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How to Reduce Overstock Inventory: A Case Study

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Abstract:- Industrial and production companies are starting to realize that greater and more varied supply chain activities, as well as upgrades and improvements at the internal and external levels, are crucial if they want to compete. Overstock or stockout situations in the company's raw material inventory operations are frequent issues in supply chain activities. The inventory audit process in 2021 at PT. ABC's SGRD warehouse yielded a total stock variance of 1449 bins. The purpose of this study will look for the main cause using the Root Causes Analysis method for cases that experience overstock and stockout in the SGRD warehouse of PT. ABC with a variance value of IDR. 75,000,000. In conclusion, the root causes of among others: Material given to customer without GI / reservation, Improper TO confirmation, and Unidentified / Misidentified Material are discovered by the Root Cause Analysis approach. Additionally, a number of suggested actions are provided below for additional supporters and various sections of the process to improve: receiving, issuing, and transfer.

Keywords:- *Warehouse, Stock, Overstock, Stockout, Root Cause Analysis.*

I. INTRODUCTION

Industrial and production companies are starting to realize that greater and more varied supply chain activities, as well as upgrades and improvements at the internal and external levels, are crucial if they want to compete. One of the crucial elements in the industrial sector to increase competitiveness is the efficacy of inventory control (Chan et al., 2017). Overstock or stockout issues in the company's raw material inventory operations are frequent issues in supply chain activities.

According to Satibi et al. (2019), overstock happens when there is an excess of supply but little demand, while stockouts happen when there is little supply but a lot of demand. While stockouts happen when existing inventory (including safety stock) is insufficient to fulfill demand or when demand is more than anticipated, according to Chao & Izaguirre (2021).

Excess inventory, according to Muller (2019), can cause a company to lose money because it adds to expenditures including labor costs, storage costs, and the cost of a product's worth. According to Chao & Izaguirre (2021), stockouts can, in addition to slowing down a production process, result in lost sales, a greater chance that customers would transfer brands, a decrease in customer happiness, and long-term effects on customer loyalty.

Today's large corporations can fulfill their objectives with effective inventory management (Sales et al., 2020). In order to manage a problem condition in its warehouse properly and effectively, every company should be required to do so in order to prevent further losses. Therefore, adopting root cause analysis is the best technique to help businesses discover and pinpoint the reason of the issue (Wirani, et al., 2019).

In a prior study by Fauziyyah & Purwanggono (2018) using the Root Cause Analysis method in the case of overstock and outstanding at PT Showa Indonesia Manufacturing, it was found that the main causes of overstock were supplier delays, additional orders, and manpower shortages while the main causes of outstanding were supplier delays, additional orders, and customer demand. Additionally, Raju's research from 2022 can pinpoint a number of components that contribute to bladder turnover and determine the underlying cause to lessen turnover.

PT ABC is a well-known and respected mining firm in Papua, but it constantly strives to enhance all aspects of its work system, in this case, the material supply chain that underpins its operations. In the highland region, PT ABC operates a total of 4 warehouses for the storage of various materials related to the company's mining operations. These warehouses house tasks like receiving, putting things away, storing things, picking orders, and shipping. The SGRD warehouse in the highlands was selected as a case study due to the enormous amount of materials, varieties of materials, and warehouses at PT ABC.

Warehouse SGRD PT. ABC has up to 24,708 items of stock in storage, but as it does its business, it frequently runs into issues with stock discrepancies that make other risks possible. Additionally, it was discovered that the total variance stock per bin was 1449 bins based on the preliminary data on the total variance stock that was gleaned from the outcomes of the Inventory Audit procedure in 2021 at the SGRD warehouse of PT ABC. Based on this issue, the goal of this study is to identify the primary factor in situations of overstock and stockout in the SGRD warehouse of PT. ABC with a variance value of IDR. 75,000,000 using the Root Causes Analysis (RCA) approach.

II. LITERATURE REVIEW

A. Warehouse Inventory Management

A warehouse is a room designed as a location to handle and store various products and commodities (Dekoster et al., 2017). Because it entails organizing and managing the supply side, or the process of stabilizing supply and demand, Song et al. (2020) claim that inventory management is a key topic in operations management. The most crucial aspect of

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operations management, according to Ajay & Pillai (2018), is inventory management because stock is a resource that can impact a company's profitability. In order to increase business revenues, good inventory management aims to satisfy customer availability expectations.

B. Root Cause Analysis (RCA)

Root Cause Analysis (RCA), according to Fauziyyah & Purwanggono (2019), is a procedure created to look at the underlying causes of incidents involving things like manufacturing procedures and their effects.

A situation is typically influenced by a variety of factors (physical conditions, human behavior, system or process behavior), according to Wirani et al. (2019). The key components of the RCA process are as follows:- Data collection

- Identifying the root of the problem
- Corrective action
- Recommendation & Implementation

C. Fishbone Diagram

The Fishbone Diagram (also known as the Ishikawa Diagram or Cause Effect Diagram), according to Coccia (2018), is a graphical method that aids researchers in identifying the reasons of a specific event. The Fishbone Diagram, in particular, may be seen as a tool frequently used to study the cause of an effect and show how causes and effects interact.

This diagram is frequently used to pinpoint the potential sources of an issue, employing factors to categorize the many causes of issues. Machine, Man, Method, Material, Measurement, and Environment are the 5M factors that are the primary causes (Galingging et al., 2023).

When a business or team needs to pinpoint and investigate the root causes of an issue or search for elements that might contribute to an improvement, they employ fishbone diagrams. (Veronica et al., 2023)

III. METHODOLOGY

Research methodologies will be discussed in this part, including data sources, data gathering methods, and research flow/stages.

Research was done to examine the inventory risk management at Warehouse SGRD at PT. ABC utilizing primary and secondary data sources. Observations made in the field or data gathered directly from sources such as interviews with warehouse area owners are examples of primary data for warehouse operations. Data from SAP in the form of inventory in the SGRD warehouse of PT ABC, data obtained during inventory audits, specifically from August to September 2021, and a number of sources of literature that are utilized as references while processing relevant data are considered secondary data in this study.

The researcher collected data using several methods, as follows: observation, interviews and literature review.

The flow/stages in this research are identifying warehouse business processes, direct observation and interviews with the Warehouse Owner Area, making RCA, analyzing the results of data processing and drawing conclusions based on the results of the fishbone diagram.

Table 1: Research Positions

No	Researcher	Topic	Method	Object
1	Arina Shafa Fauziyyah & Bambang Purwanggono (2018)	Analysis Of Overstock And Outstanding Material Cases	RCA	PT. Showa Indonesia Manufacturing
2	Ayu Puspa Wirani *et al* (2019)	Investigating Marking Mistake on Piping Installation to Avoid Accidents, Injuries, and Damage of Equipment	RCA & 5-Whys	Pipe Industry
3	Nur Layli Rachmawati & Mutiara Lentari (2022)	Application of Min-Max Method for Minimization of Stockout and Overstock of Raw Material Inventory	Min - Max	Spare Parts LPG at PT. XYZ
4	Tzu-Ning Chao & Federico Guillermo dos Santos Izaguirre (2021)	Identifying the Root Causes of Stockout Events in e-commerce	Machine Learning Techniques	Inventory E-Commerce
5	Veronica *et al* (2023)	An Analysis of Quality Control on Defective Products at PT. Signore	Fishbone Diagram	Defective Products at PT. Signore

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IV. RESULT & DISCUSSION

The information that follows pertains to the outcomes of material inventories that had overstocks or stockouts with a value greater than IDR 75,000,000 during July and September 2021.

Table 2: Materials Inventory Overstock or Stockout (July - September 2021).

Month	Material No.	*Overstock / Stockout*	*Value*
July	40403434	*Stockout*	- Rp. 109.280.226
August	40363608	*Overstock*	Rp 1.624.051.537
	40271810	*Stockout*	- Rp 280.160.000
	40509124	*Stockout*	- Rp 269.568.961
	40400833	*Overstock*	Rp 242.640.000
	40666262	*Overstock*	Rp 239.393.303
	40415119	*Stockout*	- Rp 221.737.632
	40649571	*Overstock*	Rp 187.296.255
	40374843	*Overstock*	Rp 177.961.802
	40356596	*Overstock*	Rp 171.337.318
	40321597	*Overstock*	Rp 136.383.819
	40324562	*Overstock*	Rp 136.196.427
	40356802	*Overstock*	Rp 125.962.798
	40126783	*Overstock*	Rp 125.353.873
	40342336	*Stockout*	- Rp102.250.036
	40515979	*Stockout*	- Rp 100.760.003
	40283044	*Overstock*	Rp 99.381.913
	40331254	*Overstock*	Rp 92.151.031
	40548306	*Stockout*	- Rp 90.000.000
	40420449	*Stockout*	- Rp 83.376.416
	40371993	*Overstock*	Rp 82.848.758
	40273020	*Overstock*	Rp 78.370.289
September	40372959	*Stockout*	- Rp 640.797.347
	40598352	*Stockout*	- Rp 538.763.820
	40597839	*Stockout*	- Rp 452.001.201
	40496309	*Overstock*	Rp 447.696.400
	40496313	*Stockout*	- Rp 263.402.900
	40597899	*Overstock*	Rp 442.417.696
	40643879	*Stockout*	- Rp 389.500.000
	40400833	*Stockout*	- Rp 242.640.000
	40666262	*Stockout*	- Rp 239.393.303
	40318685	*Stockout*	- Rp 212.558.832
	40649571	*Stockout*	- Rp187.504.320
	40374843	*Stockout*	- Rp 177.961.802
	40274646	*Stockout*	- Rp 173.070.594
	40375105	*Overstock*	Rp 108.179.200
	40297936	*Stockout*	- Rp 103.169.113
	40597876	*Overstock*	Rp 96.514.650
	40383687	*Stockout*	- Rp 90.208.320
	40568025	*Overstock*	Rp 78.130.081
	40332647	*Overstock*	Rp 89.239.780

A. RCA (Root Cause Analysis)

Based on observation and discussions with the Area Owner Warehouse, some of the primary reasons of material overstocks or stock-outs were determined to be as follows:

- *Material return to warehouse (RTW) did not process*

The underlying issue in this section is a result of overstock, in which a process of material transfer from the user to the warehouse that wishes to be returned as warehouse stock is not carried out in the system; instead, just the actual material is placed straight in the warehouse area.

This first section's reason can be attributed to labor that merely stores materials without confirming them through the system and to a lack of tools.

- *Unidentified/Misidentified Material*

The root cause that we get in this second part is thr overstock or stockout problem, where the stock material is not identified by spesification, types, uses, forms and UOM.

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This problem arises as a result of human error or ignorance during the material identification process.

- *Improper TO confirmation*

The final root cause in this section is the process of material movement within the warehouse between bins or storage areas, which results from overstock or stockout.

This problem arises from human error and a lack of understanding of the material placement procedure, resulting in variations in the location of the materials over numerous bins or locations. It can also be the result of a lack of tools, requiring manual placement of the materials.

B. Fishbone Diagram

Based on the observations made, a Fishbone Diagram can be obtained with the aim of finding more specific sub-core root causes, in order to get appropriate and targeted corrective steps.

- *Material return to warehouse (RTW) did not process*

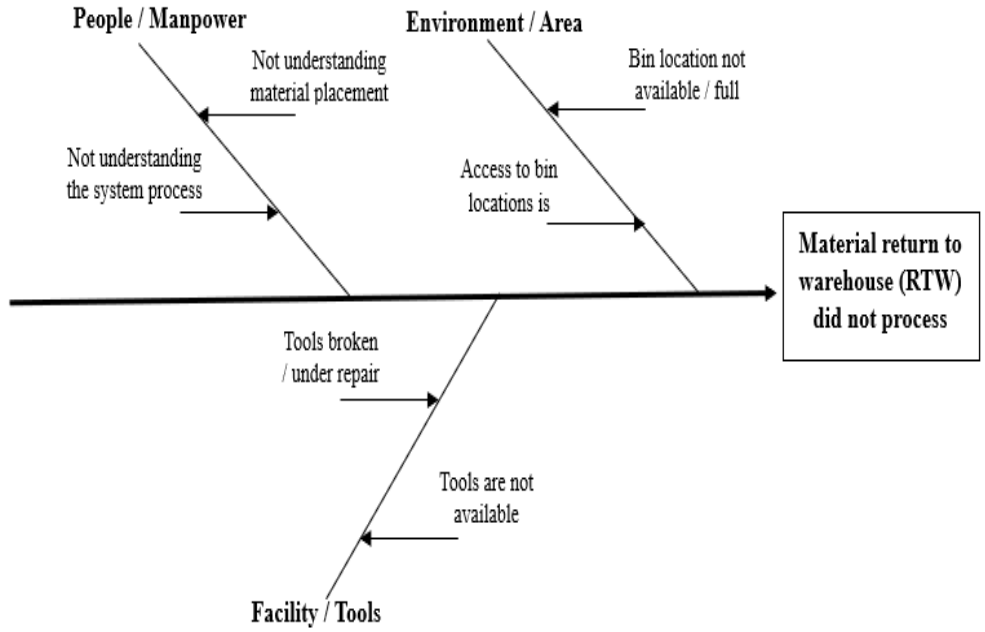

Fig. 1: Material return to warehouse (RTW) did not Process

- *Unidentified/Misidentified Materials*

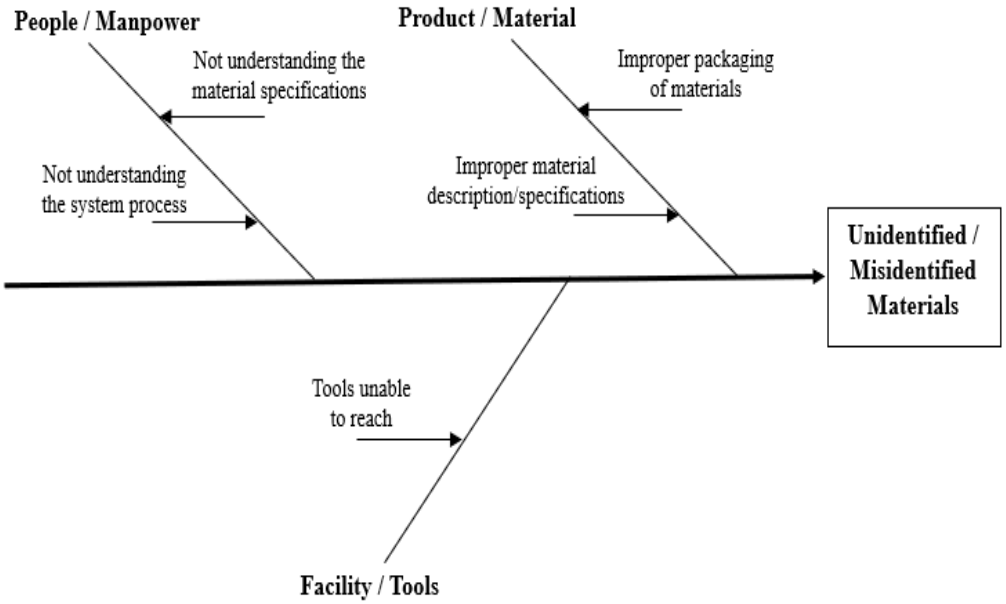

Fig. 2: Unidentified/Misidentified Materials

➢ *Improper to confirmation*

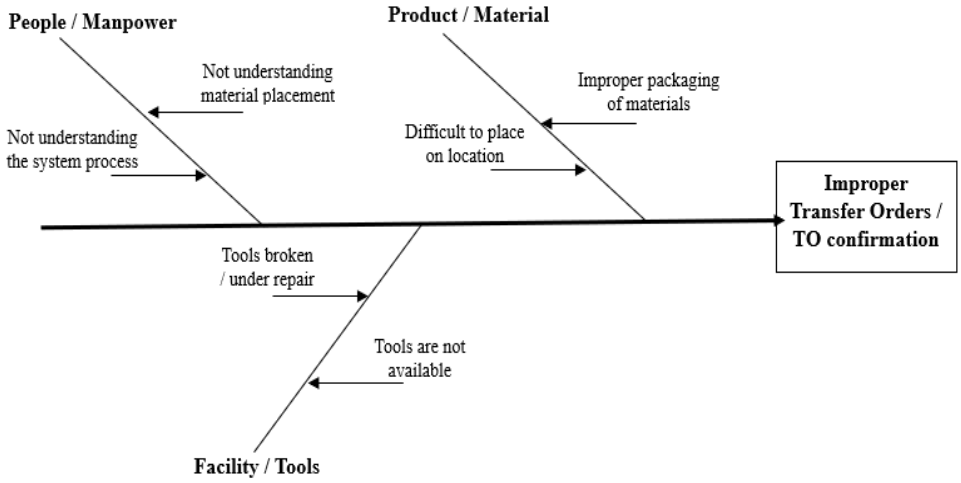

Fig. 3: Improper to Confirmation

C. Recommended Preventive Action(s)

The next stage of discussion is a proposal in the form of preventive measures in the warehouse, as follows:

➢ *Receiving*

- Ensure that the manpower performs GR and updates the quantity in the system based on the received materials and the system-designated bin.
- Carry out the activity of bin-to-bin transfer for each material movement.
- Update the system if necessary, then return the materials in accordance with the original bin.

➢ *Issuing*

- Based on the quantity of the material, the correct UoM, and the allocated bin, crosscheck and update the system.
- Distribute materials in the quantities specified by the user or POD. If there is a change, be sure the system will benefit from it as well.
- After the substance distribution is finished, perform the GI procedure.

➢ *Transfer*

- Immediately inspect the transferred materials, then deliver them in accordance with the quantity received and place them in the prescribed location.
- Update the system in accordance with the real movement of materials.

➢ *Facilities / Tools*

- Purchase the most recent tools and supplies arranged by type and purpose.
- Conduct regular and proper inspections.

➢ *Other*

- To eliminate inconsistencies caused by classifying products as unidentified or incorrectly identifying materials, make sure that all warehouse personnel mark materials with a clear and visible material number. Then, update the system in accordance with the current situation.
- Regularly train the manpower in warehouse operations and the established system.

V. CONCLUSION

The following conclusions can be drawn from the discussion of the basic issues above: Material return to warehouse (RTW) did not process, the underlying issue in this section is a result of overstock, in which a process of material transfer from the user to the warehouse that wishes to be returned as warehouse stock is not carried out in the system; instead, just the actual material is placed straight in the warehouse area; Unidentified/Misidentified Material the root cause that we get in this second part is the overstock or stockout problem, where the stock material is not identified by spesification, types, uses, forms and UOM; Improper TO confirmation, the final root cause in this section is the process of material movement within the warehouse between bins or storage areas, which results from overstock or stockout.

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