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ANALYSIS OF THE IMPLEMENTATION OF IMPROVEMENT OF TUBE MATERIAL HANDLING TO SPEED UP THE PICKING PROCESS AT THE RAW MATERIAL WAREHOUSE OF PT. DSV SOLUTIONS INDONESIA (SEMARANG BRANCH)

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Abstract: Warehouses that store various types of materials such as raw materials, semi-finished goods, and finished goods play an important role in the company's logistics system. Warehouse activities are highly dependent on the speed and accuracy of material and information management. This study aims to evaluate the activities of tube material handling strategies in the Raw Material Warehouse of PT DSV Solutions Indonesia Semarang Branch with a focus on identifying activities, impacts on time and costs, as well as risks and obstacles in the tube material picking process. The company's target is to complete 100% within 5 hours, but during July-December 2023 the target has not been achieved. This research uses a qualitative approach, data collection through observation, interviews, and documentation conducted with qualitative analysis. The results of the research on material handling tubes in the Raw Material Warehouse of PT DSV Solutions Indonesia Semarang Branch show that the current storage system is not optimal. The material picking and sorting process is less than optimal when the material is stored in the original box from the customer which contains several SKUs (Stock Keeping Units). As a result, one retrieval process takes 100 minutes and costs Rp 30,720 in employee salaries. In addition, the current storage system risks hindering the achievement of company targets, extending process time, and increasing the risk of material damage. The conclusion of this study is that the tube material handling strategy in the Raw Material Warehouse of PT DSV Solutions Indonesia Semarang Branch is not optimal and needs improvement regarding storage. The use of more organised material handling in tube material storage can improve picking activities and reduce processing time, costs, and the risk of material damage.

Keywords: Material Handling, Order Picking, Warehousing

Introduction

Each warehouse must be designed to meet specific requirements because warehouses are part of the logistics system, and the way the storage of goods is handled in it depends on other activities. it depends on other activities. Most warehouses must
consider process flow (Suntoro, 2020). Each warehouse must be designed to meet certain requirements because the warehouse is part of the logistics system, and the way goods are stored in it depends on other activities. depends on other activities. Most warehouses should consider process flow (Suntoro, 2020).

PT DSV Solution Indonesia Semarang Branch shows the existence of long activities for tube material handling, especially in the order picking process. This activity is proven to take a very long time, affecting the activities in the warehouse, and disrupting the achievement of targets that have been set, this problem can slow down the operational process. Proper action is needed and can increase optimization and reduce the time required in the tube material picking process so that the company can achieve optimization the tube material picking process so that the company can achieve the company's target of 100%⁄5 Hours. The target is said to be 100% with the following components; time efficiency, picking accuracy, use of equipment such as forklifts, picker productivity, and customer satisfaction. The company has its own target in the material picking process, this aims to improve warehouse operational activities and increase customer satisfaction. customer satisfaction.

Tabel 1. 1 Data Jumlah *Order Material Tube* Perbulan Selama Periode Juli – Desember 2023 PT. DSV Solution Indonesia Cabang Semarang

PROCESS	Jul-23	Agu-23	Sep-23	Okt-23	Nov-23	Des-23	*TOTAL ORDER*	*AVG. ORDER/ MONTH*	*AVG. ORDER/ WEEK*	*AVG. ORDER /DAY*	*SHIFT*	*AVG. ORDER/ SHIFT*
Picking	205	210	270	265	255	180	1385	231	58	10	2	5

Sumber: PT DSV Solutions Indonesia (Cabang Semarang), 2023

In table 1.1 data on the average number of orders for tube material each month reaches 231 orders, and the average for each day reaches 10 orders, and is divided by 2 shifts so that each shift performs the picking process for 5 orders of tube material.

Tabel 1. 2 Data Waktu Process Picking Material Tube

PROSES	*AVG. ORDER/ SHIFT*	*TOTAL SECOND*	*TOTAL MINUTES*	*TOTAL HOUR*	*TOTAL TIME 100% ORDER / SHIFT*	*TARGET OPERATIONAL 100% ORDER*	*SELISIH*
Picking	5	6000	100	1,67	8	5 Jam	3 Jam

Sumber: PT DSV Solutions Indonesia (Cabang Semarang), 2023

In table 1.2 it is explained that in carrying out 1 process picking tube material takes 1.67 hours or the equivalent of 100 minutes. To achieve the target of picking material tube 100% spent 8 hours, while the company's target is 100% order completion within 5 hours, so the difference from the company's target with the actual within 5 hours, so the difference between the company's target and the actual is 3 hours is 3 hours.

Placing handling in the raw material warehouse, especially in the right tube material in the picking process, can reduce the time used in the picking process. Improving the allocation and speeding up the picking process of tube material is by grouping the material according to the material number or SKU (Stock Keeping Unit) and changing the way it is stored, where currently the tube material is stored using the randomized storage method and the material is mixed in boxes between boxes randomized storage and the material is mixed in boxes between several SKU..

Methods

Judging from the type of data used, this research uses a qualitative approach. According to (Zuchri et al., 2021) a qualitative approach is a method that focuses on understanding and interpreting natural phenomena or events interpretation of phenomena or events in a natural way. This approach emphasizes the aspect of interpreting phenomena or events naturally. This qualitative research aims to get complete information about "Speed Up Process Picking Material Tube with Improvement Handling Material at Raw Material Warehouse PT DSV Solutions Indonesia Semarang Branch". The discussion in this qualitative research focuses more on the level of need of the problem identified in the research. The focus of this research

This research focuses on analyzing the activities of tube material handling currently implemented in the Raw Material Warehouse of PT DSV Solutions Indonesia Semarang Branch, whether the handling used has an impact on the time and operational costs of the tube material picking process. The data collection techniques used by researchers are:

a) Observation

Observation is an important part of the data collection process, which means that observation collects data directly from the location directly from the location. In this study, researchers used non-participatory observation methods, researchers made direct observations to obtain information related to material handling in the process of picking tube material in the Raw Material Warehouse of PT DSV Solutions Indonesia Semarang Branch.

b) Interview

Interviews are used as a data collection method both when researchers want to conduct an initial study to identify problems that need to be investigated. problems that need to be investigated, or when researchers want to get a deeper understanding from respondents (Sugiyono, 2019). In this study, interviews were conducted with individuals who had crucial information about the process of picking tube materials in the Raw Material Warehouse. Informants in this interview include: Assistant Manager of Raw Material, Supervisor, Picking Leader at the Raw Material Warehouse of PT. DSV Solutions Indonesia Semarang Branch.

c) Documentation

Documentation or documentary method is one of the data collection techniques used in research. In this method, the data collected is mostly in the form of letters, diaries, memos, reports, and the like. In this study, documentation was carried out through photographing interview activities and observing tube material picking activities while in progress. The purpose of this documentation is to collect written information which includes the history and profile of PT DSV Solutions Indonesia Semarang Branch.

Data analysis techniques according to (Sugiyono, 2018) are steps in extracting data that has been obtained from observations, interviews, and documentation, selecting data, and presenting the data that has been obtained. The data analysis techniques used by researchers are:

a) Data Collection

In qualitative studies, data collection is done through observation, in-depth interviews, and documentation, or a combination of the three (triangulation). The data collection techniques used in this study are observation, interviews, and documentation carried out in the tube material picking process in order to accelerate the tube material picking process at the Raw Material Warehouse of PT DSV Solutions Indonesia Semarang Branch.

b) Data Reduction

The data obtained from the field is quite abundant, so it is important to record it carefully and in detail careful and detailed. In summarizing data, each researcher will refer to the theory and objectives of the researcher, summarizing data involves a sensitive thinking process that requires intelligence and a deep and broad understanding (Sugiyono, 2019). Reduction starts from the researcher carrying out the internship.

c) Data Presentation

After data reduction, the next step is to present the data, the presentation of data in a qualitative context can take the form of tables, graphs, pie charts, pictograms, and so on. In qualitative research, data can be presented in the form of brief descriptions, diagrams, relationships

between categories, flowcharts, and the like, (Sugiyono, 2019). By presenting the data, it will make it easier to understand the situation and plan the next steps based on the understanding that has been obtained.

d) Drawing Conclusions

The fourth stage in the qualitative data analysis process is conclusion drawing. Taking into account that this research uses qualitative data collection methods, the author emphasizes the importance of recording significant events. The focus of this research is on handling tube material to speed up the picking process in the raw material warehouse of PT DSV Solutions Indonesia Semarang Branch, then the data collected will be analyzed by integrating it with existing theories

Results and Disscusion

Tube Material Picking Process Flowchart

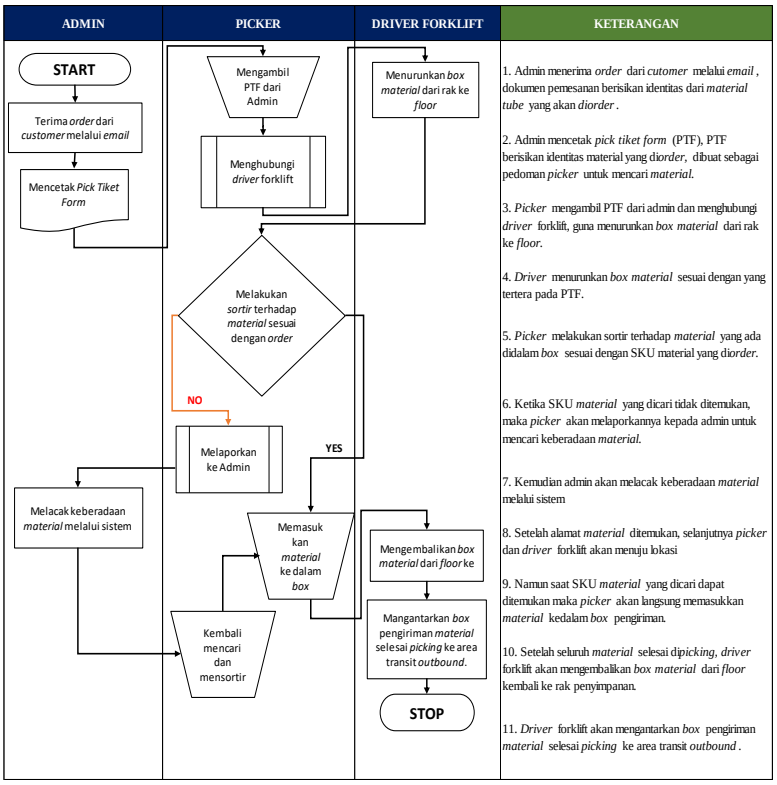

Figure 1. Tube Material Picking Process Flowchart
Source: Data processed by researchers, 2024

Target Achievement of Tube Material Picking Process:

PT DSV Solutions Indonesia Semarang Branch targets completion of tube material picking within 5 hours (100% within 5 hours). According to Alqahtani (2022), warehouse operations such as picking and loading account for 40% of labor activity, while the other 60% is for product transportation. Completion of orders in variety and on time is critical.

Randomized Storage Rack:

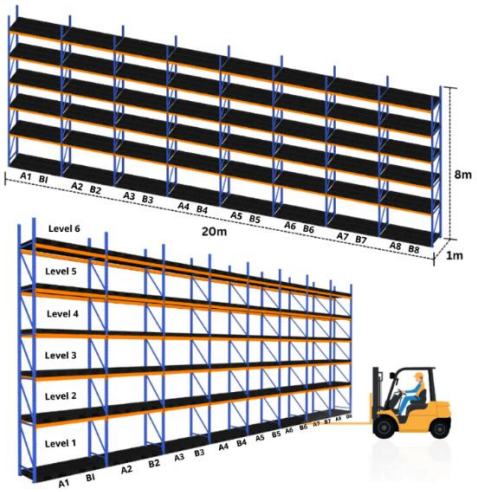

Figure 2. Randomized Storage Rack
Source: Data processed by researchers, 2024

The storage rack of PT DSV Semarang consists of 8 columns (A and B), 6 levels, with a length of 20m, a height of 8m, and a width of 1m, and is covered with black plastic pallets. According to (Alqahtani, 2022). The storage system is simple and practical, allowing uniform aisles, reducing congestion, and making good use of space.

Tube Material Characteristics:

Tube material for protecting car cables is tubular and usually made of rubber. Designed to protect cables from external damage, this material is packaged in 15-meter rolls. This material is prone to damage if not stored properly. Here is the picture:

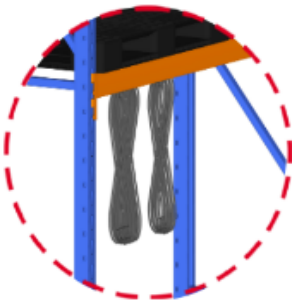

Figure 3. material roll drawing
Source: Data processed by researchers, 2024

Impact of tube material handling on picking time and cost:

According to Alqahtani's research (2022b), it is important to ship orders with the right quantity and variety on time. Order picking takes up about 55% of warehouse costs, and with packing and loading, it can reach 61%, affected by the storage process.

Table 3.1 Employee Price Calculation Based on Semarang City MSEs

Data	*Price (IDR) UOM*
ice employee berdasarkan UMK Kota Semarang 2023	IDR 3.244.000
ice per day (22 hari kerja)	IDR 147.455
ice per hours (8 hours/days)	IDR 18.432
ice per minutes	IDR 307

Source: Data processed by researchers, 2024

Semarang City's minimum wage is IDR 3,244,000 per month, equivalent to IDR 147,455 per day (22 working days), IDR 18,432 per hour (8 working hours), and IDR 307 per minute.

ıble 3.2 Calculation of Time and Cost of the Tube Material Picking Process at the Raw Material Warehouse of PT DSV Solutions Indonesia Semarang Branch

Proses	*Time motion (minutes)*	*rice Employee/minutes*	Total *Cost IDR*
Picking TF	100	IDR 307	IDR 30.720

One order for picking tube material in the warehouse takes 100 minutes. With an employee cost of Rp307 per minute, the total cost for one picking process is Rp30,720.

Applied Research Output

The new tube material storage and classification method can speed up picking and achieve company targets. The analysis involves process duration, target achievement, bottlenecks, and risks when picking tube materials. One example is the special storage rack for tube material in the Raw Material Warehouse of PT DSV Solutions Indonesia Semarang Branch.

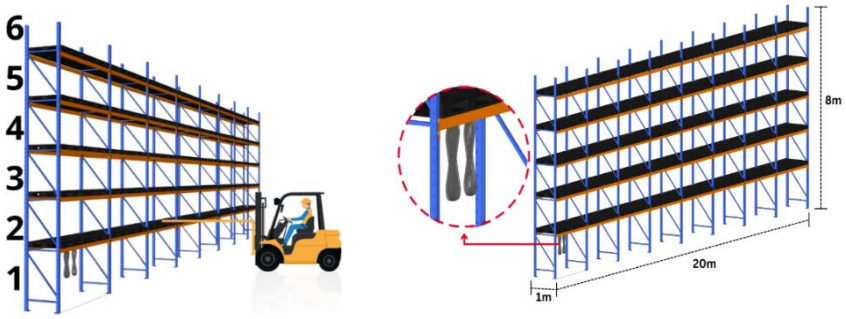

Figure 4. Special storage rack for tube material
Source: Data processed by researchers, 2024

The 6-level rack with dedicated storage is specially designed: Level 1 is for tubes with hangers according to SKU, making picking easier and faster. This dedicated storage method speeds up the tube material picking process, as shown in the following flowchart:

Flowchart of Tube Material Picking Process After Improvement

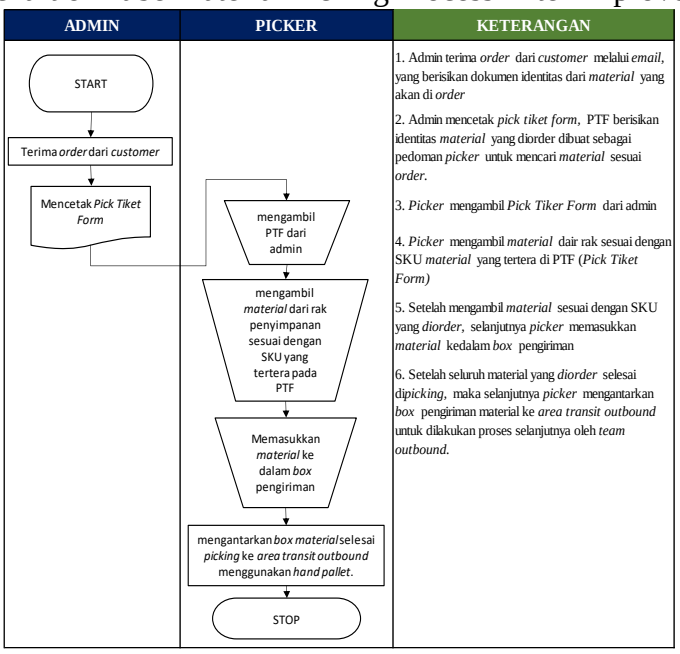

Figure 5. Flowchart of Tube Material Picking Process After Improvement
Source: Data processed by researchers, 2024

Some processes are missing in the tube material picking flowchart before the proposed dedicated storage, such as: Picker contacts forklift driver, Forklift driver lowers box from shelf to floor, Forklift driver returns box from floor to shelf, Forklift driver delivers box to outbound transit area, Picker reports admin if material is not found, Admin tracks material through the system, Picker searches for and retrieves missing material, there is no material retrieval process. This shows that the tube material picking method is more efficient in time, cost, and labor, and reduces the use of tools such as forklifts.

Conclusion

Based on the analysis of the results of the research and discussion that the author described in the previous chapter, shows that:

1. Activities in handling tube material are still not optimal, because of the ineffective storage method, where the material is stored randomly in the original client box with several SKU. randomly in the original client box with several SKUs (Stock Keeping Units) in one box so as to reduce activity. Keeping Unit) in one box thus reducing the activity of the picking process. picking process. However, the tube material handling system used today has a positive impact on the acceleration of the inbound material process at the Raw Material Warehouse of PT DSV Solutions Indonesia, Semarang Branch.
2. Handling material tube has a significant impact on the time and cost of the picking process, namely the time of 100 minutes and the cost of Rp 30,720 and cost of the picking process, namely time of 100 minutes and cost of Rp 30,720 per employee. With the risk that can hinder the achievement of the company's target to complete all orders within 5 hours.
3. The bottleneck that exists in the tube material handling in the picking process stems from the current storage system picking process comes from the storage system that is currently implemented.The material is stored in boxes that are mixed between

SKUs (Stock Keeping Units), this causes the sorting process and the handling of tube material in the picking process. Keeping Unit), this causes the sorting and picking process to be long picking process becomes longk.

References

[1]. Alqahtani, A. Y. (2022). Improving order-picking response time at retail warehouse: a case of sugar company. SN Applied Sciences, 5(1). https://doi.org/10.1007/s42452-022-05230-6
[2]. Dr. H. Zuchri, Abdussamad, & S.IK., M. S. (2021). Metode Penelitian Kualitatif
[3]. Suntoro. (2020). Fundamental Manajemen Logistik. Jakarta: Kencana.
[4]. Sugiyono. (2019). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta