

A STUDY ON CHALLENGES FACED IN MATERIAL HANDLING MANAGEMENT AT MANUFACTURING INDUSTRIES CHENNAI

Submitted in partial fulfillment of the requirements
for the award of

MASTER OF BUSINESS ADMINISTRATION

By

B.A.MOHAN BALA

Register No.40410102



SCHOOL OF MANAGEMENT STUDIES

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade "A" by NAAC | 12B Status by UGC |

Approved by AICTE

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

APRIL 2022



SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with "A" grade by NAAC | 12B Status by
UGC | Approved by AICTE**

**Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai – 600 119
www.sathyabama.ac.in**

SCHOOL OF MANAGEMENT STUDIES

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **B.A.MOHAN BALA 40410102** who carried out the project entitled **"A Study on challenges faced in material handling management at manufacturing industries chennai"** under my supervision from January 2022 to March 2022.

Dr.D.VELUMONI
Internal Guide

External Guide

Dr. BHUVANESWARI .G
Dean – School of Management Studies

Submitted for Viva voce Examination held on_____

Internal Examiner

External Examiner

DECLARATION

I **MOHAN BALA B.A. (40410102)** hereby declare that the Project Report entitled “**A Study on challenges faced in material handling management at manufacturing industries chennai**” done by me under the guidance of **DR.D.VELUMONI** is submitted in partial fulfillment of the requirements for the award of Master of Business Administration degree.

DATE:

PLACE:

B.A.MOHAN BALA

ABSTRACT

In today's fierce competitive global markets, customers are demanding adjustable lot sizes, shorter lead times, higher quality and flexibility; in short, they want it all. In order to stay competitive in the market, companies need to attain both customer satisfaction and cost reduction in production operations. Material Handling Systems is the place to accomplish this goal, since they have a direct impact on production. Therefore, the aim of this study was to design an in-house Material handling that could be efficient for the production it serves. The highly competitive environment, linked to the globalization phenomena, demands from companies more agility, better performance and the constant search for cost reduction. The present study focused on improvements in internal materials handling management, approaching the case of a large company in the manufacturing industry. Materials handling is intrinsically associated with production flow. Because of this, it has direct influence on transit time, resources usage, and service levels. The objective was to evaluate, in a systematic way, the challenges faced in material handling management at manufacturing industries.

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my sincere thanks to **Dr. G. Bhuvaneswari, Dean - School of Management Studies** and **Dr. A. Palani, Head - School of Management Studies** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **DR.D.VELUMONI** for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **School of Management Studies** who were helpful in many ways for the completion of the project.

B.A.MOHAN BALA

TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	ABSTRACT	iv
	LIST OF CONTENTS	vi
	LIST OF TABLES	viii
	LIST OF CHARTS	x
1	INTRODUCTION	
	1.1 .Introduction	1
	1.2 .History of material handling	2
	1.3 .Advantages of material handling	2
	1.4 .Disadvantage of material handling	5
	1.5 .Industry profile	7
2	REVIEW OF LITERATURE	
	2.1 Review of Literature	8
3	RESEARCH METHODOLOGY	
	3.1.Need for study	12
	3.2.Objectives	12
	3.3. Scope of the study	12
	3.4. Research design	12
	3.5. Sample design	13
	3.6.Sample size	13
	3.7.Data collection	13
	3.8.Tools	13
	3.9.Area of industry	13

4	DATA ANALYSIS AND INTERPRETATION	
	4.1 Percentage Analysis	14 – 33
	4.2.CORRELATION	34
	4.3.INDEPENDENT SAMPLE T-TEST	35
	4.4.ONE WAY ANOVA	36 - 38
5	FINDINGS,SUGGESTIONS AND CONCLUSION	
	5.1.Findings of the Study	39
	5.2. Limitations of the study	40
	5.3. Suggestion	40
	5.4.Conclusion	41
	REFERENCES	42
	ANNEXURE I – QUESTIONNAIRE	43-45
	ANNEXURE II – RESEARCH ARTICLE	46

LIST OF TABLE

TABLE NO.	PARTICULARS	PAGE NO.
4.1	AGE OF THE RESPONDENTS	14
4.2	GENDER OF THE RESPONDENTS	15
4.3	EDUCATIONAL QUALIFICATION RESPONDENTS	16
4.4	EXPERIENCE OF THE RESPONDENTS	17
4.5	EQUIPMENT FREQUENTLY USED IN MATERIAL HANDLING	18
4.6	CURRENT RACKING SYSTEM USED	19
4.7	PREFERRED MATERIAL HANDLING SYSTEM	20
4.8	TIME TAKEN TO LOAD AND UNLOAD MATERIALS	21
4.9	SAFETY EQUIPMENT FOR HANDLING MATERIAL	22
4.10	EXISTING METHOD OF STORING THE MATERIALS	23
4.11	PROBLEM FACING FREQUENTLY IN HANDLING MATERIAL	24
4.12	SATISFIED WITH THE EQUIPMENT USED IN COMPANY	25
4.13	TYPE OF MODERN EQUIPMENT REQUIRED	26
4.14	CRITICAL FACTOR IN MATERIAL HANDLING	27
4.15	IMPLEMENTATION OF ALTERNATIVE METHODS	29
4.16	EFFECTIVE RACK DISTANCE FOR MATERIAL MOVEMENT	30
4.17	DIFFICULTIES FACED WHILE LOADING ON FLEET	31
4.18	IMPROVEMENTS SHOULD BE MADE	33

LIST OF CHARTS

CHARTS NO.	PARTICULARS	PAGE NO.
4.1	AGE OF THE RESPONDENTS	14
4.2	GENDER OF THE RESPONDENTS	15
4.3	EDUCATIONAL QUALIFICATION RESPONDENTS	16
4.4	EXPERIENCE OF THE RESPONDENTS	17
4.5	EQUIPMENT FREQUENTLY USED IN MATERIAL HANDLING	18
4.6	CURRENT RACKING SYSTEM USED	19
4.7	PREFERRED MATERIAL HANDLING SYSTEM	20
4.8	TIME TAKEN TO LOAD AND UNLOAD MATERIALS	21
4.9	SAFETY EQUIPMENT FOR HANDLING MATERIAL	22
4.10	EXISTING METHOD OF STORING THE MATERIALS	23
4.11	PROBLEM FACING FREQUENTLY IN HANDLING MATERIAL	24
4.12	SATISFIED WITH THE EQUIPMENT USED IN COMPANY	25
4.13	TYPE OF MODERN EQUIPMENT REQUIRED	26
4.14	CRITICAL FACTOR IN MATERIAL HANDLING	27
4.15	IMPLEMENTATION OF ALTERNATIVE METHODS	29
4.16	EFFECTIVE RACK DISTANCE FOR MATERIAL MOVEMENT	30
4.17	DIFFICULTIES FACED WHILE LOADING ON FLEET	31
4.18	IMPROVEMENTS SHOULD BE MADE	33

CHAPTER - 1

INTRODUCTION

1.1 INTRODUCTION

The wealth of a country is measured by its gross national product the output of goods and services produced by the nation in a given time. Goods are physical objects, something we can touch, feel, or see. Services are the performance of some useful function such as banking, medical care, restaurants, clothing stores, or social services. But what is the source of wealth is measured by the amount of goods and services produced, but where does it come from Although we may have rich natural resources in our economy such as mineral deposits, farmland, and forests, these are only potential sources of wealth.

A production function is needed to transform our resources into useful goods. Production takes place in all forms of transformation extracting minerals from the earth, farming, lumbering, fishing, and using these resources to manufacture useful products. There are many stages between the extraction of resource material and the final consumer product. At each stage in the development of the final product, value is added, thus creating more wealth. If ore is extracted from the earth and sold, wealth is gained from our efforts, but those who continue to transform the raw material will gain more and usually far greater wealth. Japan is a prime example of this. It has very few natural resources and buys most of the raw materials it needs. However, the Japanese have developed one of the wealthiest economies in the world by transforming the raw materials they purchase and adding value to them through manufacturing. Manufacturing companies are in the business of converting raw materials to a form that is of far more value and use to the consumer than the original raw materials. Logs are converted into tables and chairs, iron ore into steel, and steel into cars and refrigerators.

This conversion process, called manufacturing or production, makes a society wealthier and creates a better standard of living. To get the most value out of our resources, we must design production processes that make products most efficiently. Once the processes exist, we need to manage their operation so they produce goods most economically. Managing the operation

means planning for and controlling the resources used in the process: labor, capital, and material. All are important, but the major way in which management plans and controls is through the flow of materials. The flow of materials controls the performance of the process. If the right materials in the right quantities are not available at the right time, the process cannot produce what it should. Labor and machinery will be poorly utilized. The profitability, and even the existence, of the company will be threatened.

1.2 HISTORY OF MATERIAL HANDLING MANAGEMENT

The world of material handling moves at the speed of light today; but did you ever wonder how the technology developed. Doing so could involve a history lesson dating back to the Egyptians and use of logs, block and tackle pulleys and an assortment of other basic material handling processes. However, this is not history class and you're not here to be bored. Seriously though, material handling has come a long way in the past 100 years and much of it is interrelated. Many material handling tools used today evolved around the same time in history as one improvement led to another. The pallet is a prime example. Prior to mass production, most items were made as needed and shipped the same way. As demand and production increased, inventions such as the cardboard box led to improved methods of shipment. The box increased the amount of products a company could ship, but demand still made this mode costly and required another solution.

1.3 ADVANTAGES OF MATERIAL HANDLING MANAGEMENT

1.3.1 SAVE MONEY

With decreasing profit margins within the construction industry, saving money is a big consideration for logistics and manufacturing projects. Material handling equipment may initially be costly but is a huge money saver in the long run. Using such equipment delivers products more efficiently without stretching the budget or adding more manpower. Reducing the number of people needed to sort, ship, and handle items not only saves money but

dramatically reduces the time it takes to ship a package. What this means is that work gets done faster with less people. Equipment such as robotic delivery systems help with load consolidation and route planning, which helps save on resource expenditures.

1.3.2 MAXIMIZE SPACE

Space within the production floor is important for ease of movement of staff, products, and equipment. Storage and handling equipment such as stackable frames help maximize space on the production floor as they help with holding products that are not being transported. In turn, this saves on storage space and maximizes space utilization on the production floor. Using storage equipment such as stackable frames means materials can be stacked higher resulting in more space on the facility floor. Equipment such as Automated storage & Retrieval Systems (ASRS) that help with inventory storage and retrieval also maximize floor space by storing large volumes of material within a small footprint.

1.3.3 DECREASE PRODUCT DAMAGE

Manual movement of materials or products across the facility floor could result in product damage if the materials are not handled carefully. Requiring facility staff to lift and transport goods manually increases the risk of product damage. For instance, this could happen when one accidentally drops products, hence destroying them. This is where material handling equipment comes in, delivering products safely thereby decreasing product damage. This is also a money saver for the facility since damaged products could prove to be costly if the facility is required to replace and ship them all over again. An example of such equipment would be forklifts that are meant to lift heavy materials, protecting them from accidental drops and damage.

1.3.4 IMPROVED CUSTOMER SERVICE

Shorter shipping and delivery times translates to more business and happier customers. Using material handling equipment ensures faster production and delivery times facilitating faster order fulfillment. Ensuring that customers receive their shipments on time and undamaged, not only helps maintain the customer base but brings in new business through customer referrals.

1.3.5 INCREASE WORK EFFICIENCY AND PRODUCTIVITY

Staying competitive within manufacturing sector (predicted to have a 1.9% growth in 2021), requires increased efficiency for operations and logistics. Incorporating material handling solutions is one way to increase efficiency as it enables workers to focus on one project at a time. Without having to do everything at once, workers can prioritize projects which improves productivity. Material handling systems also increase efficiency of floor staff through automating labor. Consequently, workers are able to accomplish more work in less time. These systems are also able to increase the unit load by reducing the number of trips in a warehouse facility. Material handling solutions not only increase work efficiency but also productivity. When workers are forced to handle bulk materials, they experience fatigue which often decreases productivity. Material handling equipment increases productivity by taking this burden off the workers' shoulders. Equipment such as automated conveyer belts also increase productivity by speeding up the manufacturing speed and cycle.

1.3.6 REDUCE ACCIDENTS IN FACILITIES

Much of the material moved across a facility floor is heavy and comes in bulk. Manually moving such materials can not only result in product damage but also in employee injuries. The construction industry is already known to present many hazards to its workers resulting in a higher injury rate compared to other industries. Construction activities such as lifting heavy and

bulk materials could potentially cause lifelong injuries. Reducing the number of materials to be handled manually reduces the number of potential back and hand injuries. Therefore, opting for material handling solutions is a measure that can help improve the safety of facility workers. Systems such as automated conveyer belts use integrated automation to move materials around the manufacturing facility with little manual effort. As the unit load increases, lift trucks mitigate the risk of employees overexerting themselves in the event that the total weight exceeds their physical limitations.

1.3.7 ATTRACT EMPLOYEES AND IMPROVE WORKER SATISFACTION

Implementing ideal material handling systems that keep workers safe will help attract good quality workers. This type of environment also attracts high caliber employees with experience and training to handle such systems. Employees are also able to perform tasks with confidence since these systems help ensure accuracy, control, and safety. In turn,. this promotes a positive workplace culture and a higher level of employee satisfaction. Incorporating material handling equipment means that workers will have an easier time performing their job. They will be able to prioritize projects and accomplish more in a shorter period, promoting not only their satisfaction levels but also their productivity. When inventory is at the right place at the right time, workers are not forced to search for misplaced items. Employees also do not have to deal with damaged products which could result in frustration and lower morale.

1.4 DISADVANTAGES OF MATERIAL HANDLING MANAGEMENT

1.4.1 ADDITIONAL CAPITAL INVESTMENT:

It must be verified that the cost of the handling system is more attractively invested in the system under consideration than in any other part of the business. It should be assured that the gains expected are not based

upon a more mechanized system v/s present practice, but rather the proposed new system v/s the best version of present practice.

1.4.2 LOSS OF FLEXIBILITY

Proposed system must be flexible enough to be economically and quickly adapted to the likely range of changes in the product or production techniques. If not, change over cost and time loss must be included in the evaluation, or it must be shown that the investment will be satisfactorily recovered before the proposed handling system will require modification.

1.4.3 VULNERABILITY TO DOWNTIME;

Since a handling system is a composite of mechanical and electrical machinery and controls, it must be recognized that it may break down at any times. What happens then how long will it take to get back to service and what will be done when repairs are being made. If this is serious-, the handling system must be re-design to provide for better reliability, for alternate handling techniques in event of breakdown or for in-process- storage that can feed subsequent operations while the system is being repaired. All of these can result in additional costs that must be charged against the handling system.

1.4.4 MAINTENANCE

If it is planned to install additional handling mechanization, almost surely it will be necessary to take on more maintenance. This may mean the addition of new maintenance skills, or a provision for obtaining them when needed. It may be that extra pieces of handling equipment should be provided for use during downtime or breakdowns. It may be necessary to plan for periodic overhauls by skilled technicians. It may be necessary to carry a large supply of repairs parts, or a new or enlarged maintenance facility and staff may be required.

1.4.5 AUXILIARY EQUIPMENT COSTS

Frequently a new handling system carries with it requirements that involve hidden or unrecognized costs for auxiliary equipment or service, e.g. adopting a fork lift truck means more than taking on the mobile equipment, its power supply, and its maintenance. The point of identifying this drawback is neither to discourage nor disparage the adaptation of modern handling methods, but to emphasize that a careful balance of the total benefits and limitations is required before wise decisions can be reached.

1.5 INDUSTRY PROFILE

Companies in this industry manufacture a wide variety of goods; major product groups include food and beverages, chemicals, machinery, transportation equipment, and computers and electronics. Globalization has opened new markets and opportunities for manufacturers but has also created new challenges, including how to manage far-flung supply chains and distribution channels. Manufacturers have turned to digitalization to improve efficiency across every area of operations, including product development, design, production, distribution, and marketing. However, implementing a successful digital transformation strategy including the leveraging of internet of things (IoT) technology and big data requires careful planning and significant investment. Demand ultimately depends on consumer spending. The profitability of individual companies depends on efficient production and distribution. Large companies often have large economies of scale in purchasing, production, and marketing. Small companies can compete effectively by producing specialized products.



CHAPTER - 2

REVIEW OF LITERATURE

2.1 REVIEW OF LITERATURE

The main goal of reviewing literature is to identify the theoretical framework and research on challenges faced in material handling management. Review of literature refers to identifying already existing literature in the area of consumer behaviour, to find out what contribution has already been made so that it can serve a valuable base for further expanding the literature. The researcher, while choosing the relevant literature screened to formulate the subject matter of the proposed study challenges faced in material handling management at manufacturing industries

- i. Sara Frojd (2021) Supplier development and how to improve suppliers order to delivery and learn from supplier integration.
- ii. Rami Alghalayini (2020) Improving an internal material handling system. A case study on a swedish company in food industry.
- iii. Jonatan gustafsson (2020) Reverse logistics management in construction. A multiple case study examining the effects of organizational size.
- iv. Arjun Balasubramaniam (2020) Analysis and improvement of material handling in a high customized multi-variant product based production system.
- v. Sharma & Mishra(2010)-In this study authors have examined the relationship between export and productivity performance to find out whether the export and productivity linkage exist. Sample of Indian manufacturing firms were analyzed and concluded that entering into export market does not improve the productivity and it is also observed that exit from the export market does have an adverse effect on the productivity.

- vi. C.N.Agulanna et al. (2011)-This study highlights the improving productivity in Soyabean processing through the design and fabrication of double action decoating and separation machine. This will solve productivity. It has been concluded that the dry decoating is better option to wet decoating.
- vii. Ivica Veza et al. (2011)-This study is about the results of lean manufacturing implementation problems in beverage production systems. The implementation of lean concept was made through line output improvement. The results of the case studies were there is drastic increase in production, reduction in waste, reduction in unnecessary action.
- viii. Liu & Li (2012)-In this study analyzed China's productivity growth in manufacturing industries. It was concluded that chain's Industrial strength is based on input growth and improvement in technical progress.
- ix. T.K. Jack(2012)- This paper is about case study on material handling and supply management in Fertilizer production. Here author pointed that in the Fertilizer company in the bagging line operation for bagging and conveying to final delivery to the truck is major problem due to frequent breakdown of the conveyors.
- x. Jain et al. (2013)-This study is about a review on manufacturing flexibility . Here authors state that to achieve the competitive edge in the market manufacturing flexibility is critical component. This paper presents the review of various issues related to manufacturing flexibility and implementation aspect in the company.

- xi. Naveen Kumar & Dalgobind Mahto(2013)- This paper presents the productivity improvement through process analysis for optimizing assembly line in packaging industries.
- xii. Md. Ahasan Habib et al. (2013)-In this study it was observed that productivity of Apparel manufacturing system is improved by using value stream mapping and production control tools.
- xiii. A. P.Bahale, Dr.S.S. Deshmukh (2014)-This is paper deals with a case study of improving material handling efficiency ginning machine manufacturing company. The main objective was to find out wasteful activities of material handling. It has been discovered that a problem areas are the lack of space and lack of appropriate material handling equipments.
- xiv. Bordoloi M.P. , Nath T. (2014)-This study highlights the modification of an existing Layout of a production line based on distance function. This paper presents a technique of layout improvement based on a distance function.
- xv. Kavishwar Roy Gaurh, et al. (2014)-In this study it was highlighted the MCDM techniques for the selection of material handling equipment in the Automobile industry.
- xvi. A.A. Gulghane, Prof P.V. Khandve (2015)-This study highlights management construction materials and control of construction waste in construction industry. Construction waste is one of the major problem in construction industry. Poor handling of construction material affects the overall productivity performance.

- xvii. Ajay RV- Deepan K. G.(2015)- In this paper a case study of Rackpiston manufacturing for productivity improvement based on lean production was carried out. It has been established that multi tasking job allocations could bring major improvement in the productivity. The cycle time and manpower reduction ensured improvement in the efficiency.
- xviii. Dushyant Kumar (2015), This study is about the Economic reforms and productivity of Indian manufacturing: A study of food product sector. Here author tried to estimate to find out the total factor productivity for food product and beverage industry at two digit level. Solow method is used to measure total productivity factor.
- xix. Praveen Kumar Sharma et al. (2015)-In his research paper focus is in the area of Selection of material handling equipment by using analytical hierarchy process, in pump industry to reduce the cost of manufacturing.
- xx. Rishabh Mishra (2015)-This study is about the productivity improvement in automobile industry by using method study. Here initially identified areas in the production department where the process is done which is taking extra time, extra efforts.

CHAPTER - 3

RESEARCH METHODOLOGY

3.1 NEED FOR THE STUDY:

- The study provides information to those interested in the Logistics activity.
- It provide insight into the challenges and potential benefits of Material handling management.
- It mainly focuses on safety of materials.

3.2 OBJECTIVES OF THE STUDY:

3.2.1 PRIMARY OBJECTIVES

The primary objectives of this study is challenges faced in material handling management.

3.2.2 Secondary objectives

- To identify the problems faced in Material handling.
- To find out the critical factors influencing in various stages of material handling.
- To reveal the measures to improve the flow of material handling for effective work condition.

3.3 SCOPE OF THE STUDY:

- ❖ The study restricted to the Employees in manufacturing industries.
- ❖ The study measures data only through questionnaire
- ❖ This study was started on 2 January 2022.

3.4 RESEARCH DESIGN

Descriptive research is a study designed to depict the participants in an accurate way. More simply put, descriptive research is all about describing people who take part in the study.

3.5 SAMPLE DESIGN

The sampling technique undergone for this study is Convenience sampling. Convenience sampling is a type of non-probability sampling in which sample being drawn from that part of the population that can be reached.

3.6 SAMPLE SIZE

A questionnaire was circulated to through Google forms for which 126 responded for the survey.

3.7 DATA COLLECTION

- **Primary data** was collected by giving questionnaire to the employees. The completed questionnaires in all respects were taken for the study. Questionnaire used which consist of 20 questions.
- **Secondary data** used was the literature given which were reviewed for the purpose of attaining knowledge on the topic.

3.8 TOOLS

- In this study, It has various statistical tools like percentage analysis and statistical test like Correlation, One way Anova & Independent sample T-Test.

3.9 AREA OF INDUSTRY

- SAMPLE SIZE : 126
- LOCATION : CHENNAI
- TARGET PEOPLE : EMPLOYEE
- TYPE OF INDUSTRY : MANUFACTURING

CHAPTER - 4

DATA ANALYSIS AND

INTERPRETATION

4.1 PERCENTAGE ANALYSIS

TABLE 4.1 AGE OF RESPONDENTS

S.No	Age	No. of respondents	Percentage
1.	21 - 30	56	44
2.	31 - 40	51	40
3.	41 - 50	16	13
4.	51 - 60	3	3
	TOTAL	126	100

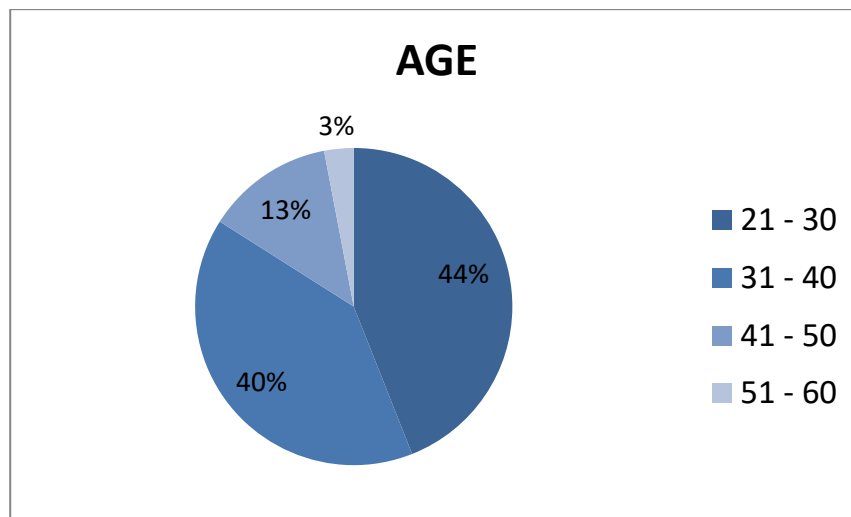


CHART 4.1: AGE OF RESPONDENTS

INTERPRETATION

From the above table it is interpreted that the number of respondents from age 21-30 are 44%, between 31-40 age of respondents are 40%, between 41-50 respondents are 13%, between 51-60 respondents are 3%

INFERENCE

Majority (44%) of the respondents are age between 21-30 years.

TABLE 4.2: GENDER OF RESPONDENTS

S.No	Gender	No. of respondents	Percentage
1.	Male	114	91
2.	Female	12	9
	TOTAL	126	100

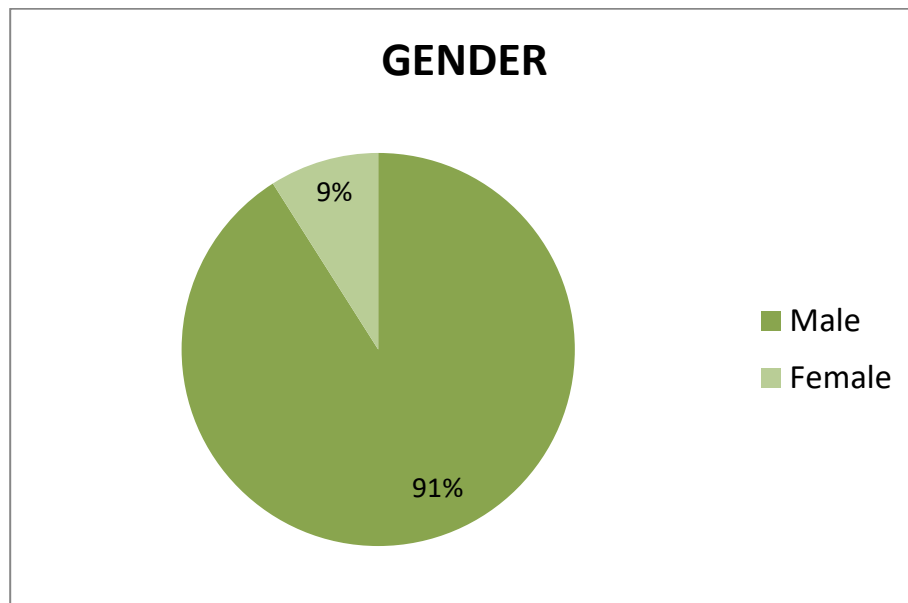


CHART 4.2: GENDER OF RESPONDENTS

INTERPRETATION

From the above table it is interpreted that the number of male respondent is 91% and female respondents is 9%

INFERENCE

Majority (91%) of the respondents are Male.

TABLE 4.3: EDUCATIONAL QUALIFICATION OF THE RESPONDENTS

S.No	Educational Qualification	No. of respondents	Percentage
1.	Diploma	14	11
2.	Under graduate	61	49
3.	Post graduate	48	38
4.	Specified course	3	2
	TOTAL	126	100

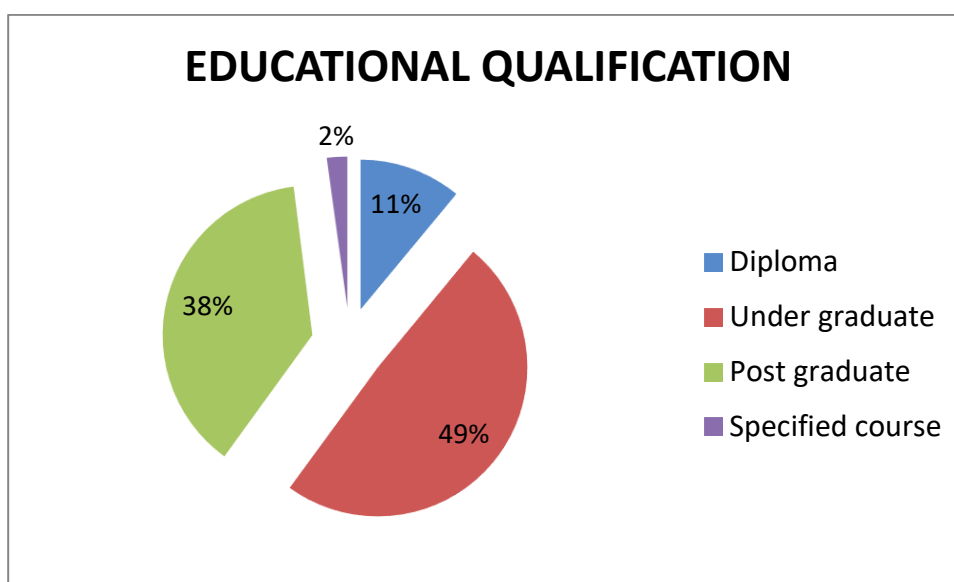


CHART 4.3: EDUCATIONAL QUALIFICATION OF THE RESPONDENTS

INTERPRETATION

From the above table it is interpreted that the number of respondents were 11% is Diploma and 49% is Under graduate and 38% is Post graduate whereas 2% for Specified course.

INFERENCE

Majority (49%) respondents is Undergraduate

TABLE 4.4: EXPERIENCE OF THE RESPONDENTS

S.No	Experience	No. of respondents	Percentage
1.	1 - 10	67	53
2.	11 - 20	44	35
3.	21 - 30	12	10
4.	31 - 40	3	2
	TOTAL	126	100

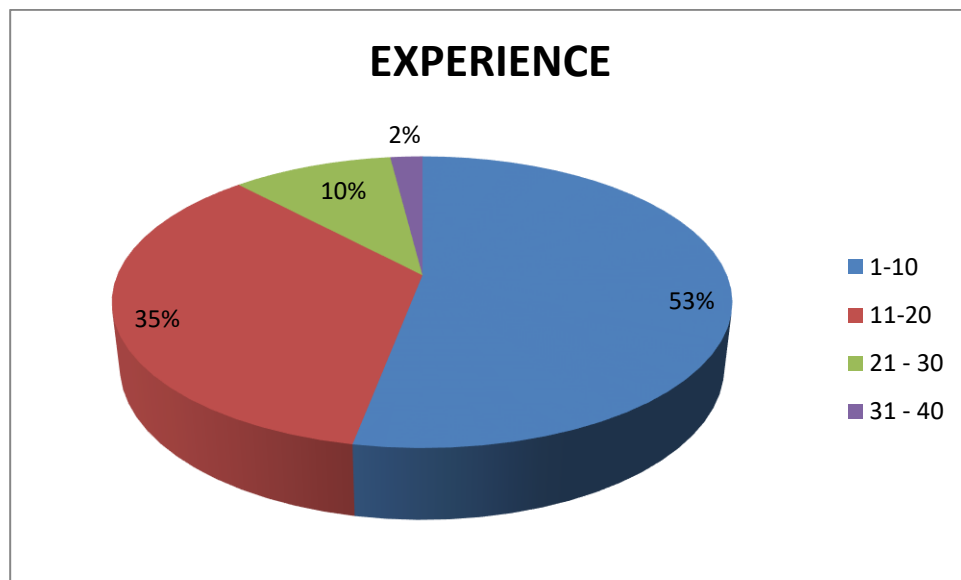


CHART 4.4: EXPERIENCE OF THE RESPONDENTS

INTERPRETATION

From the above table it is interpreted that the number of respondents Experience were 1 – 10 is 53% and 11 – 20 is 35% and 21 – 30 is 10% whereas 31 – 40 is 2% .

INFERENCE

Majority (53%) respondents has 1 – 10 years of experience.

TABLE 4.5: EQUIPMENT FREQUENTLY USED IN MATERIAL HANDLING

S.No	Equipment frequently used	No. of respondents	Percentage
1.	Fork lift	6	5
2.	Power Trolleys	79	63
3.	Hand Trolleys	19	15
4.	Pallet Stackets	22	17
	TOTAL	126	100

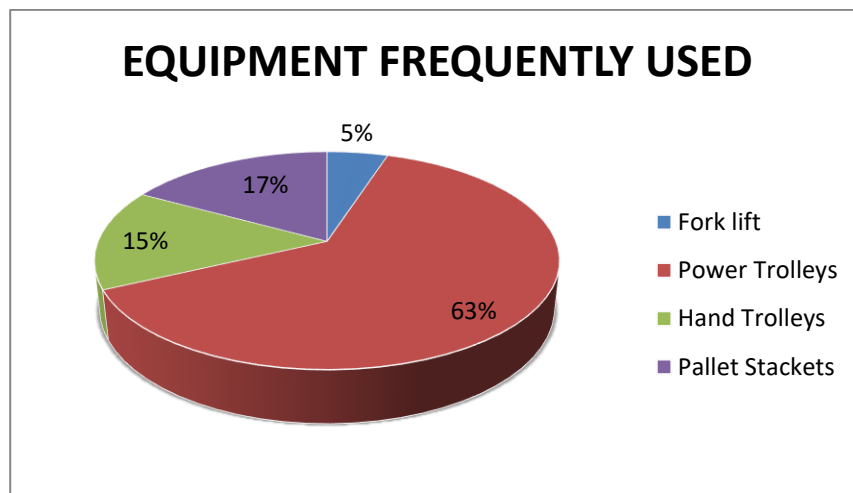


CHART 4.5: EQUIPMENT FREQUENTLY USED IN MATERIAL HANDLING

INTERPRETATION

From the above table it is interpreted that the equipment are frequently used in material handling management is 5% for Fork lift and 63% for power trolleys and 15% for hand trolleys and 17% for pallet stackers

INFERENCE

Majority (63%) of respondents choosen the power trolleys.

TABLE 4.6: CURRENT RACKING SYSTEM USED

S.No	Current racking system	No. of respondents	Percentage
1.	Bin location	19	15
2.	Two tires system	22	17
3.	Open space	11	9
4.	Pallet racking	74	59
	TOTAL	126	100

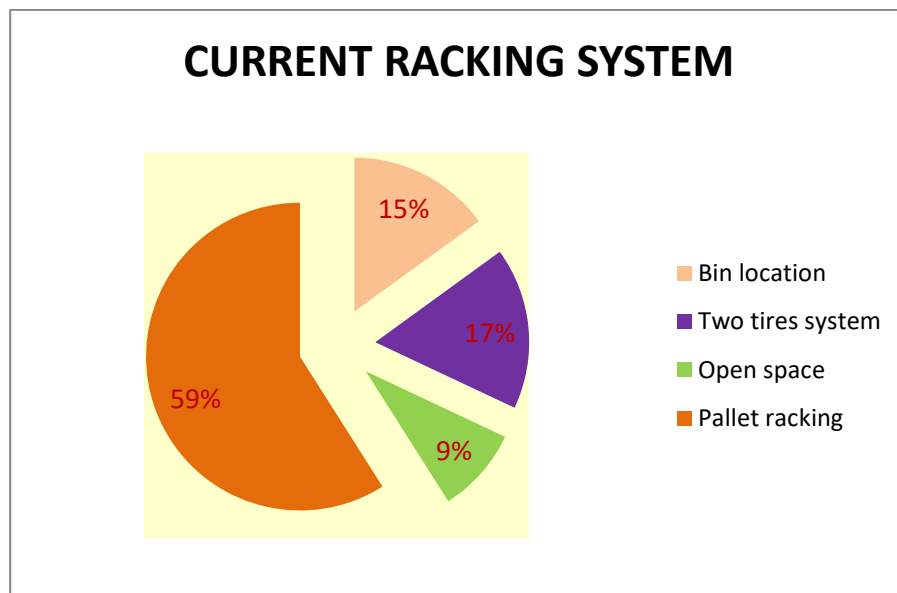


CHART 4.6: CURRENT RACKING SYSTEM USED

INTERPRETATION

From the above table it is interpreted that the racking system used is 15% for Bin location and 17% for Two tires system and 9% for Open space and 59% for pallet racking.

INFERENCE

Majority (59%) of respondents said their current racking system as pallet racking.

TABLE 4.7: PREFERRED MATERIAL HANDLING SYSTEM

S.No	Preferred material handling	No. of respondents	Percentage
1.	Manual	28	22
2.	Automated	98	78
	TOTAL	126	100

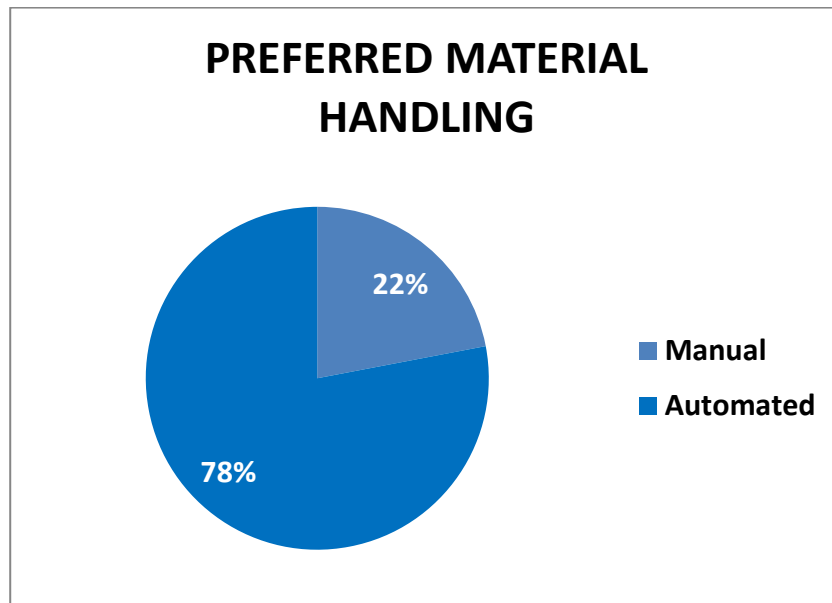


CHART 4.7: PREFERRED MATERIAL HANDLING SYSTEM

INTERPRETATION

From the above table it is interpreted that the number of respondents of 22% was manual and whereas 78% are automated.

INFERENCE

Majority (78%) of the respondents preferred automated.

TABLE 4.8: TIME TAKEN TO LOAD AND UNLOAD MATERIALS

S.No	Time taken	No. of respondents	Percentage
1.	Less than 15 min	1	1
2.	15 – 30 min	88	70
3.	30 – 45 min	29	23
4.	More than 45 min	8	6
	TOTAL	126	100

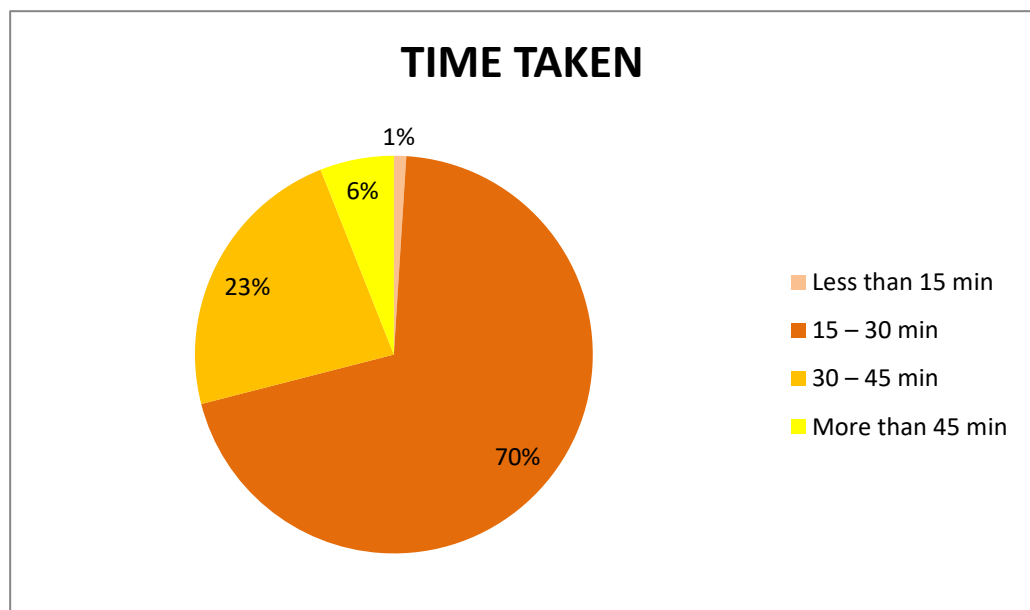


CHART 4.8: TIME TAKEN TO LOAD AND UNLOAD MATERIALS

INTERPRETATION

From the above table it is interpreted that Time taken to load and unload material is 1% for Less than 15 min and 70% for 15 – 30 min and 23% for 30 – 35 min and 6% for More than 45 min.

INFERENCE

Majority (70%) of respondents said that its takes 15 -30 min to load and unload 400 pices of materials.

TABLE 4.9: SAFETY EQUIPMENT FOR HANDLING MATERIAL

S.No	Safety Equipment	No. of respondents	Percentage
1.	Fork lifting	48	38
2.	Pallet stacker	16	13
3.	Power Trolleys	56	44
4.	Hand trolleys	6	5
	TOTAL	126	100

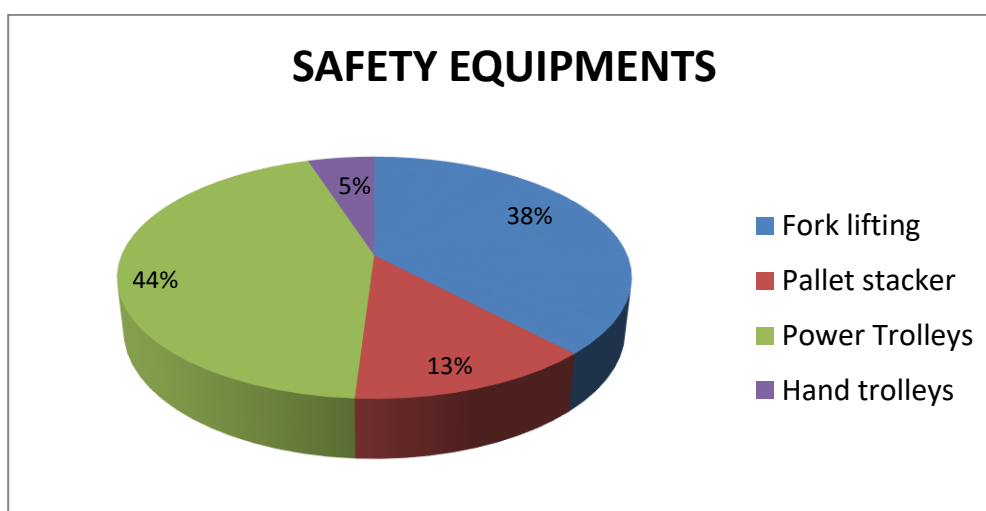


CHART 4.9: SAFETY EQUIPMENT FOR HANDLING MATERIAL

INTERPRETATION

From the above table it is clearly said that the 38% for fork lifting and 13% for pallet stacker and 44% for power trolleys and 5% for hand trolleys.

INFERENCE

Majority (44%) of respondents said that the equipment is more safety for handling materials is power trolleys.

TABLE 4.10: EXISTING METHOD OF STORING THE MATERIALS

S.No	Method of storing	No. of respondents	Percentage
1.	Highly satisfied	32	25
2.	Satisfied	53	42
3.	Neutral	34	27
4.	Dissatisfied	7	6
5.	Highly Dissatisfied	0	0
	TOTAL	126	100

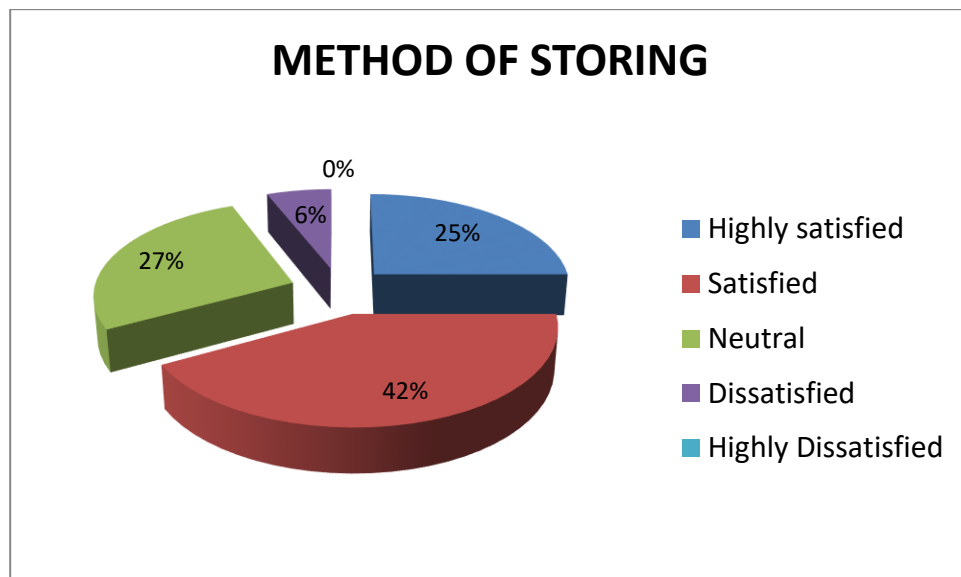


CHART 4.10: EXISTING METHOD OF STORING THE MATERIALS

INTERPRETATION

From the above table it is interpreted that the that the satisfaction level of existing method where 25% is highly satisfied and 42% satisfied and 27% neutral and 6% dissatisfied and 0% highly dissatisfied.

INFERENCE

Majority (42%) of respondents are satisfied with storage method.

TABLE 4.11: PROBLEM FACING FREQUENTLY IN HANDLING MATERIAL

S.No	Frequent problems	No. of respondents	Percentage
1.	Shortage in supply of equipment	15	12
2.	Natural calamity	33	26
3.	Want of transport	31	25
4.	None	47	37
	TOTAL	126	100

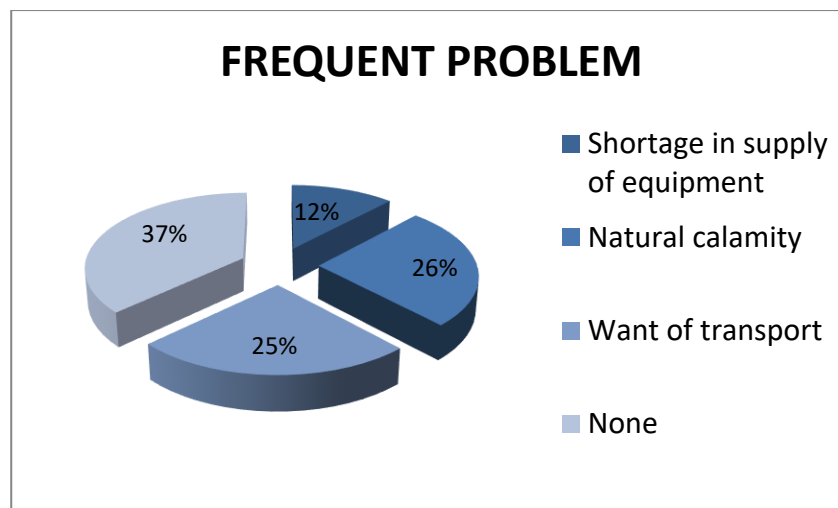


CHART 4.11: PROBLEM FACING FREQUENTLY IN HANDLING MATERIAL

INTERPRETATION

From the above table it is interpreted that the problem facing frequently where 12% is shortage in supply of equipment and 26% is Natural calamity and 25% is want of transport and 37% is None.

INFERENCE

Majority (37%) of respondents said none of the problem facing frequently.

TABLE 4.12: SATISFIED WITH THE EQUIPMENT USED IN COMPANY

S.No	Satisfied with equipment	No. of respondents	Percentage
1.	Strongly disagree	0	0
2.	Disagree	0	0
3.	Neutral	21	17
4.	Agree	67	53
5.	Strongly Agree	38	30
	TOTAL	126	100

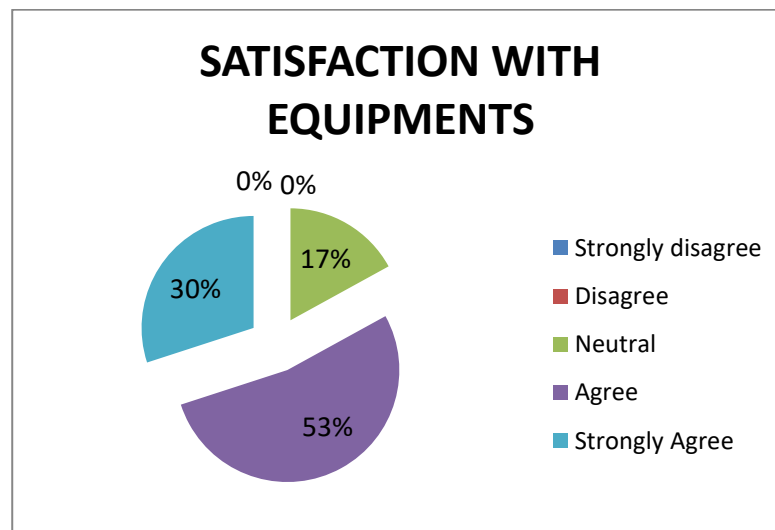


CHART 4.12: SATISFIED WITH THE EQUIPMENT USED IN COMPANY

INTERPRETATION

From the above table it is interpreted that satisfied with equipment used in company were strongly disagreed by 0% and Disagreed by 0% and Neutral is 17% and Agree by 53% and 30% strongly agree.

INFERENCE

Majority (53%) of respondents Agree that they are satisfied with the equipments used in the company.

TABLE 4.13: TYPE OF MODERN EQUIPMENT REQUIRED

S.No	Modern equipment	No. of respondents	Percentage
1.	Bay crane	43	34
2.	Scissor Lift	38	30
3.	Fork lift	8	6
4.	Order picker	37	30
	TOTAL	126	100

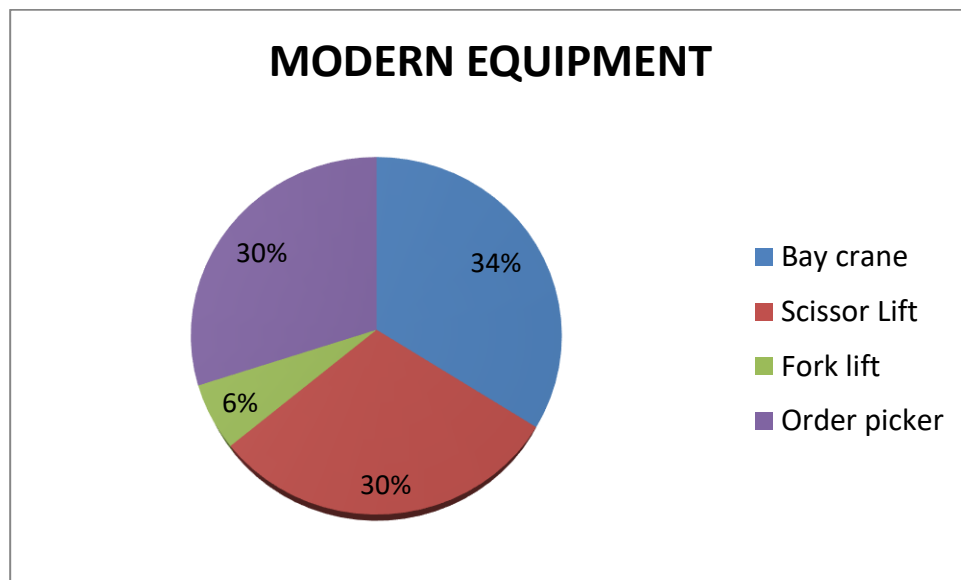


CHART 4.13: TYPE OF MODERN EQUIPMENT REQUIRED

INTERPRETATION

From the above table it is interpreted that the modern equipment required for better material handling is 34% for Bay crane and 30% for Scissor lift and 6% for Fork lift and 30% for order picker.

INFERENCE

Majority (34%) of respondents modern equipment requirement is Bay crane.

TABLE 4.14: CRITICAL FACTOR IN MATERIAL HANDLING

	Ordering system	Lack of Information	Trouble in equipment	Lack of equipment	Route damage
Strongly Agree	4	0	0	2	6
Agree	10	10	18	10	27
Neutral	33	46	38	48	42
Disagree	37	36	36	33	21
Strongly Disagree	16	8	8	7	4

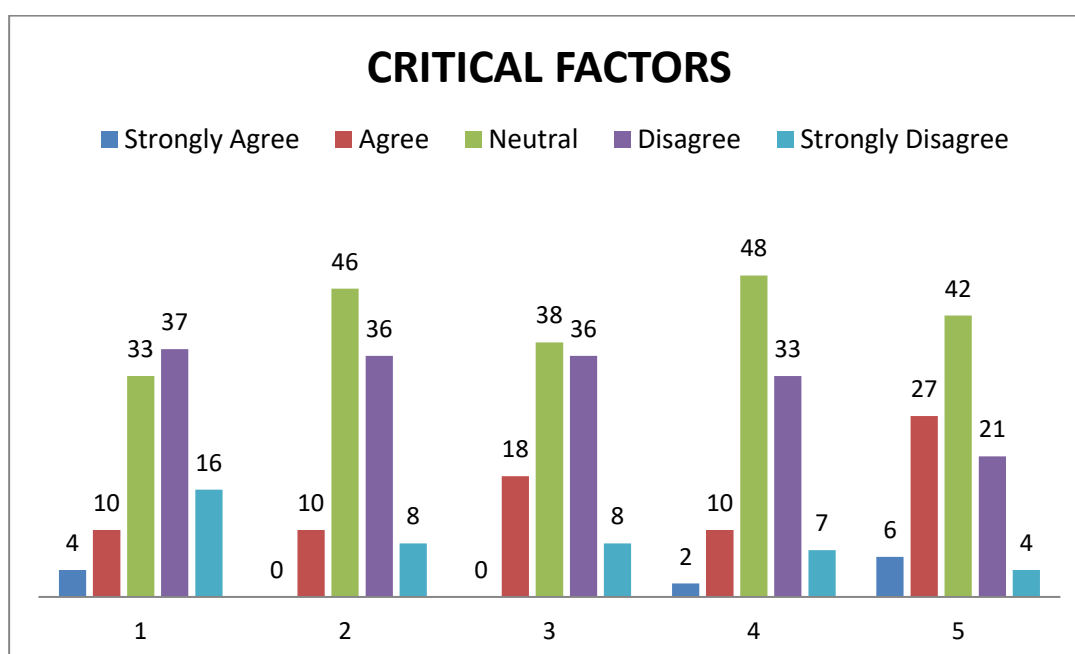


CHART 4.14: CRITICAL FACTOR IN MATERIAL HANDLING

INTERPRETATION

From the above table it is interpreted that

- 4% respondents strongly agree, 10% respondents agree, 33% respondents neutral, 37% respondents disagree, 16% respondents strongly disagree that critical factor as ordering system.
- 0% respondents strongly agree, 10% respondents agree, 46% respondents neutral, 36% respondents disagree, 8% respondents strongly disagree that critical factors as lack of information.
- 0% respondents strongly agree, 18% respondents agree, 38% respondents neutral, 36% respondents disagree, 8% respondents strongly disagree that the trouble in equipment.
- 2% respondents strongly agree, 10% respondents agree, 48% respondents neutral, 33% respondents disagree, 7% respondents strongly disagree that lack of equipments.
- 6% respondents strongly agree, 27% respondents agree, 42% respondents neutral, 21% respondents disagree, 4% respondents strongly disagree the route damage.

INFERENCE

- Majority (37%) disagree the critical factor as ordering system.
- Majority (46%) neutral that the factors as lack of information.
- Majority (38%) neutral that the trouble in equipments
- Majority (48%) neutral that lack of equipments
- Majority (42%) neutral about the route damage.

TABLE 4.15: IMPLEMENTATION OF ALTERNATIVE METHODS

S.No	Alternative methods	No. of respondents	Percentage
1.	Strongly Disagree	0	0
2.	Disagree	1	1
3.	Neutral	17	13
4.	Agree	74	59
5.	Strongly Agree	34	27
	TOTAL	126	100

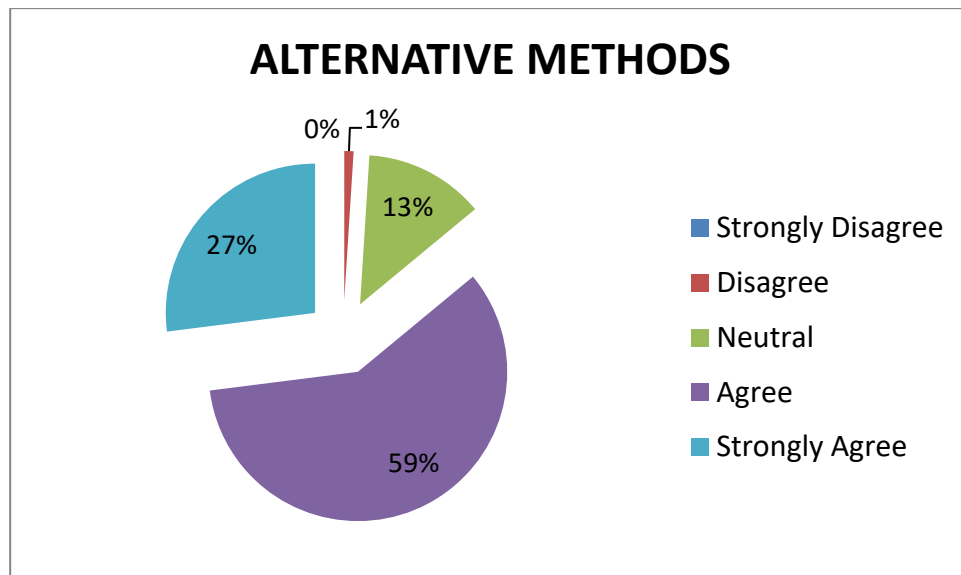


CHART 4.15: IMPLEMENTATION OF ALTERNATIVE METHODS

INTERPRETATION

From the above table it is interpreted that implementation of alternative methods were strongly disagreed by 0% and Disagreed by 1% and Neutral is 13% and Agree by 59% and 27% strongly agree.

INFERENCE

Majority (59%) of respondents Agree that they need alternative methods in material handling.

TABLE 4.16: EFFECTIVE RACK DISTANCE FOR MATERIAL MOVEMENT

S.No	Effective rack distance	No. of respondents	Percentage
1.	1.0 feet	0	0
2.	1.5 feet	14	11
3.	2.0 feet	79	63
4.	2.5 feet	33	26
	TOTAL	126	100

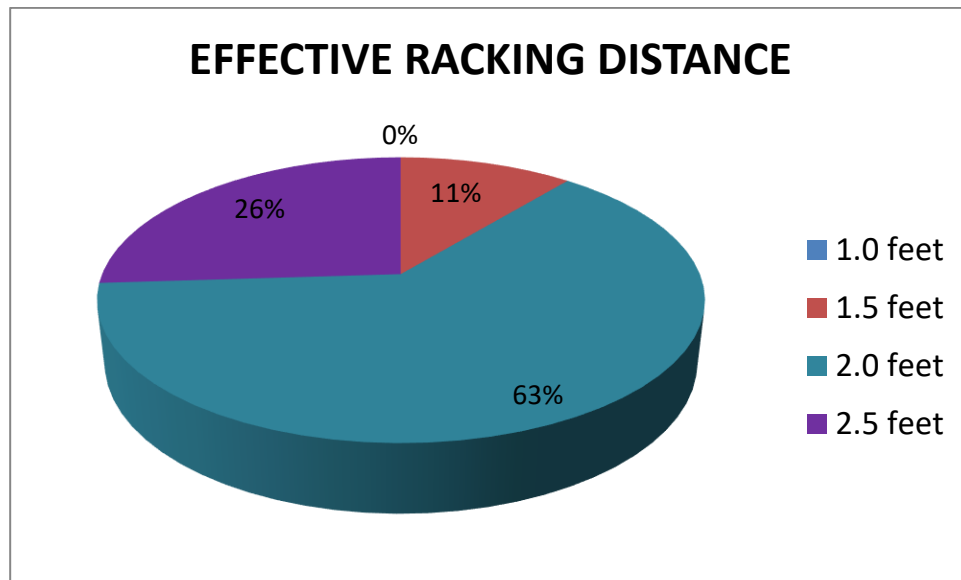


CHART 4.16: EFFECTIVE RACK DISTANCE FOR MATERIAL MOVEMENT

INTERPRETATION

From the above table it is interpreted that effective rack distance for 1.0 feet is 0% and for 1.5 feet is 11% and 2 feet is 63% whereas 26% for 2.5 feet.

INFERENCE

Majority (63%) of respondents confirmed that 2 feet is effective for material movement.

TABLE 4.17: DIFFICULTIES FACED WHILE LOADING ON FLEET

	Driver shortage	Safety of materials	Environmental control	Route optimisation	Driver behaviour
Strongly Agree	25	32	56	7	9
Agree	34	32	30	24	27
Neutral	26	30	12	56	48
Disagree	12	6	2	12	15
Strongly Disagree	3	0	0	1	1

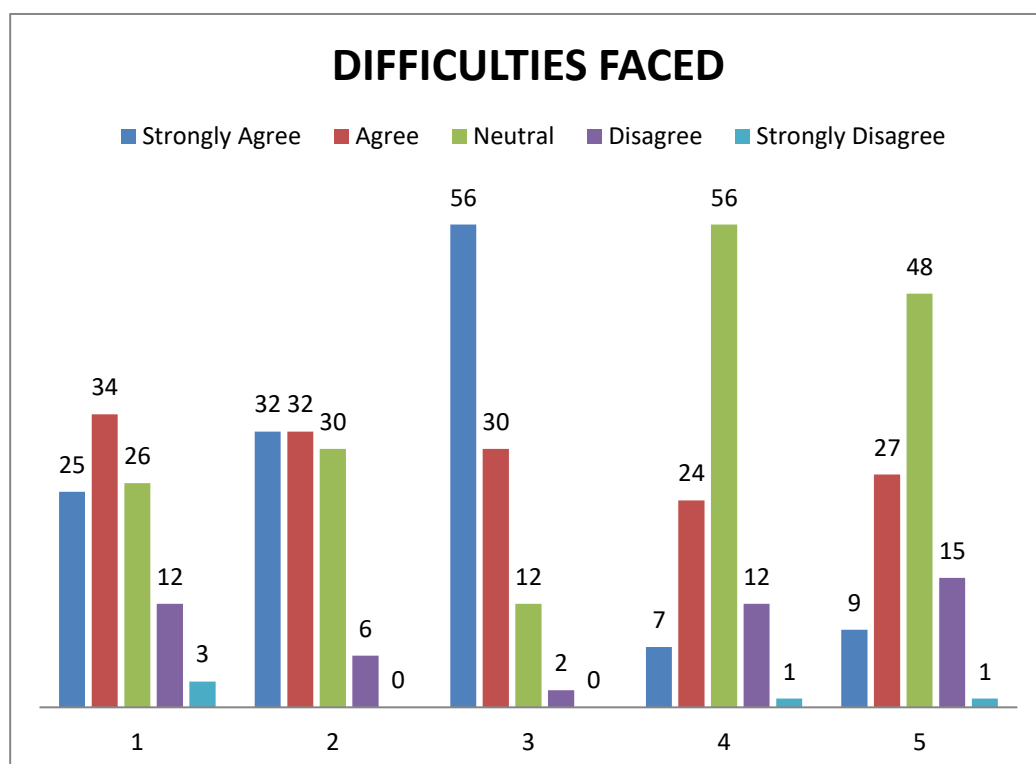


CHART 4.17: DIFFICULTIES FACED WHILE LOADING ON FLEET

INTERPRETATION

From the above table it is interpreted that

- 25% respondents strongly agree, 34% respondents agree, 26% respondents neutral, 12% respondents disagree, 3% respondents strongly disagree that the difficulties faced as driver shortage.
- 32% respondents strongly agree, 32% respondents agree, 30% respondents neutral, 6% respondents disagree, 0% respondents strongly disagree that as safety of materials.
- 56% respondents strongly agree, 30% respondents agree, 12% respondents neutral, 2% respondents disagree, 0% respondents strongly disagree that as environmental control
- 7% respondents strongly agree, 24% respondents agree, 56% respondents neutral, 12% respondents disagree, 1% respondents strongly disagree that route optimisation.
- 9% respondents strongly agree, 27% respondents agree, 48% respondents neutral, 15% respondents disagree, 1% respondents strongly disagree as driver behaviour.

INFERENCE

- Majority (34%) agree the difficulties faced as driver shortage.
- Majority (32%) strongly agree as safety of materials.
- Majority (56%) strongly agree that the environmental control.
- Majority (56%) neutral that route optimisation.
- Majority (48%) neutral about the driver behaviour.

TABLE 4.18: IMPROVEMENTS SHOULD BE MADE

S.No	Improvements	No. of respondents	Percentage
1.	Improve maintainance	21	17
2.	Proper training needed	19	15
3.	More equipment needed	50	40
4.	Everything is good	36	28
	TOTAL	126	100

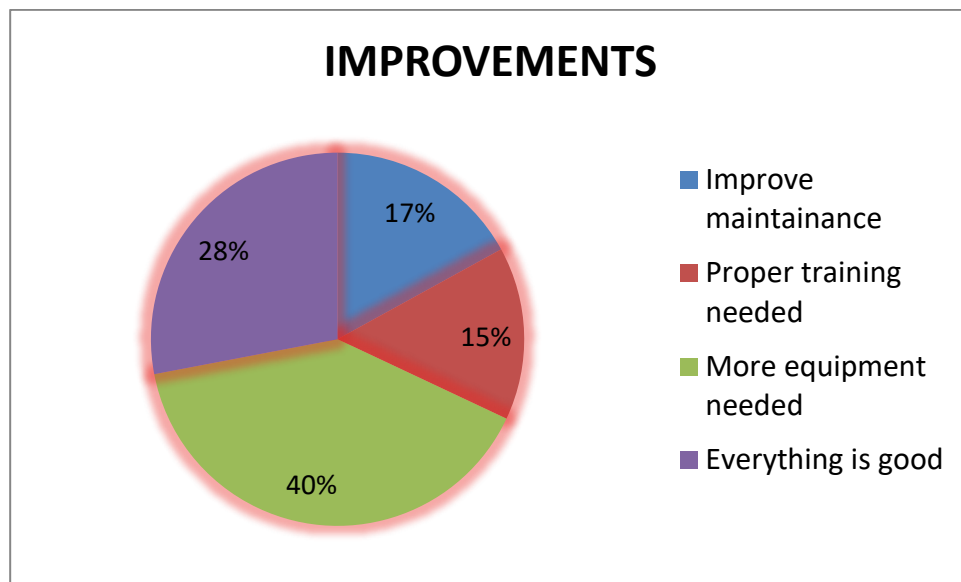


CHART 4.18: IMPROVEMENTS SHOULD BE MADE

INTERPRETATION

From the above table it is interpreted that the improvements should be made for maintainance is 17% and 15% for proper training needed and 40% for more equipment needed and 28% said everything is good.

INFERENCE

Majority (40%) of respondents agree that improvements has more equipment needed.

4.2 ANALYSIS USING CORRELATION

Correlations			
		Which problem you are facing frequently while handling the materials	Age
Which problem you are facing frequently while handling the materials	Pearson Correlation	1	-.118
	Sig. (2-tailed)		.187
	N	126	126
Age	Pearson Correlation	-.118	1
	Sig. (2-tailed)	.187	
	N	126	126

Here p value is -.118 Hence there is negative correlation between age and problem facing frequently while handling the materials.

4.3 ANALYSIS USING INDEPENDENT SAMPLE T-TEST

Null hypothesis H0: There is no significance difference between Gender and improvements in material handling

Alternate Hypothesis H1: There is significance difference between Gender and improvements in material handling

Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
What are the improvements should be made?	Male	114	2.09	1.102	.103
	Female	12	2.08	1.165	.336

Independent Samples Test										
		Levene's Test for Equality of Variance		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
What are the improvements should be made?	Equal variances assumed	.035	.852	.013	124	.990	.004	.336	-.661	.670
	Equal variances not assumed			.012	13.159	.990	.004	.352	-.754	.763

Here p value is 0.852 which is greater than 0.05, so accepting Null Hypothesis. Hence there is no significance difference between Gender and improvements in material handling.

4.4 ANALYSIS USING ONE WAY ANOVA

Null hypothesis H0: There is no significance difference between Educational qualification and Critical factor in material handling

Alternate Hypothesis H1: There is significance difference between Educational qualification and Critical factor in material handling

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
What do you consider to be the critical factor in material handling [Ordering system]	Between Groups	6.494	3	2.165	2.182	.094
	Within Groups	121.006	122	.992		
	Total	127.500	125			
What do you consider to be the critical factor in material handling [Lack of equipment]	Between Groups	1.669	3	.556	.849	.470
	Within Groups	79.990	122	.656		
	Total	81.659	125			
What do you consider to be the critical factor in material handling [Trouble in equipment]	Between Groups	.312	3	.104	.135	.939
	Within Groups	93.688	122	.768		
	Total	94.000	125			

What do you consider to be the critical factor in material handling [Lack of equipment]		
Duncana,b		
EDUCATIONAL QUALIFICATION	N	Subset for alpha = 0.05
		1
Specified course	3	2.00
Diploma	14	2.57
Under graduate	61	2.69
Post graduate	48	2.73
Sig.		.082
Means for groups in homogeneous subsets are displayed.		
a. Uses Harmonic Mean Sample Size = 9.050.		
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.		

What do you consider to be the critical factor in material handling [Trouble in equipment]		
Duncana,b		
EDUCATIONAL QUALIFICATION	N	Subset for alpha = 0.05
		1
Under graduate	61	2.62
Diploma	14	2.64
Specified course	3	2.67
Post graduate	48	2.73
Sig.		.818
Means for groups in homogeneous subsets are displayed.		
a. Uses Harmonic Mean Sample Size = 9.050.		
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.		

What do you consider to be the critical factor in material handling [Ordering system]			
Duncana,b			
EDUCATIONAL QUALIFICATION	N	Subset for alpha = 0.05	
		1	2
Diploma	14	2.21	
Under graduate	61	2.36	2.36
Post graduate	48	2.71	2.71
Specified course	3		3.33
Sig.		.324	.051
Means for groups in homogeneous subsets are displayed.			
a. Uses Harmonic Mean Sample Size = 9.050.			
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.			

Here p value is 0.094, 0.470 and 0.939 which is greater than 0.05, so accepting Null Hypothesis. Hence there is no significance difference between Educational qualification and Critical factor in material handling

CHAPTER - 5

FINDINGS, SUGGESTION

AND CONCLUSION

5.1 FINDINGS

- In **correlation test** there is negative correlation between age and problem facing frequently while handling the materials.
- In **Independent sample T – test** it proves that Experience have no impact on improvements in material handling.
- In **one way anova test** it proves that Educational qualification have no impact on Critical factor in material handling.
- Majority (44%) of the respondents are age between 21-30 years.
- Majority (91%) of the respondents are Male.
- Majority (49%) respondents is Undergraduate
- Majority (53%) respondents has 1 – 10 years of experience.
- Majority (63%) of respondents choosen the power trolleys.
- Majority (59%) of respondents said their current racking system as pallet racking.
- Majority (78%) of the respondents preferred automated.
- Majority (70%) of respondents said that its takes 15 -30 min to load and unload 400 pices of materials.
- Majority (44%) of respondents said that the equipment is more safety for handling materials is power trolleys.
- Majority (42%) of respondents are satisfied with storage method.
- Majority (37%) of respondents said none of the problem facing frequently.
- Majority (53%) of respondents Agree that they are satisfied with the equipments used in the company.
- Majority (34%) of respondents modern equipment requirement requirement is Bay crane.
- Majority (37%) disagree the critical factor as ordering system.
- Majority (46%) neutral that the factors as lack of information.
- Majority (38%) neutral that the trouble in equipments
- Majority (48%) neutral that lack of equipments

- Majority (42%) neutral about the route damage.
- Majority (59%) of respondents Agree that they need alternative methods in material handling.
- Majority (63%) of respondents confirmed that 2 feet is effective for material movement.
- Majority (34%) agree the difficulties faced as driver shortage.
- Majority (32%) strongly agree as safety of materials.
- Majority (56%) strongly agree that the environmental control.
- Majority (56%) neutral that route optimisation.
- Majority (48%) neutral about the driver behaviour.
- Majority (40%) of respondents agree that improvements has more equipment needed.

5.2 LIMITATIONS OF THE STUDY

The study suffers from certain limitations which are stated as follows:

- The findings and conclusions drawn are from samples taken from the employees.
- Sample size of the study is only 126.
- Some respondents hesitated and carelessly filled the questionnaire.

5.3 SUGGESTION

- Make a plan use as a team approach to design the material handling system.
- Standardize the consistent in your choise of storage equipment, including bins, shelves and racks as well as equipment used to transport materials.

- Reduce, combine or eliminate as much movement as possible.
- Wherever possible, move full pallets or containers to improve efficiency and reduce effort.
- Working in an organized space is more efficient than working around clutter.
- Employ automation wherever possible. Think of automated picking and put-away technologies.

5.4 CONCLUSION

Regarding various theories and empirical review from this term paper I conclude that material handling today are lifeblood of any industry and no government industry or organization or private organizations operates without them. So material handling increases the efficiency and effectiveness of the manufacturing organizations since it have many significant contributions which is finally result the reduction of production costs. By using material handling the organization can save the time, reduce the number of labours, save the space, improving working conditions etc., It is obviously that in order to achieve those objectives and to increase the organization performance the organization should set up the proper principles and guidelines to be followed that will make the organization to increase the production as well as to reduce the cost of production. Not only material handling increase the efficiency and effectiveness that result the reduction of costs in the production process but also have the great impact towards the improvement of industries in the country with leads the government to increase its income from those industries that influence the economic development.

REFERENCES

- **Arnold J.R.T., Chapman S.N., & Clive L.M. (2008).** Introduction to Materials.
- Management (6th ed.). **Englewood Cliffs**, NJ, USA: Prentice Hall.
- **Ballou, R.H. & Srrivastava, S.K. (2007).** Business Logistics Management.
- **Planning, Organizing, and Controlling the Supply Chain** (5th ed.). New Delhi, India: Prentice Hall
- **Ballou, R.H. (1992).** Business Logistics Management (3rd ed.). Englewood Cliffs, NJ, USA: Prentice Hall.
- **Bhardawj, M.K. (2002).** Glossary of Purchasing and Materials Management. New Delhi, India: Excel Books.
- **Bowersox, D. J., Closs, D.J. & Helferich, O.K. (1986).** Logistical Management (3rd ed.). New York, USA: Macmillan.
- **Glossary of Procurement Terms**, Chartered Institute of Procurement & Supply.
- **Institute of Management and Administration (2002)** IOMA Handbook of Logistics and Inventory Management. New York, USA: John Wiley & Sons.
- **Jones, J.V. (1998).** Integrated Logistics Support Handbook (Special Reprint ed.) New York, USA: McGraw Hill.
- **Refered websites** www.scribd.com, www.academia.edu, www.thebusinessartical.com, www.slideshare.net, www.wikipedia.com, www.bigthink.com, www.brightstrom.com.

ANNEXURE

QUESTIONNEIRE

A STUDY ON CHALLENGES FACED IN MATERIAL HANDLING MANAGEMENT AT MANUFACTURING INDUSTRIES CHENNAI

- 1) NAME:
- 2) AGE:
 - a) 21 – 30 b) 31 – 40 c) 41 – 50 d) 51 – 60
- 3) GENDER:
 - a) Male b) Female
- 4) EDUCATIONAL QUALIFICATION:
 - a) Diploma b) Under graduate
 - c) Post graduate d) Specified course
- 5) EXPERIENCE:
 - a) 1 – 10 b) 11 – 20 c) 21 – 30 d) 31 – 40
- 6) What type of equipments are frequently used for material handling of various types of materials.
 - a) Fork lift b) Power trolleys c) Hand trolleys d) Pallet stacker
- 7) What are the current racking system used
 - a) Bin location b) Two tires system
 - c) Open space d) Pallet racking
- 8) How much time is taken to load and unload the materials of 400 pieces manually?
 - a) Less than 15 min b) 15 – 30 min
 - c) 30 – 45 min d) More than 45 min
- 9) Which material handling system do you prefer?
 - a) Manual b) Automated

- 10) Which equipment is more safety for handling the materials?
- a) Fork lifting b) Pallet stacker
- c) Power trolleys d) hand trolleys
- 11) Are you satisfied with the existing method of storing the materials in company.
- a) Highly satisfied b) Satisfied c) Neutral
- d) Dissatisfied e) Highly Dissatisfied
- 12) Which problem you are facing frequently in handling the materials
- a) Shortage in supply of equipment b) Natural calamity
- c) Want of transport d) None
- 13) Are you satisfied with the equipment currently used in company (Likert Scaling)

SD D N A SA

- 14) What type of modern equipments are required for better material handling in company.
- a) Bay crane b) Scissor lift c) Fork lift d) Order picker
- 15) What do you consider to be the critical factor in Material handling

SA A N D SD

Ordering system

Lack of Information

Trouble in

Equipments Lack of

Equipments Route

damage

- 16) Do you agree with implementation of alternative methods in material handling (Likert scaling)

SD D N A SA

- 17) What rack distance could be effective for the equipments movement

a) 1.0 feet b) 1.5 feet c) 2.0 feet d) 2.5 feet

- 18) While loading the material on fleet what are the difficulties do you face.

SA A N D SD

Drivers shortage

Safety of materials

Environmental control

Route optimization

Driver behaviour

- 19) What are the improvements should be made?

a) Improve maintainance b) Proper training needed
c) More equipment needed d) Everything is good

- 20) Any suggestions about the material handling in your personal experience.

ANNEXURE - II

A STUDY ON CHALLENGES FACED IN MATERIAL HANDLING MANAGEMENT AT MANUFACTURING INDUSTRIES CHENNAI

MOHAN BALA B.A.

**SCHOOL OF MANAGEMENT STUDIES, SATHYABAMA INSTITUTE
OF SCIENCE AND TECHNOLOGY CHENNAI, TAMIL NADU, INDIA**

**Dr.D.VELUMONI PROFESSOR OF
SATHYABAMA INSTITUTE OF
SCIENCE AND TECHNOLOGY
CHENNAI, TAMIL NADU, INDIA**

Abstract

The highly competitive environment, linked to the globalization phenomena, demands from companies more agility, better performance and the constant search for cost reduction. The present study focused on improvements in internal materials handling management, approaching the case of a large company in the manufacturing industry. Materials handling is intrinsically associated with production flow. Because of this, it has direct influence on transit time, resources usage, and service levels. The objective was to evaluate, in a systematic way, the challenges faced in material handling management at manufacturing industries.

INTRODUCTION

The wealth of a country is measured by its gross national product the output of goods and services produced by the nation in a given time. Goods are physical objects, something we can touch, feel, or see. Services are the performance of some useful function such as banking, medical care, restaurants, clothing stores, or social services. But what is the source of wealth is measured by the amount of goods and services produced, but where does it come from Although we may have rich natural resources in our economy such as mineral deposits, farmland, and forests, these are only potential sources of wealth.

OBJECTIVES

- To identify the problems faced in Material handling.
- To find out the critical factors influencing in various stages of material handling.
- To reveal the measures to improve the flow of material handling for effective work condition.

INDUSTRY PROFILE

Companies in this industry manufacture a wide variety of goods; major product groups include food and beverages, chemicals, machinery, transportation equipment, and computers and electronics. **Globalization** has opened new markets and opportunities for manufacturers but has also created new challenges, including how to manage far-flung supply chains and distribution channels. Manufacturers have turned to digitalization to improve efficiency across every area of operations, including product development, design, production, distribution, and marketing. Large companies often have large economies of scale in purchasing, production, and marketing. Small companies can compete effectively by producing specialized products.

REVIEW OF LITERATURE

1. **Sara Frojd (2021)** Supplier development and how to improve suppliers order to delivery and learn from supplier integration.

2. **Rami Alghalayini (2020)** Improving an internal material handling system. A case study on a Swedish company in food industry.
3. **Jonatan gustafsson (2020)** Reverse logistics management in construction. A multiple case study examining the effects of organizational size.
4. **Arjun Balasubramaniam (2020)** Analysis and improvement of material handling in a high customized multi-variant product based production system.

RESEARCH DESIGN

Descriptive research is a study designed to depict the participants in an accurate way. More simply put, descriptive research is all about describing people who take part in the study.

SAMPLING DESIGN

The sampling technique undergone for this study is Convenience sampling. Convenience sampling is a type of non-probability sampling in which sample being drawn from that part of the population that can be reached.

DATA COLLECTION

- **Primary data** was collected by giving questionnaire to the employees. The completed questionnaires in all respects were taken for the study. Questionnaire used which consist of 20 questions.
- **Secondary data** used was the literature given which were reviewed for the purpose of attaining knowledge on the topic.

TOOLS

In this study, It has various statistical tools like percentage analysis and statistical test like Correlation, One way Anova & Independent sample T-Test.

AREA OF RESEARCH

SAMPLE SIZE : 126

LOCATION : CHENNAI

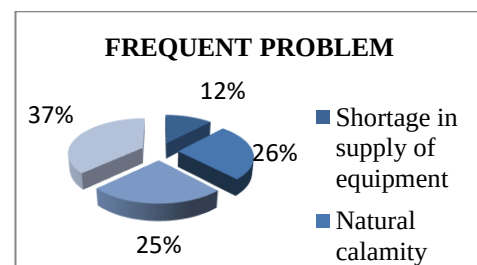
TARGET PEOPLE : EMPLOYEE

TYPE OF INDUSTRY : MANUFACTURING

DATA ANALYSIS & INTERPRETATION

TABLE 4.11: PROBLEM FACING FREQUENTLY IN HANDLING MATERIAL

S.No	Frequent problems	No. of respondents	Percentage
1.	Shortage in supply of equipment	15	12
2.	Natural calamity	33	26
3.	Want of transport	31	25
4.	None	47	37
	TOTAL	126	100



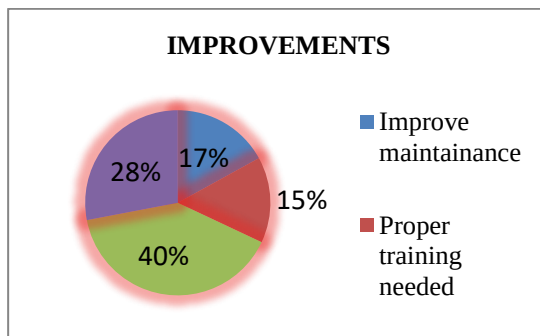
Interpretation

From the above table it is interpreted that the problem facing frequently where 12% is shortage in supply of equipment and 26% is Natural calamity and 25% is want of transport and 37% is None.

TABLE 4.18: IMPROVEMENTS SHOULD BE MADE

S.No	Improvements	No. of respondents	Percentage
------	--------------	--------------------	------------

1.	Improve maintainance	21	17
2.	Proper training needed	19	15
3.	More equipment needed	50	40
4.	Everything is good	36	28
	TOTAL	126	100

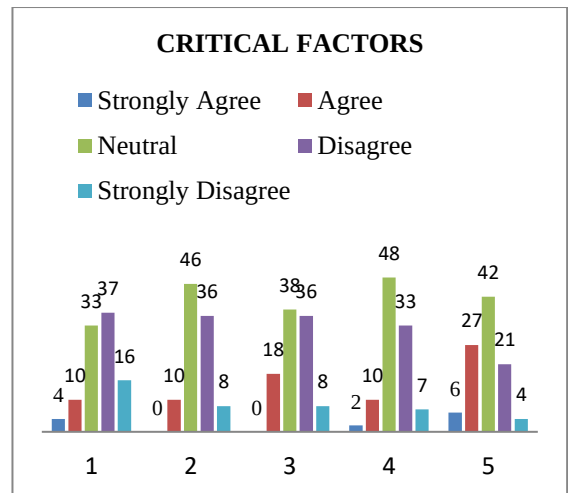


Interpretation

From the above table it is interpreted that the improvements should be made for maintainance is 17% and 15% for proper training needed and 40% for more equipment needed and 28% said everything is good.

TABLE 4.14: CRITICAL FACTOR IN MATERIAL HANDLING

	Ordering system	Lack of Information	Trouble in equipment	Lack of equipment	Route damage
Strongly Agree	4	0	0	2	6
Agree	10	10	18	10	27
Neutral	33	46	38	48	42
Disagree	37	36	36	33	21
Strongly Disagree	16	8	8	7	4



Interpretation

From the above table it is interpreted that

- 4% respondents strongly agree, 10% respondents agree, 33% respondents neutral, 37% respondents disagree, 16% respondents strongly disagree that critical factor as ordering system.
- 0% respondents strongly agree, 10% respondents agree, 46% respondents neutral, 36% respondents disagree, 8% respondents strongly disagree that critical factors as lack of information.
- 0% respondents strongly agree, 18% respondents agree, 38% respondents neutral, 36% respondents disagree, 8% respondents strongly disagree that the trouble in equipment.
- 2% respondents strongly agree, 10% respondents agree, 48% respondents neutral, 33% respondents disagree, 7% respondents strongly disagree that lack of equipments.
- 6% respondents strongly agree, 27% respondents agree, 42% respondents neutral, 21% respondents disagree, 4% respondents strongly disagree the route damage.

ANALYSIS USING CORRELATION

Correlations			
		Which problem you are facing frequently while handling the materials	Age
Which problem you are facing frequently while handling the materials	Pearson Correlation	1	-.118
	Sig. (2-tailed)		.187
	N	126	126
Age	Pearson Correlation	-.118	1
	Sig. (2-tailed)	.187	
	N	126	126

Here p value is -.118 Hence there is negative correlation between age and problem facing frequently while handling the materials.

ANALYSIS USING INDEPENDENT SAMPLE T-TEST

Null hypothesis H0: There is no significance difference between Gender and improvements in material handling

Alternate Hypothesis H1: There is significance difference between Gender and improvements in material handling

Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
What are the improvements should be made?	Male	11	2.09	1.102	.103
	Female	12	2.08	1.165	.336

Independent Samples Test		
	Levene's Test for Equality of Variance	t-test for Equality of Means

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
What are the improvements should be made?	Equal variances assumed	0.355	.852	0.13	124	.990	.004	.336	-.661	.670
	Equal variances not assumed			0.12	13.59	.990	.004	.352	-.754	.763

Here p value is 0.852 which is greater than 0.05, so accepting Null Hypothesis. Hence there is no significance difference between Gender and improvements in material handling.

ANALYSIS USING ONE WAY ANOVA

Null hypothesis H0: There is no significance difference between Educational qualification and Critical factor in material handling

Alternate Hypothesis H1: There is significance difference between Educational qualification and Critical factor in material handling

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
What do you consider to be the critical factor in material handling [Ordering system]	Between Groups	6.494	3	2.165	2.182	.094
	Within Groups	121.006	122	.992		
	Total	127.500	125			
What do you consider to be the critical	Between Groups	1.669	3	.556	.849	.470
	Within Groups	79.990	122	.656		

factor in material handling [Lack of equipment]	Total	81.659	125			
What do you consider to be the critical factor in material handling [Trouble in equipment]	Between Groups	.312	3	.104	.135	.939
	Within Groups	93.688	122	.768		
	Total	94.000	125			

What do you consider to be the critical factor in material handling [Lack of equipment]		
Duncana,b		
EDUCATIONAL QUALIFICATION	N	Subset for alpha = 0.05
		1
Specified course	3	2.00
Diploma	14	2.57
Under graduate	61	2.69
Post graduate	48	2.73
Sig.		.082
Means for groups in homogeneous subsets are displayed.		
a. Uses Harmonic Mean Sample Size = 9.050.		
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.		

What do you consider to be the critical factor in material handling [Trouble in equipment]		
Duncana,b		
EDUCATIONAL QUALIFICATION	N	Subset for alpha = 0.05
		1
Under graduate	61	2.62
Diploma	14	2.64
Specified course	3	2.67
Post graduate	48	2.73
Sig.		.818
Means for groups in homogeneous subsets are displayed.		
a. Uses Harmonic Mean Sample Size = 9.050.		

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

What do you consider to be the critical factor in material handling [Ordering system]			
Duncana,b			
EDUCATIONAL QUALIFICATION	N	Subset for alpha = 0.05	
		1	2
Diploma	14	2.21	
Under graduate	61	2.36	2.36
Post graduate	48	2.71	2.71
Specified course	3		3.33
Sig.		.324	.051
Means for groups in homogeneous subsets are displayed.			
a. Uses Harmonic Mean Sample Size = 9.050.			
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.			

Here p value is 0.094, 0.470 and 0.939 which is greater than 0.05, so accepting Null Hypothesis. Hence there is no significance difference between Educational qualification and Critical factor in material handling

SUMMARY OF FINDINGS

- In **correlation test** there is negative correlation between age and problem facing frequently while handling the materials.
- In **Independent sample T – test** it proves that Experience have no impact on improvements in material handling.
- In **one way anova test** it proves that Educational qualification have no impact on Critical factor in material handling.
- Majority (37%) of respondents said none of the problem facing frequently.
- Majority (40%) of respondents agree that improvements has more equipment needed.

- Majority (37%) disagree the critical factor as ordering system.
- Majority (46%) neutral that the factors as lack of information.
- Majority (38%) neutral that the trouble in equipments
- Majority (48%) neutral that lack of equipments
- Majority (42%) neutral about the route damage.

SUGGESTIONS

- Make a plan use as a team approach to design the material handling system.
- Standardize the consistent in your choice of storage equipment, including bins, shelves and racks as well as equipment used to transport materials.
- Reduce, combine or eliminate as much movement as possible.
- Wherever possible, move full pallets or containers to improve efficiency and reduce effort.
- Working in an organized space is more efficient than working around clutter.
- Employ automation wherever possible. Think of automated picking and put-away technologies.

CONCLUSION

Regarding various theories and empirical review from this term paper I conclude that material handling today are lifeblood of any industry and no government industry or organization or private organizations operates without them. So material handling increases the efficiency and effectiveness of the manufacturing organizations since it have many significant contributions which is finally result the reduction of production costs. By using material handling the organization can save the time, reduce the number of labours, save the space, improving working conditions

etc., It is obviously that in order to achieve those objectives and to increase the organization performance the organization should set up the proper principles and guidelines to be followed that will make the organization to increase the production as well as to reduce the cost of production. Not only material handling increase the efficiency and effectiveness that result the reduction of costs in the production process but also have the great impact towards the improvement of industries in the country with leads the government to increase its income from those industries that influence the economic development.

REFERENCE

- **Arnold J.R.T., Chapman S.N., & Clive L.M. (2008).** Introduction to Materials.
- Management (6th ed.). **Englewood Cliffs, NJ, USA: Prentice Hall.**
- **Ballou, R.H. & Srivastava, S.K. (2007).** Business Logistics Management.
- **Planning, Organizing, and Controlling the Supply Chain** (5th ed.). New Delhi, India: Prentice Hall
- **Ballou, R.H. (1992).** Business Logistics Management (3rd ed.). Englewood Cliffs, NJ, USA: Prentice Hall.
- **Glossary of Procurement Terms,** Chartered Institute of Procurement & Supply.