EFFICIENCY IMPROVEMENT FOR WAREHOUSE MANAGEMENT OF LIGHT BULB PRODUCTS A CASE STUDY OF XYZ COMPANY LIMITED

Thanongsak Phutphat [*], Karnnapat Chumkad [**], Phuwana Aussawakornnirangkool [***]

[,**,***]Faculty of Logistics and Supply Chain, Suan Sunandha Rajabhat University, Bangkok, Thailand,*

E-Mail: [*] s64127321050@ssru.ac.th, [**] Karnnapat.ch@ssru.ac.th, [***] Phuwana.au @ssru.ac.th

ABSTRACT

The objectives of this study were: 1) to study warehouse management in current situations and problems within the warehouse of XYZ company limited 2) to analyze the warehouse management in current situations and problems within the warehouse of XYZ company limited and 3) to guideline for efficiency improvement for warehouse management of XYZ company limited. Data were collected from unstructured interviews by using fishbone diagram as a data analysis tool for warehouse space management and applied the ABC analysis concept as a tool to improve the efficiency for warehouse management of XYZ company limited. The result of the study found that warehouse management with the concept of ABC analysis can increase the efficiency for warehouse management of the case study company. The main cause of problems and processes that affect the efficiency of work in the warehouse is caused by a "Waste of Space" that results in "Lost Products" including causing delays in picking products due to the lack of systematic space management in the warehouse. After warehouse management with the ABC Analysis concept, it was found that it could be better in organizing the area, increasing the work performance, setting cycle count policy, and reducing lost products, resulting in increased warehouse management efficiency, thus making customers satisfied.

Keywords: Efficiency Improvement, Warehouse Management, Light Bulb, Fishbone Diagram, ABC Analysis

INTRODUCTION

The lighting industry is an industry that has a business growth rate in line with the new economic environment and to be used as basic utilities both inside and outside the building. In addition, installation in some organizations or departments may be possible to replace the original product from energy savings, it affects the bulb market with a growing trend (SCB Economic Intelligence Center, 2016). The organization sees the benefits of saving energy to reduce costs by installing new products including products LED bulbs and LED lamps that provide better light efficiency, and enable the organization to save electricity which is in accordance with the energy saving policy that the government has consistently promoted (TMI, 2017)

The case study company has been in the business of selling LED lighting since 2003. It offers a wide variety of products covering wholesale, production, and sales for projects. There are factories located in China, and in Thailand where is a manufacturer and mainly exports to Europe, America and Canada, and quality LED chips from Taiwan and the United States. There are 3 warehouses studied which are warehouses, main warehouse, and storage warehouse. Most of the products are stored in the main warehouse which has a total of 458 SKUs with a wide variety of products. From the study of warehouse operations and interviews, it was found that there was no systematic space allocation in the warehouse. Storage products were mixed in multiple locations. Order picking took a long time to pick, causing delays in picking. And it was found that a large number of lost products affected inventory management services and subsequent management costs, which was an important problem in urgent management. The research team has realized the importance of the problem, losses and effects arising from the loss of goods to determine guidelines for systematic inventory management, leading to an increase in the efficiency of the company's operations in the future.

OBJECTIVE

1. To study warehouse management in current situations and problems within the warehouse of XYZ company limited.
2. To analyze the warehouse management in current situations and problems within the warehouse of XYZ company limited.
3. To guideline for efficiency improvement for warehouse management of XYZ company limited.

METHODOLOGY

- **Fishbone Diagram**

Wanwipa Cuhanpet (2017) explains that the fishbone diagram or a cause-and-effect diagram is a diagram that represents the relationship between the problem (Problem) and all the possible causes that cause it.

The Fishbone diagram was first developed in 1943 by Professor Kaoru Ishikawa of the university of Tokyo. It is one of many management tools. It is often used to analyze the cause of the problem under the concept that “Problem solving must be solved at the root cause, the cause must be practical and rational.”

For the method of constructing a fishbone diagram, it is important to build it according to the way of managing or solving the problem. It must see the big picture of all the data or causes, in which to create the plan must be done as a group using the following 6 steps:

Step 1: Determine the problem sentence at the fish head.

Step 2: Determine the group of factors that will cause that problem.

Step 3: Brainstorm causes for each factor.

Step 4: Find the root cause of the problem.

Step 5: Prioritize causes

Step 6: Implement the necessary improvement guidelines.

Determining factors on a fishbone diagram must be able to help distinguish and determine the causes systematically and rationally. It most often uses the 4M 1E principle as a group of factors to lead to distinguishing various causes, which the details of 4M1E come from:

M: Man, worker, employee, or personnel

M: Machine, machinery, or facilities

M: Material Raw materials or spare parts, other equipment used in the process

M: Method, working process

E: Environment, weather, place, brightness, and working atmosphere

- **Warehouse Management by ABC Analysis Method**

ABC Analysis is based on the principles of Vilfredo Pareto, an Italian economist. It noted that "The important things are fewer than the unimportant, which are often larger, in a ratio of 20 to 80, that is to focus on a small number of high-value products. rather than a large group of commodities that are generally of little value" (Diana, Francisco, Soumaya and Ada,2017).

As Pareto's concept, it leads to inventory control and improve inventory arrangement (Tommanee and Kanokporn,2022) by using unit value as a criterion for grouping of products, Type A inventory account for 15% of the total inventory but high value of 70-80% of the total inventory value, Type B inventory will account for 30% of total inventory but high value of 15-25% of the total inventory value, and Type C inventory will account for 55% of total inventory but high value of the total inventory value (Kochakorn Jiumsanga ea.al,2020)

Gathering information from unstructured Interview and participation observation using Fishbone diagram theory, ABC analysis concept, which are the tools for collecting and analyzing data.

- **Steps for conducting research are as follows:**

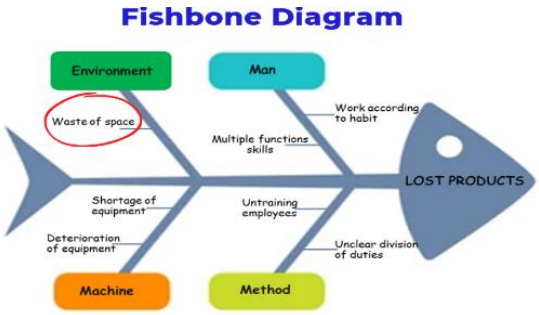
Figure 1
Steps for conducting research
Source: Researcher

- **Data Analysis**

Using information obtained from unstructured interviews. (Unstructured Interview) and Participant Observation together with Fishbone Diagram Theory, all 6 steps described by Wanwipa Cuhanpet (2017) as a tool for analyzing the cause of the problem and the process that affects In-warehouse performance reveals that "Lost Products". It is the main cause of problems and processes that affect the performance within the warehouse. Therefore, the 4M 1E principle is used, which is a group of factors of the fishbone diagram theory

By identifying the causes of the 4M 1E principle, it can be written the analysis of the cause of the problem and the process that causes it. "Delay in picking and frequent wrong picking" that affects the efficiency of work with a fishbone diagram as shown in **Figure 2.**

Figure 2.
Analysis of the cause of the problem with a fishbone diagram
Source: Researcher

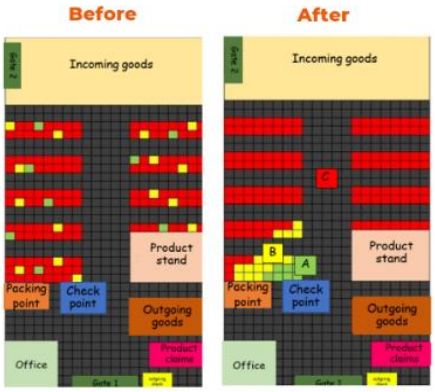


RESULTS

After Using information obtained from unstructured interviews and participant observation together with the concept of ABC Analysis applied from Pareto's principles. It is a tool to classify products into 3 groups, in which the research team collects data on items of goods entering and exiting within the warehouse by collecting goods in-out and analyzed according to the ABC analysis and sorting the product values from the highest to the lowest, therefore, to find the percentage of each product (Bring the number of products multiply by list multiply by one hundred divided by total product price), then, arrange the products with the highest percentage on the top and the lowest percentage on the bottom by descending order to find the cumulative percentage.

In the next step (take the percentage of the first product plus the percentage of the next item) and sorted into groups ABC, respectively, where Group A is the item with a value greater than 80% (26 SKUs and 932,757,199 baht), Group B is the item with a value less than 15%(47 SKUs and 185,364,323 baht), and Group C is Items with a value as low as 5% (285 SKUs and 59,005,510 baht).

Figure. 3
Warehouse before and after improvement with ABC Analysis concept.
Source: Researcher



Before the improvement, the warehouse had a disorganized product placement, scattering products throughout the warehouse without grouping products according to their value. Employees will sometimes place the products according to their own familiarity, or according to their own convenience, causing the product to be disordered and obstructing the path at some points, resulting in difficult moving products, resulting in delays and can also cause accidents during the movement of the goods and may damage the goods.

After the improvement, the warehouse has been grouped by value and well-organized by placing high-value products as close to the exit as possible to reduce the chance of accidents with high-value goods. It's also easy for picking and moving products. As a result, the delivery and handling of high-value goods is convenient, as well as being able to continuously inspect the goods and reducing the chances of causing product loss from malfunction or theft. as shown in **Figure 3.**

CONCLUSION AND FUTURE WORK

From the research results, it was found that Efficiency Improvement for Warehouse Management of Light Bulb Products can increase the warehouse efficiency of XYZ company limited according to the research objectives as follows:

The study found that warehouse management in current situations, there was no systematic for area management of products within the warehouse (Zoning Unorganized). There was a disorganized work process of employees due to limited staff, causing the problem for items to be placed on the floor in a cluttered manner. This results in wasted storage space and delays in picking.

The study found that the results of the analysis of warehouse management in current situations and problems within the warehouse by categorizing various causes with the 4M 1E principle, the researcher team wrote an analysis of the causes of the problems that cause "Lost Products" with a fishbone diagram, choosing the cause of "Waste of Space" from the factors (E: Environment), which is the main cause of problems up to 80% that cause the lost product and including delays in picking and mismanagement of space within the warehouse. This affects the efficiency of work within the warehouse.

To guideline for efficiency improvement for warehouse management of XYZ company limited.

The study found that the problem of warehouse management can be applied to the ABC Analysis tool to solve the problem by clearly dividing product zones, making the work in the warehouse clearer, and making work possible quickly as stocking products or picking products out of the warehouse, easily find out where the products are placing, and what kind of products are in the warehouse and determine the products cycle counting guidelines for each group, namely Group A "Always follow up and monitoring", Group B "Often checking", and Group C "Sometimes checking ".

From the problem of lost products in the warehouse causing problems in inventory management. The researcher proposed steps and methods for using ABC Analysis as a guideline for determining a product cycle counting plan to reduce loss and control inventory appropriately. And if applied with visual control for dividing the proportion of each type of product will control operations more appropriately.

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