

Institute: Jnan Chandra Ghosh Polytechnic

Dept.: Mechanical Engg.

Subject: Industrial Management.
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Topic: Material Management.

Selective Inventory Control.

ABC Analysis

The word ABC literally may be assumed as Always Better Control. This analysis has its origin on Pareto Principle. Vilfredo Pareto was an economist who studied the distribution of wealth and income among the citizens of Milan, Italy and observed that most of the wealth is concentrated in a few hands, and a great majority of people were in poverty. Thus the concept of separating 'Vital few from trivial many' emerged out which, later on was applied in many industrial situations - ABC analysis is one of such applications and is also popularly known as Pareto Analysis.

A manufactured article requires a number of items.

Let us consider the manufacture of a Television Set. It requires high cost items like Picture Tube, Cabinet etc, medium cost items like ~~transistors~~ transistors, ~~screws, nuts, washers etc~~ diodes, electrolytic capacitors etc as well as low cost items like ceramic capacitors, standard film resistors, screws, nuts, washers etc. A standard film resistor costs Rs. 0.50 but it may be required in large quantities say 400 nos. per TV set, while a power cord worth Rs 25 may be required in single piece per product. Thus usage value (or consumption rate = unit price \times quantity required) of 400 resistors is Rs 200 = 00 and that of the power cord is Rs 25 = 00. It implies that so far as the usage value (or consumption rate) of the material input are considered, the class 'resistor' should be given more attention than the power cord. In ABC-analysis, we arrange all the items required in accordance to their consumption rate and classify them into -

A Category - class of items comprising of high total annual consumption (in rupee value) but very low in quality.

C-Category — class of items comprising of low total annual consumption but high in quantity.

B-Category — those falling between A and C categories with moderate total annual consumption and medium in quantity.

A ~~sample~~ specimen of a certain A-B-C analysis is given herewith (Reference fig. 1 & 2)

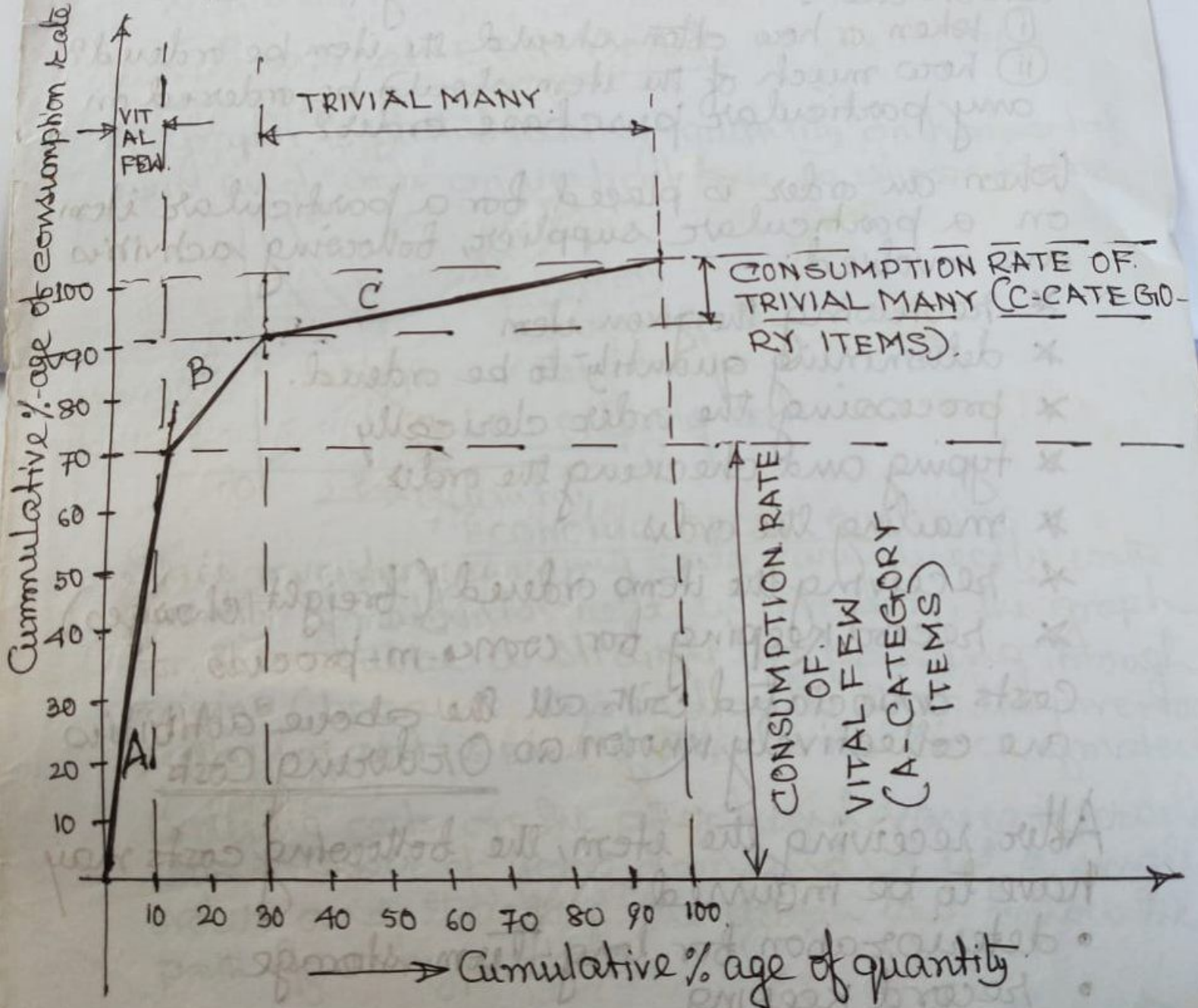
<u>Category</u>	<u>% age consumption rate</u>	<u>% age quantity</u>	<u>Remarks</u>
A	70%	10%	vital few.
B	20%	30%	
C	10%	60%	Trivial many

The degree of control over A-category items should be more intense since it involves more financial implications than others. B ~~and~~ and C category items, therefore, require medium and low degree of attention respectively.

Let us consider that in a manufacturing organisation 2000 materials, components and parts are being used and the average annual procurement value for all these materials is Rs. 100,00,000 = 00. According to the table just exhibited, A-category of items cover Rs. 70,00,000 (70%) of annual procurement value while they are only 200 (10%) in number. These constitute the vital few of the materials and demand maximum attention and control of management. On the other hand, C-category items have annual procurement value of Rs. 10,00,000 (10%) while they are 1200 (60%) in number. These constitute the trivial many of the materials and demand lesser control over them. B-Category items fall in between A and C and have Rs. 20,00,000 (20%) annual procurement value and they are 600 (30%) in number. So they demand a medium range control over them.

Control Aspects

Category	Consumption Rate	Quantity	Control over Inventory	Rigidity of Material specification	Safety Stock Level	Frequency of ordering
A	High	Low	Tight	High	Small	High
B	Moderate	Medium	Moderate	Medium	Small	Medium
C	Low	High	Loose	Low	Large	Low



ABC Analysis or Pareto Analysis - Graphical Representation

EOQ = Economic Order Quantity

Q OP = Economic Order Costs.

* At E, Total Carrying Cost = Total Ordering Cost
= MQ

$$\therefore EQ = MQ + MQ = 2MQ$$

Mathematically,

if D = Annual Demand,

Q = Quantity demanded per order

C_c = Inventory Carrying cost per item

C_o = Ordering cost per order

then no. of orders placed/year = $\frac{\text{Annual demand}}{\text{Quantity demanded per order}}$

$$\text{and average inventory} = \frac{D}{Q}$$
$$= \frac{\text{Qty. demanded per order}}{2} = \frac{Q}{2}$$

$$\therefore \text{Total Carrying Cost} = \text{Average inventory} \times \text{Carrying cost per item}$$
$$= \frac{Q}{2} \times C_c \quad \text{--- (i)}$$

and Total Ordering Cost

$$= \text{No. of orders per year} \times \text{ordering cost per order}$$

$$= \frac{D}{Q} \times C_o \quad \text{--- (ii)}$$

At E.O.Q,

$$\text{Total Carrying Cost (MQ)} = \text{Total ordering Cost (MQ)}$$

$$\Rightarrow \frac{Q}{2} \times C_c = \frac{D}{Q} \times C_o$$

$$\Rightarrow Q^2 = \frac{2D \cdot C_o}{C_c}$$

$$\Rightarrow Q^* = \sqrt{\frac{2D \cdot C_o}{C_c}}$$

This is the mathematical expression for E.O.Q.

Group - C (06)
Topic - Material Management

6.4 Steps in Purchasing

Steps involved in one complete purchasing cycle may be enumerated as given below:

- (i) Recognition of need, receipt and analysis of purchase requisition.
- (ii) Selection of possible potential sources of supply.
- (iii) Making request for quotation.
- (iv) Receipt and analysis of quotation.
- (v) Selection of right sources of supply.
- (vi) Issuing of purchase order.
- (vii) Follow-up and expediting the order.
- (viii) Analysing receiving reports and processing discrepancies and rejections.
- (ix) Checking and approving vendors invoices for payment.
- (x) Closing completed orders.
- (xi) Maintenance of records and bills.

Store System: Materials and supplies constitute the most important assets in the majority of business enterprises. The success of the business, besides other factors, depends to a large extent on the efficient storage and control. Material pilferage, deterioration of materials and care-less handling of stores lead to reduced profit.

Receipt of Materials:

- (i) All materials from outside sources are received by the Receiving Department.
- (ii) The receiving department unpacks the goods received and checks quantities and conditions of goods.
- (iii) There is a packing slip inside each package that tells what it is supposed to be and usually it gives the purchase order number (PON).
- (iv) A copy of the purchase order if it exists with the receiving department, can be made use of to check the items received. Otherwise, a Material Received Report is prepared by the receiving department and sent

to sent either to the purchase or the accounting department.

(v) All the items after they have been received and before they are removed from the receiving department are inspected and sample tested to ensure that the purchase order specifications have been met.

(vi) In case of rejection, a part or whole of the consignment may be returned to the vendor, with a request either for a complete cancellation of order or for replacement.

Issue of Materials

(i) Materials should be issued by the storekeeper to the different departments, only upon receipt of a properly authorized withdrawal form - usually called a Material Issue Requisition (MIR) form.

(ii) Materials requisition is prepared in duplicate by the foreman or the manager depending upon the nature and amount of materials or goods to be withdrawn from the stores.

(iii) Both the copies are sent to the storekeeper who issues the materials and records the quantities disbursed.

(iv) Both the copies are then forwarded to material ~~accs~~ accounting division for pricing and entry in the stock ledger.

(v) One copy of the material requisition is retained by the stock ledger clerk to be used as the basis for an entry in the issued section of the stock ledger accounts. The balance section of the stock ledger account is then completed to show the new balance figures for quantity, cost, etc.

(vi) The second copy goes to the foreman of the department who uses it as the basis for a charge to the appropriate production for which he prepared the material requisition.

Store Records (BIN CARDS)

(i) Two records are usually kept of materials and other goods received, issued or transferred namely on BIN cards and in the Store Ledger.

(ii) BIN cards are written and kept in the stores, whereas store ledger is sometimes maintained by store office or cost department.

Material Management

Modern Techniques Of Material

Introductory treatment to JIT/SAP/ERP

SAP is a name of the ERP software (System Application Product).

SAP ERP (Enterprise Resource Planning) is a commercial software that will integrate all informations altogether in a single software considering various factors like time and cost. Organisations can easily meet their business demands with the help of SAP. Basically SAP MM is one of the modules of SAP that deals with material management and inventory management.

ERP is a category of business-management software — a house of integrated applications that an organisation can use to collect, store, manage and interpret data from many business activities including product planning, purchase, inventory management etc.

JIT: (The full form of JIT is just in time). It is a methodology aimed primarily at reducing flow time within production as well as response times from suppliers and customers.