

Lacunas of Inventory Management Techniques in Diesel Locomotive Works Varanasi

Dr. Davendra Kumar Sharma

Abstract

Each manufacturing company is in great need of the review of their plans, Inventory and production in order to make the new strategies and to implement and modify them from time to time. Therefore firms are increasing the expenditure on carrying inventory. Research form the basis for developing a new plan, to know the reasons for the increase the cost of inventory and to know about How to control it?

After the problem is defined, one is to prepare the design of the research project. Questions relating to decisions regarding of the research what, where, when, who and how constitute a research design It is the blue print for the collection measurement analysis of data. The research design, which I choose for study, was descriptive research design.

In Railway production unit Diesel Locomotive Works mostly time they don't use inventory management Techniques. The management wants to reduce cost of inventory and the store keeper want to know inventory management techniques. Many of the items needed for the day-to-day maintenance and operation are required to be specially manufactured for the railways. The time to procure these materials, therefore, is longer dues to various reasons and it is not possible to procure these materials when instantaneously required. It is, therefore, necessary to keep stocks of such items. In the given project primary data was collected through Questionnaire, interview replies, from store manager and employees and the observation and the secondary data is taken by annual reports published Diesel Locomotive works and Store budget of DLW, which is incorporated for collecting the raw information. The survey method is adopted because it helps collecting the great deal of information about particular material.

In the given study the techniques was structured (it follow the prescribed sequence of inventory management techniques) and non- disguised type. The present study done by the using of inventory management techniques. The scope of the study will include the analysis of the inventory management, which is being conducted to know the awareness of the inventory management in DLW Varanasi.

Keywords: *Strategies, Implement, Instantaneously, Constitute, Store budget, Non- disguised.*

Introduction

Each manufacturing company is in great need of the review of their plans, Inventory and production in order to make the new strategies and to implement and modify them from time to time. Therefore firms are increasing the expenditure on carrying inventory. Research form the

basis for developing a new plan, to know the reasons for the increase the cost of inventory and to know about How to control it?

Inventory is a list for goods and materials, or those goods and materials themselves, held available in stock by a business. It is also used for a list of the contents of a household and for a list for testamentary purposes of the possessions of someone who has died. In accounting inventory is considered an assets. Inventory management is primarily about specifying the size and placement of stocked goods. Inventory management is required at different locations within a facility or within multiple locations of a supply network to protect the regular and planned course of production against the random disturbance of running out of materials or goods.

The scope of inventory management also concerns the fine lines between replenishment lead time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods and demand forecasting.

Literature Review

Research analysis of supply chain management practices in Indian manufacturing industry was done with the combined efforts of **Mr. B.S. Shahay and Mr. Ramneesh Mohan** in September 2003. This analysis is based on a joint survey concerning 156 organizations, carried out by management Development Institute gurgaon and KPMg Ltd. The analysis primarily focuses on the status of four major supply chain strategy with business strategy, streamline process for supply chain integration form partnerships for minimizing inventory and focus in infrastructure and technology development to build a India specific supply Chain.

Another case study was evaluated by **Mr. M.P. Jaiswal and Ms. Anjali Kaushik** on manufacturing enhanced value due to business network redesign through extended ERP systems: Case study of HLL Net. This study is basically to examine and measure the effectiveness of enterprise systems at business networks level. The paper examines the business potential of enterprise system through a case study one of the largest fast moving consumer goods network HLL Net.

There is an article from **Sanjay Jharkharia and Ravi Shankar** on Supply Chain Management - Some Insight from Indian Manufacturing Companies which was published in Asian Academy of Management Journal (Vol No. 9, January 2004). In this article researchers have analyzed issues such as inventory management. IT- enablement of supply chain, and buyer supplier relationships are at the core or supply chain research. The research results demonstrate that inventory management implementation improves competitive performance by lowering inventory level.

After analyzing the above work I felt that there too discovered pertaining to inventory management performance of Manufacturing companies of our country in a liberalized global business scenario. An Advanced study is still needed for it. Therefore, I choose this topic

Challenges of inventory management in DLW Varanasi for further analysis particularly in respect of inventory management with reference to working capital management.

Research Methodology

After the problem is defined, one is to prepare the design of the research project. Questions relating to decisions regarding of the research what, where, when, who and how constitute a research design. A research design is thus the arrangement of conditions for collection and analysis of data in a manner that aims to combined relevance to the research purpose. It is the blue print for the collection measurement analysis of data. The research design, which I choose for study, was descriptive research design.

Since this study is being conducted for checking the type of the inventory in the Diesel locomotive works the present study describes the research methodology being followed in the study. It includes the description of the sample selected, sample unit, sample size, sampling technique, methods of the collecting information, statistical analysis and also point out limitations of present study.

Objective Of The Study

Many of the items needed for the day-to-day maintenance and operation are required to be specially manufactured for the railways. The time to procure these materials, therefore, is longer dues to various reasons and it is not possible to procure these materials when instantaneously required. It is, therefore, necessary to keep stocks of such items. In DLW mostly time they don't use inventory management Techniques. The management want to reduce cost of inventory and the store keeper want to know inventory management techniques.

Even for those items which are readily available in the market, it may not be economical to buy these items every time as buying in piecemeal involves additional costs to the administration. It is therefore cheaper to buy in bulk and to stock some of these items and supply our indenters through such stocks. The following items point out for objectives:

1. To make minimum investment in working capital.
2. To ensure continuous supply of Raw Materials.
3. To have continuous production.
4. To minimum purchase and inventory cost.
5. To provide better product to customers.
6. Economy in Purchasing.

Type of Research

In the given project primary was collected through questionnaire. The data collection method was store in charge information and records maintained by Store manager, which is incorporated for collecting the raw information. The survey method is adopted because it helps collecting the great deal of information about individual respondent.

In the given project the questionnaire was structured (it follow the prescribed sequence of questionnaire) and non- discussed type.

Research Design

The concerned with describing the characteristics of a particular Diesel Locomotive Works. Study concerned with narration of facts and characteristics concerning with Diesel Locomotive Works or situation are all example of descriptive research. The procedure is carefully planned.

Sources of Data

- **Primary Data:** Primary data is collected by Questionnaire, interview replies, from store manager and employees and the observation by me.
- **Secondary Data:** The sources of secondary data are taken by annual reports published Diesel Locomotive works and Store budget of DLW.

To the extent possible the processing the analyzing procedure several is planned in detailed .The accuracy of tabulation is to be checked by having a sample of table redone. Finally, graphical tools are worked out; lastly the report findings are prepared and communicated to the respective authority.

Research Techniques

In the given study primary was collected through Questionnaire, interview replies, from store manager and employees and the observation and the secondary data is taken by annual reports published Diesel Locomotive works and Store budget of DLW. which is incorporated for collecting the raw information. The survey method is adopted because it helps collecting the great deal of information about particular material.

In the given project the questionnaire was structured (it follow the prescribed sequence of questionnaire) and non- disguised type. The present study done by the using of following inventory management techniques.

1. Economic Order Quantity / Re-order Quantity
2. Re - order level
3. Minimum Stock Level
4. Maximum Stock Level
5. Average Stock Level
6. Danger level

Sample Design

As I have to study the existing Railway unit DLW store. 3500 to 4500 parts is used in one locomotive. Following major parts used for production of Railway Diesel Engine.

Major Parts of Railway Diesel Engine

1- Traction Motor 2- Power Pack 3- Crankshaft 4- Axle 5- Wheel etc.

I took the sample wheel part of inventory from DLW, which is highly turnover material of Class A. Data has been analyzed with the help of Questionnaire and inventory management techniques.

Scope of Study

Through the efficient Management of Inventory of the wealth of owners will be maximized. To reduce the requirement of cash in business, inventory turnover should be maximized and management should save itself from loss of production and sales, arising from its being out of stock. On the other hand, management should maximize stock turnover so that investment in inventory could be minimized.

The scope of the study will include the analysis of the inventory management, which is being conducted to know the awareness of the inventory management in DLW Varanasi.

The Scope of inventory management in DLW can be explained in detail as under:

- (i) To ensure that the supply of raw material & finished goods will remain continuous so that production process is not halted and demands of customers are duly met.
- (ii) To minimize carrying cost of inventory.
- (iii) To keep investment in inventory at optimum level.
- (iv) To reduce the losses of theft, obsolescence & wastage etc.
- (v) To make arrangement for sale of slow moving items.
- (vi) To minimize inventory ordering costs.

Limitations of Study

However, the study is going to be a research project, but it definitely has some of the limitation, which is as follows:

- The research is confined to a certain part of DLW Varanasi.
- The time constraint is the important limitation of this study.
- Due to the less knowledge about the topic, detailed study could not be conducted.
- Respondents were hesitating to give the financial information.
- Possibility of error in data collection because respondents may have not given actual answers of my questionnaire.
- Type of inventory may not adequately represent the whole type of inventory in DLW.

Techniques used by DLW for Inventory Management

ABC Analysis

The general characteristic of most of the inventory held in stock at stores depots is that relatively a small number of items account for bulk share of purchases (e.g. coal, diesel oil, cement, steel).

It is seen that nearly 80% of the expenditure is accounted by 20% of the items and vice versa. Under the traditional system all items are given same attention irrespective of their monetary values.

ABC Analysis on the other hand is a selective method for controls and evaluation to achieve beneficial results. Under this system, the items of stores are segregated into A,B,C categories depending on the value of their annual transactions.

The efforts of COS are concentrated in reviewing the high value items and leaving the less important items to the management at lower levels and also fixing uniform procedures of procurement (i.e. Maxima and Minima basis). For the purpose of effective controls the stock items are divided into the following groups:

- A - Annual usage value above Rs.1,00,000/-
- B - Annual usage value above Rs.50,000/- up to Rs.1,00,000/-
- C - Annual usage value below Rs.50,000/-

The advantages of ABC Analysis are that items which really affect the Inventory Management costs are reviewed at frequent intervals.

The limits fixed for ABC categories are reviewed frequently and revised according to usage value.

Data Analysis and Interpretation

Name of Inventory = Wheel Part

Base Year = 2015-16

Cost per wheel = 2.12 lac

Minimum wheel used per day = 12

Maximum wheel used per day = 20

Re order period = 30 to 40 days

No. of working days in a year = 250

A = Annual usage = 4000 Units

O = Ordering cost per order = Rs. 15 Lac

2CC = Annual carrying cost per unit = 0.50 Lac

➤ **Economic Order Quantity (EOQ)-**

For a vast network of railway organisation, stocking of materials is necessary and unavoidable. Keeping in view the cost of ordering for the equipment and also the carrying costs (i.e. holding the stock in the depot, handling transport custody, obsolescence, deterioration) the stock holder should therefore know when to order and how much to order.

EOQ is in fact the economic lot size. This can be achieved by scheduling the deliveries against long term contracts and rate contracts.

The commonly used formula to arrive at the economic order quantity is:

EOQ = 490 Units

- If DLW purchases 490 units in a lot then cost of inventory will be lowest. If DLW does not maintain Re order quantity as per EOQ then company has to bear High cost of inventory.
- If DLW follow EQO then company should give No. of order in a year is (4000/ 490) 8.16 or can say 8 order in a year
- Time between two order is may (365/8) 46 days.
- Total cost of inventory can be calculated as follows:

Computation of Annual Cost of Inventory

	<u>Amount Rs. Lac.</u>
Wheel Purchase cost (4000 × 2.12)	8,480.00
Add: Ordering Cost (A/EOQ × O) (4000 / 490 × 15)	122.46
Add: Carrying Cost (EOQ/2 × CC) (490/2 × 0.50)	122.50
Total Cost of Inventory	<u>8,724.96</u>

➤ **Re-order Level:**

Re-order level is that level of inventory at which an order should be placed for replenishing the current stock of inventory.

Re-order Level = Maximum Usages × Maximum Re- Order Period

ROL = 20 units × 40 days = 800 units

Company should Re- order at the level of 800 units in stock.

➤ **Minimum Stock Level / Safety Stock:**

Minimum stock is that level that must be maintained always for smooth flow production. How to fix minimum level? while determination of minimum stock level, lead time, consumption rate, material nature must be considered.

Minimum Stock Level = Re-order level - [Average Usage × Average delivery time]

Minimum Stock Level = 800 Units - (16 Units × 35 days) = 240 units

Company must be maintained always 240 units in stock. Re order period may be delayed if the usage increases, then the company faces problem of stock out. To avoid out, a firm may require maintaining safety stock/ Minimum Stock Level.

➤ **Maximum Stock Level:**

Maximum level of stock is that level of stock beyond which a firm should not maintain in the stock.

Maximum Stock Level =

(Reorder Level + Reorder Quantity) – (Minimum Usage × Minimum Re- order period)

Maximum Stock Level = (800 + 490) – (12 units × 30 days) = 930 Units

Maximum Stock Level of company is 930 units. If the stock inventory beyond the maximum stock level, it involves heavy cost of inventory, because it blocks firm's funds in inventory, excess carrying cost, wastage, obsolescence, and theft cost. Hence, company should not stock above the maximum stock level.

➤ **Average Stock Level:**

Average stock level represents the average stock which is maintained in the stores.

Average Stock Level = $\frac{1}{2}$ (Minimum Stock Level + Maximum Stock Level)

Average Stock Level = $\frac{1}{2}$ (240 units + 930 units) = 585 units

The average stock level of DLW is 585 units. This level is above the minimum level and below the maximum level.

➤ **Danger Level:**

Danger level is that level of materials beyond which materials should not fall in any situation.

Danger Level = Minimum Usage × Minimum Re- Order Period

Danger Level = 12 units × 30 days = 360 Units

The danger level of inventory in DLW is 360 Units. If it falls in danger level it will disturb production. Hence, the DLW should not the stock level to go to danger level if at all it falls in that level then immediately stock should be arranged even if it costly.

Findings

As from the study of questionnaires, I have found that mostly time DLW follows inventory management techniques. I submit my findings here.

- DLW has well equipped to graph fundamentals of Inventory control system.
- Most of time DLW maintained ABC classification of inventory but sometimes it is not possible.
- Company tries not to become surplus of stock but sometimes it is seen.
- Most of Time Company maintained MIS system of inventory.
- Company follow inventory budget but sometimes company has to do work beyond the budget.
- Mostly time inventory procurement system as per Economic order quantity but some time it is ignored due to discount policy offered by the venders or urgency.
- Most of inventory does not have any expiry date in DLW.
- Company has computerized inventory control system but some of records are maintained manually.
- Company has sufficient space for material storages but some cases are differ.
- Most of time company serve monthly statement. In some cases it is prepared yearly quartly and weekly.
- DLW has shortage of staff.
- Most of employees are satisfied for the system of inventory control in DLW.

Suggestions

- DLW maintained ABC classification of inventory but some of material cannot be classified so company should try to classified such type of material.
- Company should maintain proper management information system.
- DLW should make strong budget and work should be done according to budget.
- Some of inventory has expiry date so company should not by such type of inventory in heavy quantity.
- Inventory information should be updated and it can be cheeked any time. For this purpose company should maintain complete computerized inventory control system,
- DLW should have shaded inventory stores.
- Company should recruit some member of staff.

Conclusion

- From the analysis of the responses received from the employees in DLW a majority of employees are satisfied their inventory management system.
- DLW has very large store. There are large no of inventory has been maintained in store. I found that managers try to apply maximum type of inventory techniques.

- I found many employees cannot give proper information regarding inventory so company should maintained proper MIS.
- I found managers make generally monthly statements for information. If it is maintained online, then information can be checked anytime anywhere.
- I found inventory verification system is good in DLW and internal audit also going on throughout the year.
- I found most of inventory issued on the base of book average price. It is suggested that company should use FIFO method in case of expiry material.
- Company has sufficient space to keep material but some of material is very sensitive and valuable so company should have proper stores for such type of material.
- Some times DLW face over stock / surplus stock problem so company should try to control surplus of stock problem.

*Associate Professor,
Department of Accountancy and Business Statistics,
S.S.Jain Subodh P.G. (Autonomous) College - Jaipur (Raj.)*

Bibliography

- Brown, Stephen J., and William N. Goetzmann, 1995, Performance Persistence, *Journal of Finance*, 50(2), 679–698.
- C.R. Kothari; *Research Methodology*, 12th Edition TATA Mc GRAW HILL
- Chase, Jacobs and Aquila no - *Operation Management for competitive advantages*, Tata Mc Grew Hill.
- Fetter, R.B. and W.C. Dalleck- *Decision Models for Inventory Management* (Homewood, IL; Irwin)
- Gallinger, G.W. and P.B. Healey - *Liquidity Analysis and Management*, Addison Wesley Publishing Company.
- G.Sudarsana Reddy; 2010, *Financial Management*, Himalaya Publishing House
- Hill, N.C. and W.L. Sartaris- *Short Term Financial Management*, Macmillan.
- IM Pandey- *Financial Management*, Vikas Publishing House Pvt. Ltd.
- Jrown, Stephen J., William N. Goetzmann, and Stephen A. Ross, 1995, Survival, *Journal of Finance*, 50(3), 853–873.
- Kullberg, J.G. and K. Parkinson - *Current Assets Management: Cash, credit and Inventory*, John Wiley and Sons.
- Mc Gee, J.F. and D.M. Boodman - *Production, Planning and Inventory control*, 2nd ed. (New York, Mc Grew Hill)

- Mcleavey, D.W. and S.L. Narasimhan- *Production Planning and Inventory control* Boston: allyn and Bacon.
- M. Y. Khan, Y. K. Jain; *Financial Management*; 7th Edition TATA Mc GRAW HILL
- Prasanna, Chandra-*Financial Management*, Tata Mc Grew Hill.
- Robert S Russel and Bernard W. Taylor - *Operation Managements*, Pearsn Education Ltd., Delhi.
- S.P. Jain and K.L. Narang, *Cost Accounting*; 2009 Edition, Principles & Practice.
- Srivastva, Mishra; *Financial Management*, 9th Edition, Oxford.
- Zip kin - *Foundation of Inventory Management*, Edition First, Tata MC Grew Hill,

Reports and Year Books:

1. Annual Report of DLW Varnasi
2. Manufacturing Sector Year Books.
3. Accounting Policies issued by Institute of Cost and Works Accountants of India.
4. Indian Review of Management of Future New Delhi.

Websites:

1. www.dlw.indianrailways.gov.in/
2. www.valueline.com
3. www.businessweek.com
4. www.alltheweb.com