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A Study on Challenges Faced in Material Handling Management in Sandhar Technologies Limited, Bengaluru

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ABSTRACT: Material handling management plays an important role in industries where materials need to be moved, stored, and controlled properly for smooth operations. Many organisations face different challenges in this area, which can affect productivity, safety, and workflow. The main objective of this study is to understand the challenges faced in material handling management in Sandhar Technologies Limited, Bengaluru. Descriptive research design and convenience sampling method has been used. The sample size of this study is 110. Questionnaire has been used as a primary data. Simple percentage analysis, chi-square analysis, correlation statistical tools have been applied to reach the findings of the study. The study found that employees in Sandhar Technologies Limited feel material handling equipment is not always sufficient and breakdowns create interruptions in work. It revealed that equipment selection and backup availability also create some level of difficulty in handling processes. It concluded that space utilization, material placement, and storage arrangement play a major role in affecting warehouse efficiency and movement of materials. It suggested that better layout planning and proper organization can reduce confusion and unnecessary movement inside the warehouse. The study found that inventory-related issues like manual tracking, delayed information, and poor system integration affect smooth operations. It revealed that these problems lead to errors, mismatches, and difficulty in decision-making. It concluded that operational inefficiencies such as delays, repeated movement, and lack of clear procedures reduce productivity.

KEYWORDS: Material handling, warehouse layout, inventory tracking system, operational efficiency

I. INTRODUCTION

Material handling in companies refers to the process of moving, storing, controlling, and protecting materials throughout the production and distribution stages. It starts from the point where raw materials are received and continues until finished goods are delivered to customers. This process plays a major role in industries such as manufacturing, warehousing, logistics, and retail. It includes both physical movement and proper management of materials so that work can happen smoothly without delays. In a company, materials need to be handled many times. Raw materials are brought into the factory, then moved to different departments for processing, and finally turned into finished products. After production, these goods are stored, packed, and transported to markets or customers. All these activities come under material handling. It is not just about lifting and carrying items, but also about planning how materials flow inside the company.

Material handling can be done in different ways depending on the type of company and the size of operations. One common type is manual handling, where workers use their hands or simple tools to move materials. This method is usually seen in small-scale industries. Another type is mechanical handling, where machines like forklifts, cranes, and conveyors are used. In large companies, automated systems such as robots and computerized conveyors are also used to move materials quickly and accurately include forklifts, pallet jacks, cranes, hoists, and conveyor belts. Storage equipment like racks, shelves, and bins are also used to keep materials organized. Proper use of these tools helps in reducing physical effort and saving time. It also helps in avoiding damage to materials during movement.

OBJECTIVES OF THE STUDY

- To examine the challenges associated with Material Handling Equipment in material handling management.
- To analyze the challenges in Warehouse Layout in the organisation
- To evaluate the challenges in the Inventory Tracking System in the organisation
- To assess the Operational Efficiency of the organisation in material handling management

II. REVIEW OF LITERATURE

(Cheng et al., 2025) explored dynamical control of automated guided vehicles (AGVs) in warehouse tasks by reinforcement learning methods on simulation data sets of a warehouse. The aim was to enhance task assignment and reduce delays in operations of automated environments. The results of the simulation showed higher throughput and scheduling efficiency as compared to the conventional means. The research proposed the implementation of AI-based planning to the operations related to dynamic material handling. It found that the reinforcement learning systems enhance operational flexibility and logistics performance.

(Mwizerwa & Akumuntu, 2024) explored warehousing management and its effects on supply chain performance based on a quantitative study on the survey of a census of 105 employees in a manufacturing organization. The methods of data collection were structured questionnaires and data analysis by the use of inferential statistics (SPSS), paying attention to regression and descriptive statistics. Results indicated that material handling, inventory management, and capacity planning were effective in enhancing supply chain efficiency, which accounted up to 96.7% of the variation in the performance. The investigations proposed the improvement of operational systems in terms of automated and manual handling and concluded that the supply chain success is achieved due to efficient management of a warehouse.

(Kareem et al., 2023) studied the impact of the different types of material handling equipment on the reduction of defective products and the overall production efficiency with the help of a structured quantitative survey of 191 respondents (manufacturing facilities). The study utilized primary data in form of structured questionnaires and used regression and correlation analysis in testing the relationships between the type of equipment and the outcomes of production. The results indicated that storage and handling equipment and engineered systems were very effective in enhancing skills of defective products reduction and efficiency in production. The authors advised manufacturing companies to invest in the right handling equipments depending on the nature of their operations. They came to the conclusion that the best choice and utilization of handling equipment are the central factors of the increased production quality and efficiency.

III. RESEARCH METHODOLOGY

This study adopts a descriptive research design. Convenience sampling is adopted in this study. Both primary data and secondary data are applied to the study. The size of the sample to be used in this study is 110 respondents. Simple percentage analysis, chi square analysis and correlation has been used in this study.

Data analysis and interpretation

Table No. 1 MATERIAL HANDLING EQUIPMENT

Statements	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Total
Material handling equipment is insufficient to meet operational requirements	30 (27.3%)	40 (36.4%)	20 (18.2%)	15 (13.6%)	5 (4.5%)	110 (100%)
Frequent breakdown of equipment affects material movement	35 (31.8%)	38 (34.5%)	20 (18.2%)	12 (10.9%)	5 (4.5%)	110 (100%)

Outdated equipment reduces handling speed and efficiency	28 (25.5%)	42 (38.2%)	25 (22.7%)	10 (9.1%)	5 (4.5%)	110 (100%)
Improper selection of equipment leads to handling difficulties	25 (22.7%)	40 (36.4%)	30 (27.3%)	10 (9.1%)	5 (4.5%)	110 (100%)
Limited availability of backup equipment causes work delays	32 (29.1%)	38 (34.5%)	25 (22.7%)	10 (9.1%)	5 (4.5%)	110 (100%)

Source: Primary data

INTERPRETATION

27.3% of respondents strongly agree and 36.4% agree that material handling equipment is insufficient to meet operational requirements, while 18.2% are neutral, 13.6% disagree, and 4.5% strongly disagree. 31.8% strongly agree and 34.5% agree that frequent breakdown of equipment affects material movement, with 18.2% neutral, 10.9% disagree, and 4.5% strongly disagree. 25.5% strongly agree and 38.2% agree that outdated equipment reduces handling speed and efficiency, while 22.7% are neutral, 9.1% disagree, and 4.5% strongly disagree. 22.7% strongly agree and 36.4% agree that improper selection of equipment leads to handling difficulties, with 27.3% neutral, 9.1% disagree, and 4.5% strongly disagree. 29.1% strongly agree and 34.5% agree that limited availability of backup equipment causes work delays, while 22.7% are neutral, 9.1% disagree, and 4.5% strongly disagree.

Table No. 2 OPERATIONAL EFFICIENCY

Statements	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Total
Inefficient handling processes increase operational costs	35 (31.8%)	40 (36.4%)	20 (18.2%)	10 (9.1%)	5 (4.5%)	110 (100%)
Delays in material movement affect production schedules	38 (34.5%)	42 (38.2%)	15 (13.6%)	10 (9.1%)	5 (4.5%)	110 (100%)
Inefficient workflow increases idle time in operations	32 (29.1%)	40 (36.4%)	25 (22.7%)	8 (7.3%)	5 (4.5%)	110 (100%)
Handling inefficiencies lead to repeated material movement	30 (27.3%)	42 (38.2%)	28 (25.5%)	7 (6.4%)	3 (2.7%)	110 (100%)
Lack of standard procedures affects operational performance	33 (30.0%)	40 (36.4%)	25 (22.7%)	8 (7.3%)	4 (3.6%)	110 (100%)

Source: Primary data

INTERPRETATION

31.8% of respondents strongly agree and 36.4% agree that inefficient handling processes increase operational costs, while 18.2% are neutral, 9.1% disagree, and 4.5% strongly disagree. 34.5% strongly agree and 38.2% agree that delays in material movement affect production schedules, with 13.6% neutral, 9.1% disagree, and 4.5% strongly disagree. 29.1% strongly agree and 36.4% agree that inefficient workflow increases idle time in operations, while 22.7% are neutral, 7.3% disagree, and 4.5% strongly disagree. 27.3% strongly agree and 38.2% agree that handling inefficiencies lead to repeated material movement, with 25.5% neutral, 6.4% disagree, and 2.7% strongly disagree. 30.0% strongly agree and 36.4% agree that lack of standard procedures affects operational performance, while 22.7% are neutral, 7.3% disagree, and 3.6% strongly disagree.

Table No. 3 WAREHOUSE LAYOUT

Statements	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Total
Inadequate space utilization affects storage efficiency	32 (29.1%)	40 (36.4%)	20 (18.2%)	12 (10.9%)	6 (5.5%)	110 (100%)
Improper placement of materials increases handling time	30 (27.3%)	42 (38.2%)	22 (20.0%)	10 (9.1%)	6 (5.5%)	110 (100%)
Lack of systematic storage arrangement leads to confusion	28 (25.5%)	38 (34.5%)	28 (25.5%)	10 (9.1%)	6 (5.5%)	110 (100%)
Inefficient layout causes unnecessary material travel distance	35 (31.8%)	40 (36.4%)	20 (18.2%)	10 (9.1%)	5 (4.5%)	110 (100%)
Inadequate labeling and zoning affect material identification	30 (27.3%)	42 (38.2%)	25 (22.7%)	8 (7.3%)	5 (4.5%)	110 (100%)

Source: Primary data

INTERPRETATION

29.1% of respondents strongly agree and 36.4% agree that inadequate space utilization affects storage efficiency, while 18.2% are neutral, 10.9% disagree, and 5.5% strongly disagree. 27.3% strongly agree and 38.2% agree that improper placement of materials increases handling time, with 20.0% neutral, 9.1% disagree, and 5.5% strongly disagree. 25.5% strongly agree and 34.5% agree that lack of systematic storage arrangement leads to confusion, while 25.5% are neutral, 9.1% disagree, and 5.5% strongly disagree. 31.8% strongly agree and 36.4% agree that inefficient layout causes unnecessary material travel distance, with 18.2% neutral, 9.1% disagree, and 4.5% strongly disagree. 27.3% strongly agree and 38.2% agree that inadequate labeling and zoning affect material identification, while 22.7% are neutral, 7.3% disagree, and 4.5% strongly disagree.

IV. CHI-SQUARE ANALYSIS: RELATIONSHIP BETWEEN MATERIAL HANDLING EQUIPMENT AND OPERATIONAL EFFICIENCY

HYPOTHESIS TESTING

Null hypothesis (H0): There is no significant relationship between the material handling equipment and operational efficiency.

Alternative hypothesis (H1): There is some significant relationship between the material handling equipment and operational efficiency.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	176.199 ^a	182	0.607
Likelihood Ratio	149.077	182	0.965
Linear-by-Linear Association	0.965	1	0.326
N of Valid Cases	110		

a. 210 cells (100.0%) have expected count less than 5. The minimum expected count is .01.

INTERPRETATION

As per the above table, it is inferred that the P value is 0.607; it is not significant to 5% (0.05) significant level. The minimum expected count is .01. Thus null hypothesis is accepted and it is finding that there is no significant difference between material handling equipment and operational efficiency.

V. CORRELATION ANALYSIS: RELATIONSHIP BETWEEN WAREHOUSE LAYOUT AND OPERATIONAL EFFICIENCY

HYPOTHESIS TESTING

Null hypothesis (H0): There is no significant relationship between the material handling equipment and operational efficiency.

Alternative hypothesis (H1): There is some significant relationship between the material handling equipment and operational efficiency.

Correlations			
		WAREHOUSE LAYOUT	OPERATIONAL EFFICIENCY
WAREHOUSE LAYOUT	Pearson Correlation	1	.391**
	Sig. (2-tailed)		0
	N	110	110
OPERATIONAL EFFICIENCY	Pearson Correlation	0.391	1
	Sig. (2-tailed)	0	
	N	110	110

** . Correlation is significant at the 0.01 level (2-tailed).

INTERPRETATION

The above table indicates that, co-efficient of correlation between warehouse layout and operational efficiency is 0.391. It is below 1. So there is positive relationship between warehouse layout and operational efficiency.

VI. SUGGESTIONS

- The company should make sure that there is enough availability of material handling equipment to meet the needs of the operations.
- The company should have enough backup equipment to prevent delays and ensure smooth operations.
- The company should aim to utilize available space to enhance efficiency.
- The company must ensure that materials are properly placed to reduce handling time and improve accessibility.
- The company must ensure that there is an accurate and up-to-date inventory to ensure that there is adequate material availability.
- The company should replace manual tracking systems with automated systems to improve accuracy and reduce errors.
- The company needs to improve its tracking system to prevent stock mix-ups and discrepancies.
- The company should ensure that there is real-time information flow to improve efficiency in handling materials.
- The company has to work on improving the integration of inventory-related data to improve operational control.
- The company has to work on improving the handling processes to reduce operational costs.
- The company has to work on improving the movement of materials to avoid delays in production.
- The company has to work on improving the processes to avoid idle time and increase productivity.
- The company has to work on improving the processes to avoid the movement of materials more than once.

VII. CONCLUSION

It is concluded that the management of the material handling activities is crucial for the determination of the overall efficiency and productivity of Sandhar Technologies Limited, Bengaluru. The research reveals that the challenges faced in the handling of the equipment, layout, inventory tracking, and operational activities are crucial for the smooth flow of the activities. The lack of equipment, poor layout, and the absence of inventory tracking systems are the challenges faced, which are crucial for the determination of the need for improvements in the areas

Furthermore, it is concluded that these challenges can be effectively tackled by modernizing equipment, optimizing the layout of the warehouse, developing efficient inventory tracking systems, and standardizing operations. Through such effective strategies and approaches, it is possible to minimize inefficiencies in material handling operations and improve productivity in an effective manner, thereby enhancing the overall performance of the company.

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