Concept of inventory in pulp & paper industry

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The post world war economic scene witnessed a phase, where scarcity of materials was compounded by high costs. This development, heightened the urgency to have an effective management of materials, particularly in view of the fact that the contribution of materials to the total cost structure of finished goods was in the range of 50% to 60%. It was in this context said that Inventory was the grave yard of industry ! The concept of Inventory Control, in the management kit of controls, therefore, quite naturally, came to occupy the top rung out of sheer necessity to survive in business.

BUSINESS

According to Prof. Peter F. Drucker, the business of a businessman is "To create a customer". Inventory Management, as a tool in the hands of a businessman, seeks to provide maximum customer's service by way of controlling the in-put cost of materials, at optimum level; thus helping him to achieve his objective. In persuance of the said objective, the entire exercise influencing decision on inventory centres around the cost factor.

INVENTORY CONTROL

Inventory has been defined as the idle resources of a Company, which has economic value. Control of Inventory embraces the following goals; to name only a few :

1. Providing right materials at right time at right place at the optimum possible cost.
2. Minimising investment in inventory.
3 Cutting down material cost through standardisation and value analysis.
4. Import substitution.

INVENTORY & PAPER INDUSTRY

With the above goals serving as a backdrop, the seasonal nature of procurement of raw materials dominating the stage Inventory Management in Pulp & Paper industry should naturally enjoy a special status.

The raw materials of agriculture base in particular, are seasonal in character and therefore, the procurement exercise has to be kept confined to a particular period; while usage is spread over the year. This phenomenon is something unique and peculiar to this Pulp & Paper industry. Derailed decisions on Inventory Management would mean either denying or drowning the unit with supplies.

The fact that over the years, the economic health of Paper industry has been deteriorating is not only due to the escalation of prices of raw materials but also because of the uncertainties that normally attend agricultural operations.

ITEMS OF INVENTORY

The major items required in Pulp & Paper industry are : Bamboo wood, Bagasse, Straw, Paper Cuttings, Sodium Sulphate, Alum, Soap Stone Powder, Rosin, Caustic Soda Lye, Chlorine, Sodium Sulphite, Common Salt, Burnt Lime, Dyes, Hessian Cloth, Jute Twine, Coal, Furnace Oil, Lubricants etc. Besides, various consumable and maintenance spares are also required to be carried as a part of the Inventory.

It is feared that there will be an acute shortage of paper during the coming decade, particularly because of the depleting stocks of raw materials. The requirement of forest produce by the paper industry during the late 80's is estimated at 50 million CMT as against which availability is figured at 35 million CMT.

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In fact, the raw material position even at present level is so alarming, that it serves as a source of major concern to the industry. Certain problems in the areas like power, fuel, coal, steel and Railway wagons have only further deepened the crisis.

It was on this basis, the Indian Paper Makers' Association assailed the norms for inventory fixed by the Tandon Committee.

The following table which presents a comparative operational indicators in relation inventory pertaining to five Paper Mills highlights the key position occupied by the inventory in the financial canvas.
enclosed.

CLASSIFICATION OF INVENTORIES

Classification of Inventory is a prerequisite for Inventory control measure; which generally follow the following pattern :

i) **PRODUCTION INVENTORIES**

Raw materials, parts and components which enter the product in the production process. These may consist of three types (a) Special items manufactured to drawings in the factory itself, (b) Standard industrial items purchased off the shelf, (c) Non standard items.

ii) **M.R.O. INVENTORIES**

Maintenance, repairs and operating supplies which are consumed in the production process, but which do not become part of the product (Oils, machinery and Plant spares fire bricks etc.,)

iii) **IN PROCESS INVENTORIES**

Semi-finished products formed at various stages in the production programme.

iv) **FINISHED GOODS INVENTORIES**

Completed products ready for shipment.

v) **MATERIALS IN TRANSIT ALREADY PAID FOR :**

The total inventory of any undertaking should include all the above categories of inventories since they lock up capital borrowed at high rate of interest. However, locking up of capital inventory to an extent, is a necessary evil as it is economically imprudent to keep machine and men idle, waiting for materials.

Inventory decisions will have to therefore endeavour :

i) to minimise idle time of men and machine and capital caused by shortage of raw materials, stores and spare parts,

ii) to keep down :
   a) capital investment in inventories,
   b) inventory carrying cost; and
   c) obsolescence losses.

Since the above objectives are in conflict with each other, Inventory Management calls for a skill in striking a balance between these two objectives and obtaining an optimum overall result. Any mistake in the decision making process is normally reflected in disruption of operations for want of materials on one hand and excessive stocking of items on the other. Surplus inventories while damaging the operational results of the enterprise, also injure the economy by depriving other industries of their requirements.

EFFECTIVE CONTROL

Closely following the classification, a simple analysis of the entire inventory on the basis of moving and non-moving items has to be undertaken.

While the purpose of analysis is to formulate selective controls, the extent of attention paid, cost incurred etc., should have definite relation to the results and achievements sought to be obtained by such measures.

ABC CONCEPT

ABC concept in Inventory Management is one of the popular approaches to control inventory. This concept has been defined by J.M. Juran as follows :

"In any series of elements to be controlled, a selected small fraction in term of numbers of elements always accounts for a large fraction in terms of effect. A few percent of quality characteristics account for the bulk of customer complaints and the bulk of the scrap and rework. A few percent of various piece-parts entering the final product account for the bulk of scheduling and delivery date failure. A few percent of the purchase orders account for the bulk of the dollar purchases. A few percent of all customers account for the bulk of the credit losses and the bulk of unjustified return. A few percent of the decisions may account for the bulk of the total effect of all decisions".

Further, ABC analysis is said to be an acronym for "Always Better Control". The basis of analysis is the annual consumption cost guided by the principle "Vital few trivial many". And the criteria used is the money spent and not the quantity consumed.

STATMENT SHOWING OPRATIONAL INDICATORS IN RELATION TO INVENTORY

Name of the Company	Andhra Pradesh Paper Mills		Rohit Pulp & Paper Mills		Star Paper Mills		Titaghur Paper Mills Co.		West Coast Paper Mills	
Industry Group	Paper		Paper		Paper		Paper		Paper	
	Year ended Jun.		Year ended Mar.		Year ended Mar.		Year ended Mar.		Year ended Jun.	
Item	1979	1980	1979	1980	1979	1980	1979	1980	1978	1979
1. Net worth (i)+(ii)	1516.3	1548.9	205.2	264.4	731.0	802.0	1136.4	1224.0	1204.1	1198.5
i) Paid up capital (a+b)	450.0	450.0	60.0	96.0	319.1	319.1	504.0	504.0	500.0	500.0
a) Equity	450.0	450.0	60.0	96.0	269.1	269.1	473.1	473.1	410.1	410.0
b) Preference	--	—	—	—	50.0	50.0	30.9	30.9	90.0	90.0
ii) Reserves	1066.3	1098.9	155.2	168.4	411.9	482.9	632.4	720.0	704.1	698.5
2. Gross Fixed Assets	2953.4	3305.1	452.4	502.7	1505.3	1696.5	2651.9	2827.0	2449.0	2541.5
3. Less Depreciation	1559.4	1770.8	160.8	189.2	907.4	983.7	1356.5	1476.9	1326.1	1468.6
4. Net Fixed Assets (2—3)	1394.0	1594.3	291.6	313.5	597.9	712.8	1295.4	1350.1	1122.9	1072.9
5. Current Assets										
(i) + (ii) + (iii)	1287.7	1300.2	244.2	293.3	787.3	904.3	1499.9	2149.1	1139.0	1141.0
i) Inventories	807.4	805.8	170.0	197.6	576.2	702.6	863.7	1134.8	818.1	821.0
ii) Receivables, Loans & Advances	372.9	375.8	60.2	86.0	170.7	18.8	562.6	910.6	290.3	290.0
iii) Others	107.4	48.6	14.0	9.7	40.4	20.9	73.6	103.7	30.6	30.0
6. Other Assets	—	—	—	—	—	—	0.9	0.1	131.5	130.0
Net Assets (4 + 5 + 6)	2681.7	2824.5	535.8	606.8	1385.2	1617.1	2796.2	3499.3	2393.4	2343.9
7. Sales/Income net of Excise Duty discount selling commissions	3083.6	3031.8	713.5	994.4	1398.3	1416.4	3139.1	3952.5	2178.1	1863.0
OPERATIONAL INDICATORS (PERCENT)										
a) Inventories/net sales	26.2	26.6	23.8	19.9	41.2	49.6	27.5	28.7	37.6	64.1
b) Inventories/Current Assets	62.7	61.9	69.6	67.4	73.2	77.7	57.6	52.8	71.8	72.0
c) Current Assets/Net Assets	48.0	46.0	45.0	48.3	56.8	55.9	53.6	61.4	47.6	48.7

Source : COMMERCE, Feb. '81.

Normally, all moving items are taken up for ABC analysis and non moving items are subjected to other types of analysis such as HML and XYZ analysis.

The steps in computing ABC analysis for inventory are :

1. Calculate the annual usage in units for each item based on forecast estimates.
2. Multiply annual usage in units with the unit cost to get the annual usage in rupees for each item.
3. Rank the items from highest annual rupee usage and assign categories.

It is usual to consider the first 10% of the items as 'A' items; next 20% as 'B' items and next 70% as 'C' items. However, there is nothing sacred about this assignment of categories and it will depend on management decision in a particular situation.

The general picture of ABC analysis will show the following pattern

	Item%	%of Annual Consumption Cost
A items	10	70
B items	20	20
C items	70	10

It may be of interest to note that ABC analysis which underlines the principle "Vital few trivial many" is relevant even in sorting out many of the business problems such as number of dealers and volume of business; items of expenditure and the amount involved; nature of complaints from the customers and number of complaints etc.

Therefore, the need for controlling Inventory based on the principles of ABC classification is obvious. It is akin to the slogan "THICK ON THE BEST, THIN ON THF REST". Some enterprising gentlemen modified this to state "THICK ON THE BEST, HELL WITH THE REST".

CONTROL OF 'A' ITEMS

Annual consumption cost being very high in respect of items belonging to this category, a small percentage of savings results in substantial savings. Normally these items command the direct control of the Manager. The items normally figured under this category are as follows. Taking into account the seasonal character, uncertainity regarding availability and transport bottlenecks, the maximum stock that is desirable to be held is also indicated.

A.	1) Bagasse, Straw	.....	3—6 months
	2) Bamboo/wood	.....	2—3 months
	3) Lime Stone, Rosin, SS Powder	.....	2—3 months
B.	Sodium Sulphate	.....	1—2 months
C.	Alum	.....	1—2 months
D.	Liquid Chlorine	.....	10—15 days
E.	Caustic Soda Lye	.....	23—30 days
F.	Furnace Oil	.....	2— 3 months
G.	Dyes	.....	,, ,,
H.	Hessian Cloth	.....	1½—2 months
I.	Coal	.....	2--3 months

The measures normally to be taken on "A" category items are briefly as follows:—

i) Annual contract for supplies with as frequent staggered deliveries as is economical.

ii) Minimum Safety Stock or even fluctuating safety stocks, by maintaintng better Vendor/ Vendee relationships, speculation or market conditions, supply conditions etc.

iii More frequent review of stock position and consumption patterns.

iv) Precise quality specifications or materials standards evolved.

v) Value analysis to find cheaper substitutes, better sources of supply and reduce the overall costs.

vi) Waste control measures to reduce the scrap, rework,' rejection and sub standards.

vii) Favourable conditions for developmental work or research to be provided where-ever possible.

viii) possibility of adopting 'COCK SYSTEM' when the materials are stored and supplied at the factory site by the supplier at his own cost.

CONTROL 'C' ITEMS

The other extreme is where a large number of items constituting a small percentage of costs need very simplified procedures. The objective being to reduce the purchase costs as well as handling and distribution costs. The following measures are suggested:

1. Maintain sumptuous stocks (avoid the proverb "for the sake of a horse-shoe nail, the battle was lost")
2. Purchasing coal minimised through single tendeg system, blanket contract, travel orders, clubbin- of similar items into one purchase order, purchgr sing annual requirements, blank cheque orderina procedure etc.

3. Inventory carrying costs and paper work reduced by bulk issues, writing off the values (control through Perpetual Inventory) of stocks. variety reduction and standardisation, pool system etc.
4. Liberal safety stock.

CONTROL OF 'B' ITEMS

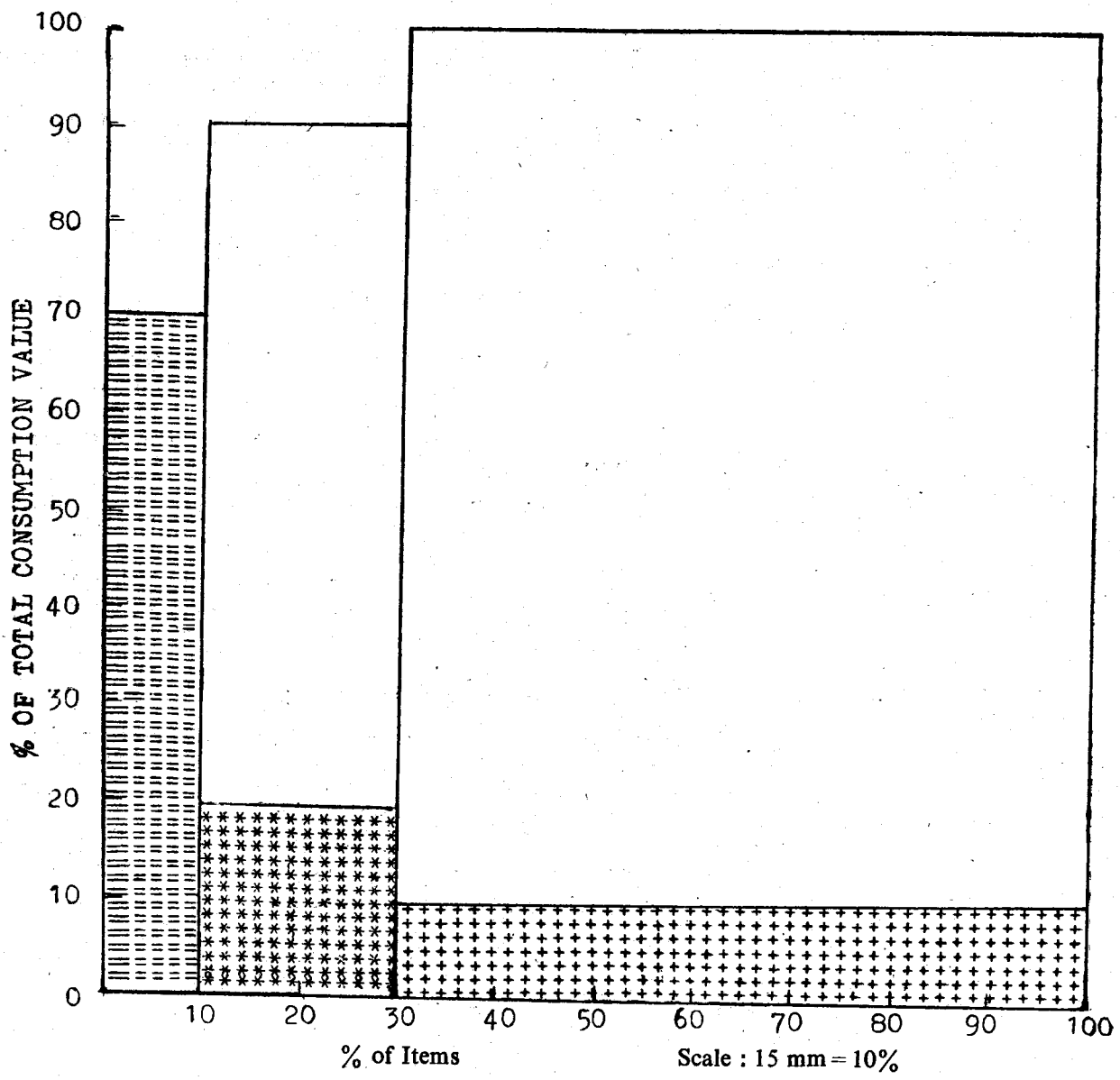
On these items, the controls are 'via media' of A & C. Usually, the safety stocks are decided on the basis of policy guidelines.

The graphic presentation of ABC analysis is as per the chart enclosed.

VALUE ANALYSIS

This is one of the latest and more important tool in the hands of management for cost reduction and increased profit. It seeks to iron out unnecessary cost element involved. It can be applied to Raw-materials, components, parts, production tools, plant and machinery etc.

Graph of A B C Analysis



The advantages that could accrue by effectively implementing the system can be illustrated by the fact that Railways who were till recently using Bronze bearings for Axel boxes of the wagons have switched over to Malleable iron. This has not only resulted in reduction of cost but also have saved inputs of 100 of tonnes of non ferrous metals and thus saving foreign exchange.

EOQ CONCEPT

This popular concept (Economic Ordering Quality) attempts to answer the questions (How much to order and when to order). The concept determines the optimum number of orders that should be placed during the year for an item on the basis of annual usage. It aims at striking a blend between the two aspects associated with each other:

a) Cost of placing an order which includes all variable costs such as tendering, typing, follow-up, establishment charges etc.,

b) Inventory carrying cost which includes obsolescence, deterioration, handling, godown rent, establishment charges etc.

CONCLUSION

It is pertinent to point out that there is at present, a prodigious literature on Inventory Management backed by profound discussions at periodical intervals. However, in practice, precious little is being done. May be, certain vested interests block the entry of a new discipline into the management realm, either out of fear of losing their importance or out of plain jealousy. The time has come to give up sentiments and to be practical.

In our case, we have taken on hand a crash programme to introduce certain inventory disciplines like ABC analysis, XYZ analysis, EOQ system in replenishment of stock and identification of surplus items; besides codification. We are optimistic about favourable results flowing from these exercises.

The tremendous impact of inventory on %ge of profit could be gleaned from the following table; which only substantiates the saying 'A rupee saved is a rupee earned.'

Item	Material Cost	Other Cost	Profit	Total sales realisation	%ge of increase in profit
A. Base level	50	40	10	100	—
B. Reduction in material cost by 2.5%	48.75	40	11.25	100	12.5%
C. Reduction in material cost by 5%	47.50	40	12.50	100	25.00%
D. Reduction in material cost by 10%	45	40	15	100	50.0%

The writing on the wall is there, for all to see : 'Control or perish'.