



THE STUDY OF WAREHOUSE MANAGEMENT IN THE CONTEXT OF SUPPLY CHAIN

Ar. SAMYAK MAHAJAN

Ar. SANIYA KHAN (Research Guide)

Dr. D. Y. Patil College of Architecture, Akurdi Pune (MS) INDIA

Email: samyakmahajan@gmail.com

Abstract: In supply chain management, modern warehousing firms and distribution centers are overwhelmed with information related to the flows and storage of goods and services. The efficient and effective utilization of logistics-related information can enhance firms' ability to reduce costs while simultaneously improving customer satisfaction. Warehouse management systems (WMS) are frequently implemented and used with these goals in mind. In addition, a research agenda is offered to guide future efforts related to WMS. At a same time, Inventory management is a science about specifying the placement of stocked goods. It is required at different locations within a facility or within many locations of a supply network to precede the regular and planned course of production and stock of materials. In today's competitive market environment companies are continuously forced to improve their warehousing operations. This paper highlights the findings of the study to evaluate performance levels and enhance productivity of the warehouses by developing better solutions to various distribution and to analyze the impact of effective and efficiency warehousing on enhanced preservation of stock & overall cost reduction and also to find out various factors affecting efficiency and effectiveness of warehouse system.

Key words –

Warehouse management system, supply chain, cost benefit analysis, Supply chain and Warehouse Management, warehousing Improvement, Layout,

I. INTRODUCTION

Warehousing facilities play a vital role in the overall supply chain process. This research will address basics that are fundamental for warehouses to achieve both efficiency and effectiveness in supply chains, and provide some perspective on current challenges and the future.

Ar. SAMYAK MAHAJAN

It is evident that continuing globalization and changes/challenges occurring in such areas as reverse logistics, environmental sustainability, information technology, and overall supply chain integration are further evolving the strategies, roles, and responsibilities for warehouses. In fact, the term distribution center (DC) may be much more appropriate in representing the broad range of activities that now occur in modern warehouses that go beyond filling customer orders to provide an ever-expanding collection of services.

Across the supply chains, warehousing is an important element of activity in the distribution of goods, from raw materials and work in progress through to finished products. It is integral part to the supply chain network within which it operates and as such its roles and objectives should coordinate with the objectives of the supply chain. It is not a 'Stand-alone' element of activity and it must not be a weak link in the whole supply chain network. The theme of the research is the investigation of possibility for optimizing warehousing operations through the change of material flow and space utilization. Influence on the change on financial results of the company is also considered.

The main idea behind the research is to find weaknesses in current warehousing process in order to eliminate faults and decide of changes lead to the improvements in overall performance. The general aim of the research is to analyze the current warehousing situation. In a way, that after the analysis one would be able to come up with a better layout, understanding of raw metal storage features and developments concerning workforce of the facility.

Following can be main improvements to be implemented are

- New space planning

Ar. SANIYA KHAN

Page 1

- Equipment re-arrangement
- New effective layouts

It is known in advance after previous researches, that warehousing can be troublesome and changes are desirable. Main task is to find what operations are all right and what are the obstacles preventing good performance. Coming up with ideas for the improvement of the situation is part of task as well.

Aim: To study and implement methods for effective warehouse management for better working conditions on site.

Research Question:

1. What factors should be considered for efficient warehouse management?
2. How those factors can be implemented in the process?

Objectives:

1. To study and analyze current warehouse management system through case study.
2. To find limitations of current warehouse management practices.
3. Recommend methods for effective warehouse management.

Limitations:

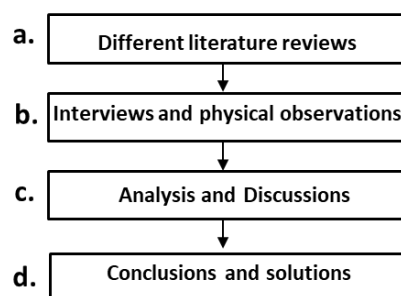
This research is to deal mainly with the warehouse management for residential the project site in Baramati region only.

II. METHODOLOGY

Some basic data needs to be provided by site office such as- financial accounting tables, and some reports, current layouts, current warehouse management systems, etc.

The theory is taken from books, articles, and Internet publications. The research will also include my own knowledge, experience, and ideas. The work is based on available information and on assumptions, tables, and analyses as a result. Research methods in this research work are qualitative; data is collected, analyzed and preceded with new ideas as a result.

The idea research can be developed as indicated in the flow chart



III. LITERATURE REVIEW

Warehousing takes up to between 2% and 5% of the cost of sales of a corporation and with today's highly competitive global business environment organizations are emphasizing on Return on Assets, and hence minimizing warehousing costs has become an important business issue. It is necessary to allocate warehouse resources efficiently and effectively to enhance the productivity and reduce the operation costs of the warehouse. Various factors affecting the storage assignment like order picking method, size and layout of the storage system, material handling system, product characteristics, demand trends, turnover rates and space requirements are been extensively studied.

Research paper 1.

Impact of Warehouse Management System in a Supply Chain

International Journal of Computer Applications

Authors: Ramaa. AK. N. SubramanyaT. M. Rangaswamy

Year of Publication: 2012

In a supply chain, warehousing function is very critical as it acts as a node in linking the material flows between the supplier and customer. In today's competitive market environment companies are continuously forced to improve their warehousing operations. Many companies have also customized their value proposition to increase their customer service levels, which has led to changes in the role of warehouses. This paper highlights the findings of the study carried out to evaluate performance levels and enhance productivity of the manual warehouses by developing a WMS framework and cost benefit analysis.

Research paper 2.

Warehouse design and management

IIM Ahmedabad, India.

Author: Debjit Roy

Published online: 19 Sep 2017

Warehouse design and operations have undergone major changes over the past decades. In particular, with the onset of e-commerce, the complexity of warehouse operations has increased multi-fold with the large storage, volatile demand patterns and primarily single-line customer orders. They have grown in size due to merging, new and fast identification and communication technologies have found their way into the warehouse and process automation technologies have progressed improving speed and operational efficiencies. In line with these developments, this special issue pays attention to new technologies and methods and how they impact warehouse design and management.

Research paper 3.

A Study on Warehouse Management of REB: A Case Study of Central Warehouse, Dhaka

Institute of Governance Studies (IGS) BRAC University Dhaka

Authors: A Dissertation by Md. Sakil Ibne Sayeed

Year of Publication: 2013

In today's world warehouse management is considered as an indivisible part of all business.

If effectively and efficiently organized and managed the warehouses could deliver safe custody of materials, clear monitoring and accountability, distribution of the right goods at the right time whenever required in the right condition to all user departments, maximum profitability with the minimum investment through ordering cost and carrying of materials.

It provides service and controls function of the flow of materials entering and distributed at a company. In general, this study is expected to be helpful for the policy makers to improve the existing performance of warehouse management at Central Warehouse, Dhaka which in turn can be implemented throughout to improve its overall performance.

IV. DATA COLLECTION

The main focus of research is warehousing operations and processes around storage activity. Warehouse is a central element of the logistics system. The way it is organized has an influence on all other processes on site.

There are several basic principles of warehousing:

- Maximum possible mechanization and automation of operations;
- Optimal use of space and capacity of storage facilities;
- Organization through "continuous flow" of goods;
- Planned system of storage operations;

- Safety of goods.

It is obvious that warehouses are not just rooms for the storage of goods, they are transport and storage facilities, they process three types of flows --- input, output and internal. Warehouses contribute to the transformation of load flows by changing the parameters of accepted and issued consignments in size, composition, physical characteristics of the incoming goods, and time spent. The specifics of the warehouse system provide the presence of reserves considered as an essential factor in ensuring a certain level of customer service.

Types of warehouses

Warehouses form one of the major subsystems of the logistic system. Logistic system generates organizational, technical and economic requirements for warehouses, sets goals and criteria for the optimal functioning of the storage system, defines the terms of material handling. In turn, the organization of the storage of materials (choice of warehouses location, method of storing) has a significant impact on the costs of circulation, the level and movement of stocks in different parts of the supply chain. By type of products are distinguished warehouses:

- The raw material, semi-finished products and components;
- Semi-finished production (stocks of work in progress);
- Finished products;
- Residues and waste;
- Equipment.

Logistics

Logistics is the strategic management of movement, storage, and information relating to material, parts and finished goods in supply chains, through the stages of procurement, work in process, and final distribution.

There are many tasks of logistics that vary depending on needs, systems, markets, companies etc. Logistics is really flexible and dynamic thing that in any case has a close relation to supply chain, material management, and distribution. Key components of logistics can be seen in the figure.

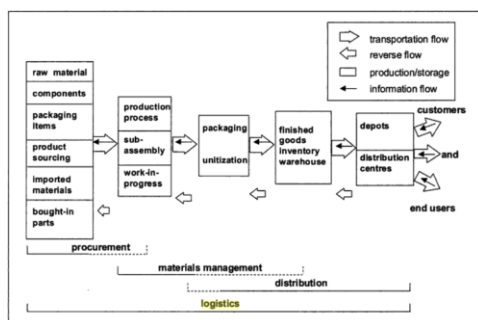


Figure1. Key components of logistics

Organization of storage

For the smooth production process good warehousing is essential. In most cases, the design of processes gives the optimal solution with the gathering of raw materials, semi-finished products in a particular part of the supply chain for a time period. The manufacturer needs warehouses of raw materials and required starting materials which are provided for a nonstop production process. Good organized logistics system cannot exist without warehouses.

Operations of warehouse

Layout of the warehouse is planned according to the operations performed. Traditionally warehouses were regarded as places for long term storage of goods, and their main function was considered as warehousing, consisting of the maintenance and preservation of stocks. Currently, the role of warehouses has changed, they are now considered more as an intermediary through which the material flow is converted and moved as quickly as possible, that justifies expansion of the operations in the warehouse activities. Thus, the basic functions of the warehouses are:

- Storage of goods
- Movement of goods
- Information management
- Protection of goods
- Risk bearing
- Financing
- Processing

Warehousing costs

Being part of supply chain warehousing brings costs to the overall financial reports.

- General overhead cost
- Delivery cost
- Labour cost

- Processing costs
- Storage costs

Warehouse management system

With the development of IT technologies, most of warehousing operations turn into being connected to some software. Utilization of computer systems is beneficial, since it makes tracking easier and mistakes are simply avoided. It was noticed, that warehouse management affects employee productivity, overall efficiency, and even storage capacity.

Layout

Warehousing layout should always support activities. Materials and products must be properly placed to be accessible, so staff can avoid mistakes and delays carrying their tasks. Proper utilization of space is another key component that effects efficiency and keeps costs closer to the desired minimum. The goal of the warehouse layout is to optimize the warehousing functions and achieve maximum efficiency and space utilizations.

Case study for warehouse management

Project Details:

No.	Description	
1	Project by	Vastushodh
2	Project name	URBANGRAM
3	Location	Jalochi, Baramati.
4	Site area	7 Acre
5	Total No. of blocks	5
6	Total no. of floors	7
7	Block consists	Residential flats (1,2,3 BHK)

Warehouse Details:

No.	Description		
1	No. of warehouse	2	
2	Purpose	<ul style="list-style-type: none"> • Production and warehousing facility • For the storage of raw material, semi-finished goods and finished products 	
3			
4			
No.	Description	Warehouse 1	Warehouse 2

1	No of floors	1	1
2	Basement	-	-
3	Height	5 m	5 m
4	Area	1200 sq m	800 sq m

The site that owns total 2 warehouses. These buildings are located next to the production plant. They have layout as follows:

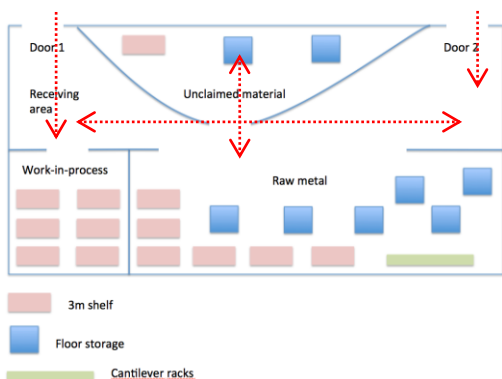


Figure2. Warehouse A

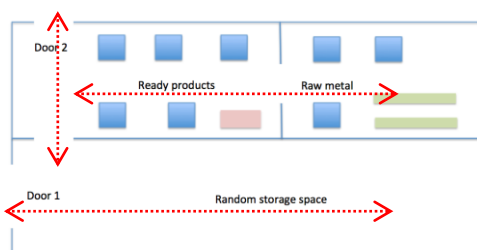


Figure3. Warehouse B

.....> Circulation

Both buildings share similar features. They are one-floor warehouse buildings with no basement and known as flat stores. Its height is stackable and equal to 5 m. The area is 1200 m² and 800 m² for A and B buildings. The height of the shelves is 3m max, which results in a waste of useful space. This is done due to the reason of warehouse being focused on heavy raw material and weight limitations. Warehouses are equipped with shelves but some of the products are kept on the floor.

For technological operations for receiving, storing and shipping of goods in warehouses following main areas stand out: the unloading; acceptance of goods by quantity and quality; storage; packing of goods; picking and picking of customer orders; loading of road transport. These operating

areas of the warehouse are not wisely linked by walkways and passages. Vehicle unloading area is close to the area of acceptance of goods, which is convenient for needed operations.

The storage area is the major part of the area in warehouses. It consists of an area occupied by goods, and the area of the passages. The ratio of these areas is not balanced and equal to 3,2:1 when this ration is recommended to be 2:1 allowing enough space for actual movement.

The space reserved for the operating passages is minimal, and it does not provide normal conditions for the movement goods and equipment. Current warehousing layout serves as a storage area with some supportive equipment, but it is not wisely planned.



Figure4. Metal and Cement Storage



Figure5. wooden material storage

V. ANALYSIS

	Problem	Cause	suggestions
Layout	Obstructed material movement	Warehousing area is not divided by the activity performed	Balanced Floor plan, with proper Aisles shelves ratio
Equipment	Inefficient equipment utilization	Lack of machinery & maintenance, wrong storage equipment options	Inventory, maintenance And adjunction Of machinery. New storage equipment
Labeling	Inventory mistakes and	Poor inventory tracking	New Product shelf tags

Ar. SAMYAK MAHAJAN

Ar. SANIYA KHAN

Page 5

	unclaimed material		
Solutions	Inefficient Work planning	Absence of methods to evaluate performance Of human resources	Development Of more efficient methods and inventories

Solutions/ Suggestions

After understanding the needs for storage of products and materials, re-planning facilities was possible in a way that it meets requirements and allows more optimized processes and smoother flow.

The new layout has balanced available space and dock doors, it brings better utilization of equipment and workforce. Planned and easy to navigate space helps to see if there is unclaimed material in stock arrangement. Layout gives a chance to see control inventory separation.

The warehouse facility and the material handling processes within the warehouse are affected by the product requirements. So new layout is based on the needs.

Modified plans of the warehouses:

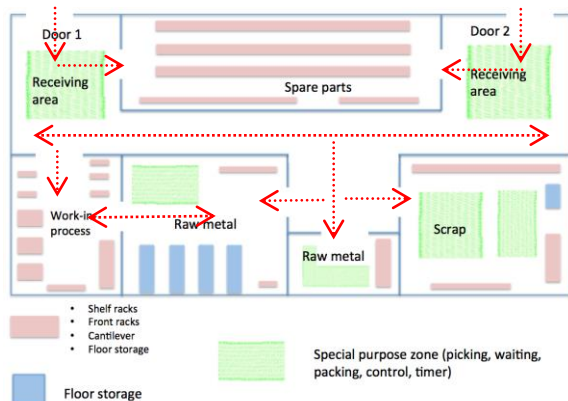


Figure6. Warehouse A

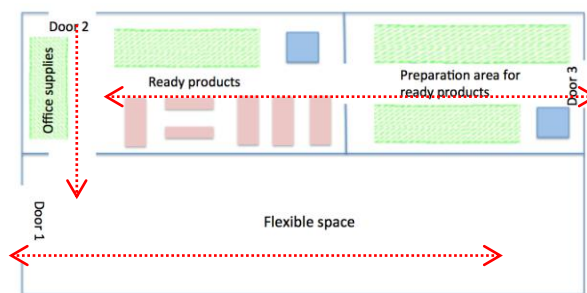


Figure7. Warehouse B

.....> Circulation

VI. CONCLUSION

Before beginning of the research, the main aim of the work was an improvement of the warehouse situation to increase warehousing efficiency and balance workload of the employees.

After working, conclusion can be given that warehousing is an important piece of the site activities and even if the main focus is on production, warehousing operations should not be neglected. More optimal storage activities lead to the reduction of facility operating costs and better efficiency by smart area, equipment, and staff utilization.

Now it is expected, that implemented changes will reduce facility operating costs and release of the area approximately up to 10-15%.

Main recommendation is to the improvement of the warehousing situation included detecting some problems and coming up with solutions.

VII. ACKNOWLEDGEMENT

I would like to take this opportunity to express my profound gratitude and deep regard to my Guide Ar. Saniya Khan, for her exemplary guidance, valuable feedback and constant encouragement throughout the duration of the project. Her valuable suggestions were of immense help throughout my project work. Her perceptive criticism kept me working to make this project in a much better way. Working under her was an extremely knowledgeable experience for me.

VIII. REFERENCES

- i. Journal of manufacturing and distribution system P:66-79 2.



- ii. Supply chain management
<https://en.wikipedia.org/wik>
- iii. Andre Langevin, Riopel Diana (2005) Logistics Systems: Design and Optimization, Springer, New York.
- iv. Coyle, J.J., Bardi, E.J., & Langley, C.J. Jr. (2003). The management of business logistic: A supply chain perspective, (7 th ed.). Cincinnati, Ohio: South-Western/Thomson Learning, cop. 2003
- v. Emmett, S. 2005. Excellence in Warehouse Management. John Wiley & Sons Ltd.
- vi. Mulcahy, D.E., & Sydow, J. (2008). A supply chain logistics program for warehouse management, (9 th ed.). Boston, Mass.: McGraw Hill/Irwin
- vii. Perreault, W.D., & McCarthy, Jr. E. J. (2003). Essential of marketing: A global management approach, (9 th ed.). In Perreault, W.D., & McCarthy, Jr. E. J. (Eds).
- viii. Project Management: A Systems Approach to Planning, Scheduling, and Controlling, 11th Edition, Harold Kerzner
- ix. Richards, G. 2011 Warehouse management: a complete guide to improving efficiency and minimizing costs in the modern warehouse
- x. Strategic Workforce Planning: Guidance & Back--- Up Plans Paperback – October 10, 2012 by Tracey Smith