



A Dissertation Report

on

**“LOGISTICS AND WAREHOUSE MANAGEMENT
CHALLENGES”**

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DECLARATION

I hereby declare that this dissertation report entitled “**LOGISTICS AND WAREHOUSE MANAGEMENT CHALLENGES**” submitted in partial fulfillment for the **Degree of Master of Business Administration in Logistics and supply chain management** from University of Petroleum and Energy Studies the result of my work carried out and is true.

The above work has been carried out by me under the guidance **Dr. Sumeet Gupta**(Associate Professor) I further declare that this is my original work and has not been previously submitted to this or any other university for any other degree or distance courses

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ACKNOWLEDGMENT

Thank you Lord! Thank you for everything. I never have words to say what I want to say to you, but thank you very much.

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EXECUTIVE SUMMARY

The Dissertation is undertaken in two stages. The first stage involved the calculation of the Labor Productivity at the warehouse of the company. It also involved the calculation of the number of labors required per day on the basis of the number of trucks loaded/offloaded per day. The calculation of labor productivity was done at different hours of the day and then the mean value was taken. Again the labor productivity for different truck size was noted and finally on the basis of the collected data final labor productivity was calculated. It also included the ways by which the Labor Productivity could be increased in the warehouse.

The second stage of the project involved in carrying out the best practices of a warehouse. It involved the inspection of the ways the warehouse functions and how the warehouse could benefit if it implements the best warehouse practices. The first step involved here was to inspect the functionality of the warehouse in consideration to the best warehouse practices. Then those practices were followed which was not involved in the daily functionality of the warehouse, which could have been incorporated previously.

The project involves descriptive research. It involves the use of both primary data as well as secondary data. The primary data was used for the calculation of labor productivity and the number of labors required per day by the warehouse on the basis of number of trucks being loaded or offloaded per day. Since, the project was the first kind of its nature in terms of calculation of the labor productivity hence all the aspects required and necessary for the project were studied in-depth and then all the necessary studies were conducted step-wise as planned. Further, the limitations were notably considered and the calculation and analysis was done on that basis. The secondary data was used for following the best warehouse practices in the warehouse. A special focus was given to the implementation of the 5S in the warehouse operation.

The analysis of data gives a clear picture about the time required by labor force for either loading or offloading a truck. on that basis, the labor productivity has been calculated at different time intervals of a day. Also the labor productivity of different truck dimensions has been taken differently. All the collected data were analyzed minutely and lastly the exact labor productivity was known.

Again, the means of increasing the labor productivity as per the observation were noted and inculcated within the labor force. Although difficult to implement, yet it showed positive results.

The best practices one could implement for a warehouse was also introduced which led to the discovery of better ways of using the warehouse.

The study is carried out for knowing the labor productivity and the number of labor required per day. This would help the organization to save the cost by knowing the exact number of labor required in a day as per the number of trucks.

The study is bounded by limitations of unpredictability of labor force. Again, at possible places the assumption was made with respect to the previously calculated labor productivity in the study. So, there is every scope of further exploratory and descriptive research on this topic.

CHAPTER 1

1.1 AN INTRODUCTION

Logistics is responsible for the development and capacity of materials as they are traveling through the production network channels (Waters, 2003).

Logistics is characterized as a business arranging system for the administration of material, administration,

Data and capital streams. It incorporates the inexorably complex data, correspondence and control frameworks needed in today's business surrounds. It is additionally categorized as the acquisition, support, conveyance, and substitution of work force and material. A common logistics structure includes of physical supply, inside operations and physical dispersion of products and administrations.

The assets oversight in logistics can incorporate physical things, for example, food, materials, creatures, hardware and fluids, and also unique belongings, for example, time, data, particles, and vitality. The logistics of physical things as a rule includes the combination of data stream, material taking care of, creation, packaging , inventory, transportation, warehousing, and regularly security. The many-sided quality of logistics can be displayed, investigated, pictured, and enhanced by committed reenactment programming. The minimization of the utilization of assets is a typical inspiration in logistics for import and fare.

The worldwide logistics industry is described by high expenses of operations, low edges, lack of ability, infrastructural bottlenecks nearby expanding interest from customers for giving one-stop answers for everything their needs and for putting resources into dynamic innovation . Every one of these components will further decline the edges included in this industry and affix the methodology of combination in industry through acquisitions, mergers and partnerships

The substances in a run of the mill production network are the supplier, the producer, the trade, the seller and the client. Merchandise, data and account move unidirectional or bi-directionally between these substances.

The term Logistics and Supply Chain Management (SCM) are typically used interchangeably in common parlance, though there is a subtle change between the two. While SCM is more planned in nature, logistics is more operations-oriented. Logistics can be measured as a part of SCM which encompasses planning activities, application, control of the efficient forward and reverse flow and storing of goods, services and related information between the point of origin and the point of ingesting in order to meet customer and legal requirements. The activities involved in a typical supply chain are typically inbound activities or outbound activities; inbound logistics refers to doings relating to bringing goods into the association, while outbound logistics deals with activities linking to taking the goods out of the organization.

Logistics is a critical component applicable across agriculture, manufacturing and service sectors and has to be optimally managed for smooth functioning of the production and distribution operations. Additionally, logistics cost accounts for a major factor of the input costs in all sectors more so in the case of sectors such as cement, steel, automobiles, FMCG, retail, medicines etc.

With rising competition in the sectors that use logistics facilities, it has become even more important to improve the efficiency of the system and use the cost-benefit in increasing the company's competitiveness. Besides, with increasing globalization a larger number of multi-national companies (MNCs) are sourcing, engineering and issuing goods on a global scale, and thus need more compound supply chains to be achieved.

Given such growths, the Transportation, Logistics, Warehousing and Packaging Sector is expected to become a more specialized and niche expertise area where high premium will be charged for increased quality and quantity of service delivered by logistic service provider.

The movement of materials and goods between point of origin and point of use includes storage, transportation, and management. This is where logistics and warehouse management plays a serious role. By enhancing every link in the supply chain we can ensure that materials reach the production facility or consumer in an efficient and timely manner.

1.2 INDUSTRY SIZE AND ITS SCOPE

The annual logistics cost in India is valued at Rs. 6,750 billion (US\$ 135 billion) and it is growing at 8-10% annually. Logistics cost by worth accounts for around 13% of the GDP of India – this is much higher than that in the US (9%), Europe (10%) and Japan (11%) but lower than that in countries such as China (18%) and Thailand (16%). In particular, the percentage-wise share of transport cost (an important constituent of total logistic cost incurred by a nation) by value of GDP has been steadily increasing.

The high cost of logistics in India when compared to developed nations may be attributed to poor quality of infrastructure and inadequate service quality vis-a-vis counterparts such as US and Europe. The Transport, Logistics, Warehousing and Packing Sector in India is dominated by the unorganized segment (small truck owning companies linked to intermediate brokers or transport companies, minor warehouse operators, custom agents, freight forwarders, etc.); the organized segment accounts for less than 10% of the total logistics market in India.

The scope of logistics involves the following:-

- Planning
- Procurement
- Transportation/ Fleet Management
- Warehousing/ Stock Control
- Tracking
- Recording

The logistics value chain involves of three main sections, namely

- Transportation
- Warehousing
- Value Addition Services.

The crux of logistics and warehousing is getting the right goods to the right place at the right spell. From production to distribution, manufacturers repeatedly have a plant with raw materials On hand and a warehouse nearby where additional materials can be reserved. Some manufacturers have vital warehouses that feed smaller local warehouses to optimize distribution

routes in main markets. Inaccurate information regarding amounts, storage locations, pricing and documentation remain the biggest problem in logistics and warehouse management.

These imprecisions may arise from order adjustments, human management, long processing procedures, mistakes, lack of automation, or poor management arrangements. In addition to these difficulties, businesses have to be concerned with the flow of products and information both within the business and in the wider supply chain. In order to make products accessible for end consumers, businesses must achieve their logistics and warehousing in terms of product movement and demand organization. They need to see what is selling in the stores in order to both anticipate and respond to changes in demand.

For many decades warehouses in India have been equated with the tired concept of go downs, with the common belief that these logistics hubs are merely confined to stocking goods. However, with the rapid liberalization of the economy over the past two decades and changing customer demands, warehousing has undergone a tectonic change- at least as far as corporate India is concerned.

Today these commercial buildings do not simply store products, but are equipped to receive goods, segregate as well as prepare for shipments, distribution, order picking, with multiple value-added services like labeling, shrink wrapping, reverse logistics, etc.

The Warehousing segment is expected to grow from Rs.1, 000 billion (US\$ 20 billion) to Rs.2,750 billion (US\$ 55 billion) by 2011, constituting about 35% of the total logistics company in India. Major players in the warehousing segment are Central Warehousing Firm, State Warehousing Firm, and Food Company of India, and other private companies.

The need for a warehouse arises due to the time gap between making and consumption of products. Warehousing or storage refers to the holding and preservation of goods until they are dispatched to the consumers. By bridging this break, storage creates time utility. There is a need for storage the goods so as to make them available to buyers as and when required. Storage enables a firm to carry on production in anticipation of demand in future. Warehouses enable the manufacturers to carry on production throughout the year and sell their products, whenever there is satisfactory demand. Importance for warehouses arise also because some goods are produced only in a particular season but are demanded throughout the year.

Warehouse allow transport optimization within the supply chain, and allow companies to have the right inventory required for its use.

Benefits of Warehousing

- Warehouses enable storage of goods when their supply exceeds demand and by releasing them when the demand is more than immediate creations. This on one hand ensures a regular supply of goods in the market and on the other hand it helps to stabilize prices by matching supply with demand.
- Warehouses provide for safe supervision of goods. Businessmen can thus minimize the risks to goods from loss, damage, fire, theft etc. Fresh products can be preserved in cold store. Also, the goods kept in a warehouse are generally insured.
- A warehouse provides facilities for process, packing, combination, grading etc, of the goods for the motive of sale. The prospective buyers can inspect the goods kept in a warehouse.
- Warehouses provide a receipt to the owner of goods for the goods kept in the warehouse. The proprietor can borrow money against the security of goods by making an endorsement on the warehouse invoice. By keeping the imported goods in a bonded warehouse, a businessman can fee customs duty in installments.

Warehouse needs to be managed with a plan so as to save cost of operating the warehouse. Labor is the largest controllable expense of the warehouse and hence needs to be managed effectively so as to get the goal with the minimum possible labor.

Again space utilization is another significant factor to be considered as managing space would lead to saving of cost. This can be achieved by following the best practices of the warehouse.

Therefore, a good management of warehouse leads to the on time delivery of products and services to the desired destination by providing value to the customer. Not only this, it also points in saving of valuable costs to the company.

2. SIGNIFICANCE OF STUDY

The importance of efficient and effective warehousing to the overall enterprise supply chain becomes more evident when placed within the context of the booming logistics market in India. According to various new studies, the domestic logistics sector is estimated to be worth around US\$ 110 billion, accounting for around 10 percent of the gross domestic product. This market is estimated to post a consistent annual growth rate of nearly eight-nine percent over this period, and record revenues of approximately US\$190-200 billion by 2020; this growth will be driven by key manufacturing industries such as the automotive industry, engineering, pharmaceuticals, foodstuff processing and the textile industry. Warehousing is a important component of the Indian economy as it accounts for 20 percent of India's logistics industry.

Hence, it becomes all the most important to manage the warehouse effectively and resourcefully. The effective management helps to carry the operations of the warehouse in a structured way and helps to get the general goal. It also helps to cut down on some heavy cost and expenses.

Managing Labor Productivity and best warehouse practices are the ways by which a company can lead to is effective way of warehouse process. That would help the company to attain its goal in minimum cost possible.

Thus, the study conducted in this project is very significant and will benefit the company with its warehousing operations in the time to come.

CHAPTER 2

LITERATURE REVIEW

2.1 WAREHOUSE AND ITS FUNCTIONING

A Warehouse is a part of company's logistics system that stores products at and between point of origin & point of consumption.

The term "Warehousing" is denoted as transportation at zero miles per hour.

Warehousing provides time and place utility for raw materials, manufacturing goods, and finished products, allowing companies to use customer service as a dynamic value-adding competitive tool.

THE ROLE OF THE WAREHOUSE IN THE LOGISTICS SYSTEM

The warehouse is where the supply chain holds or stores goods.

The functions of warehousing include the following:-

- Transportation consolidation
- Product mixing
- Docking
- Service
- Protection against contingencies

TYPE OF WAREHOUSING

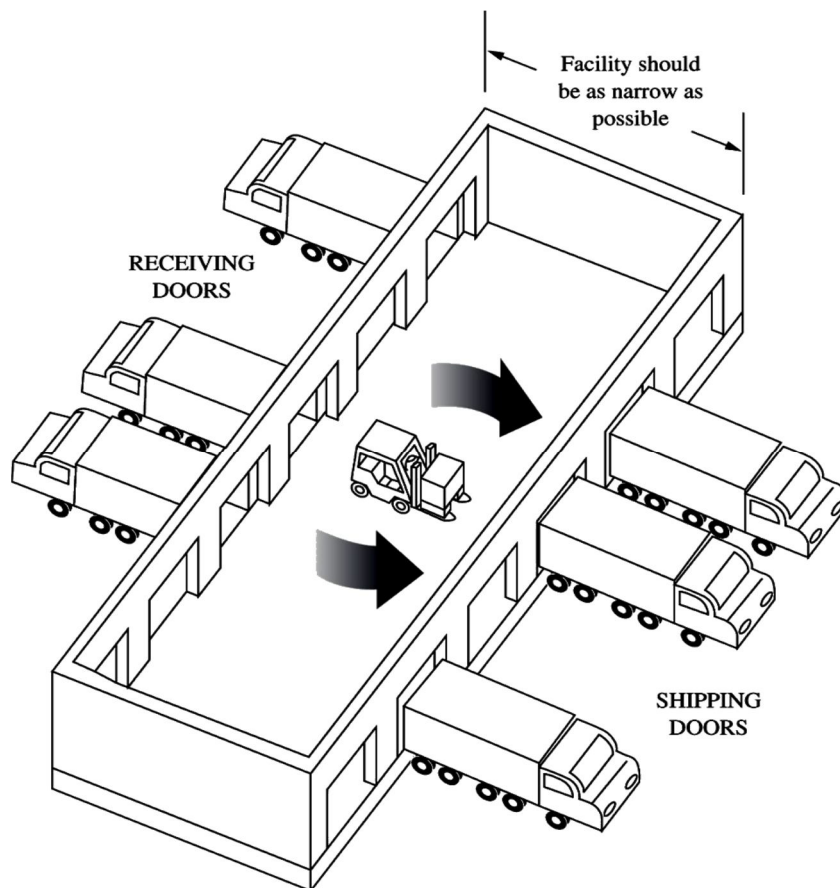
- Public Warehousing
- Private Warehousing
- Contract Warehousing
- Multi-client Warehousing

Objectives of efficient warehouse Operations-

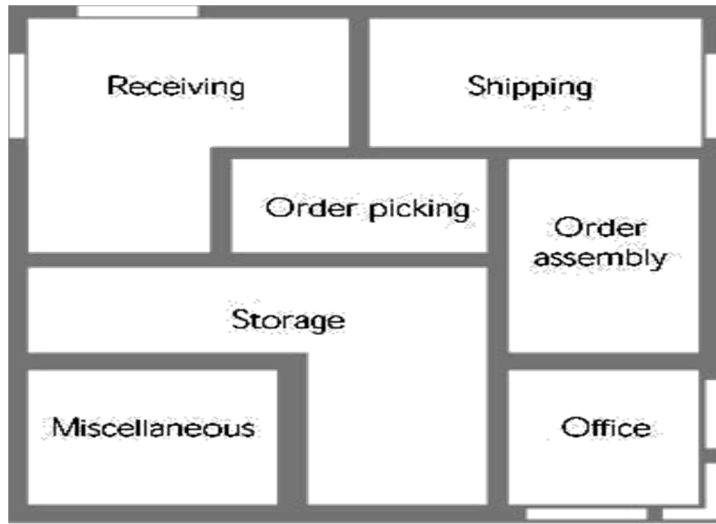
- Delivering frequently customer service by quality.
- Keep way of products so they can be found easily & correctly.
- Minimize cost of moving goods.

3.2 DESIGN CONSIDERATION

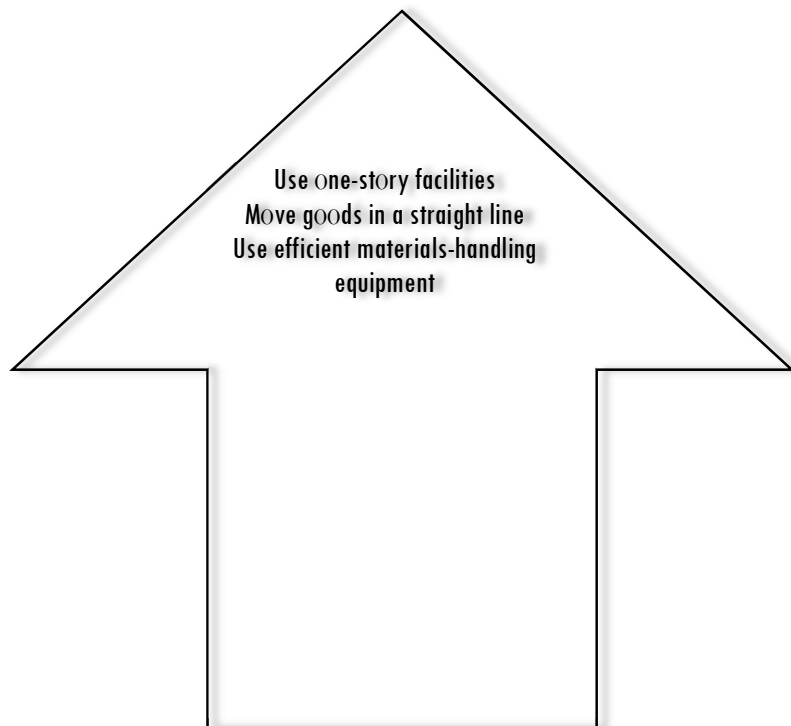
Ideal Facility for Pure Supplier Consolidation



Warehouse Space Requirements

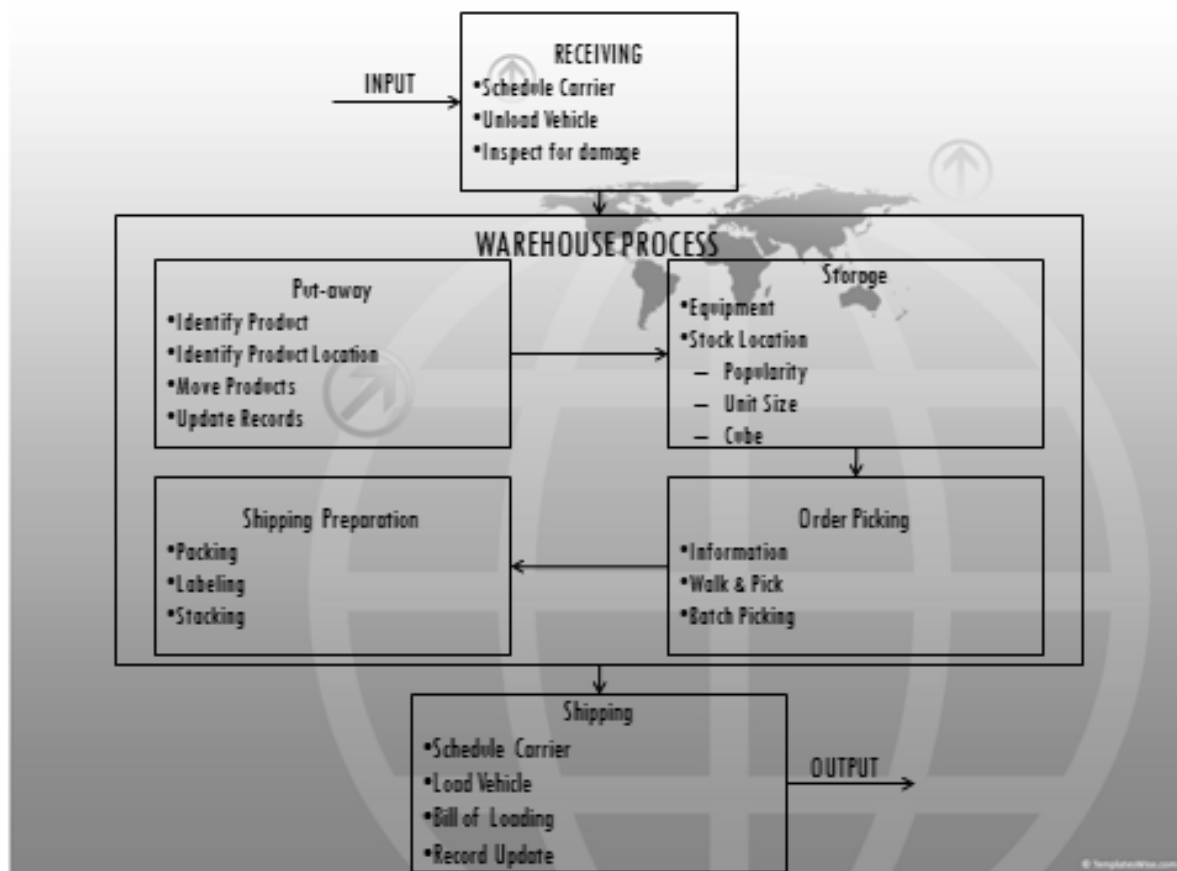


PRINCIPLES OF WAREHOUSE LAYOUT DESIGN



The design consideration of a warehouse is very important and all the activities of the warehouse should be considered while designing the warehouse.

The different warehouse procedure is clarified by a flow chart diagram as shown below.



Benefits of Warehouse Management

- Provide a place to store & protect inventory
- Reduce transportation cost
- Improve customer service levels

Complexity of warehouse operation depends on the number of SKUs handled and the number of orders received and engaged. Most activity in a warehouse is material handling.

COSTS OF OPERATING A WAREHOUSE

- Capital costs
- ❖ Costs of space & materials handling equipment
- Operating costs
- ❖ Cost of labor
- ❖ Measure of labor productivity is the number of units that an operator can move in a day

3.3 WAREHOUSE ACTIVITIES

- Receive goods
- Identify the goods
- Dispatch goods to storage
- Hold goods
- Pick goods
- Marshal shipment
- Dispatch shipment
- operate an information system

Receive goods

- Accepts goods from outside transportation or attached factory & accepts responsibility
- Check the goods against an order & the bill of loading
- Check the quantities
- Check for damage & fill out damage reports if necessary
- Inspect goods if required

Identify the goods

- Items are identified with the appropriate stock-keeping unit (SKU) number (part number) & the quantity received recorded

Dispatch goods to storage

- Goods are sorted & put away

Hold goods

- Goods are kept in storage & under proper protection until needed

Pick goods

- Items required from stock must be selected from storage & brought to a marshaling area

Marshal the shipment

- Goods making up a single order are brought together & checked for omissions or errors; order records are updated

Dispatch the shipment

- Orders are packaged, shipping documents are prepared, & goods loaded on the vehicle

Operate an information system

- A record must be maintained for each item in stock showing the quantity on hand, quantity received, quantity issued, & location in the warehouse

To maximize productivity & minimize cost, warehouse management must work with the following:-

- Maximize use of space
- ❖ Space is the largest capital cost
- Effective use of labor & equipment
- ❖ Labor is the largest operating cost
- ❖ Material handling equipment is the second largest capital cost

3.4 CHARACTERISTICS OF IDEAL WAREHOUSE

In the distinctive distribution centers sufficient plans are made to keep the products in fitting conditions. Notwithstanding, any stockroom is said to be a perfect distribution center on the off chance that it has specific qualities, which are given underneath:

- Warehouse ought to be situated at a helpful place close parkways, railroad stations, airplane terminals and seaports where products can be stacked and emptied effortlessly.
- Mechanical machines ought to be there to stacking and emptying the merchandise. This lessens the wastages in taking care of furthermore minimizes taking care of expenses.
- Adequate space ought to be accessible inside the building to keep the merchandise in fitting request.
- Ware houses implied for protection of perishable things like organic products, vegetables, eggs and spread and so forth., ought to have chilly storerooms.
- Proper plan ought to be there to shield the merchandise from daylight, downpour, wind, dust, dampness and irritations.
- Sufficient parking spot ought to be there inside the premises to encourage simple and snappy stacking and emptying of products.
- Round the clock security game plan ought to be there to maintain a strategic distance from robbery of merchandise.
- The building ought to be fitted with most recent putting out fires hardware's to keep away from loss of products b

Hence, the location of the warehouse is very important aspect as it decides the overall profit margin of any company.

Further other aspects needs to considered while deciding on the location of the warehouse. These include location of major suppliers and customers, volume of product moving, transport rates, service level required, product characteristics, access to and cost of labor, access to and cost of land and buildings, infrastructure regard to transportation, IT and communication and also the tax incentives involved.

The project involves the calculation of the labor productivity in the warehouse.

3.5 LABOR PRODUCTIVITY

Labor productivity is a measure of efficiency at the workplace.

It is equal to output per unit of labor.

It is measured as total output divided by the hours of labor employed to produce that output.

- ❖ Labor Productivity = output quantity/input quantity
- ❖ The three quantity used to calculate labor productivity:-
 - Hours worked by workforce
 - Workforce work done
 - Number of labor in employment.

In today's world the biggest challenge of a firm is to increase its labor productivity.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 OBJECTIVE OF THE STUDY

- ❖ To calculate the labor productivity of the warehouse and the number of labors required by the warehouse per day on the basis of the number of trucks loaded or offloaded per day.
- ❖ To observe the ways by which the labor productivity can be increased and to inculcate these ways to increase the overall labor productivity.

The overall activities involved in the objectives of the study include the calculation of the labor productivity, the number of labors required per day on the basis of the number of trucks being loaded or offloaded

4.2 Business Problem:

- **What are the major issues in warehouse?
How to improve turnover?**

4.3 Research Problem:

- **What the factor affecting warehouse efficiency?**

4.4 RESEARCH METHODOLOGY

Research Methodology is the systematic way to solve the research problem. It gives an idea about various steps adopted by the researcher in a systematic manner with an objective to determine various manners.

4.5 RESEARCH DESIGN

Research Design states the conceptual structure within which a research is to be conducted. It is considered as the framework or plan for a study that guides as well as helps dated analysis of data.

The Qualitative research design is followed in implementing the best warehouse practices while the Quantitative research is followed in calculating the labor productivity and number of labors required per day on the basis of number of trucks loaded or offloaded.

Descriptive: This study is descriptive in nature as the data collected is mainly from PRIMARY source. SECONDARY source of data is also collected for the study.

Exploratory: The labor productivity for different truck sizes were calculated and then analyzed in-depth to know the final labor productivity of the warehouse.

4.6 COLLECTION OF DATA

Data collected is both primary and secondary in nature.

Primary Data – the data is collected for the first time hence is fresh and is original in nature.

Secondary Data – The data is collected from company files and internet.

CHAPTER 5:

FINDING AND INTERPRETATION

5.1 FIELD WORK

The field work was conducted in the warehouse of the company **3SC solutions pvt** and **flipkart** located in Mumbai, Maharashtra. The field work was done in two stages.

The first stage of the field work involved the calculation of the labor productivity and then on the basis of that the number of labors required per day was calculated. It involved the observation of the time taken by different labor force for loading and offloading the trucks of different dimensions. This study was done regularly to see and check whether the time taken per day, per labor was the same or different. All the noted values were thus collected for further analysis of the data.

5.2 PROCEDURES

The labor productivity was calculated on the basis of the number of labors involved in the loading/offloading the truck, the time taken by them for loading/offloading the truck and the number of boxes being loaded/offloaded by the labor force in a day.

The different steps followed for calculation of the labor productivity and the numbers of labors required per day was as follows:-

The different steps for calculation of labor productivity:-

1. First we calculate the labor productivity for offloading the product
 - For appliances the labor productivity is calculated separately
 - Again , for fans & their blades labor productivity is calculated separately
2. Then we take the mean of the above two calculated productivity and get a final labor productivity for offloading.
3. Then we calculate the labor productivity for loading the product.

4. Then we again calculate the mean of the final calculated labor productivity for offloading & loading the product. This gives the net overall productivity of loading & offloading combined.

The different steps for calculation of number of labors required per day are as follows:-

1. First we see the total number of boxes that is loaded and offloaded in a given day. Here, for a given day let say it is 18,000 boxes assuming 9,000 boxes being loaded & 9,000 boxes being offloaded
2. Then we see the number of hours worked by a labor in a day.
3. Then we divide the total number of boxes being loaded and offloaded by the overall productivity for loading & offloading
4. Again, we divide the value obtained above by the number of hours worked by a labor in a day. Here it is 8 hrs.
5. The value obtained above gives us the actual labor required by the warehouse for the given number of boxes.

- **Note:- For the above calculations an assumption was considered on the basis of the observation of boxes being loaded and offloaded :- 80% of the boxes of fans have boxes of blades too & 20% of the boxes of fans have blades in them**

The above process was repeated to get the labor productivity at different hours of the day. The calculated value for different hours was taken for study and then overall final labor productivity was calculated for a day.

The different labor productivity for different truck sizes was calculated for different days and then on the basis of the calculation the value for the final labor productivity was calculated on the basis of assumption from the different values calculated above.

5.3 DATA ANALYSIS

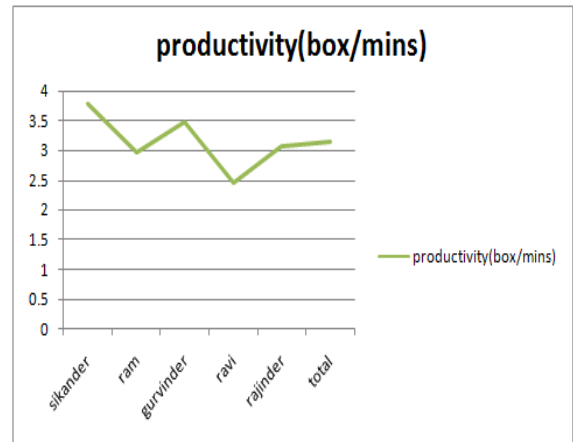
On the basis of the steps being followed for calculation of the labor productivity, the labor productivity of different trucks were calculated and then on the basis of that final labor productivity was calculated as shown here.

First the labor productivity is shown for offloading of fans & blades:-

Labour Productivity in case of fan & blades products(offloading)

1. Time taken by the truck to come on the dock and be ready for offloading = 10 minutes

Labour	no.of box	time take	productivi	productivity(box/hr)
sikander	136	36	3.777778	226.6667
ram	106	36	2.944444	176.6667
gurvinder	125	36	3.472222	208.3333
ravi	88	36	2.444444	146.6667
rajinder	110	36	3.055556	183.3333
total	565	180	3.138889	188.3333

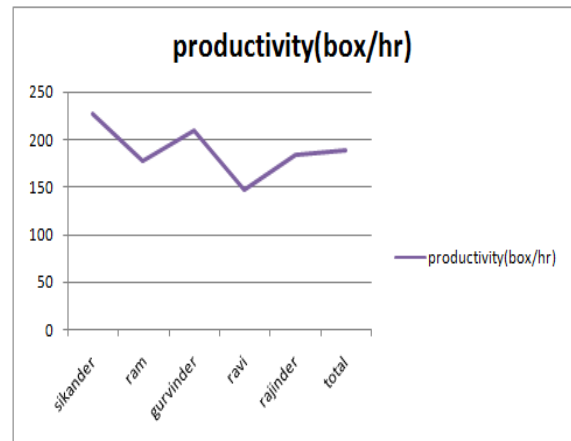


2. Time taken by the truck to move away from the dock = 10 minutes

3. So, overall final productivity(box/min)= output/ input
1.835

4. so, overall final productivity(box/hour)=output/input
102

NOTE:- The assumption is that 80% of the fan's blade is in another box and 20% of the fan's blade is inside the fan's box itself

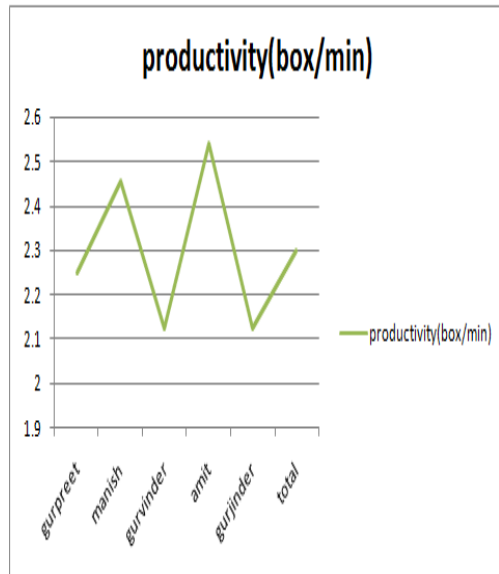


Then the labor productivity is shown for offloading of the appliances:-

Labour Productivity in case of gysers(appliances) products(offloading)

1. Time taken by the truck to come on the dock and be ready for offloading = 10 minutes

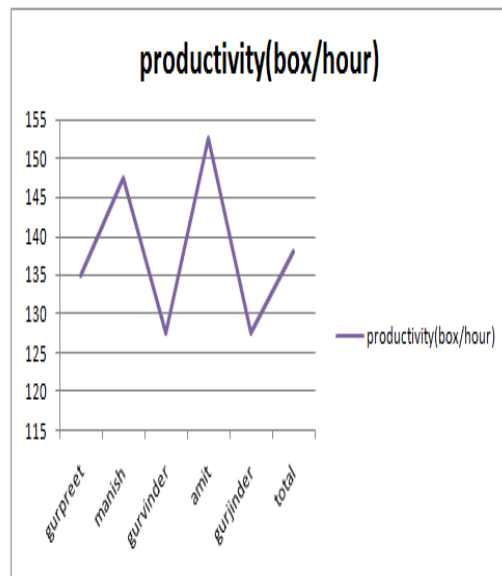
Labour	no.of box	time take	productivi	productivity(box/hour)
gurpreet	54	24	2.25	135
manish	59	24	2.458333	147.5
gurvinder	51	24	2.125	127.5
amit	61	24	2.541667	152.5
gurjinder	51	24	2.125	127.5
total	276	120	2.3	138



2. Time taken by the truck to move away from the dock = 10 minutes

3. So, overall final productivity(box/min)= output/ input
1.971429

4. so, overall final productivity(box/hour)=output/input
118.4549

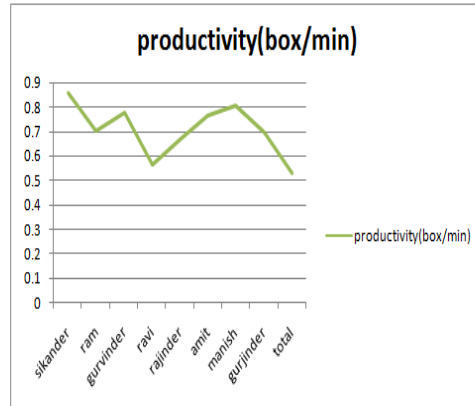


Then the labor productivity is shown for loading the appliances as well as fans & blades:-

Labour Productivity (onloading)

1. Time taken by the truck to come on the dock and be ready for offloading = 10 minutes

labour	no of box	time take	productivi	productivity(boxes/hour)
sikander	136	159	0.855346	51.32075
ram	111	159	0.698113	41.88679
gurvinder	123	159	0.773585	46.41509
ravi	89	159	0.559748	33.58491
rajinder	106	159	0.666667	40
amit	121	159	0.761006	45.66038
manish	128	159	0.805031	48.30189
gurjinder	110	159	0.691824	41.50943
total	924	1272	0.52673	31.60377

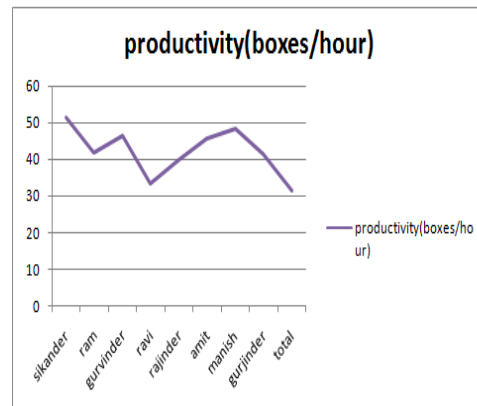


2. Time taken by the truck to move from one dock to other= 10 minutes

3. Time taken by the truck to move away from the dock = 10 minutes

4. So, overall final productivity(box/min)= output/ input
0.514593

5. so, overall final productivity(box/hour)=output/input
30.87558



NOTE:- The assumption is that 80% of the fan's blade is in another box and 20% of the fan's blade is inside the fan's box itself

on the basis of the above data the final analysis was done to get the results.

5.4 DATA INTERPRETATION

CALCULATION OF LABOUR PRODUCTIVITY

Calculated value of labor productivity for offloading:

For offloading of Appliances = 118.45

For offloading of Fans & Blades = 102

Calculation of the mean value for appliances & fans and blades to get overall labor productivity for offloading the product = $(118.45+102)/2 = 220.45/2 = \underline{110.225}$

Calculated value of labor productivity for loading product = 30.875

#**NOTE**: - Assumption is made that 80% of the fan's blade is in separate box while 20% of the fan's blade is inside the fan box itself.

Calculation of the mean value of overall labor productivity for offloading & loading to get net labor productivity = $(110.225+30.875)/2 = 141.1/2 = \underline{70.55}$

CALCULATION OF LABOUR FORCE FROM THE ABOVE DATA

Total number of boxes to be offloaded & loaded in a day = $(9000+9000) = \underline{18000}$

Assuming the number of hours worked by a labor in a day = 8 hrs

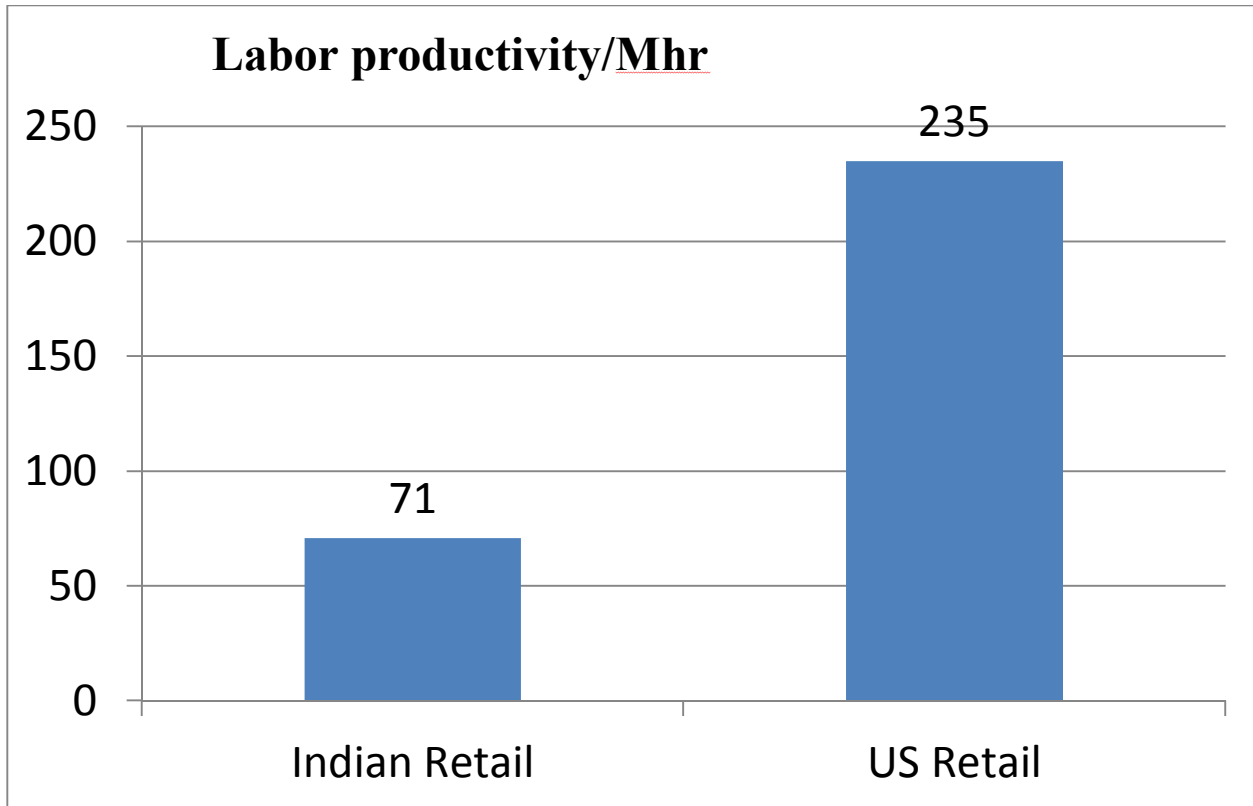
And net calculated labor productivity as calculated above = 70.55

So, labor force required = $18000/(8*70.55) = \underline{32}$

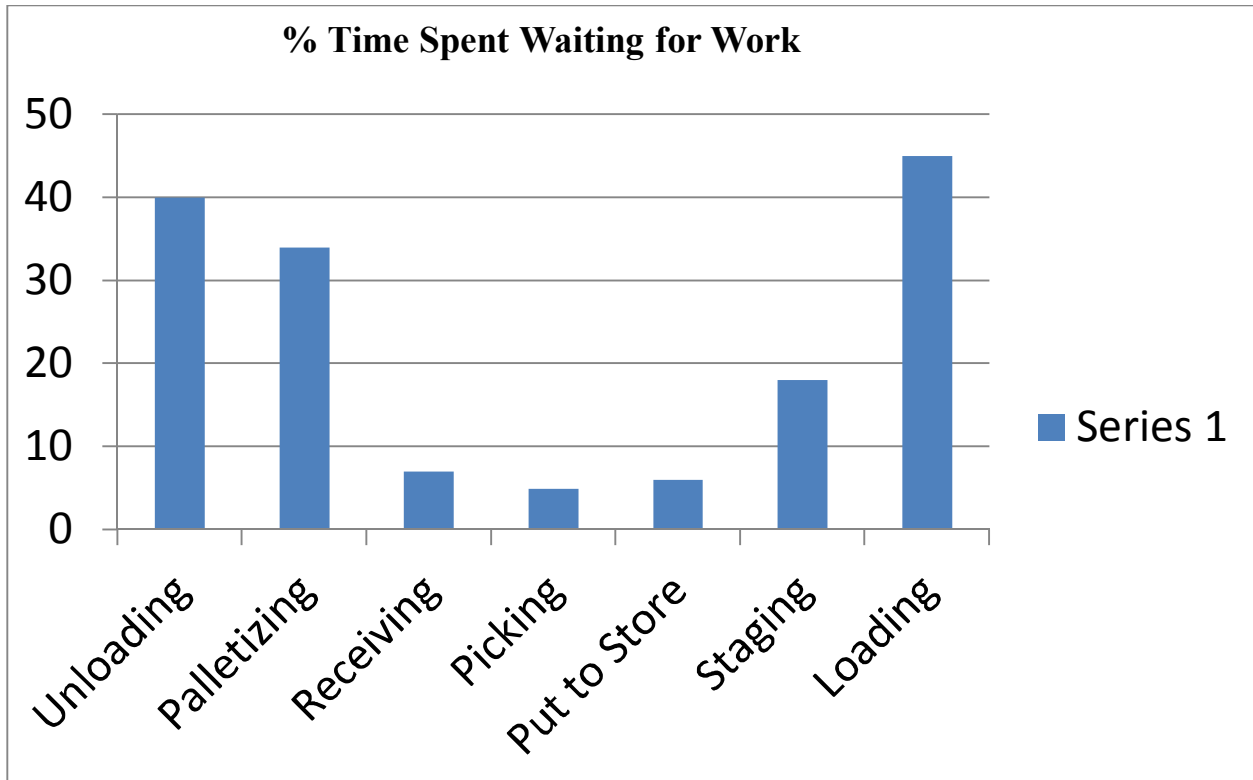
NOTE: - considering labor force not 100% efficient and sometime taken by them while working for the whole day over nearly 25 trucks, the assumed actual number of working hours by a labor in 1 day = 7 hrs

So, the final net labor required = $18000/(7*70.55) = \underline{36}$

According to the calculated data, we get the labor productivity as 71 boxes per labor per hour. But if we compare it with the US, then we find that we are far behind them as the labor productivity in US is 231 boxes per labor per hour. The following graph shows the difference between the labor productivity between India and US.



The reason for the above difference in the labor productivity between India and US is due to the percentage of time spent waiting for work by the labor force. In India, if we see the scenario, we find the reason for the above cause. The percentage time spent waiting for work by an Indian labor force has been calculated which has been shown by the following graph:-



➤ **Hence, the final results of the above calculations are as follows:-**

1. The final labor productivity comes out to be 70.55. This means that a single labor in the warehouse lifts approximately 71 boxes per hour while offloading or loading a truck.
2. On the basis of above, if the approximate number of boxes are known which depends on the number of trucks being loaded or offloaded in a single day, then the number of labors required per day can be known.

In the above case, there were 18000 boxes on a given day, so the number of labors required on that particular day was 36, which was the same number of labor force working that particular day.

Global warehouses are much ahead in their warehouse operations as compared to India, despite the fact that the Indian warehouse operation's contribution to the GDP and the logistics sector in itself is huge.

The given below chart shows that how the global warehouse perform in terms of each of the metrics and how much of their metrics they are using in terms of percentage.

	METRIC	% using
<u>1</u>	<u>On-time shipment- customer</u>	<u>85.80%</u>
<u>2</u>	<u>Order filling accuracy quality</u>	<u>73.20%</u>
<u>3</u>	<u>Average warehouse capacity used-capacity</u>	<u>70.40%</u>
<u>4</u>	<u>Annual workforce turnover- employee</u>	<u>60.20%</u>
<u>5</u>	<u>On-time ready-to-ship-outbound Operations</u>	<u>58.80%</u>
<u>6</u>	<u>Peak warehouse activity used- capacity</u>	<u>58.70%</u>
<u>7</u>	<u>Fill rate-line-outbound operations</u>	<u>57.70%</u>
<u>8</u>	<u>Dock-to-stock cycle time in hours-in-bound operations</u>	<u>56.20%</u>
<u>9</u>	<u>Inventory count accuracy by location-quality</u>	<u>53.00%</u>
<u>10</u>	<u>Order fill rate-outbound operations</u>	<u>50.70%</u>

Methods used to increase the labor productivity

There were some methods which were used to increase the labor productivity in the warehouse. These methods were based on the basis of the observation made in the labor force at the warehouse. The methods used were as follows:-

- The “soft” or qualitative aspects
 - ❖ Productivity culture
 - ❖ Team work
 - ❖ Quality work
 - ❖ Work ethic
- The technical or quantitative aspect
 - ❖ To measure productivity

The above methods were observed because the labor force working in the warehouse lacked each of these skills when they were working. So, some methods were employed to inculcate these skills in the labor force so that they could work better and thus increase the overall labor productivity of the warehouse.

The main problems in the labor force that were noted were as follows:-

- **There was no team work involved. The same labor used to do the same work daily and didn't do the other work. So, this was a major problem.**
- **The labor force did not know their capability and had in their mind the time needed to load/offload a truck. They were not aware of their goal.**
- **There was a lack of motivation among the labor force.**
- **They used to follow a similar kind of pattern while doing their work. Thus, smart work was not been carried out.**

When the above problems were addressed within the labor force, there was a change in the labor productivity at each dock. The values measured were as follows:-

❖ Differences in labor productivity after employing techniques to increase labor productivity.

Observation Table

DOCKS	Labour Productivity (Before) (Box per hour per labour)	Labour Productivity (After) (Box per hour per labour)
1	73.65	75.25
2	70.90	71.60
3	70.55	71.90
4	68.25	69
5	69.40	70.5

The above data showed that when certain methods were inculcated within the labor force then the labor productivity increased for each of the docks in the warehouse.

Although quite difficult to implement, these methods resulted in a positive way and gave positive results.

Motivation and team work were the two major factors of increased labor productivity within the labor force, which was lacking previously.

CHAPTER 6

6.1 CONCLUSIONS

The study was first of its kind so there were some new findings which will benefit the company in the coming days. On the basis of the study and the interpretation of the data some of the findings and conclusions were noted. The findings and conclusions of the study include:-

- **The good thing about the warehouse was that all the necessary resources were available which was required.**
- **There was on time delivery of products and services with quality to the customer which was again one of the biggest strength of the warehouse.**
- **Another positive fact about the warehouse was that it was flexible in its planning. Any change in the plan was adjusted well without any trouble or loss to the company.**
- **The Labor Productivity of the warehouse was calculated and it was equal to 70.55 i.e. a single labor can approximately lift 71 boxes per hour while offloading or loading a truck.**
- **The number of labors required was calculated. This will help the company to use the exact number of labor required depending upon the number of boxes which is based on the number of trucks that are being loaded or offloaded per day.**
- **During the process of inspection of the warehouse, it was noticed that the space could be utilized in a better way, if at the end of the day, set to order is done, i.e. after the stocks are matched the same product could be placed at a similar location if there is space available rather than some lying somewhere and others lying somewhere.**

- **Again, the labor force was working manually. If automation is provided then there will be a definite increase in labor productivity as well as better utilization of space within the warehouse. So, automation on the basis of needs could be incorporated.**
- **The methods for improving the labor productivity was observed and noted. It was observed that motivation is the biggest source of increasing the labor productivity followed by team work.**
- **The WMS followed was manual rather than system generated. WMS generated by system automatically will again lead to better space utilization.**

CHAPTER 7

7. RECOMMENDATIONS

The following recommendations are made on the basis of the study:-

- **Motivation and team work to be inculcated in the labor force so that the Labor Productivity could be increased**
- **Automation can be brought to the warehouse so that the Labor Productivity could be increased and there would be more space available.**
- **WMS can be automated rather than manual, which would again lead to better space utilization.**
- **Set to order can be implemented which would lead to more availability of space. It can be done at the end of the day after the stocks are matched.**
- **Better training and innovation skills could be given to the supervisors who control the labor force.**

7.2 LIMITATIONS

The study was first of its kind done in the company. All the possible measures were taken to study the project in-depth and minutely, but still the study is bounded by the following limitations as mentioned here:

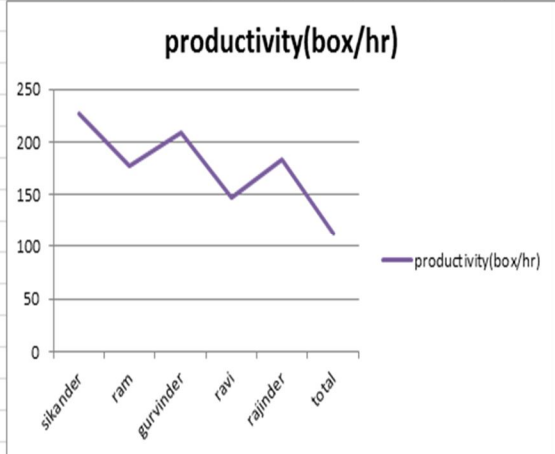
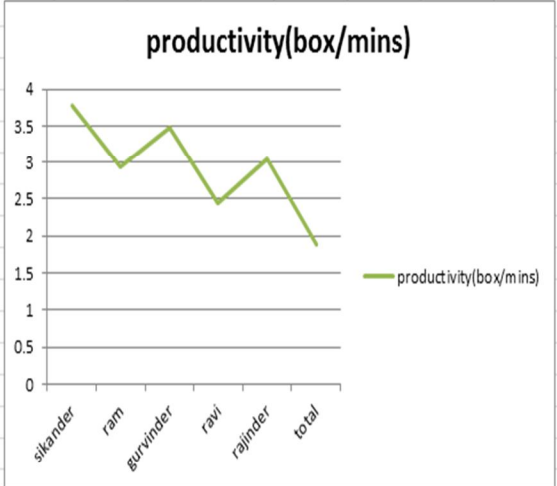
- **The calculated labor productivity doesn't shows the skills of the labor as there are certain other factors which may have not been included in the study.**
- **There shouldn't be any misrepresentation of the calculated labor productivity as one cannot predict their nature on a given day.**
- **There have been certain places where the approximate value has been taken rather than the exact value. Therefore, a minor change in value is possible.**
- **The methods employed to increase the labor productivity in the study is based solely on observation. Hence, there may be changes.**
- **While calculating the labor productivity, some assumptions were made on the basis of the calculated value for loading and offloading of trucks for similar kind of dimensions.**

APPENDIX

The following excel sheets were used to calculate the values.

SHEET 1:-

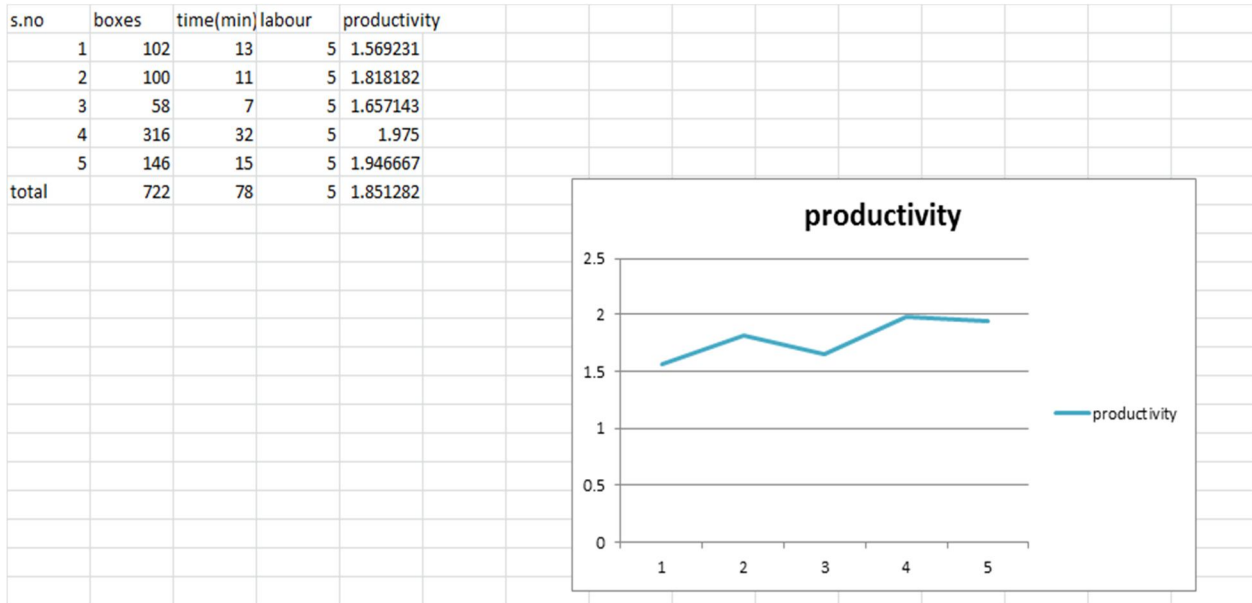
Labour Productivity in case of fan & blades products(offloading)				
1. Time taken by the truck to come on the dock and be ready for offloading = 7 minutes				
Labour	no.of box	time take	productiv	productivity(box/hr)
sikander	136	36	3.777778	226.6667
ram	106	36	2.944444	176.6667
gurvinder	125	36	3.472222	208.3333
ravi	88	36	2.444444	146.6667
rajinder	110	36	3.055556	183.3333
total	565	180	1.88	113
CONSIDERING 80% OF THE BOXES HAD FANS AND BLADES IN SEPARATE BOX AND 20% OF THE BOXES HAD FANS AND BLADES IN THE SAME BOX.				
2. Time taken by the truck to move away from the dock = 6 minutes				
3. So, overall final productivity(box/min)= output/ input				
1.756477				
4. so, overall final productivity(box/hour)=output/input				
105.6075				



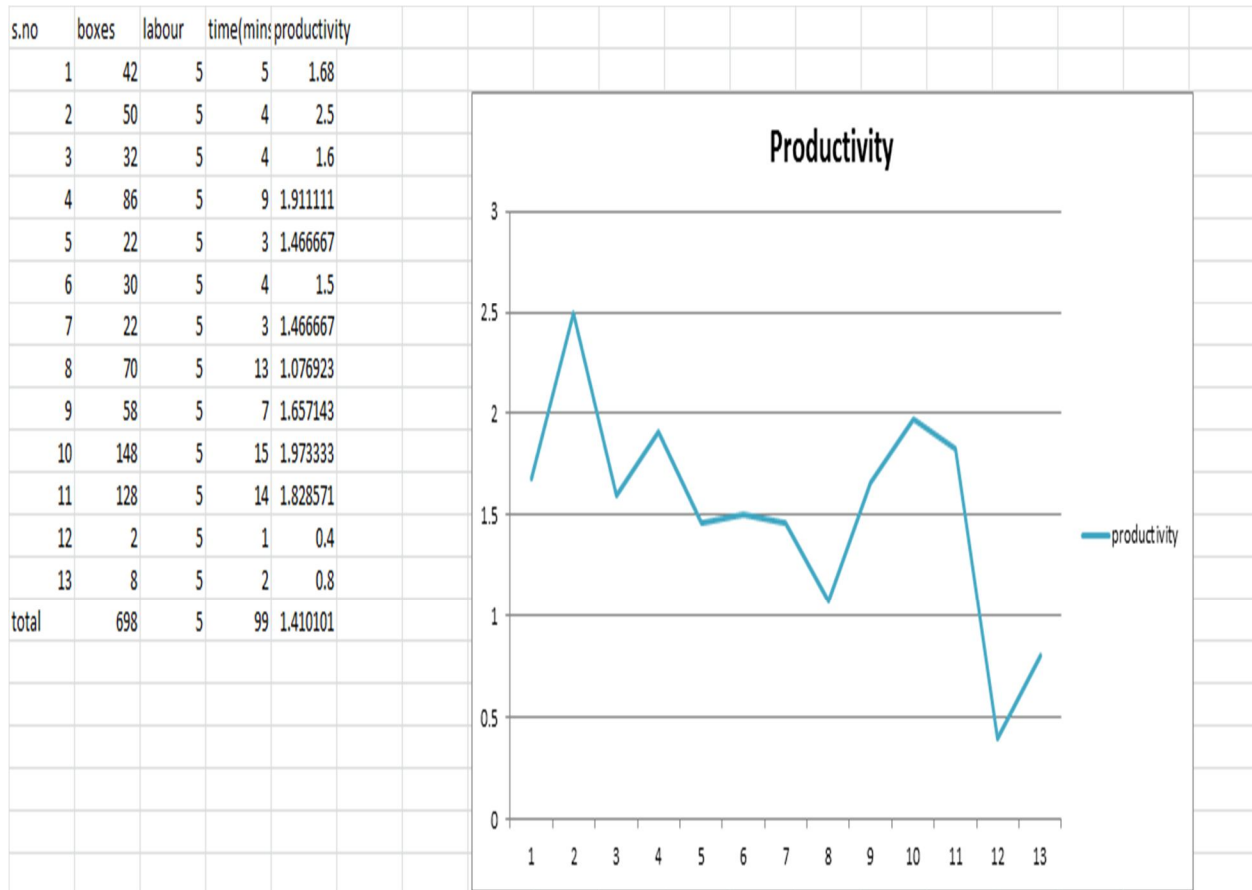
SHEET 2:-



SHEET 3:-



SHEET 4:-



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