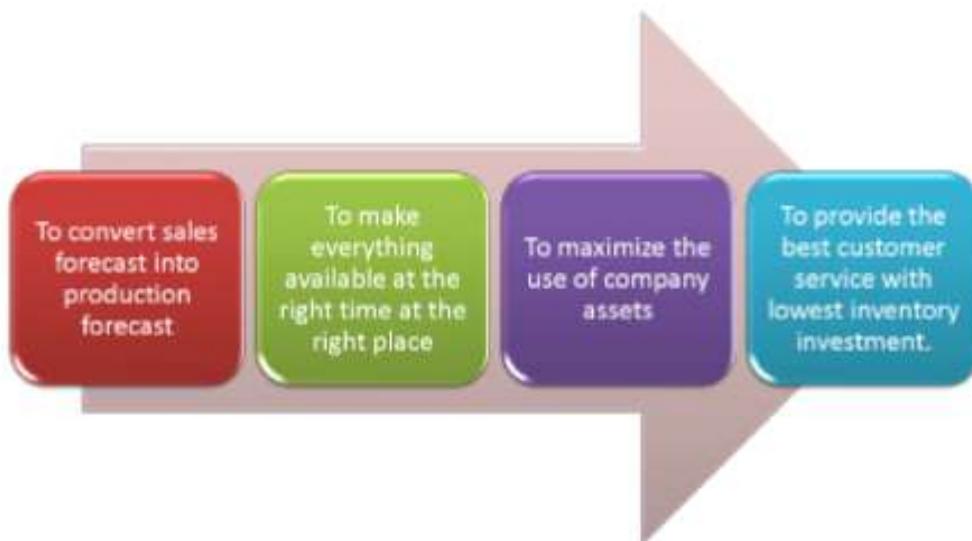


Role of materials management



Thus there has to be control over

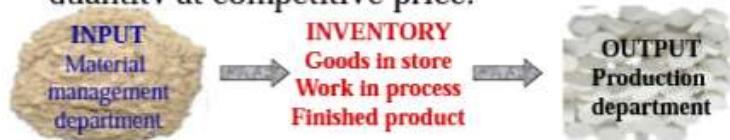




INVENTORY MANAGEMENT

Inventory management

- Inventory management may be defined as a scientific method of finding out how much stock should be maintained in order to meet the production demand and be able to provide right type of material at right time in right quantity at competitive price.



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Objectives of Inventory Control

To meet unforeseen future demand due to variation in forecast figures and actual figures.



To average out demand fluctuations due to seasonal or cyclic variations.



To meet the customer requirement timely, effectively, efficiently, smoothly and satisfactorily.



To smoothen the production process.



Benefits of Inventory Control

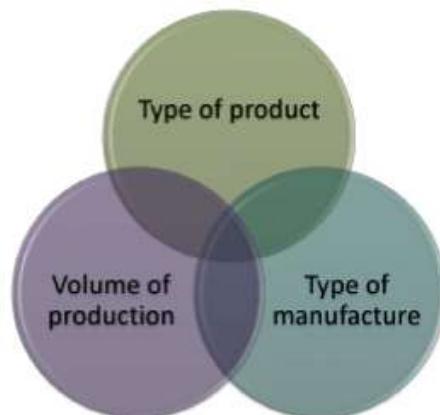
1. Ensures an adequate supply of materials
2. Minimizes inventory costs
3. Facilitates purchasing economies
4. Eliminates duplication in ordering
5. Better utilization of available stocks

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6. Provides a check against the loss of materials
7. Facilitates cost accounting activities
8. Enables management in cost comparison
9. Locates & disposes inactive & obsolete store items
10. Consistent & reliable basis for financial statements

Factors Affecting Inventory Control



Economic Order Quantity (EOQ)

- EOQ or Fixed Order Quantity system is the technique of ordering materials whenever stock reaches the **reorder point**.
- Economic order quantity deals when the cost of procurement and handling of inventory are at optimum level and total cost is minimum.
- In this technique, the order quantity is larger than a single period's any requirement so that ordering costs & holding costs balance out.

METHODS OF DETERMINATION OF EOQ

1) Tabular determination of EOQ

2) Graphical presentation of EOQ

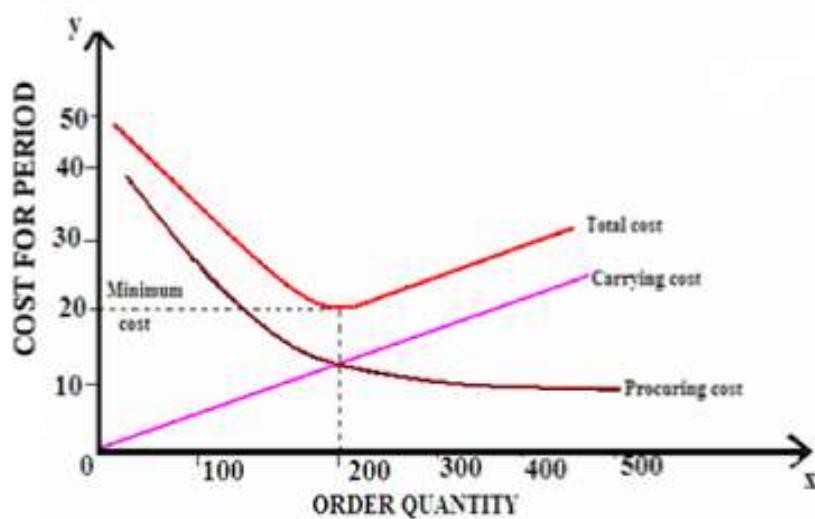
3) Algebraic formula for determination of EOQ

Tabular determination of EOQ

S.No	No. of orders per year	Annual ordering cost	Annual inventory carrying cost	Total annual cost

❖ Total annual cost = ordering cost + carrying cost

Graphical presentation of EOQ



Algebraic formula for determination of EOQ

$$\text{EOQ} = \sqrt{\frac{2AS}{I}}$$

EOQ = Economic order quantity

A = Annual usage in rupees

S = Ordering cost in rupees

I = Inventory carrying cost in rupees.

Assumptions of EOQ

- Demand for the product is constant
- Lead time is constant
- Price per unit is constant
- Inventory carrying cost is based on average inventory
- Ordering costs are constant per order
- All demands for the product will be satisfied (no back orders)



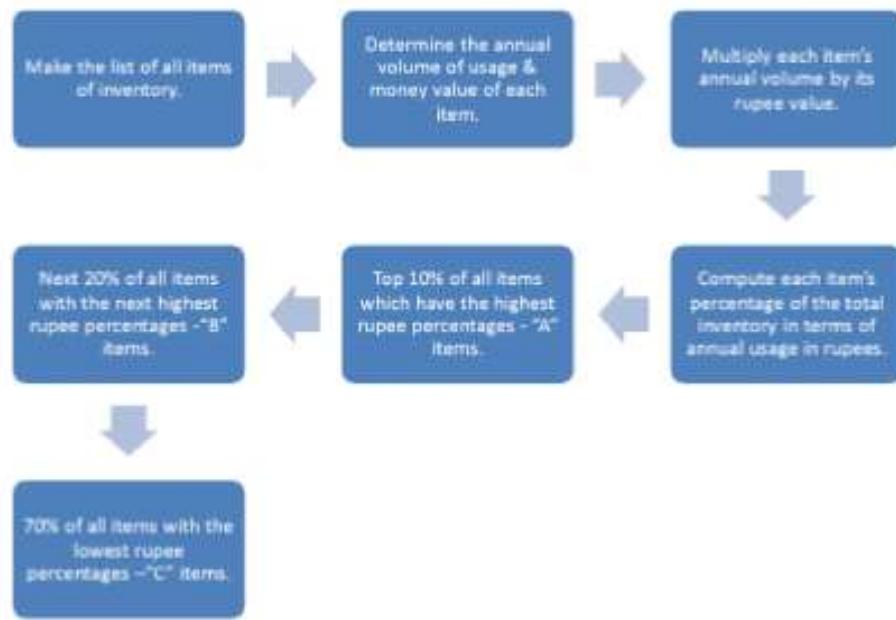
Weaknesses of EOQ formula

- Erratic usages
- Faulty basic information
- Costly calculations
- No formula is a substitute for common sense
- EOQ ordering must be tempered with judgment

Always Better Control (ABC) Analysis

- ▶ This technique divides inventory into three categories A, B & C based on their annual consumption value.
- ▶ It is also known as Selective Inventory Control Method (SIM)
- ▶ This method is a means of categorizing inventory items according to the potential amount to be controlled.
- ▶ ABC analysis has universal application for fields requiring selective control.

Procedure for ABC Analysis



Advantages of ABC Analysis

- Helps to exercise selective control
- Gives rewarding results quickly
- Helps to point out obsolete stocks easily.
- In case of "A" items careful attention can be paid at every step such as estimate of requirements, purchase, safety stock, receipts, inspections, issues, etc. & close control is maintained.
- In case of "C" items, recording & follow up, etc. may be dispensed with or combined.
- Helps better planning of inventory control
- Provides sound basis for allocation of funds & human resources.

Disadvantages of ABC Analysis

Proper standardization & codification of inventory items needed.

Considers only money value of items & neglects the importance of items for the production process or assembly or functioning.

Periodic review becomes difficult if only ABC analysis is recalled.

When other important factors make it obligatory to concentrate on "C" items more, the purpose of ABC analysis is defeated.

Sales forecasting

- It dictates
 - Future personnel,
 - Equipment; and
 - Warehousing requirements.
- It also generates the inventory investment plan
- Determines the amount of cash needed by the business

A sales forecast is important for at least five reasons

Manufacturing

- Basis for setting and maintaining a production schedule

Purchasing, personnel

- Determines the quantity and timing of needs for labor, equipment, tools, parts, and raw materials

Controller

- Influences the amount of borrowed capital needed to finance the production and the necessary cash flow to operate the business

Sales management

- Provides a basis for sales quota assignments to various segments of the sales force

Marketing officer

- Determines the company's business and marketing plans, which are further broken down into specific goals

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Responsibility of sales forecast

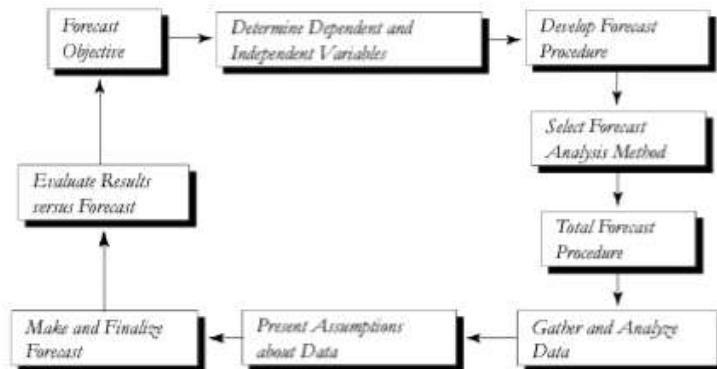
Made by marketing staff mostly but in conjunction with production and materials management staff.

They should know the market condition

Should assess the effects of competition, advertising and promotion, changes in prices and the size of the sales keeping fluctuating demands in mind.

When inventories are too high, the forecast is blamed.

People are laid off, or under-utilized, thus increasing cost and labour efficiency.



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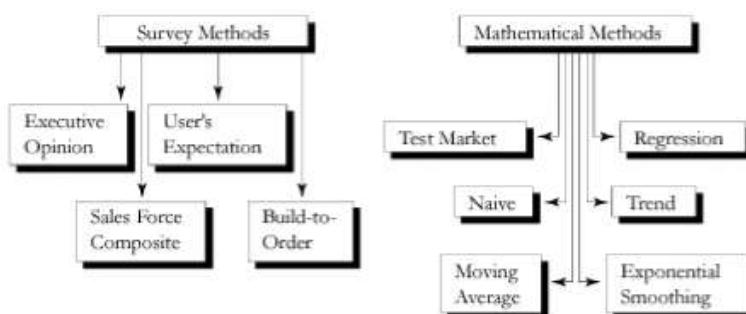
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Sales Forecasting Methods

Two categories of sales forecasting methods exist:

- **Survey methods** are qualitative and include executive opinion, sales force composite, and customer's intention surveys.
- **Mathematical methods** are test markets, market factors, naïve models, trend analysis and correlation analysis.

THE MORE POPULAR OF MANY FORECASTING METHODS



Four basic survey methods are

- Executive Opinion
- Sales Force Composite
- User's Expectations
- Build-to-Order

Executive Opinion

Executive forecasting is done in two ways:

1. By one seasoned individual (usually in a small company).
2. By a group of individuals, sometimes called a "jury of executive opinion."

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The group approach uses two methods:

1. Key executives submit the independent estimates without discussion, and these are averaged into one forecast by the chief executive.
2. The group meets, each person presents separate estimates, differences are resolved, and a consensus is reached.

Delphi Method

Administering a series of questionnaires to panels of experts.

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Sales Force Composite

Obtaining the opinions of sales personnel concerning future sales.

User's Expectations

Consumer and industrial companies often poll their actual or potential customers.

Build-to-Order

Companies build final products only after firm orders are placed.

MATHEMATICAL FORECASTING METHODS

Test markets are a popular method of measuring consumer acceptance of new products.

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Time Series Projections

Time series methods use chronologically ordered raw data.

Classical approach to time series analysis:

- The trend component.
- The seasonal component.
- The cyclical component.
- The erratic component.

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Naïve Method

$$\text{Next Year's Sales} = \text{This Year's Sales} \times \frac{\text{This Year's Sales}}{\text{Last Year's Sales}}$$

Moving Average

Moving averages are used to allow for marketplace factors changing at different rates and at different times.

Exponential Smoothing

Exponential smoothing is similar to the moving-average forecasting method. It allows consideration of all past data, but less weight is placed on data as it ages.

$$\text{Next Year's Sales} = a (\text{This Year's Sales}) + (1-a) (\text{This Year's Forecast})$$

Trend Projections – Least Squares

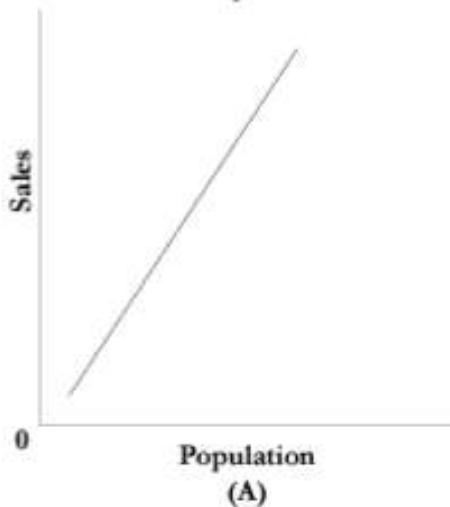
Eyeball fitting is simply a plot of the data with a line drawn through them that the forecaster feels most accurately fits the linear trend of the data.

Regression Analysis

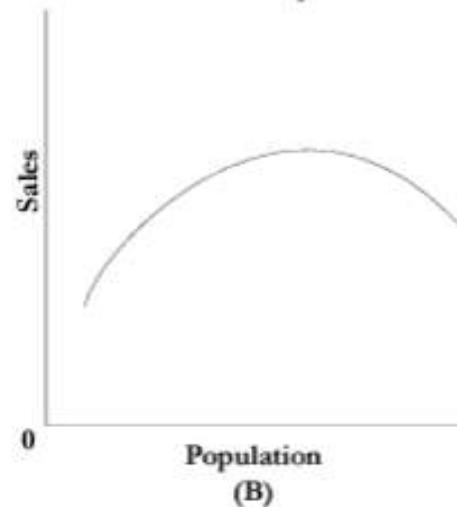
Regression analysis is a statistical method used to incorporate independent factors that are thought to influence sales into the forecasting procedure.

REGRESSION ANALYSIS

Linear Relationship



Curvilinear Relationship



Elements of cost and cost control :

- From the sales forecast, the material management group generates a production forecast taking into account
• seasonality • deals & promotion • introduction of new product • product size • other factors that create a demand on inventory, equipment and personnel.

This information in turn permits the development of operating or expense budgets for each department.
The three elements of cost are

(I) material : Based on needs expressed in production forecast the purchasing department negotiates contracts and price arrangements and ascertains the standard cost for each item. These standard costs form the basis of a monthly price variance report, which not measures effectiveness of purchasing but monitors changes.

- It is desirable to have a favourable price variance but on other hand a variance that is too high might indicate poor estimation on part of purchasing division; it would overstate or underestimate cost of goods.
- Another control occurs in usage of material during production. From production forecast, production planning determines number of batches of each product needed to meet sales forecast and batch sheet for each product give the exact formula and quantity of all raw materials.

- The batch sheets shows actual bulk yields which can be compared with theoretical yields adjusted to take care of normal losses during manufacturing
- Variances in raw finishing supplies are derived by comparing the finished goods produced in packaging with the amount that should have been consumed on packaging order and with losses on packaging line
- In control of material costs, the variances are budgeted as hedge against unforeseeable price changes

(ii) Labour :

Direct labour : management and careful use of labor force are important for cost control as well as stability and happiness of work force. In most companies number of hours required in each department for production of most item is known. The production of any bulk or finished good item is expressed as the number of direct labour hours need to produce 1000 bulk tabs/bottle of 100's for every product made including promotion samples.

Imp for : accounting department, production planning and operating manager.

- ⑧ Large plants & storage depots are constructed
- ⑨ Inventory management, production requires material stored

Indirect labour : To arrive at true cost , indirect labour are needed .

Without indirect labour hours , it would be difficult to analyse and control available hours of work and use labour force efficiently .

Transfer of materials by serviceman

M/C cleaning cost

Line change over cost

QA inspector

General cleaning & sanitization

These all categories should be budgeted

Another cost to be carefully monitor is use of direct labour for an indirect labour job . This is to be minimized as direct labour has higher rate .

For good cost control ,

effort should be made to lower % of indirect labour to total labour .

(II) Burden

→ Direct burden : Expenditure such as

Supervision

Retirement benefit

Clerical help

Operation expenses like

Premium on overtime

• Laundry expense for

Injury with pay

uniforms

Insurance

• Replacement of

Maternity leave .

HEPA

Vacation

• Repairing or changing part

→ Fixed burden

Other department giving services to operating department should be considered

Engineering

QC

Material management

R&D / F&D

Administration

⑧ Large plants with a
Storage density walls
are constructed.

⑨ Inventory management
Production

warehousing

- It is the largest operation in plant in terms of area. The custodian of warehouse is generally known as store keeper.
- Basic warehousing functions include receiving, shipping, in-process storage along with storage of operating supplies and excess/surplus equipment.
- Special attention should be focused on maintaining cleanliness, freedom from infestation and orderliness.
- The entire warehousing area should be cleaned as often as necessary to maintain sanitary conditions.
- Mechanical floor washer can be used in large areas.

Objectives of warehousing :

- ① Easy location of items in warehouse
- ② Efficient utilization of space
- ③ Speedy issue of material
- ④ Proper identification of items.

Functions of warehousing

- ① Receiving, handling and speedy issue of material
- ② To establish regular supply of materials
- ③ Effective utilization of warehouse space.
- ④ To provide service to the organization in most economic way
- ⑤ Proper identification and easy location of items

- Good warehousing practices.
 - Stocks received from the factory should be received with proper documents detailing
 - ✓ Name of product
 - ✓ The batch number
 - ✓ The number of units of each batch.
 - ✓ The date of despatch.
 - ✓ The quality control status of the batches
 - Finished products that are "under test" must be quarantined and segregated from "Released or Passed" stocks.
 - "Rejected" stocks must be held in a secure place from passed stocks and disposed off with approval of QC manager.
 - The stock control system must be such that only passed batches of product are issued for distribution.
 - Stock rotation should be "first in first out" basis. Stocks should therefore be racked and stored in a manner that earlier stocks are more easily accessible than later ones.
 - In case of many different types items and their environmental needs, multiple types of warehousing areas are used.
 - Inventory management is integrated with production requirements to minimize the amount of material stored.
- Returned goods:
- Stocks of products that may be returned to the warehouse for any reason should be

⑧ Large plants with highly automated and high storage density warehouses with computerised are constructed.

accounted for and dealt with in consultation with quality control manager. Returned goods must be

- Isolated on receipt
- Clearly identified
- Record indicating the details of consignment and reasons for return.

Production planning :

It is concerned with the determination of future production activities. It involves ~~four~~ ^{two} main aspects

(A) Routing : It fixes up the route / path from raw material to finished product

- operation sheet : Describes how product should be made

- Bill of materials : Describes part of materials and quantity required to make the product

(B) Scheduling : Describes the starting / finishing date / time for each operation

(C) Dispatch : Involves issue of orders as per routing and scheduling.

In this work is assigned to machine, work, place and people.

Certain forms used :

(a) Material requisition form

(b) Job cards

(c) Labour cards

(d) Move ticket

(e) Tool & gauge ticket

(d) Follow up : Expediting the progress of production, identifying the problems of delay & helping in removing or preventing delays.

- Objectives :
- ① To estimate resource
 - ② To attain production targets
 - ③ To satisfy customers
 - ④ To maintain optimum inventory
 - ⑤ Working conditions
 - ⑥ To capture desired market share
 - ⑦ To reduce waiting time

Levels of planning : Three main levels .

(I) Factory planning :

Space requirements of department is fixed

(II) Process planning : Here the plans are made for the layout of work centers in each department. This is achieved by planning the sequence of operation.

(III) Operation planning : Here there is selection of sequences of work processes necessary to complete as per schedule

VENDOR AUDIT



Vendor Audit Program



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Before the audit



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Audit Plan :
VENDOR AUDIT

VENDOR DETAILS

Name of the Vendor

Auditors

Date of Audit

Personnel Contacted

No of Pages (incl. this)

Date of Issue

Distribution

1. (Supplier audited) - with a request to submit a compliance report within 30 days of the receipt of the audit report
2. Head of Purchase.

Reason for Audit

Recommendations made:

Nature of Observations:

Conclusion:

COMPANY PROFILE

- 1 Supplier
- 2 New Supplier Appraisal
- 3 Manufacturing Location
- 4 Materials / Components to be supplied to OCP
- 5 OCP sites supplied
- 6 Other Materials Manufactured at Site
- 7 Approximate % of the Business for the Pharmaceutical Industry
- 8 General Site Comments / Suitability of Buildings
- 9 Holiday and Shift Cover / Production Pattern:
- 10 Personnel on Site
- 11 Location of other Manufacturing Sites
- 12 Accreditation
- 13 Other Customers supplied to
- 14 Safety Policies
- 15 General Housekeeping

QUALITY SYSTEM

- 1 Raw materials tested?
- 2 In process control / Finished pack check
- 3 Material Identification & Label Control
- 4 Storage of Raw Materials & Finished Products
- 5 Plate making / Positives / Cylinder making details
- 6 Destruction & Disposal of Printed Packaging Material
- 7 Machinery:

- 8. Laboratory Facility, Control of Inspection, Measuring and Test Equipments
- 9. Retention samples

- 10. Record of Rejection, complaints & action taken
- 11. Transport & Delivery of Material

VENDOR EVALUATION

Topic	Marks	Obtained Marks
Quality System	50	
Environmental	15	
Customer services	20	
Safety	15	
Total	100	

Overall comments :	APPROVED
	NOT APPROVED
	WITHDRAW APPROVAL

Auditor :	Date
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Auditor :	Date
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During Audit



After the Audit

