Reducing Product Damage from Handling Process in the Warehouse of Srisawat Construction Materials Store

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Abstract

This research aims to analyze the factors contributing to product damage and improve processes for handling goods. A qualitative research approach is used, with a population comprising 10 warehouse staff members from Srisawat Construction Materials Store. The sample size is determined using Krejcie and Morgan's sample size table. The primary research tool is the Fishbone diagram, which aids in identifying the root causes of product damage. Following this analysis, Work Instruction (WI) is developed as a guideline for operational procedures, and a preventive maintenance plan is established for handling equipment.The findings indicate that: 1) Product damage is primarily caused by inefficient staff performance, outdated handling equipment, and the use of unsuitable handling tools. 2) The implemented improvements have led to enhanced staff performance by developing work skills, introducing rest rotations, ensuring consistent work processes, and reducing employee fatigue. The use of the Fishbone diagram to pinpoint root causes, combined with Work Instruction (WI) as a standard procedure, has proven effective. These findings can be practically applied by utilizing the Fishbone diagram to identify underlying issues and adopting Work Instruction (WI) to standardize operational procedures.

Keywords: Warehouse, Product damage, Work instruction

1. Introduction

Warehouse management is a critical aspect of running a construction business, as construction materials come in various types, sizes, and properties. Efficient storage and control of products are therefore essential. Mistakes in management, such as product damage, can negatively impact the business in terms of cost, time, and overall quality. Effective warehouse management is crucial for success. A common problem in warehouses is product damage, which affects both costs and the organization’s reputation. Product damage leads to sunk costs, as the damaged goods cannot be sold, and it reduces the organization's credibility due to the substandard condition of the products. The problems often arise from improper storage and handling of goods, a lack of skills among operational staff, disorganized product

placement, the use of inappropriate tools for handling goods, irregular maintenance of machinery and equipment, and the use of worn-out or outdated equipment. These storage and handling issues directly affect the business's image and finances, leading to reduced profits and increased losses. The root causes are typically linked to improper storage and handling practices. This research to studying the factors that contribute to product damage in warehouses is therefore of utmost importance in order to develop strategies for preventing and minimizing potential damage.

2. Research Objective

1. To analysis the causes of product damage.
2. To improve the process of moving and handling products.

3. Literature Review

3.1 Warehouse Management

Stock J.R. and Lambert. D.M. (2001) explained that warehousing and Storage refers to activities that encompass everything from structuring a warehouse or selecting the type of warehouse, designing the storage system, organizing the warehouse space, and arranging the necessary equipment for warehouse operations. Effective warehouse planning and management can facilitate smooth operations and add value to the products

3.2 Fishbone Diagram

Worapongpat N. and Banyen R. (2023) explained that the fishbone diagram is a tool used to identify the root causes of problems in detail. It is necessary to first recognize the problem, which is obtained from data collection and arrangement, selecting the most relevant issue to address first. Then, brainstorming is conducted to identify related causes. The fishbone diagram systematically illustrates the problem, making the causes apparent. These causes are detailed and derived logically, facilitating further steps for effective problem-solving.

3.3 Work Instruction

The document that contains detailed procedures or each sub-step of a process is specialized information. It includes work instructions and the methods the organization uses for its operations and Office of the Civil Service Development Commission. (2006) explained that An operations manual refers to a document created by each unit to serve as a guide for performing tasks within that unit. It is also used as a reference for staff to understand work procedures. The manual can be updated to align with future changes in regulations, methods, and technology. The manual consists of the following elements: 1) It serves as a roadmap outlining the work process, with a clear start and end point. 2) It is a document used to support specific tasks defined by position standards, containing comprehensive and detailed instructions on each task, compiled into a booklet. 3) It can be revised when there are changes in work procedures. 4) It is a qualitative document that outlines responsibilities and principles for performing duties, along with guidelines for operations and problem-solving suggestions.

5) It specifies the steps and details of various organizational processes and methods for controlling these processes. 6) It is typically created for complex tasks involving multiple steps and several individuals.

3.4 Preventive Maintenance

Inseemeesak B. et al. (2021). explained that Preventive Maintenance (PM) is a plan that sets a timeline for replacing spare parts or performing overhauls to prevent damage, without needing to stop operation for emergency repairs. It allows for maintenance planning and more efficient asset utilization compared to corrective maintenance. Typically, it is difficult to predict in advance and there is a lack of data to estimate the lifespan of assets, increasing the risk of damage occurring after maintenance activities. Both the efficiency and effectiveness of the maintenance plan should follow the manufacturer's manual

4. Methodology

This research is Qualitative research. The Target group are staff members from the warehouse of Srisawat Construction Materials Store and key Informant are 10 members of the warehouse of Srisawat Construction Materials Store.

The methodology of research as follows :

1. Study the current conditions and working practices within the warehouse, including how operations are conducted and identifying any existing problems.
2. Collect data from key informants through unstructured interviews regarding the movement and storage of goods that may lead to damage or deterioration.
3. Analyze the data obtained from the interviews to identify the root causes of the problems using a fishbone diagram.

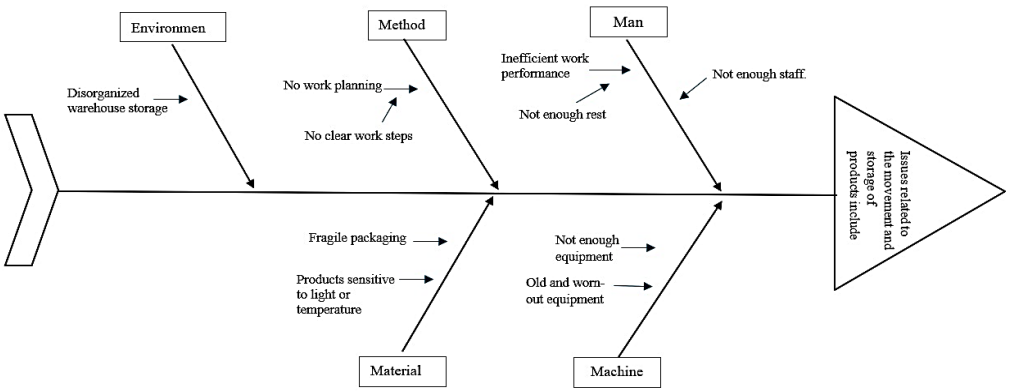

Figure 1 Analyze the issues related to the movement and storage

Figure 1 shows in result of analyze the issues related to the movement and storage in the warehouse of Srisawat Construction Materials Store as follows :

- Man (Employees or Personnel)

1. Lack of work efficiency: Insufficient rest may cause drowsiness during work, resulting in reduced efficiency in handling and moving goods.

2. Insufficient number of staff: For instance, a shortage of workers during certain periods causes the remaining staff to work hastily, which may lead to product damage due to rushed picking or inappropriate handling methods.

- Machine (Machinery or Equipment)

1. Insufficient equipment.

2. Equipment is old and overused, with no clear maintenance schedule. Additionally, improper equipment may be selected for handling and moving goods.

- Method (Work Process)

Lack of work planning: There are no clear steps or procedures, causing employees to rely on their habits, which can easily lead to errors. Frequent handling, lifting, or grasping of goods may cause product loss, scratches, or torn packaging.

- Material (Products and Raw Materials)

1. Thin, fragile, and easily torn packaging can be affected during storage and handling, causing product damage.

2. Specific storage requirements: Certain fragile items or those sensitive to light and temperature are at higher risk compared to regular products, such as cement, gypsum boards, and steel, which need to be kept away from moisture.

- Environment

The warehouse is disorganized, making the movement of goods unsafe.

From the fishbone diagram analysis, the main causes can be summarized as follows:

- Lack of work efficiency : A contributing factor is insufficient rest for employees and fatigue from work.

- Equipment is old and overused : A contributing factor is careless usage and lack of maintenance.

4. The results from the fishbone diagram analysis reveal the causes of the problems. Therefore, Work Instruction and Preventive Maintenance are applied as tools to help reduce the problem of product damage.

5. Results

From the fishbone diagram, the main causes can be summarized as follows: 1) Lack of work efficiency, with secondary causes being insufficient rest for employees and fatigue from work. 2) Equipment that is old and has been used for a long time, with secondary causes being careless use and lack of maintenance. Thus, the research applied Work Instruction and Preventive Maintenance as tools to help reduce the problem of product damage , the results as show in Table 1**.**

Table 1 Comparison of the quantity of product damage before and after improvement

Before Improvement		**After Improvement**	
Month	Quantity of product damage	Month	Quantity of product damage
July	6	September	2
August	7	October	1

Table 1 shows a comparison of the quantity of product damage before and after improvements, with the causes stemming from improper or careless handling of goods, leading to broken tiles, torn cement bags, and damaged plywood from impacts. The researcher applied Work Instruction (WI) and Preventive Maintenance (PM) to improve the handling and warehouse management processes. The results, as shown in Table 1, indicate a significant reduction in the number of damaged products after implementing WI, especially for fragile or

easily damaged items such as tiles, cement, and wood. This led to more efficient operations, a decrease in damaged products, and safer handling processes.

The research results led to a reduction in warehouse waste, allowing the organization to use storage space more efficiently, which aligns Moryadee C. et al. (2020) research was conducted to find solutions for the pharmaceutical warehouse system of a drugstore in Nakhon Pathom Province. The results from the research were used to design a new warehouse layout to facilitate more efficient inventory management. This made it easier for staff to retrieve products and reduced errors in their work. And which aligns Niyomrath R. et al. (2021) research focused on improving the white coconut production process. The results of implementing the process improvement plan showed that, after the improvements, the distance of movement and the time used in the production process could be reduced.

6. Conclusion

This study focuses on identifying the factors leading to product damage and enhancing the handling processes. A qualitative research method is employed, with the study population consisting of 10 warehouse staff members from Srisawat Construction Materials Store. The sample size is determined using Krejcie and Morgan's sample size table. The Fishbone diagram is used as the primary research tool to identify the root causes of product damage. After the analysis, Work Instruction (WI) is developed to guide operational procedures, and a preventive maintenance plan is created for handling equipment.

The results show that: 1) Product damage is mainly due to poor staff performance, outdated equipment, and the use of improper handling tools. 2) The improvements made have resulted in better staff performance, including enhanced work skills, the introduction of rest rotations, consistent work processes, and reduced fatigue. The use of the Fishbone diagram to identify root causes, coupled with the implementation of Work Instruction (WI) as a standardized procedure, has been effective. These insights can be practically applied by using the Fishbone diagram to uncover underlying problems and adopting Work Instruction (WI) to streamline operational procedures.

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