

**A STUDY ON IMPACT OF EFFICIENT MATERIAL HANDLING
METHOD AT LOURDU ASSOCIATES**

Submitted in partial fulfilment of the requirements for the
award of

MASTER OF BUSINESS ADMINISTRATION

by

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SCHOOL OF MANAGEMENT STUDIES

SATHYABAMA

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

Accredited with Grade “A++” by NAAC | 12B Status by UGC |

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December 2023



SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
CATEGORY - 1 UNIVERSITY BY UGC**

SCHOOL OF MANAGEMENT STUDIES

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of
P. ASWINI PONMALAR 42410077 who carried out the project entitled “**A Study
on impact of efficient material handling method at lourdu associates**”
under my supervision from September 2023 to December 2023.

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Submitted for Viva voce Examination held on _____

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DECLARATION

I **ASWINI PONMALAR.P. (42410077)** hereby declare that the Project Report entitled “**A Study on impact of efficient material handling method at lourdu associates**” done by me under the guidance of **DR. R. BLESSIE PATHMU** is submitted in partial fulfilment of the requirements for the award of Master of Business Administration degree.

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SIGNATURE OF THE CANDIDATE

ABSTRACT

Efficient material handling (EMH) is a critical aspect of manufacturing success. It encompasses the movement, storage, and control of materials throughout the production process, directly influencing productivity, cost-effectiveness, and product quality. Manufacturing companies face challenges in optimizing material handling processes, leading to inefficiencies, increased costs, and potential safety hazards. The objective of this project is to investigate the impact of implementing efficient material handling methods in a manufacturing company. 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. Therefore, the aim of this study was to design an in-house Material handling that could be efficient for the production it serves. Choosing the right material handling equipment for the specific needs of the manufacturing company, considering factors such as capacity, automation capabilities, and ergonomics. Providing comprehensive training to employees on EMH procedures, equipment operation, and safety guidelines to minimize the risk of accidents and injuries. Conduct a comprehensive review of relevant literature on EMH principles and best practices. Gather data on the current material handling practices in the manufacturing company. Analyze the current material handling processes to identify areas for improvement. 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. Develop a comprehensive EMH strategy tailored to the specific needs of the manufacturing company. Create a detailed implementation plan for the proposed EMH strategy. Monitor and evaluate the impact of the implemented EMH strategy on key performance indicators (KPIs). 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.

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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.

P. ASWINI PONMALAR



Lourdu Associates

Msrf Modular Lab Furniture & Equipments

21st October 2023

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Aswini Ponmalar pursuing MBA (Finance & OPS) from Sathyabama Institute of Science and Technology, Chennai has completed her internship training on the project "A study on Impact of efficient material handling" under the guidance S. John Stephen during the period from 18.09.2023 to 21.10.2023.

Her conduct and performance during the above mention period were found to be good.

We Wish Her All the Best

Yours Faithfully
For Lourdu Associates


S. John Stephen
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TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	ABSTRACT	iv
	LIST OF CONTENTS	vii
	LIST OF TABLES	ix
	LIST OF CHARTS	x
1	INTRODUCTION	
	1.1. Introduction	1
	1.2. History of material handling management	3
	1.3. Advantages of material handling	11
	1.4. Disadvantage of material handling	14
	1.5. Product profile	15
	1.6. Statement of the study	18
	1.7. Need of the study	18
	1.8. Objective of the study	18
	1.9. Scope of the study	19
2	REVIEW OF LITERATURE	
	2.1. Review of Literature	20
3	RESEARCH METHODOLOGY	
	3.1. Methodology	25
	3.2. Research design	25
	3.3. Sampling Technique	25
	3.4. Sources of data	25

	3.5. Structure of questionnaire	26
	3.6. Sample size	26
	3.7. Period of study	27
	3.8. Area of the study	27
	3.9. Need for the study	27
	3.10. Scope of the study	27
	3.11. Objectives of the study	27
	3.12. Hypothesis	28
	3.13. Tools for analysis	30
	DATA ANALYSIS AND INTERPRETATION	
4	4.1. Percentage Analysis	30 – 51
	4.2. Correlation	52
	4.3. Independent sample t-test	52
	4.4.one way Anova	53
	FINDINGS, SUGGESTIONS AND CONCLUSION	
5	5.1. Findings of the Study	55
	5.2. Limitations of the study	56
	5.3. Suggestion	57
	5.4. Conclusion	57
	REFERENCES	59
	ANNEXURE I – Questionnaire	61

LIST OF TABLES

TABLE NO.	PARTICULARS	PAGE NO.
4.1	Age of the respondents	30
4.2	Gender of the respondents	31
4.3	Educational qualification respondents	32
4.4	Experience of the respondents	33
4.5	Method of order picking strategies	34
4.6	Current racking system used	35
4.7	Preferred material handling system	36
4.8	Time taken to load and unload materials	37
4.9	Frequent problems	38
4.10	Method of more operationally efficient	39
4.11	Problem facing frequently in handling material	40
4.12	Satisfied with the equipment used in company	41
4.13	Gender-based differences in efficiency	42
4.14	Critical factor in material handling	43
4.15	Varies tasks significantly based on the age	45
4.16	Efficient material handling to significant cost savings	46
4.17	Positively correlated	47
4.18	Improvements efficient material handling method	48
4.19	Implementing efficient material handling practices	49
4.20	Implementing product quality	50

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4.10	Method of more operationally efficient	39
4.11	Problem facing frequently in handling material	40
4.12	Satisfied with the equipment used In company	41
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4.14	Critical factor in material handling	43
4.15	Varies tasks significantly based on the age	45
4.16	Efficient material handling to significant cost savings	46
4.17	Positively correlated	47
4.18	Improvements efficient material handling method	48
4.19	Implementing efficient material handling practices	49
4.20	Implementing product quality	50

CHAPTER - 1

INTRODUCTION

1.1 INTRODUCTION

Material management is the branch of manufacturer that deals with the tangible components of efficient material handling. Specifically, this covers the acquisition of spare parts and replacement quality control of purchasing and ordering such parts, and the standards involved in ordering shipping and warehousing the said parts, it is the planning, directing, controlling and coordinating those activities which are concerned with material and inventory requirements from the point of their inception to their introduction into the manufacturing process, it begins with the determination of materials quality and quantity and ends with its issuance to per the schedule and at the lowest cost. Material management can deal with campus planning and building design for the movement of materials or with logistics that deal with the tangible components of an efficient material handling. Specifically, this covers the acquisition of spare parts and replacements quality control of purchasing and ordering such parts and the standards involved in ordering shipping and warehousing the said parts.

The goal of material management is to provide an unbroken chain of components for production to manufacture goods on time for the customer's base. The material department is charged with releasing materials to a supply base, ensuring that the materials are delivered on time to the organization using the correct carrier, materials is generally measured by accomplishing on time delivery to the customer on time delivery from the supply base, attaining a freight budget, inventory shrink management and inventory accuracy. The material department is also charged with the responsibility of managing new launches.

In some company's materials management is also charged with the procurement of materials by establishing and managing an efficient material handling base.

Other companies the procurement and management of the supply base is the responsibility of a separate department. The purchasing department in their responsible for the purchased price variance from the efficient material handling base.

There are no standards for material management that are practiced from organization to organization. Most companies use ERP systems such as SAP, Oracle, BPCS, MAPICS, and other systems to manage materials control afford. Small concerns that do not have or cannot afford ERP system use a form of spreadsheet application to manage material. Some other construction projects use barcode and GPS material management system like Trackem material management is not a science and depending upon the relevance and importance that organization officials place upon controlling material flow. The level of expertise changes some companies place material management on a level whereby there is a logistics director, other companies see the importance level as managing at the plant level by hiring an inventory manager or material manager, and still other companies employ the concept that the supervisors in the plant are responsible accompanied by a planner. Services are the performance of some useful function such as banking, medical care, restaurants, clothing stores, or social services. 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. 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 number of products a company could ship, but demand still made this mode costly and required another solution.

1.2.1 INTRODUCTION OF MATERIALS HANDLING

Materials handling is loading, moving and unloading of materials. To do it safely and economically, different types of tackles, gadgets and equipment are used, when the materials handling is referred to as mechanical handling of materials.

Since primitive men discovered the use of wheels and levers, they have been moving materials mechanically. Any human activity involving materials need materials handling. However, in the field of engineering and technology, the term materials handling is used with reference to industrial activity. In any industry, be it big or small, involving manufacturing or construction type work, materials have to be handled as raw materials, intermediate goods or finished products from the point of receipt and storage of raw materials, through production processes and up to finished goods storage and dispatch points.

- Materials handling as such is not a production process and hence does not add to the value of the product.
- It also costs money; therefore, it should be eliminated or at least reduced as much as possible.
- However, the important point in favour of materials handling is that it helps production.
- Depending on the weight, volume and throughput of materials, mechanical handling of materials may become unavoidable.

Based on the need to be of optimum design and application specific to different type of industries, materials handling can be as diverse as industries themselves. As a consequence, unfortunately, there is no universally accepted definition of materials handling. One of the definitions adopted way back by the American Materials Handling Society is: Materials handling is the art and science involving the moving, packaging and storing of substances in any form. Some of the other definitions are:

- **Materials handling is the movement and storage of materials at the lowest possible cost through the use of proper methods and equipment.**
- **Materials handling is the moving of materials or product by any means, including storage, and all movements except processing operations and inspection.**
- **Materials handling is the art and science of conveying, elevating, positioning, transporting, packaging and storing of materials.**

In one of the definitions, all the functions of materials handling have been referred to which are conveying, elevating, positioning, transporting, packaging and storing. Storage or warehousing is very much a part of materials handling. Materials handling uses different equipment and mechanisms called materials handling equipment. Though in one of the definitions, processing operations and inspection have been specifically excluded from scope of materials handling operations, it is worth mentioning that in specific cases processing or inspection of materials may be accomplished simultaneously with handling activity. One definition also covers the important objective of materials handling which is lowest cost solution.

The essential requirements of a good materials handling system may be summarized as:

- i. Efficient and safe movement of materials to the desired place.
- ii. Timely movement of the materials when needed.
- iii. Supply of materials at the desired rate.
- iv. Storing of materials utilising minimum space.
- v. Lowest cost solution to the materials handling activities.

Functional scope of materials handling within an industry covers the following:

- i. Bulk materials as well as unit materials handling. Bulk handling is particularly relevant in the processing, mining and construction industries. Unit materials handling covers handling of formed materials in the initial, intermediate and final stages of manufacture.

- ii. Industrial packaging of in-process materials, semi-finished or finished goods, primarily from the point of view of ease and safety of handling, storage and transportation. However, consumer packaging is not directly related to materials handling.
- iii. Handling of materials for storage or warehousing from raw materials to finished product stage.

The variety of devices for handling materials is also large. Simple shop trucks on wheels, electronic sorting conveyors and automatic finishing conveyors are just a sample. Initial experimentation with robot technology is underway in a few firms.

The variety and complexity of the equipment used in making furniture creates the need for organized and effective maintenance programs. Machines and devices must be able to run in a manner that gets the job done safely.

The Unit Load Concept

A unit load is either a single unit of an item, or multiple units so arranged or restricted that they can be handled as a single unit and maintain their integrity.

Advantages of unit loads:

1. More items can be handled at the same time, thereby reducing the number of trips required and, potentially, reducing handling costs, loading and unloading times, and product damage.
2. Enables the use of standardized material handling equipment.

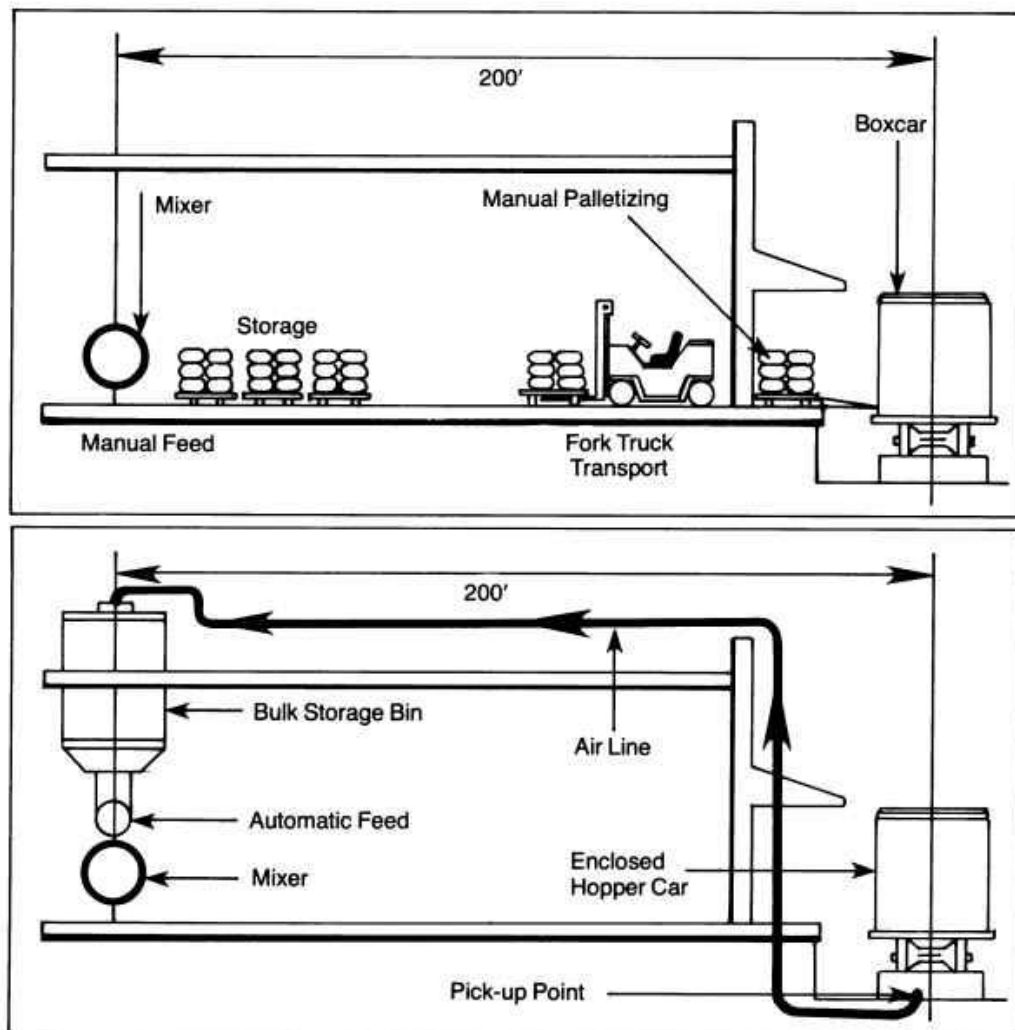


Figure 1. Unit vs. bulk handling of material.

Disadvantages of unit loads:

1. Time spent forming and breaking down the unit load.
2. Cost of containers/pallets and other load restraining materials used in the unit load.
3. Empty containers/pallets may need to be returned to their point of origin.

Basic ways of restraining a unit load:

- Self-restraining—one or more units that can maintain their integrity when handled as a single item (e.g., a single part or interlocking parts).
- Platforms—pallets (paper, wood, plastic, metal), skids (metal, plastic).
- Sheets—slipsheets (plastic, cardboard, plywood).
- Reusable containers—tote pans, pallet boxes, skid boxes, bins, baskets, bulk containers (e.g., barrels), intermodal containers.

- Disposable containers—cartons, bags, crates.
- Racks—racks.
- Load stabilization—strapping, shrink-wrapping, stretch-wrapping, glue, tape, wire, rubber bands.

Basic ways of moving a unit load:

- Use of a lifting device under the mass of the load (e.g., a pallet and fork truck).
- Inserting a lifting element into the body of the load (e.g., a coil of steel).
- Squeezing the load between two lifting surfaces (e.g., lifting a light carton between your hands, or the use of carton clamps on a lift truck).
- Suspending the load (e.g., hoist and crane).

Unit Load Design

Unit loads can be used both for in-process handling and for distribution (receiving, storing, and shipping).

Unit load design involves determining the:

1. Type, size, weight, and configuration of the load.
2. Equipment and method used to handle the load.
3. Methods of forming (or building) and breaking down the load.

Unit Load Formation Equipment

Self-restraining (no equipment)

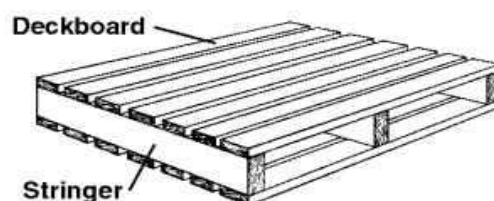
One or more items that can maintain their integrity when handled as a single item (e.g., a single part or interlocking parts).

Pallets

Platform with enough clearance beneath its top surface (or face) to enable the insertion of forks for subsequent lifting purposes.

Materials: Wood (most common), paper, plastic, rubber, and metal.

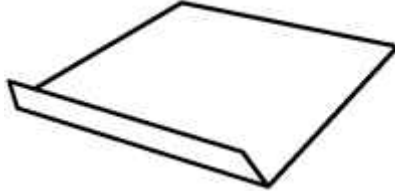
Size of pallet is specified by its depth (i.e., length of its stringers or stringer boards) and its width (i.e., length its deckboards)—pallet height (typically 5 in.) is usually not specified.



Slipsheets

Thick piece of paper, corrugated fiber, or plastic upon which a load is placed.

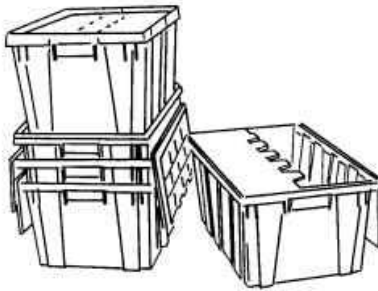
Handling method: tabs on the sheet are grabbed by a special push/pull lift truck attachment.



Tote pans

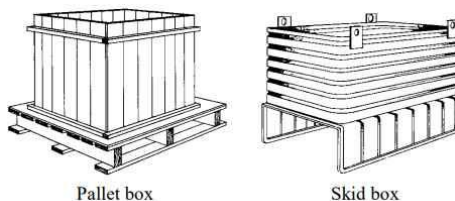
Reusable container used to unitize and protect loose discrete items.

Typically used for in-process handling Returnable totes provide alternative to cartons for distribution Can be nested for compact storage when not in use.



Pallet/skid boxes

Reusable containers used to unitize and protect loose items for fork/platform truck handling. Pallet box sometimes referred to as a “bin pallet”.

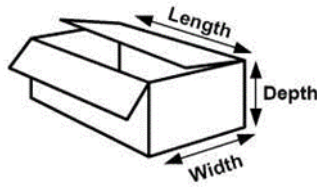


Cartons

Disposable container used to unitize and protect loose discrete items.

Typically used for distribution,

Dimensions always specified as sequence: Length × Width × Depth, where length is the larger, and width is the smaller, of the two dimensions of the open face of the carton, and depth is the distance perpendicular to the length and width.



Bags

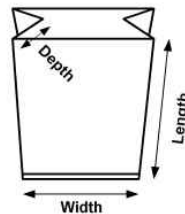
Disposable container used to unitize and protect bulk materials

Typically used for distribution,

Polymerized plastic ("poly") bags available from light weight (1 mil.) to heavy weight (6 mil.) in flat and gusseted styles.

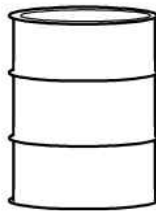
Dimensions of bag specified as: Width × Length, for flat bags, and

Width × Depth (half gusset) × Length, for gusseted bags.



Bulk load containers

Reusable container used to unitize and protect bulk materials Includes barrels, cylinders, etc. Used for both distribution and in-process handling.



Palletizers

Used for load formation three general methods of building (or "palletizing") unit loads.

Manual palletizing

Operators arrange items into the desired pattern used to form the unit loads.



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 mean 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 fulfilment. 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. 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 calibre 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 PRODUCTS PROFILE

PRICILLAB EQUIPMENTS

Our firm has been one of the leading manufacturers and suppliers of laboratory furniture and its associated accessories since 2001. our firm supplies and installs laboratory furniture that is elegantly designed to change your laboratory environment.

We have been in business over 22 years of manufacturing and supplying a wide range of superior quality Modular Lab Furniture, Modular Office Furniture, Modular Cabins, Clean Room, Hospital Furniture, Modular School, College Furniture and Laboratory Equipment.

Located at Trichy –near Airport in Tamil Nadu has its own manufacturing facilities including imported powder coating plants with the latest technology. our FIRM has furnished laboratories such as Pharmaceutical, Health care, Schools and Colleges.

Being an ISO 9001:2015 Certified company and a registered MSME unit, we understand the importance of well-designed lab furniture and reliable fume hoods in ensuring smooth work flow and productive work environment. Hence our technical experts assist our clients in planning, designing and budgeting from concept to completion.

Our firm is well known to provide customized solutions in the most efficient and economical way. we believe not only giving shape but also long-lasting customer relations.

Pricillab Equipment's manufactures and exports a wide array of laboratory furniture, fume hoods and fume cupboards.

1.5.1 Fume Hoods / Fume cupboards:

- Fume Hoods-Cluster,
- Bench Top Hoods,
- Slim line Hoods,
- Distillation Low Height Hoods,
- Walk-In Hoods,
- Radio Isotope Hoods,
- Perchloric Acid Hoods,
- Polypropylene Hoods,
- Fiberglass Hoods, etc.



Fig 1: Modular lab, Fume hood & Spot Extraction System



Fig 2: Computer Lab Steel Power Coated



Fig 3: Drafting Storage Cabin

1.5.2 Laboratory Furniture/Laboratory Benches:

- Island Benches,
- Laboratory Wall Benches,
- Laboratory Work Benches,
- Laboratory Bench with Overhead Storage,
- Exterior Carcass/Module Panels,
- Laboratory Equipment,
- Laboratory Glass Ware,
- Laboratory Cupboards,
- Storage,
- Cabinets,
- Laboratory Valves,
- Work Tops, etc.



Fig 4: laboratory Glass Ware

1.6 STATEMENT OF THE PROBLEM

- Inefficient material handling methods at Lourdu Associates lead to increased operational costs, delays in production, and potential risks to workplace safety.
- Current material handling processes lack optimization, causing bottlenecks in inventory management, storage inefficiencies, and suboptimal transportation methods.
- These inefficiencies hinder overall productivity, affect cost-effectiveness, and pose safety concerns within the workplace.

1.7 NEED OF THE STUDY

- To enhance operational efficiency by optimizing material handling methods.
- To identify opportunities for cost reduction and resource optimization within material handling processes.
- To improve overall productivity by streamlining material flow and reducing inefficiencies.
- To address safety concerns related to inefficient material handling practices, ensuring a safer work environment.

1.8 OBJECTIVES OF THE STUDY:

1.8.1 PRIMARY OBJECTIVES

The primary objectives of this study are impact of efficient material handling method.

1.8.2 SECONDARY OBJECTIVES

- To identify the key areas of material handling that contribute to operational inefficiencies and cost overruns in the manufacturing process.
- To find out the critical factors influencing in various stages of material handling.

- To assess the impact of implementing efficient material handling practices on productivity, inventory management, and product quality.

1.9 SCOPE OF THE STUDY

- This study will specifically concentrate on analysing and improving material handling practices at Lourdu Associates.
- It encompasses inventory management, storage, transportation, and associated processes within the company's operations.
- The study focuses solely on material handling methods and might not address broader operational issues.

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.

Maximilian Belin; Elvira Sjöström; (2023) When developing a material handling system (MHS) it is crucial to the various aspects for each developing step to increase the efficiency of the MHS. This Master s thesis is aimed to identify conceptual solutions of a MHS and analyse the advantages and challenges for each of the developed concepts.

Wilma fager; hanna Engberg; (2023) This thesis focuses on the investigation of material usage in the production processes of electrical motors and generators at ABB Machines, a company based in Västerås, Sweden. The study aims to understand the reasons for the occurrence of excess material after the assembly of a motor or generator and explore possible solutions to minimize its occurrence.

Ziao Wang's (2023) Workers in material handling tasks often suffer from work-related musculoskeletal disorders (WMSDs) caused by inaccurate work postures or the lifting of excessively heavy loads. Therefore, effective ergonomic assessment of workers is needed to improve worker productivity while reducing the risk of musculoskeletal disorders.

Sepideh sadat sobhgol (2023) The project addresses the challenges of time-consuming back-office support and interpreting customer requests using different vocabularies. As partners involved in the project, we are developing a semi-automated approach to the creation of an ontology for the material handling

Kehinde M. Adeleke (2023) Automated material handling system, in order to minimize the idle time and increase in throughput of machines that are employed in processing bulk materials, a more efficient way is to have material distrusted in batches to other sections for further processing.

Dushyant Kumar (2023) The study focuses on the role of materials handling in materials management of a manufacturing organization focusing attention on max aluminium industry Owerri the study does not exceed the area of study.

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

Sharma & Mishra (2021)-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.

T.K. Jack (2021)- 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.

C.N. Agulanna et al. (2021)-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.

Ivica Veza et al. (2020)-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.

Rami Alghalayini (2020) Improving an internal material handling system. A case study on a Swedish company in food industry.

Jonatan gustafsson (2020) Reverse logistics management in construction. A multiple case study examining the effects of organizational size.

Arjun Balasubramaniam (2020) Analysis and improvement of material handling in a high customized multi-variant product-based production system.

Liu & Li (2020)-In this study analysed 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.

Jain et al. (2019)-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.

Naveen Kumar & Dal Gobind Mahto (2019)- This paper presents the productivity improvement through process analysis for optimizing assembly line in packaging industries.

Md. Ahasan Habib et al. (2019)-In this study it was observed that productivity of Apparel manufacturing system is improved by using value stream mapping and production control tools.

A. P. Bahale, Dr.S.S. Deshmukh (2018)-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 problem areas are the lack of space and lack of appropriate material handling equipment's.

Bordoloi M.P., Nath T. (2018)-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.

Kavishwar Roy Gaurh, et al. (2018)-In this study it was highlighted the MCDM techniques for the selection of material handling equipment in the Automobile industry.

A.A. Gulghane, Prof P.V. Khandve (2017)-This study highlights management construction materials and control of construction waste in construction industry. Construction waste is one of the major problems in construction industry. Poor handling of construction material affects the overall productivity performance.

Ajay RV- Deepan K. G. (2017)- In this paper a case study of Rack piston 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.

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.

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.

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. METHODOLOGY:

Research methodology is mainly needed for the purpose of framing the research process and the designs and tools that are to be used for the project purpose. Research methodology helps to find employee engagement in the company. This time research methodology is framed for the purpose of finding the level of employees in the current system. To know the attitude of the employee's data is collected through a structured questionnaire.

3.2. RESEARCH DESIGN:

Descriptive 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.

3.3. SAMPLING TECHNIQUE:

Convenience sampling method

A convenience sample is one of the main types of non-probability sampling methods. A convenience sample is made up of people who are easy to reach.

3.4. SOURCES OF DATA:

In this research, internal and external source of data are used. Collected raw materials through facts and figure of researcher's works. Collecting data from company records and document, these are all internal data and other data are external.

In data collection, there are 2 types

•**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.

3.5. STRUCTURE OF QUESTIONNAIRE:

Questionnaire was divided into two sections. First part was designed to know the general information about employees and the second part contained the respondent 's opinions about employee engagement at Lourdu Associates

- **Basic Introduction**
- **Personal Details**
- **Research related Questions**
- **Perception Questions**
- **Likert Scaling Questions**

3.6. SAMPLE SIZE

A questionnaire was circulated to through Google forms for which 96 responded for the survey.

SAMPLE DESIGN

It is a particular definite plan formulation before collecting the data from population.

The research should select a particular sample. In sampling, there are 2 types- probability sampling and non-probability sampling. In this research, only nonprobability sampling is used.

SAMPLING

- Sample unit : Employees
- Sample size : 96 respondents
- Type of industry : manufacturing

3.7. PERIOD OF STUDY

The period of the study is to determine that research process is carried out for 1 months.

3.8. AREA OF THE STUDY:

The targeted people are the employees worked and customer in lourdu associates.

3.9. NEED FOR THE STUDY:

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

3.10. SCOPE OF THE STUDY:

- The study restricted to the Employees in manufacturing industries.
- The study measures data only through questionnaire.
- The study will examine the impact of efficient material handling methods on various production processes.
- The study will assess the impact of automation, technology integration, and layout optimization on material handling efficiency.
- The study will measure the impact of efficient material handling methods on productivity, cost reduction, safety, and customer satisfaction.
- Data will be collected through surveys, case studies, and analysis of operational data.

3.12. HYPOTHESIS:

HYPOTHESIS – 1

Null Hypothesis (H0): There is no significance difference between educational qualification and Critical factor in material handling.

Alternative Hypothesis (H1): There is a significant difference between educational qualification and critical factor in material handling.

HYPOTHESIS - 2

Null Hypothesis (H0): There is no significant relationship between gender and efficient material handling practices within a manufacturing organization.

Alternative Hypothesis (H1): There is a significant relationship between gender and efficient material handling practices within a manufacturing organization.

3.13. TOOLS FOR ANALYSIS:

Questionnaire was created in order to receive the necessary response required from the sample to achieve the research objective. The tools used for this are

3.13.1. PERCENTAGE ANALYSIS

Research questions are always answered with a descriptive statistic: generally, either percentage or mean. Percentage is appropriate when it is important to know how many of the participants gave a particular answer. Generally, percentage is reported when the responses have discrete categories.

3.13.2. ANALYTICAL TOOLS (SPSS)

Tool for testing the Hypothesis (SPSS)

Anova

Correlation

Independent sample t-test

▪ ANOVA TEST

One-Way ANOVA ("analysis of variance") compares the means of two or more independent groups in order to determine whether there is statistical evidence that the associated population means are significantly different. One-Way ANOVA is a parametric test. This test is also known as: One-Factor ANOVA.

▪ CORRELATION

Correlation analysis in research is a statistical method used to measure the strength of the linear relationship between two variables and compute their association.

- **PEARSON CORRELATION**

The Pearson correlation coefficient (r) is the most common way of measuring a linear correlation. It is a number between -1 and 1 that measures the strength and direction of the relationship between two variables.

CHAPTER – 4

DATA ANALYSIS AND INTERPRETATION

4.1 PERCENTAGE ANALYSIS

TABLE 4.1 AGE OF RESPONDENTS

S. No	Age	No. of respondents	Percentage
1.	20 - 25	23	24%
2.	26 - 30	35	37%
3.	31 - 35	29	30%
4.	Above 35	9	9%
	TOTAL	96	100%

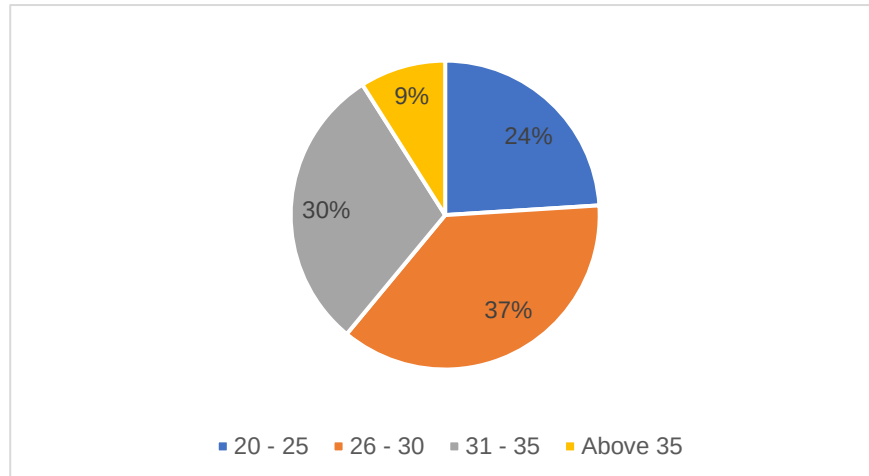


CHART 4.1: AGE OF RESPONDENTS

INTERPRETATION

From the above table it is interpreted that the number of respondents from age 20-25 are 24%, between 26-30 age of respondents are 37%, between 31-35 respondents are 30%, between Above 35 respondents are 9%.

INFERENCE

Majority (37%) of the respondents are age between 26-30 years.

TABLE 4.2: GENDER OF RESPONDENTS

S. No	Gender	No. of respondents	Percentage
1.	Male	66	64%
2.	Female	30	36%
	TOTAL	96	100%

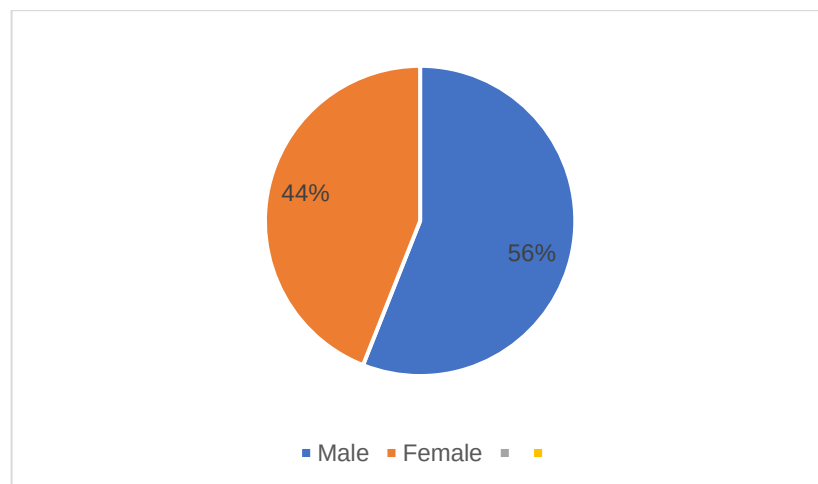


CHART 4.2: GENDER OF RESPONDENTS

INTERPRETATION

From the above table it is interpreted that the number of male respondents is 64% and female respondents is 36%.

INFERENCE

Majority (64%) of the respondents are Male.

TABLE 4.3: EDUCATIONAL QUALIFICATION OF THE RESPONDENTS

S. No	Educational Qualification	No. of respondents	Percentage
1.	Diploma	14	15%
2.	Under graduate	46	48%
3.	Post graduate	32	33%
4.	Specified course	4	4%
	TOTAL	90	100%

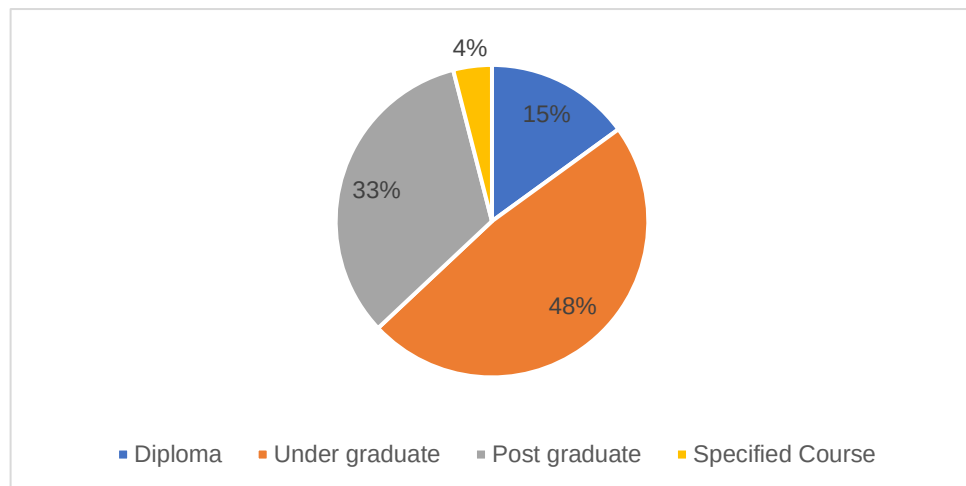


CHART 4.3: EDUCATIONAL QUALIFICATION OF THE RESPONDENTS

INTERPRETATION

From the above table it is interpreted that the number of respondents were 15% is Diploma and 48% is Under graduate and 33% is Post graduate whereas 4% for Specified course.

INFERENCE

Majority (48%) respondents is Undergraduate.

TABLE 4.4: EXPERIENCE OF THE RESPONDENTS

S. No	Experience	No. of respondents	Percentage
1.	0 - 2 years	17	18%
2.	2 - 5 years	35	37%
3.	5 - 10 years	33	34%
4.	About 10 years	11	12%
	TOTAL	96	100%

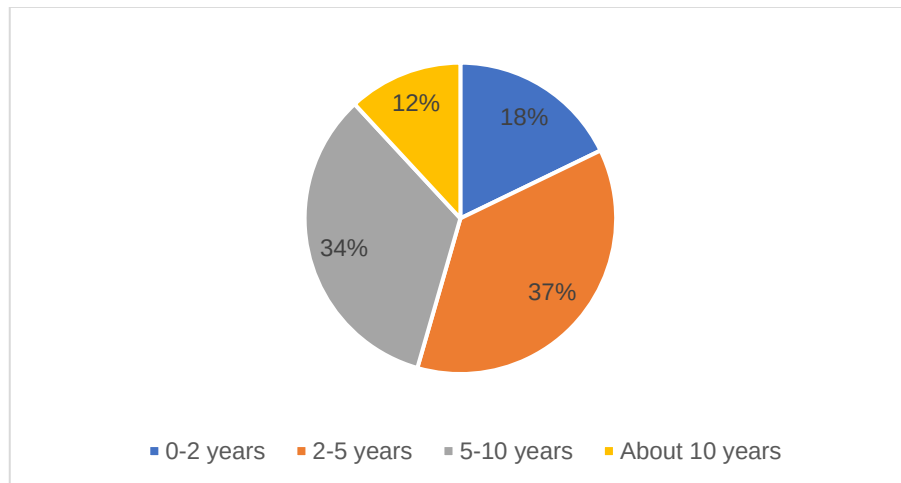


CHART 4.4: EXPERIENCE OF THE RESPONDENTS

INTERPRETATION

From the above table it is interpreted that the number of respondents Experience were 0 – 2 is 18% and 2 – 5 is 37% and 5 – 10 is 34% whereas Above 10 is 12%.

INFERENCE

Majority (37%) respondents has 2 – 5 years of experience.

TABLE 4.5: OLDER WORKERS HAVE A BETTER UNDERSTANDING OF ORDER PICKING STRATEGIES AND TECHNIQUES TO MINIMIZE PICKING ERRORS AND OPTIMIZE PICKING TIMES.

S. No	Method of order picking strategies	No. of respondents	Percentage
1.	Strongly Disagree	6	6%
2.	Disagree	20	21%
3.	Neutral	31	32%
4.	Agree	29	30%
5.	Strongly Agree	10	10%
	TOTAL	96	100%

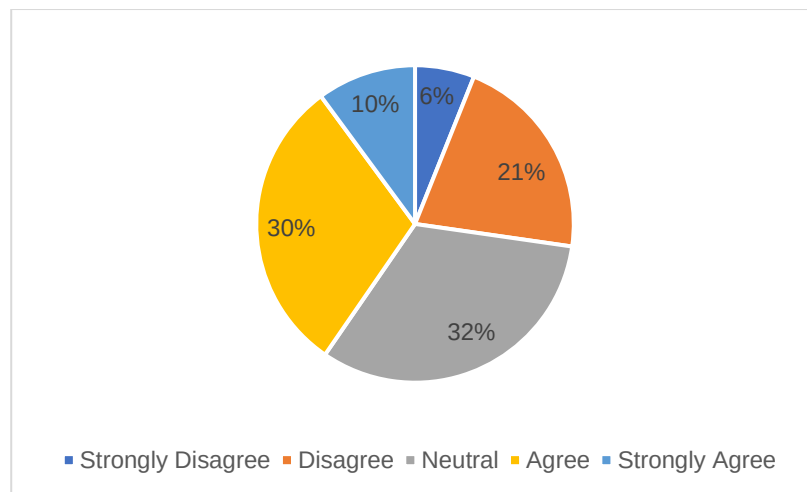


CHART 4.5: METHOD OF ORDER PICKING STRATEGIES

INTERPRETATION

From the above table it is interpreted that the method of order picking strategies used in material handling management is 6% for Strongly disagree and 21% for Disagree and 32% for Neutral and 30% for Agree and 10% for Strongly Agree.

INFERENCE

Majority (32%) of respondents chosen the Neutral.

TABLE 4.6: CURRENT RACKING SYSTEM USED

S. No	Current racking system	No. of respondents	Percentage
1.	Bin location	20	21%
2.	Two tires system	30	31%
3.	Open space	7	7%
4.	Pallet racking	39	41%
	TOTAL	96	100%

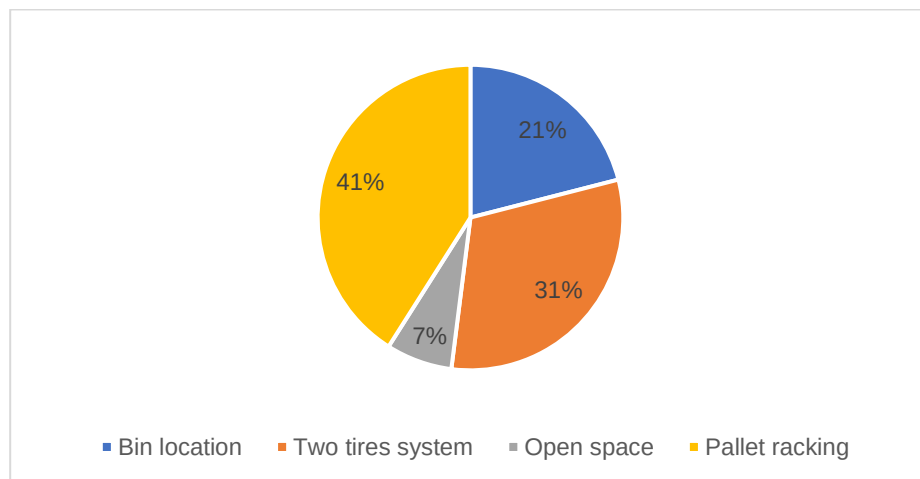


CHART 4.6: CURRENT RACKING SYSTEM USED

INTERPRETATION

From the above table it is interpreted that the racking system used is 21% for Bin location and 31% for Two tires system and 7% for Open space and 41% for pallet racking.

INFERENCE

Majority (41%) 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	45	41%
2.	Automated	51	59%
	TOTAL	96	100%

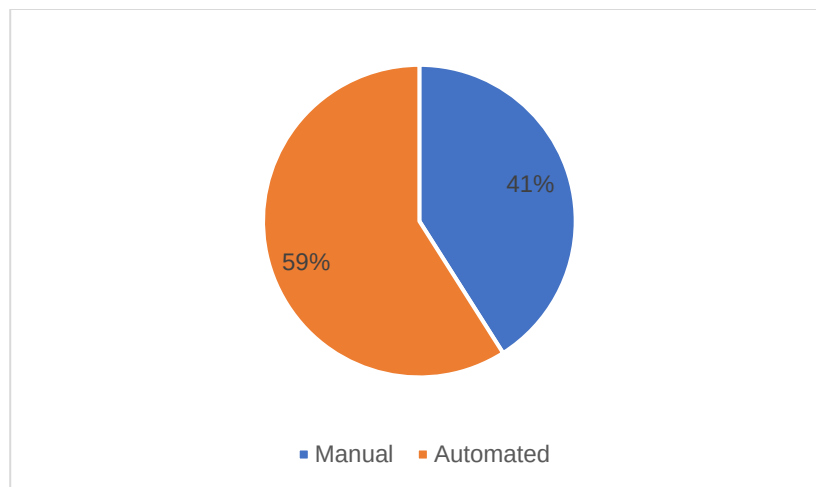


CHART 4.7: PREFERRED MATERIAL HANDLING SYSTEM

INTERPRETATION

From the above table it is interpreted that the number of respondents of 41% was manual and whereas 59% are automated.

INFERENCE

Majority (59%) 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	62	70%
3.	30 – 45 min	29	23%
4.	More than 45 min	4	6%
	TOTAL	96	100%

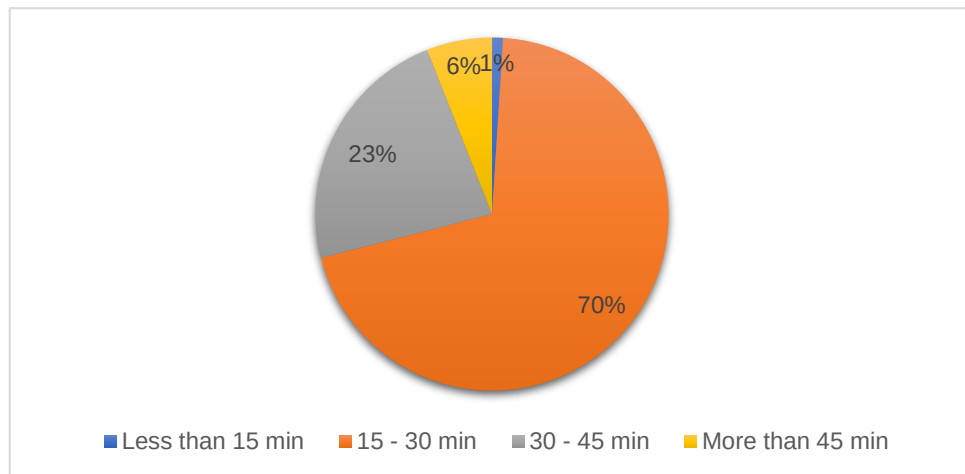


CHART 4.8: TIME TAKEN TO LOAD AND UNLOAD MATERIALS

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: WHICH PROBLEM YOU ARE FACING FREQUENTLY WHILE HANDLING THE MATERIALS WANT OF TRANSPORT?

S. No	Frequent problems	No. of respondents	Percentage
1.	Strongly Disagree	36	38%
2.	Disagree	29	30%
3.	Neutral	20	21%
4.	Agree	6	6%
5.	Strongly Agree	5	5%
	TOTAL	96	100%

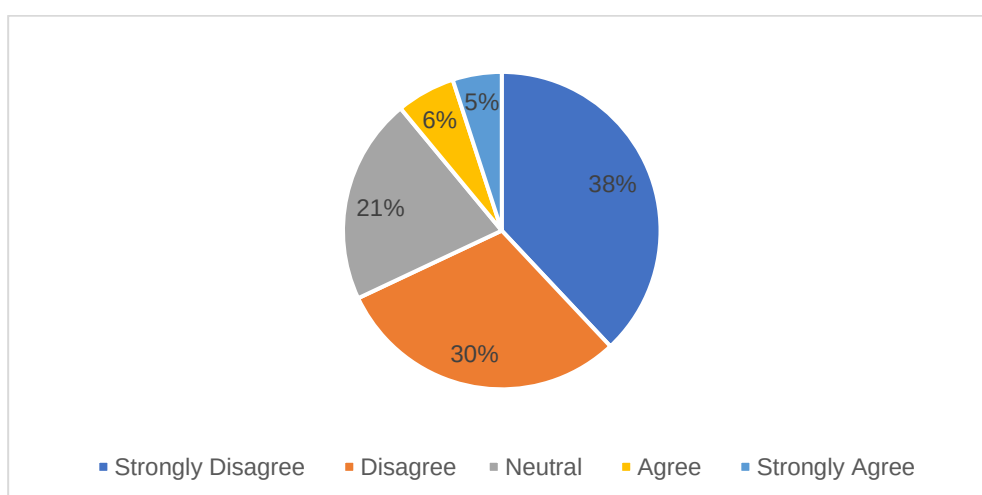


CHART 4.9: FREQUENT PROBLEMS

INTERPRETATION

From the above table it is interpreted that the problem facing frequently while where 6% is strongly disagree and 21% is disagree and 38% is neutral and 30% is agree and 5% is strongly agree.

INFERENCE

Majority (38%) of respondents are strongly disagree of the problem facing frequently.

TABLE 4.10: WORKERS WITH MORE EXPERIENCE ARE MORE OPERATIONALLY EFFICIENT IN THE MANUFACTURING PROCESS THAN THOSE WITH LESS EXPERIENCE.

S. No	More experience is more operationally efficient	No. of respondents	Percentage
1.	Strongly Agree	12	14%
2.	Agree	40	42%
3.	Neutral	27	27%
4.	Disagree	13	14%
5.	Strongly Disagree	4	4%
	TOTAL	96	100%

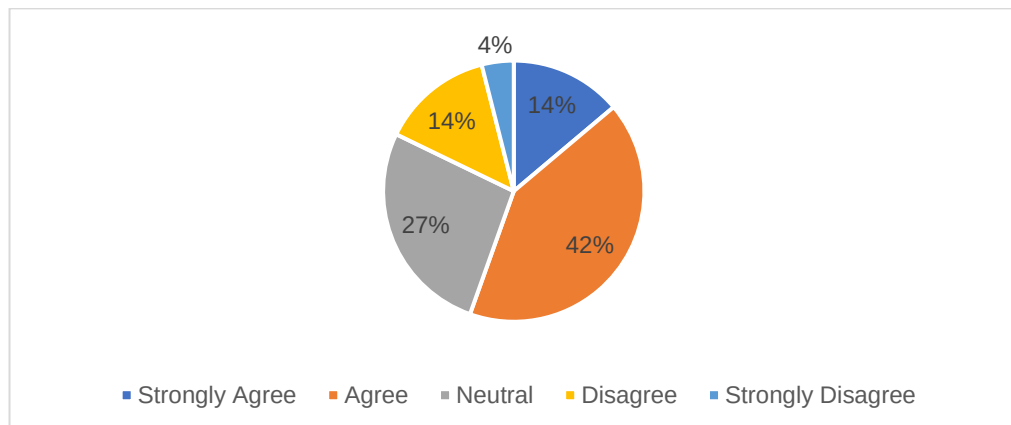


CHART 4.10: MORE EXPERIENCE ARE MORE OPERATIONALLY EFFICIENT

INTERPRETATION

From the above table it is interpreted that the that the satisfaction level of method of more operationally efficient where 14% is highly satisfied and 42% satisfied and 14% neutral and 6% dissatisfied and 4% highly dissatisfied.

INFERENCE

Majority (42%) of respondents are satisfied with method of more operationally efficient.

TABLE 4.11: IN YOUR EXPERIENCE, DO YOU THINK THAT WORKERS' OPERATIONAL EFFICIENCY GENERALLY IMPROVES AS THEY GAIN MORE EXPERIENCE IN THE MANUFACTURING PROCESS?

S. No	Workers operational efficiency	No. of respondents	Percentage
1.	Strongly Disagree	7	7%
2.	Disagree	14	15%
3.	Neutral	26	27%
4.	Agree	35	37%
5.	Strongly Agree	14	15%
	TOTAL	96	100%

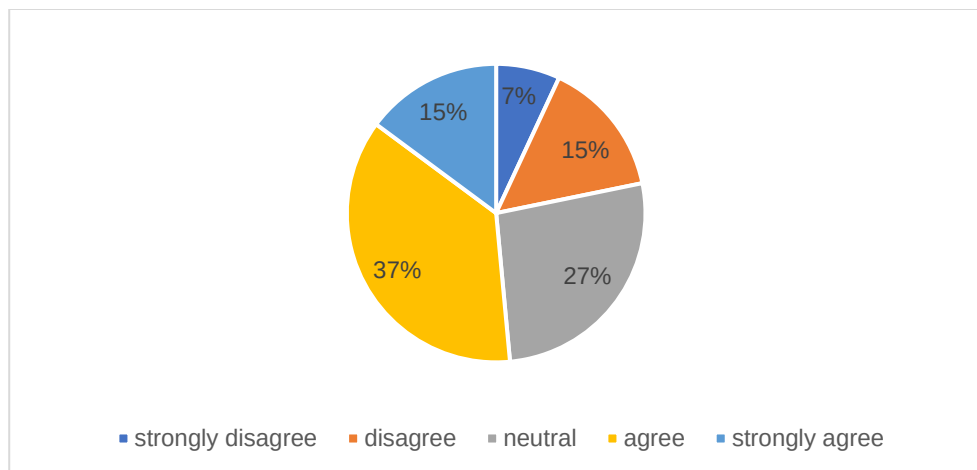


CHART 4.11: WORKERS OPERATIONAL EFFICIENCY

INTERPRETATION

From the above table it is interpreted that the problem facing frequently in handling material workers operational efficiency where 7% is strongly disagree and 15% is disagree and 27% is neutral and 37% is agree and 15% is strongly agree.

INFERENCE

Majority (37%) of respondents agree of the problem facing frequently in handling material.

TABLE 4.12: SATISFIED WITH THE EQUIPMENT USED IN COMPANY

S. No	Satisfied with equipment	No. of respondents	Percentage
1.	Strongly disagree	3	3%
2.	Disagree	12	13%
3.	Neutral	29	30%
4.	Agree	34	35%
5.	Strongly Agree	18	19%
	TOTAL	96	100%

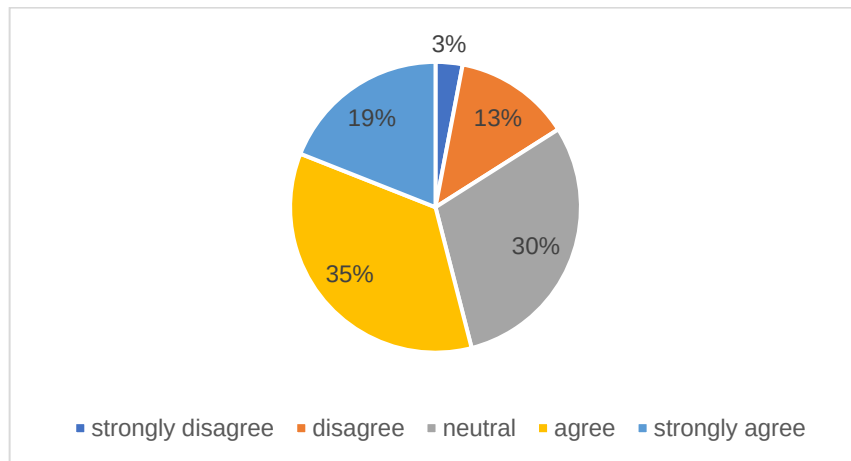


CHART 4.12: SATISFIED WITH THE EQUIPMENT USED IN COMPANY

INTERPRETATION

From the above table it is interpreted that satisfied with equipment used in company were strongly disagreed by 3% and disagreed by 13% and Neutral is 30% and agree by 35% and 19% strongly agree.

INFERENCE

Majority (35%) of respondents Agree that they are satisfied with the equipment's used in the company.

TABLE 4.13: PROVIDING EQUAL ACCESS TO TRAINING AND DEVELOPMENT OPPORTUNITIES FOR MATERIAL HANDLING CAN HELP ELIMINATE GENDER-BASED DIFFERENCES IN EFFICIENCY.

S. No	Equal access to training and development opportunities for material handling	No. of respondents	Percentage
1.	Strongly disagree	3	3%
2.	Disagree	12	13%
3.	Neutral	23	24%
4.	Agree	41	43%
5.	Strongly agree	17	18%
	TOTAL	96	100%

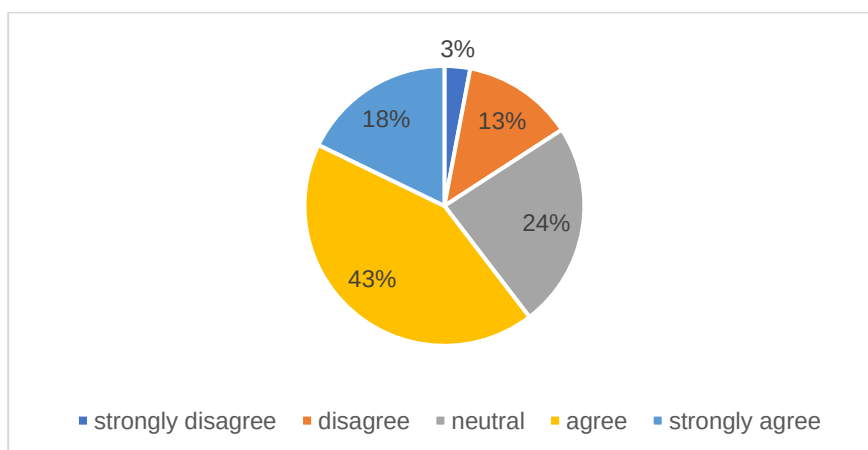


CHART 4.13: EQUAL ACCESS TO TRAINING AND DEVELOPMENT OPPORTUNITIES FOR MATERIAL HANDLING

INTERPRETATION

From the above table it is interpreted that the gender- based differences in efficiency for better material handling is 3% is strongly disagree and 13% is disagree and 24% is neutral and 43% is agree and 18% is strongly agree.

INFERENCE

Majority (43%) of respondents agree that they are gender-based differences in efficiency.

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%

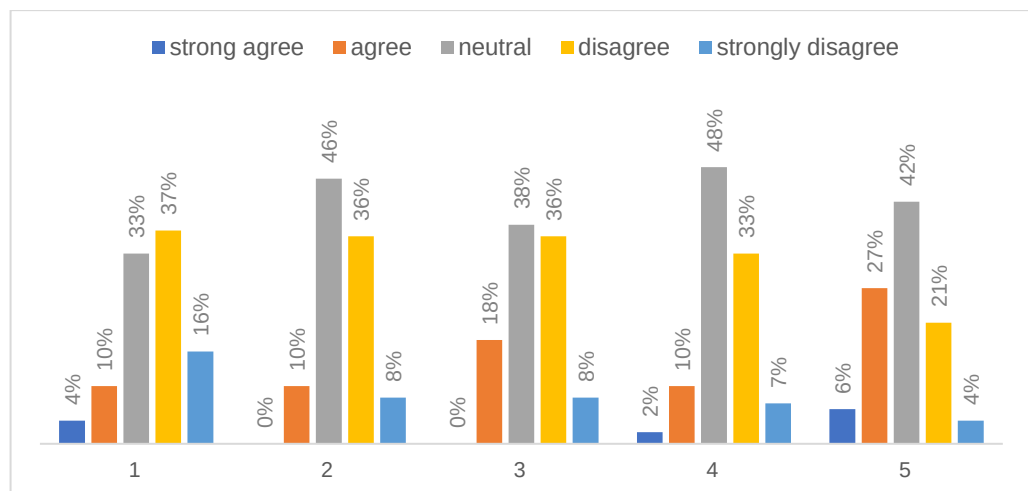


CHART 4.14: CRITICAL FACTOR IN MATERIAL HANDLING

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's.
- 2% respondents strongly agree, 10% respondents agree, 48% respondents neutral, 33% respondents disagree, 7% respondents strongly disagree that lack of equipment's.
- 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 equipment's.
- Majority (48%) neutral that lack of equipment's.
- Majority (42%) neutral about the route damage.

TABLE 4.15: THE TYPE OF MATERIAL HANDLING TASKS VARIES SIGNIFICANTLY BASED ON THE AGE OF THE WORKER.

S. No	Type of material handling task varies significant	No. of respondents	Percentage
1.	Strongly Disagree	4	4%
2.	Disagree	10	10%
3.	Neutral	32	33%
4.	Agree	35	37%
5.	Strongly Agree	15	16%
	TOTAL	96	100%

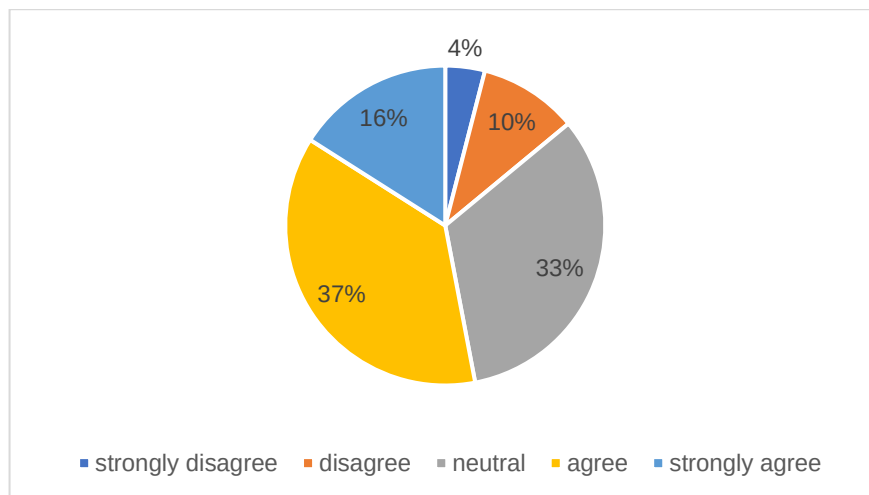


CHART 4.15: TYPE OF MATERIAL HANDLING TASK VARIES SIGNIFICANT

INTERPRETATION

From the above table it is interpreted that type of material handling tasks varies significantly based on the age of the worker were strongly disagreed by 4% and disagreed by 10% and Neutral is 33% and agree by 37% and 16% strongly agree.

INFERENCE

Majority (37%) of respondents Agree that type of material handling tasks varies significantly based on the age of the worker.

TABLE 4.16: I BELIEVE THAT ADOPTING EFFICIENT MATERIAL HANDLING METHODS HAS LED TO SIGNIFICANT COST SAVINGS FOR MY ORGANIZATION.

S. No	Efficient material handling to significant cost savings	No. of respondents	Percentage
1.	Strongly disagree	2	2%
2.	Disagree	11	11%
3.	Neutral	29	30%
4.	Agree	42	44%
5.	Strongly agree	12	13%
	TOTAL	96	100%

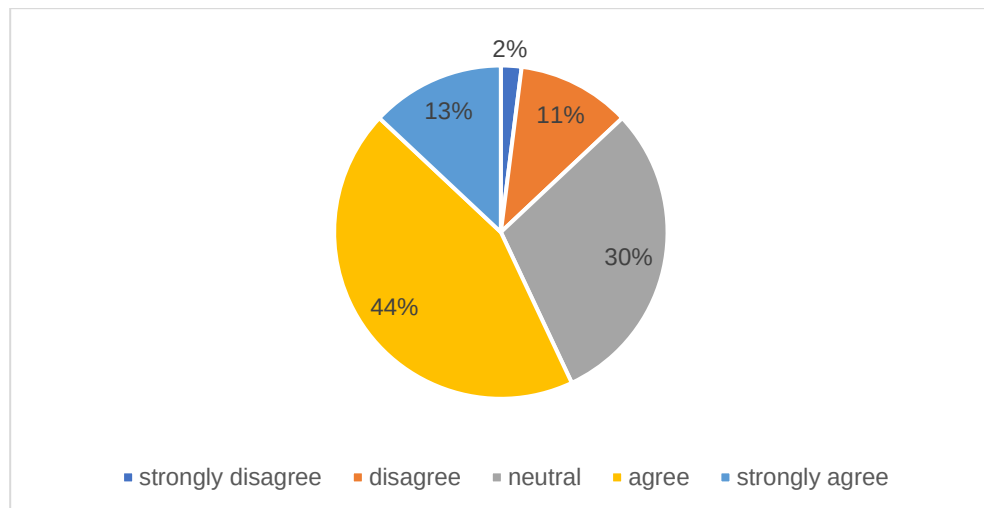


CHART 4.16: EFFICIENT MATERIAL HANDLING TO SIGNIFICANT COST SAVINGS

INTERPRETATION

From the above table it is interpreted that efficient material handling for strongly disagree is 2% and disagree is 11% and neutral is 30% and agree is 44% and strongly agree is 13%.

INFERENCE

Majority (44%) of respondents agree that efficient material handling.

TABLE 4.17: I BELIEVE THAT THE LEVEL OF WORKING EXPERIENCE AN EMPLOYEE HAS IS POSITIVELY CORRELATED WITH THEIR EFFECTIVENESS IN ADOPTING EFFICIENT MATERIAL HANDLING METHODS.

S. No	Positively correlated	No. of respondents	Percentage
1.	Strongly disagree	2	2%
2.	Disagree	8	8%
3.	Neutral	26	27%
4.	Agree	43	45%
5.	Strongly agree	16	17%
	TOTAL	96	100%

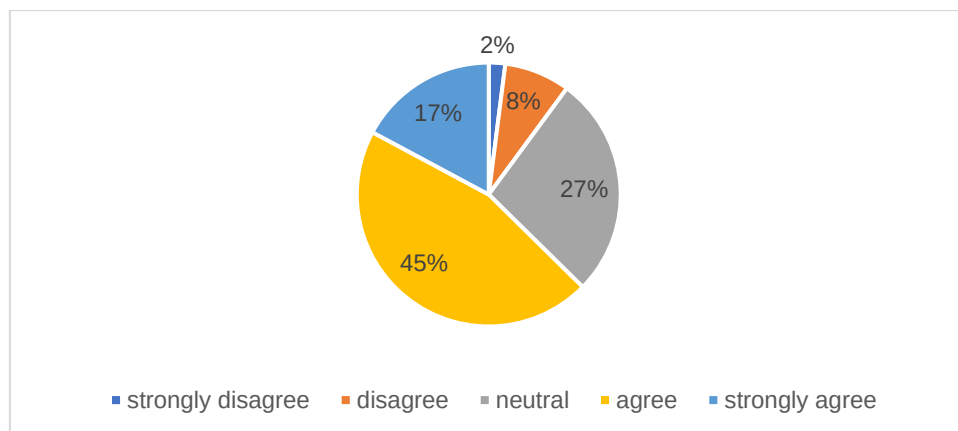


CHART 4.17: POSITIVELY CORRELATED

INTERPRETATION

From the above table it is interpreted that 17% respondents strongly agree, 45% respondents agree, 27% respondents neutral, 8% respondents disagree, 2% respondents strongly disagree that the is positively correlated with their effectiveness in adopting efficient material handling methods.

INFERENCE

Majority (45%) agree the is positively correlated with their effectiveness in adopting efficient material handling methods.

TABLE 4.18: I BELIEVE THAT MORE WORKING EXPERIENCE CAN HELP EMPLOYEES IDENTIFY AND IMPLEMENT COST-SAVING AND OPERATIONAL IMPROVEMENT OPPORTUNITIES THROUGH EFFICIENT MATERIAL HANDLING METHODS.

S. No	Improvements efficient material handling method	No. of respondents	Percentage
1.	Strongly disagree	2	2%
2.	Disagree	11	12%
3.	Neutral	32	33%
4.	Agree	36	38%
5.	Strongly agree	15	16%
	TOTAL	96	100%

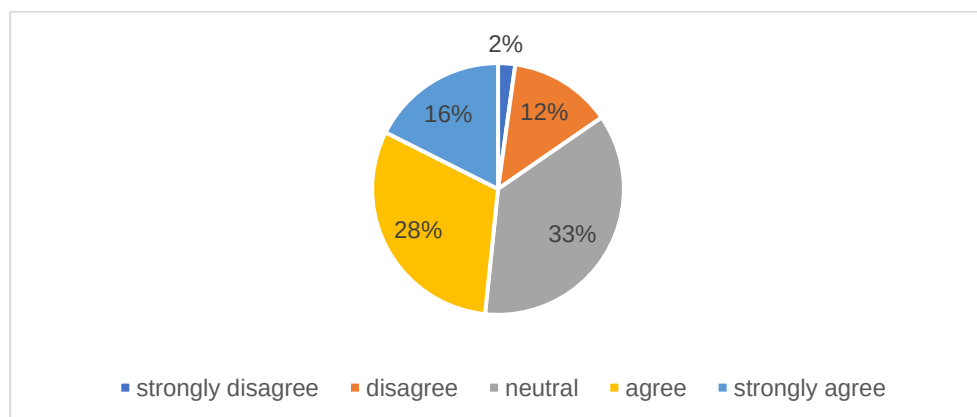


CHART 4.18: IMPROVEMENTS EFFICIENT MATERIAL HANDLING METHOD

INTERPRETATION

From the above table it is interpreted that the improvements efficient material handling methods strongly disagree is 2% and disagree is 12% and neutral is 33% and agree is 38% and strongly agree is 16%.

INFERENCE

Majority (38%) of respondents agree that improvements efficient material handling method.

TABLE 4.19: TO WHAT EXTENT DO YOU AGREE THAT IMPLEMENTING EFFICIENT MATERIAL HANDLING PRACTICES HAS REDUCED PRODUCT DAMAGE?

S. No	Implementing efficient material handling practices	No. of respondents	Percentage
1.	Strongly disagree	1	1%
2.	Disagree	8	8%
3.	Neutral	24	25%
4.	Agree	45	47%
5.	Strongly agree	18	19%
	TOTAL	96	100%

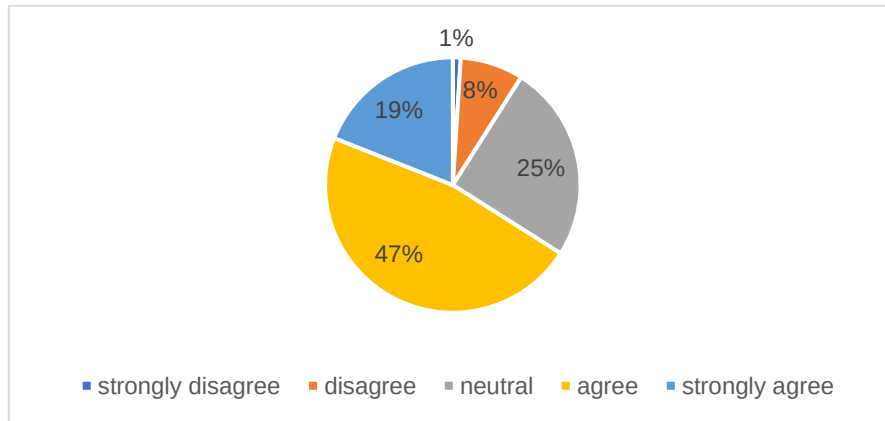


CHART 4.19: IMPLEMENTING EFFICIENT MATERIAL HANDLING PRACTICES

INTERPRETATION

From the above table it is interpreted that the implementing efficient material handling practices has reduced product damage for strongly disagree is 1% and disagree is 8% and neutral is 25% and agree is 47% and strongly agree is 19%.

INFERENCE

Majority (47%) of respondents agree that efficient material handling practices has reduced product damage.

TABLE 4.20: HOW MUCH DO YOU THINK IMPLEMENTING EFFICIENT MATERIAL HANDLING PRACTICES HAS IMPROVED OVERALL PRODUCT QUALITY?

S. No	Implementing product quality	No. of respondents	Percentage
1.	Strongly disagree	4	4%
2.	Disagree	8	8%
3.	Neutral	22	24%
4.	Agree	36	40%
5.	Strongly agree	22	24%
	TOTAL	96	100%

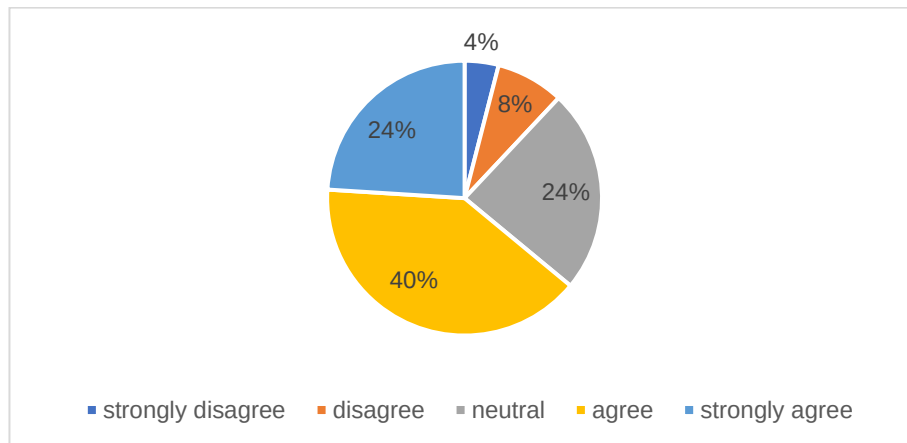


CHART 4.20: IMPLEMENTING PRODUCT QUALITY

INTERPRETATION

From the above table it is interpreted that the implementing product quality for strongly disagree is 4% and disagree is 8% and neutral is 24% and agree is 40% and strongly agree is 24%.

INFERENCE

Majority (40%) of respondents agree that implementing product quality.

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	96	96
Age	Pearson Correlation	-.118	1
	Sig. (2-tailed)	.187	
	N	96	96

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 significant relationship between gender and efficient material handling practices within a manufacturing organization.

Alternative Hypothesis (H1): There is a significant relationship between gender and efficient material handling practices within a manufacturing organization.

Independent Samples Test										
		Levene's Test for Equality of Variance		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
What are the improvements equal access to training and development opportunities for material handling	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	93	.992		
	Total	127.500	96			
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	93	.656		
	Total	81.659	96			
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	93	.768		
	Total	94.000	96			

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 has no impact on improvements in material handling.
- In **one-way Anova test** it proves that educational qualification has no impact on Critical factor in material handling.
- Majority (37%) of the respondents are age between 26-30 years.
- Majority (64%) of the respondents are Male.
- Majority (48%) respondents is Undergraduate
- Majority (37%) respondents has 2 – 5 years of experience.
- Majority (32%) of respondents chosen the Neutral.
- Majority (41%) of respondents said their current racking system as pallet racking.
- Majority (59%) 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 (38%) of respondents are strongly disagree of the problem facing frequently.
- Majority (42%) of respondents are satisfied with method of more operationally efficient.
- Majority (37%) of respondents agree of the problem facing frequently in handling material.
- Majority (35%) of respondents Agree that they are satisfied with the equipment's used in the company.

- Majority (43%) of respondents agree that they are gender-based differences in efficiency.
- 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 equipment's
- Majority (48%) neutral that lack of equipment's
- Majority (42%) neutral about the route damage.
- Majority (37%) of respondents Agree that type of material handling tasks varies significantly based on the age of the worker.
- Majority (44%) of respondents agree that efficient material handling.
- Majority (45%) agree the is positively correlated with their effectiveness in adopting efficient material handling methods.
- Majority (38%) of respondents agree that improvements efficient material handling method.
- Majority (47%) of respondents agree that efficient material handling practices has reduced product damage.
- Majority (40%) of respondents agree that implementing product quality.

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 96.
- 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 choice of storage equipment, including bins, shelves and racks as well as equipment used to transport materials.
- Reduce, combines 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

Efficient material handling methods can have a significant positive impact on a variety of performance measures, including productivity, cost, safety, and customer satisfaction. By implementing efficient material handling practices, organizations can achieve like, Increased productivity: Efficient material handling can reduce the time it takes to move materials through the production process, thereby increasing throughput and output. Reduced costs: Efficient material handling can minimize material handling costs, such as labor, equipment, and energy. Improved safety: Efficient material handling can reduce the risk of accidents and injuries by eliminating hazards and improving ergonomics. Enhanced customer satisfaction: Efficient material handling can lead to faster order fulfilment and fewer product defects, which can improve customer satisfaction. Image of a manufacturing plant with a well-organized material handling system. The specific benefits of efficient material handling will vary depending on the organization and its specific needs. However, the overall impact of efficient material handling can be substantial and can contribute to the overall success of the organization. Develop case studies of organizations that

have successfully implemented efficient material handling practices. Overall, efficient material handling is an essential component of successful operations for a wide range of organizations. By implementing efficient material handling practices, organizations can achieve a variety of benefits that can contribute to their overall competitiveness and success.

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ANNEXURE

QUESTIONNEIRE

A STUDY ON IMPACT OF EFFICIENT MATERIAL HANDLING METHOD AT LOURDU ASSOCIATES

- 1) Name:
- 2) Age:
 - a) 20 – 25 b) 26 – 30 c) 31 – 35 d) above 35
- 3) Gender:
 - a) male b) female
- 4) Educational qualification:
 - a) diploma b) under graduate
 - c) post graduate d) other
- 5) Experience:
 - a) 0 – 2 b) 2 – 5 c) 5 – 10 d) About 10
- 6) What is the current racking system used
 - a) Bin location b) Two tires system
 - c) Open space d) Pallet racking
- 7) 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
- 8) Which material handling system do you prefer?
 - a) Manual b) Automated

- 9) Older workers have a better understanding of order picking strategies and techniques to minimize picking errors and optimize picking times.
- a) Strongly Disagree b) Disagree
c) Neutral d) Agree e) Strongly Agree
- 10) Workers with more experience are more operationally efficient in the manufacturing process than those with less experience.
- a) Strongly Disagree b) Disagree c) Neutral
d) Agree e) Strongly Agree
- 11) Which problem you are facing frequently in while handling the materials want of transport?
- a) Strongly Disagree b) Disagree
c) Neutral d) Agree e) Strongly Agree
- 12) In your experience, do you think that workers operational efficiency improves as they gain more experience in the manufacturing process?
- a) Strongly Disagree b) Disagree
c) Neutral d) Agree e) Strongly Agree
- 13) Providing equal access to training and development opportunities for material handling can help eliminate gender-based differences in efficiency.
- a) Strongly Disagree b) Disagree
c) Neutral d) Agree e) Strongly Agree
- 14) What do you consider to be the critical factor in Material handling

	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
Ordering system					
Lack of Information					
Trouble in equipment					
Lack of equipment					
Route damage					

15) The type of material handling tasks varies significantly based on the age of the worker.

- a) Strongly Disagree b) Disagree
- c) Neutral d) Agree e) Strongly Agree

16) I believe that adopting efficient material handling methods has led to significant cost savings for my organization.

- a) Strongly Disagree b) Disagree
- c) Neutral d) Agree e) Strongly Agree

17) I believe that the level of working experience an employee has is positively correlated with their effectiveness in adopting efficient material handling methods.

- a) Strongly Disagree b) Disagree
- c) Neutral d) Agree e) Strongly Agree

- 18) I believe that more working experience can help employees identify and implement cost-saving and operational improvement opportunities through efficient material handling methods.
- a) Strongly Disagree b) Disagree
- c) Neutral d) Agree e) Strongly Agree
- 19) To what extent do you agree that implementing efficient material handling practices has reduced product damage?
- a) Strongly Disagree b) Disagree
- c) Neutral d) Agree e) Strongly Agree
- 20) How much do you think implementing efficient material handling practices has improved overall product quality?
- a) Strongly Disagree b) Disagree
- c) Neutral d) Agree e) Strongly Agree
- 21) Any suggestions about the material handling in your personal experience.