Inventory Management in Indian Industry (A study of Maruti Udyog Limited)

Dr. Wakchaure Rajaram Nathaji

rajaramwakchaure@gmail.com

Shridi Sai Rural Institute's, Arts, Science and Commerce College, Rahata, Maharashtra

ABSTRACT

The material constitutes a very important position in the total cost of the finished product in most of the manufacturing industries. Therefore, proper recording and control over material costs are essential. Material control may be as, the regulation of the procedures for requisitioning, buying receiving, storing, handling and uses of material, also it applies the system for A, B, C classification of components is based mainly on cost and consumption of a particular component. This system also provides for various risk factors. The inventory management in the Indian industry is developed in a systematically in the modern business world and also to evaluate the concept as well as precepts pertaining to inventory management develop in Indian industry, as a special reference of Maruti Udyog Limited (MUL)

Keywords— *Inventory, Management, Industry, Manufacture, Material Control, Production*

1. INTRODUCTION

Material control is a system, which ensures the availability of the right quantity of material, of the right quality, at the right time which the minimum amount of capital by purchasing them at the right price from the right source.

2. OBJECTIVES OF AN EFFECTIVE INVENTORY CONTROL SYSTEM

(a) Maintaining adequate inventory so as to avoid production stoppages.
(b) Avoiding excess inventory holding thereby reducing the material holding cost chances of obsolescence, storage loss, pilferage, etc.
(c) Fixation, of Economic Order Quantity, maximum level, minimum level Reordering level, safety stock level, etc.
(d) Avoiding slow-moving and non- moving dormant surplus and obsolete stock, etc.
(e) Avoiding the blocking of the Capital amount i.e. minimum investment in the inventory.

3. REQUIREMENT OF MATERIAL CONTROL SYSTEM

(a) Material control is a matter of coordination among the various departments concerned viz purchases, production, maintenance, inspection, stores, accounts & cost accounting departments.
(b) Classification, codification, standardization, rationalization, and simplification of materials.
(c) Use of standard forms and documents in all the stages.
(d) Centralization of purchasing under an efficient purchase department.
(e) Perpetual inventory system and continuous physical stock verification.

In the mid-eighties "Maruti Limited " started to manufacture the first high quality, low cost, and fuel-efficient car of India. In the factory 1981, the company was nationalized as "Maruti Udyog Limited" (MUL) one of the foremost tasks before MUL was to determine the most suitable product mix. Towards this end, the company was in search of suitable foreign partner whosoever be willing to accept requirements in terms of product mix technology transfer equity participation and others.

After extensive discussions with several major European and Japanese car manufactures. MUL chose Suzuki Motor Co. (SMC) of Japan as its partner. The joint venture was set up with a 25% equity share from SMC with an option to increase its share to 40% within 5 years. In 1992 the Government of India approved foreign partner's request to increase its equity from 40% to 50%. A subscription and amendment agreement was signed between the Government of India and SMC in 1992. As a result, MUL becomes a non-Government Co., which is now Board managed.

The factory is located at Gurgaon 50 Kms west of Delhi- with a licensed capacity of 1,40,000/- vehicles per annum during 1994. The factory started production in December 1983. It is equipped with the most modern machinery. On average almost six hundred

vehicles are produced each day as per the records of 1994. To achieve higher operational efficiency and profitability, it is very essential to reduce the amount of capital locked in inventories. This will help achieve a higher rate of return on investment by minimizing tied up working capital. Also, this will improve the liquidity position of the organization.

4. INVENTORY IN MARUTI UDYOG LIMITED (MUL)
The factory had an average inventory of materials, consumables, components, spare parts, etc. worth Rs. 60 crores approximately per day during 1993 and 80 crores approximately per day during 2004. The inventory of indigenous components only amounts to Rs. 23 crores per day and 34 crores per day during the same period. It may not be out of place to mention here that this study is limited to the inventory of indigenous components only. The inventory of indigenous items is quite considerable when looked in terms of cost involved. i.e. interest, rent, obsolescence, and other opportunity costs. The company has to slim down this overhead in order to become competitive in the International Market.

5. INVENTORY MANAGEMENT
The main objective of holding inventory is to provide smooth and efficient operation inventories in business that serve much as the suspension system of an automobile. Ups and downs in sales can be absorbed by inventory. A large inventory decouples production from supplies, purchases from operations and final assembly, etc. In other words, it provides flexibility in operations, but this involves cost and investment in idle stock interest and obsolescence.

On the other hand, a low inventory is related to low cost. But there are other opportunity costs, which are Rs.16,000/- approximately per vehicle in MUL that accounts for a staggering figure of Rs.3.7 lack per day during 2003. This high stockout cost forces one to keep inventory. Hence from an overall company viewpoint, inventory investment is to be balanced other demands of capital, considering costs and benefits related to the bath. In the MUL inventory system the products are classified on:
(a) A.B.C Analysis pattern. and
(b) Inventory norms are determined.

5.1 A.B.C Analysis pattern – (Classification)
A.B.C Analysis is based on the principle known as Pareto law developed by Pareto, an Italian economist. According to this law, in any series of elements to be controlled, selected small functions, in terms of numbers of the element, would always account for a large fraction in terms of effect. A.B.C Analysis is popularly known as Always Better Control. It is also known as Control for Importance and Exception. It is based on the concept of selective Inventory Management.

A.B.C Analysis is a method control according to value, so the basic principle is that high-value items are more closely controlled than the low-value items. The materials are grouped according to the value and frequency of replenishment during a period.
'A'- class items: Small percentage of the total items but having higher values.
'B'- class items: More percentage of the total items but having medium values.
'C'- class items: High percentage of the total items but having low values.

The analysis classifies items into A.B&C based on the Annual consumption value. If this value for each of the items is worked out in an industry, it is noticed that only a small percentage of items account for a major portion of the total consumption in rupees. They are the most important items from the point of view of inventory control and are classified as A- items. There are other items which are large in number, but account for only a small portion of total consumption in terms of value, which are classified as C- items and are relatively least important B-items are there in between A- items and C- items which are of median importance.

A-items are about 12% of the total number but account for nearly 80% of the total value, B-items are 24% of the total number and account for 12% of the total value. Thus, by exercising astringent on a small number of items that contribute to a very large value of inventory it would be possible to control the overall inventory in the organization.

In Maruti Udyog Limited, the system for A, B, C classification of components is based mainly on the cost and consumption of a particular component. The system also provides for various risk factors (e.g. number of sources, the proximity of vendors, etc.) associated with each component to take care of safety stock and variation in demand and supply of parts. Also, the weight and volume of the component are taken into account and with the result, most of the high-volume items are classified as A- items. This results in the anomalies in the system as classification does not reflect the cost of the inventory.

The number of indigenous components, the enterprise understudy is dealing with, are above 5621. These items are classified into three categories viz. A.B & C with a total average inventory value of rupees 41 crores per day during 2009.

Table 1: Relation Between Number of Components and Inventory Value
(Per day during 2010)

Class	Number of Components	Percentage of number of components	Value in rupees
A	262	5.80	85,000,000/-
B	2670	53.12	100,000,000/-
C	2312	41.08	45,000,000/-

Source: Records for the year 2010, Maruti Udyog Limited (MUL), Gurgaon (Haryana).

5.2 Determination Inventory Norms

Control of inventory is an inevitable aspect for the smooth functioning of an organization its problems are ubiquitous and complex due to its manifold influence. This call setting up of inventory norms a major factor in inventory control. The basic idea for fixing minimum and maximum level of inventory is to have flexibility in the inventory holding and at the same exercise control if stock exceeds the norms or fall below the minimum level. In the enterprise understudy, presently there are a number of types of inventory norms for the component of different classes. However, for better control, there should be only six to eight types of inventory norms. This will lead to simplicity and close monitoring of the component. The inventory norms should be as:

Class	Inventory item (days)
A	1 to 2
	3 to 6
	4 to 8
B	6 to 12
	6 to 15
	6 to 18
	12 to 36
C	24 to 48

Factors to be considered by MUL for A, B, C classification and fixation of inventory norms –

I) **Unit Cost/ Value:** A higher cost items involves high investment and hence high interest/ opportunity cost. The inventory should be minimized for these components to decrease the inventory cost.

II) **Minimum Batch/ Lot size:** This is in consideration of the supplier that he may not be willing to supply a batch smaller than the minimum batch size. Transportation cost would correspondingly get inflated it batch size is decrees or a large number of batches are procured. It is possible to schedule the arrival of batches resulting in low inventory holding.

III) **Transportation cost:** The higher transportation costs, minimizing the number of trans-shipments and truckloads decrease the overhead incurred.

IV) **Unit Volume:** This is important because a large volume implies a large storage space and hence higher rental cost. This could also be looked at as storage space last in keeping one unit in storage.

V) **The proximity of the Vendor:** The large the distance of the source, the higher will be the external effects (Road conditions, truck break-downs, transportation losses/damages, etc.) a variation of transport items. Hence higher inventory is required for smooth operations. Similarly, inventory for vendors who are in the vicinity of MUL can be reduced to one day and so by procuring material on a daily basis.

VI) **Number of Sources:** It is possible to distribute the risk of procuring from a source, when more sources are present, by shifting from one vendor to another if one fails. It is also possible to create competition among them for better performance and quality. However, this is not a single source item. Therefore, the inventory system provides for higher inventory for a single source, items as compared to multiple source items.

VII) **Machine Process:** Certain components like break-drums, which are machined, suffer from altogether different drawbacks. These components like break-drums, which are machined, suffer from altogether different drawbacks. In those components, a whole lot gets rejected because the machine toolset gets disturbed. This result is the wrong dimension. These incidents occur very infrequently. Thus, in spite of good vendor performance, a higher inventory is required to meet this inherent uncertainty, which a component suffers from.

VIII) **Production Capacity of Vendor:** The production capacity of the supplier forms a constraint on the procurement of components. A component having just sufficient production capacity runs a higher risk of going stock out than a component having high-production capacity. This is because in case of rejection/bad quality, procuring the component is difficult if there is no other supplier. Thus, a component with low just sufficient capacity should be held at higher inventory than others.

IX) **Lead Time:** Lend times in India are considerably larger than those in industrially advanced countries. Lead times may vary from item to item and from time to time for the same items. Therefore, lead time should be taken into account while going by A, B, C classification or fixation of inventory norms.

X) **New/ Old Vendor:** A new vendor who is stabilizing the operations is likely to suffer from quality and rejection problems as compared to a well established one. Hence inventory norms should be suitably adjusted by taking this factor into consideration.

XI) **Previous Performance:** The previous performance in terms of rejection rate and delivery schedule should be used to adjust inventory norms. A poor performance would entail higher inventory.

XII) **Substitutes:** Products which have close substitute like nuts, bolts, tires, tubes, etc. should be maintained at a consolidated inventory figure. The substitutes for such components can be used as they are similar in almost all respects. The cumulative inventory figure should be used for deficiency inventory norms and not individual figures.

XIII) **Complimentary Products**: Complimentary products like tyres and tubes should have similar inventory norms, though they need to be adjusted to their corresponding rejection rate.

XIV) **The criticality of Components:** Products, which become critical frequently should have higher inventory than others.

XV) **Shelf Life:** A fragile component whose rejection depends upon intermediate handling should be maintained at a minimum possible level to minimize the breakages.

5.3 Inventory Control

The inventory control in Maruti Udyog Limited (MUL) is being performed by MCD in close Co-ordination with the marketing division, Vendor Development Department (VDD), Production Engineering, Production Planning and Control (PPC), Materials & Finance Department (MDF).

The total out-put to be planned depends basically on anticipated and sales. When the master production schedules are deemed realistic (achievable) the system goes to work; plans for material and capacity requirements are generated in detail or updated. Feedback during execution defects significant deviations from plan and corrective actions are initiated.
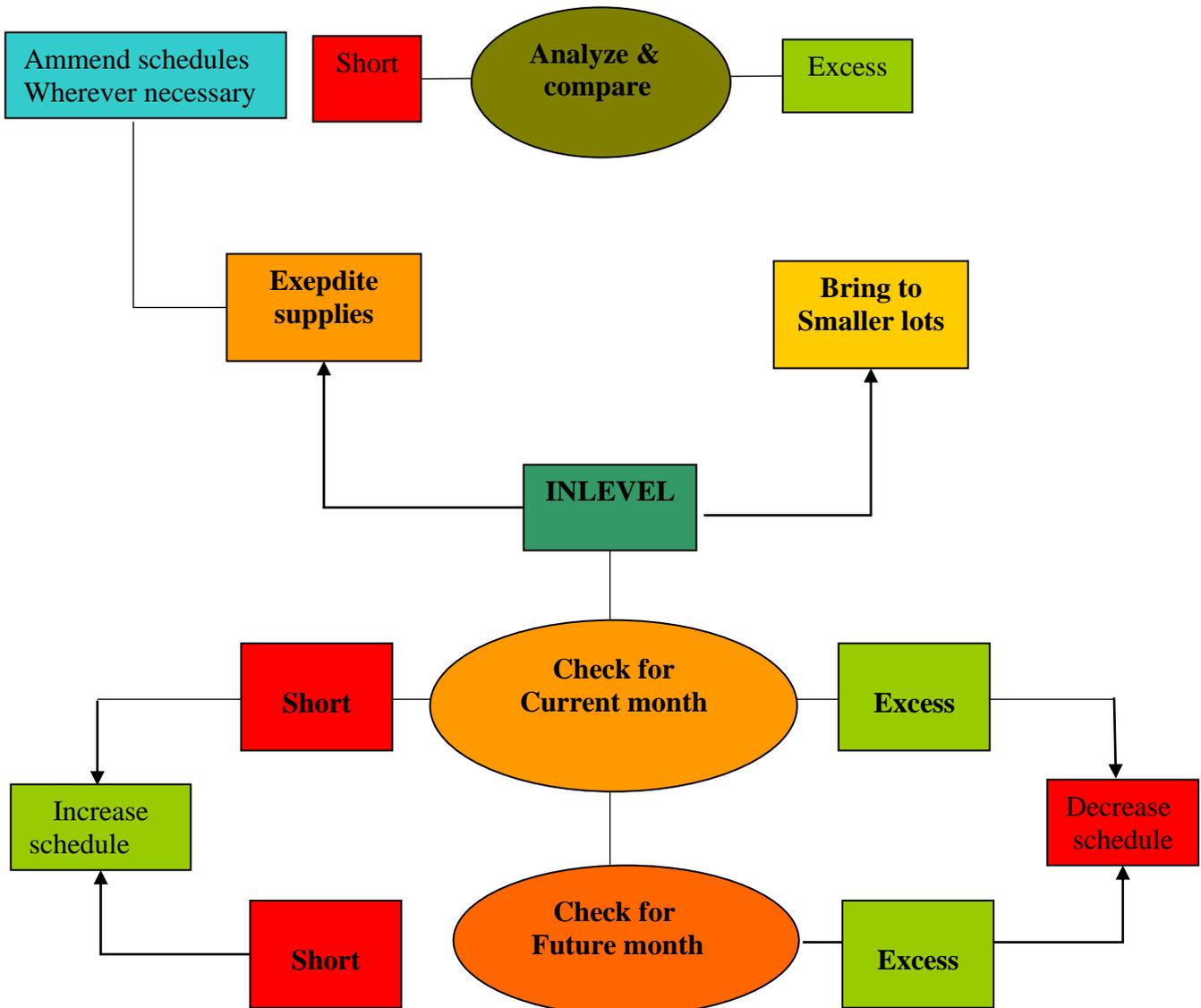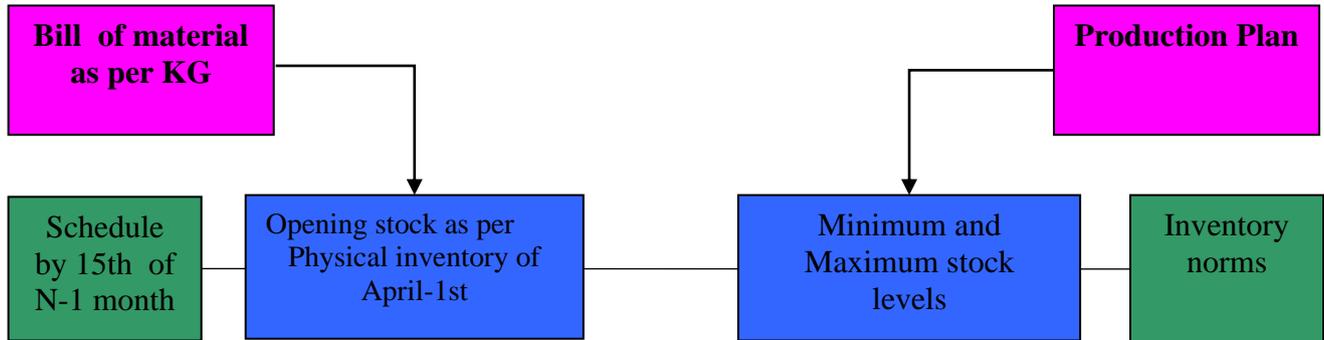

Fig. 1: Inventory Control System

The aggregate and detailed scheduling are done on the basis of forecasting, capacity and capability of plant, availability of materials, storage spaces, opening stock and availability of working capital. The engineering bill of materials which reflects the components required per unit of product, the standard of each component for a specified unit of product, along with the production

plans are taken as the basis for scheduling of supplies. However, scheduling of supplies is carried out into consideration with factors like Vendor capacity and availability of materials.
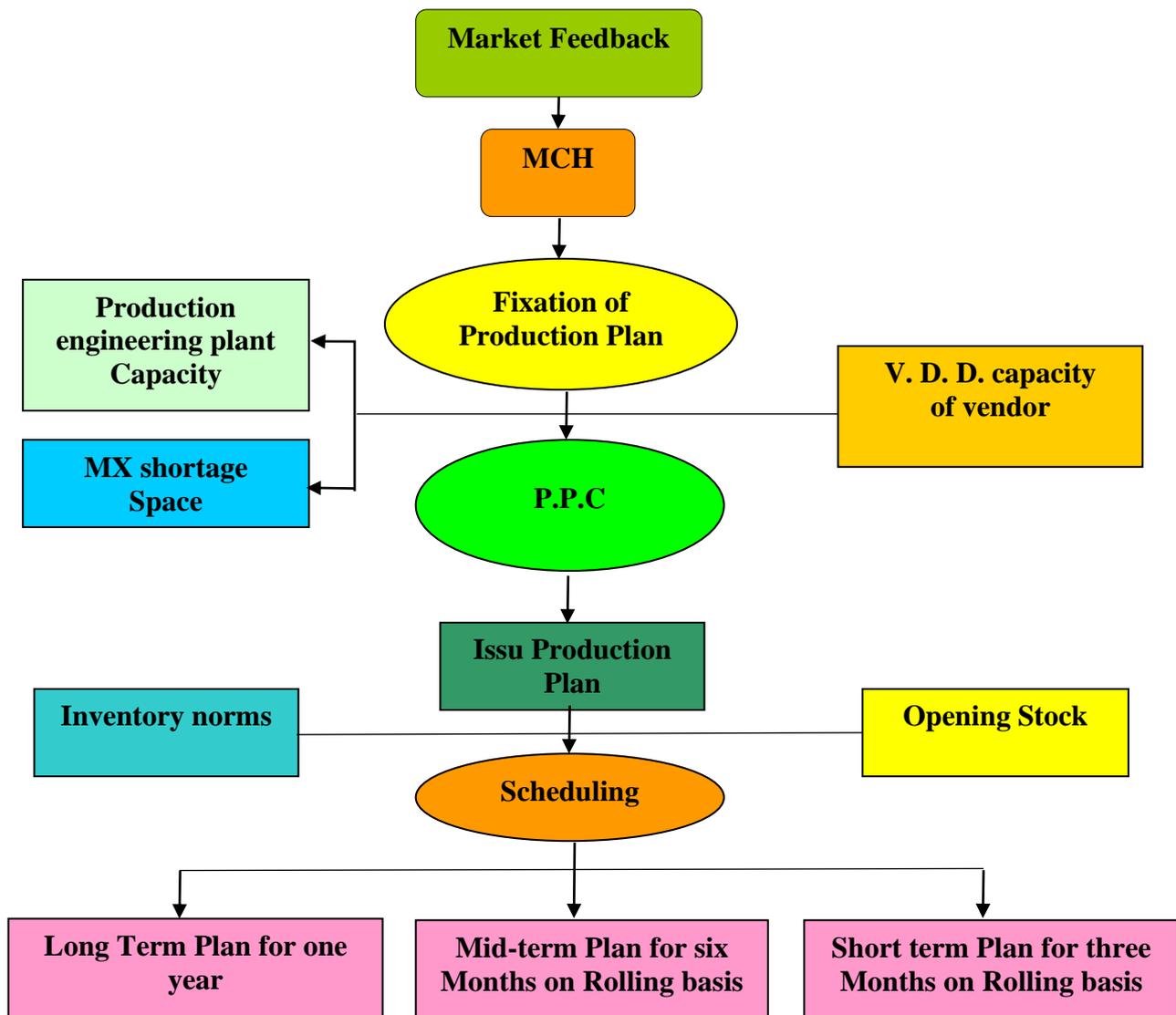

Fig. 2: Inventory Control System

Once plans are made via such an integrated system and inventory norms are fixed in consideration with many risk factors, computer programmes are designed to keep inventory records and to calculate Economic Order Quantity (EOQ) and safety stock as necessary. The development of computer programmes provides the capacity of getting full integration and keep the plans more up to date by the frequent running of all data. Changes in the sales forecast, production plan, scheduling, criticality of components and many other factors are updated promptly on the computer.

In monthly scheduling system vendors usually supply the material in the last week resulting in criticality during the first three weeks and excess inventory in the last week. The perpetual inventory control would be easier if weekly scheduling is done and the inventory can be monitored on a weekly basis, thereby, minimizing the fluctuation in supplies resulting from monthly scheduling. In addition to gear up the control over inventory, the MUL should take cognizance of the following.
(a) There should be automatic scheduling for vendors with 100% shares.
(b) The electronic communication system is developed to get quick supplies of material needed.
(c) Educational programs should be conducted to educate the vendors with special emphasis on just in time supplies and cost-benefit analysis, and
(d) The vendor who is far from Maruti Udyog Limited (MUL) should be motivated to set up godowns in the vicinity of the factory to keep the inventory for one week, so as to supply the material in time. This can also meet urgencies or changes in the production plan.

6. CONCLUSION
This article has discovered that in a monthly system in vendors usually supply the material in the last weeks and excess inventory in the last week. The inventory management is developed in a systematic way in the modern business world in the Indian industry. As a special reference to Maruti Udyog Limited.

7. REFERENCES

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