LOGISTICS WAREHOUSE LAYOUT DESIGN

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Article Info	ABSTRACT
	General Background: Effective warehouse management is critical for ensuring rapid and efficient logistics operations, especially in disaster response scenarios. **Specific Background**: Dinas Sosial Provinsi Jawa Tengah, tasked with disaster management support, faces inefficiencies in its warehouse layout, where logistics goods are poorly organized, leading to delays and increased labor costs during the movement and retrieval of items. **Knowledge Gap**: Current literature lacks focused studies on optimizing government warehouses specifically for disaster response logistics using class-based storage methods. **Aims:** This study aims to redesign the warehouse layout of the Central Java Social Service using the class-based storage method to improve the efficiency of goods movement and minimize labor costs. **Results**: The proposed redesign organizes goods into three classes: Class A (Food), Class B (Evacuation Equipment and Family Supplies), and Class C (Blankets), with respective frequencies of 77.47%, 10.99%, and 4.54%. The new layout, based on these classifications, significantly enhances the efficiency of goods retrieval and movement, reducing labor costs. **Novelty**: This study applies the class-based storage method, traditionally used in commercial warehouses, to a public-sector disaster logistics context, showcasing its potential to improve operational efficiency in government-run facilities. **Implications:** The findings suggest that implementing class-based storage methods in government disaster warehouses can serve as a model for other regions to streamline logistics processes, potentially improving disaster response times and resource management.

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INTRODUCTION

The problem that occurs in the logistics goods storage warehouse at the Central Java Provincial Social Service is that the warehouse layout is not organized and does not match the characteristics of the goods in the warehouse. Goods are only arranged by type

and not according to the characteristics and volume of entry and exit, causing inefficient use of space, hampering the process of entry and exit of goods, and spending a lot of time during the receipt or delivery process because it is difficult to reach the item. In addition, inappropriate arrangements can result in reduced effectiveness in the warehouse operational process. Therefore, a proper and adequate warehouse or storage area is needed to store these logistics items because the goods are stored at an indeterminate time. It can be taken at any time or remain in the warehouse until it arrives at pickup time. The proposed redesign uses the class-based storage method because this method classifies goods based on their class, namely class A, class B, and Class C. These classes are categorized based on the number of items in each class. These classes are categorized based on the number of items in the warehouse. The placement of the layout affects the effectiveness of the process of getting in and out of goods so that it requires the use of the right method to overcome existing problems and obstacles. The purpose of this research is to utilize the warehouse area so that the process of moving and retrieving goods and the process of getting in and out of goods can be done effectively by saving time and energy spent. The result of this research is savings in the time of movement and the labor of the workers used.

METHODS

Research design The class-based storage method is a method of storing goods in a warehouse that are grouped according to certain types or categories and each category is placed in a designated area. The classification of goods is carried out according to the type and size of the goods and will then be grouped into several classes, namely class A, class B and class C. Class A is placed in the warehouse. Goods that have a high level of popularity, namely fast moving products, are also called class A. Class A is placed in an area close to the entry and exit of goods, and products that have a level of propularity below class A are called class B and so on. The class-based storage method makes the area design more flexible by separating the area into several sections. Product placement is arranged in a predetermined area with several existing products according to similar characteristics such as size, type and others. The advantage of the class-based storage method is that it can increase efficiency and order in the storage of goods. By clearly classifying the goods in the warehouse, employees can easily identify the storage location of goods according to product categories and organize the warehouse more regularly. Data collection techniques in this research are observation, interviews, and documentation. While the data analysis technique uses data reduction, data presentation, and conclusions.

RESULTS AND DISCUSSION

The placement and arrangement of goods is the initial warehouse layout. The initial warehouse layout is the initial warehouse layout before it is designed. The logistics warehouse of the Central Java Province Social Service has an area of 15x20m2 and does not have a warehouse layout method. Goods are only arranged according to their type

(food is put together with food, tents are put together with tents). There is no special method in the arrangement of goods. So that the arrangement does not pay attention to the volume of goods in and out and the characteristics of the goods. Goods that are large and heavy should be easy to pick up and reach, but are placed in a non-strategic position so that it takes more time and a lot of energy to pick them up.

The process of receiving logistics goods from the Ministry of Social Affairs to the Central Java Provincial Social Service at the logistics warehouse starts with the arrival of the Ministry of Social Affairs truck carrying logistics goods into the warehouse area. The goods are unloaded by the coolies working at the time. Logistics goods in the warehouse are arranged and moved manually by human labor because the Provincial Social Service does not have the tools to move these goods. So that this becomes one of the obstacles encountered during the process of receiving and sending goods.

After seeing the initial condition of the warehouse and some of the problems encountered in the warehouse, it is very important for us to classify products based on their type, and based on the frequency of movement. This classification uses the class-based storage method to customize goods and warehouse conditions. The following is a warehouse layout design using the class based storage method.

Images and Tables

Table 1. Data on Logistics Brang Types

Item	Name Type
Food	Kids Food A2023
	Prepared Food
Evacuation Equipment	Mattress 2023
	Multipurpose Tent 2023
	Portable Family Tent 2023
	Dumlap 2022
	A2023 Roll Up Tent
	Water Purifier
Clothing	Blanket
Family Equipment	Family Kit A2023
	Kids Ware
	Family Kitchen Equipment 2022

Figure 1: Applied Research Output

Citations and References

According to Meyers and Stephens (2002), a warehouse is a place to store goods, goods that are stored either raw materials or finished goods and will be used in the manufacturing process and ready to be shipped. Meanwhile, warehousing activities are not only in the activity of storing goods, but also the process of managing goods from receiving goods, recording, storing, to the process of shipping goods.

According to Warman (2012), warehousing management is an information system that is used to monitor or supervise activities in the warehouse starting from receiving, storing, moving, picking, and shipping. Warehouse management itself can be defined as a step to organize and manage the warehouse. So that the goods stored in the warehouse can be managed properly. This aims to reduce errors during the process of entering and exiting goods or stock calculations.

CONCLUSION

Fundamental Finding: This research demonstrates that the implementation of a class-based storage method in the logistics warehouse of Dinas Sosial Provinsi Jawa Tengah significantly improves the efficiency and effectiveness of goods movement by categorizing items based on ABC analysis. The results indicate a 77.47% movement frequency for Class A (Food), making it the priority for placement near entry and exit points, followed by Class B and C items. **Implication**: The proposed redesign not only optimizes the use of space and reduces labor costs but also enhances disaster response efficiency by streamlining the process of goods retrieval and distribution. **Limitation**: However, the study is limited by the absence of advanced tools and equipment for moving goods, which impacts the overall speed and labor requirements in the warehouse. **Further Research**: Future studies should explore the integration of automated systems and tools to further enhance the efficiency of logistics operations and investigate the application of the class-based storage method in different types of disaster management warehouses across varying regions.

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