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Improving Warehousing And Inventory Management At Teaching Factory Electronic Manufacturing

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ABSTRACT

Effective inventory management is essential to reduce financial losses and maintain the integrity of the production and supply system. The core of this management lies in the organized management of inventory and distribution, collectively known as inventory management. By following standard operating procedures (SOPs), this approach ensures that warehouse operations are streamlined and run according to established guidelines. Avoiding the loss of goods is critical not only for economic reasons, but also to avoid disruptions in the warehouse and production and delivery processes. Storage management acts as a safeguard against these potential failures. The term encompasses various strategies and practices aimed at optimizing the storage, retrieval and distribution of goods in a warehouse environment. In essence, the emphasis on inventory management is a proactive measure to improve operational efficiency. This involves careful planning and execution and alignment with SOPs to maintain consistency and reliability of warehouse operations. With this approach, companies can not only avoid financial losses associated with misplaced or damaged products, but also promote a smooth workflow in the warehouse. The key to successful warehouse management lies in its ability to combine best practices, technology and adherence to established procedures. This ensures that the warehouse is operating at full capacity and meeting production targets and delivery schedules. Ultimately, the synergy between efficient inventory management and SOP adherence forms a solid framework for continued operational success in the dynamic field of warehousing and distribution.

Keywords:

inventory, management

Introduction

Teaching Factory Electronic Manufacturing (TFME) at Politeknik Negeri Batam is a support service unit that combines taking orders from the manufacturing sector with the idea of learning as an educational laboratory. The collaboration between the Institut Teknologi Bandung and Politeknik Negeri Batam led to the founding of TFME in 2012.

Because TFME is able to generate electronic components, it serves as a service unit that moves in both manufacturing and service. In order to remain competitive in the service sector, TFME Polytechnic State Batam needs to be able to produce efficiently and raise the standard of the product. Because a product's customer does not want the item they ordered or it does not fit the intended ordering schedule. In order to achieve this, capacity planning helps the business determine the amount of

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capacity needed to carry out production scheduling that is advantageous for meeting the production target. If there is an excess of capacity, it will result in inefficient production operations, low resource utilization, higher production costs, and a lower profit margin for the business. If there is a shortage of production time, the delivery of goods to customers will also be delayed.

In order to prevent the loss of items, which would be a financial loss for the firm and interfere with the warehouse's production and delivery system, management of the warehouse is essential. The organization of stock storage and distribution activities in a warehouse is known as warehousing management. This management makes warehouse operations more efficient and in compliance with standard operating procedures (SOPs).

In PBL (project-based learning) activities, we use this method in relation to 1. Occupational Safety, Health, and Environment . 2. Purchasing and Management of Suppliers . 3. The Practice of Inventory Management and Warehousing . 4. Workplace Productivity with Information Technology . Specifically, we ran this PBL in three warehouses—the general warehouse, the chemical warehouse, and the design warehouse—at the Teaching Factory Manufacture of Electronics (TFME) for one semester. Priority one in the general warehouse goes to our PBL.

Methods

The two issues we have at the TFME warehouse are the unautomated system and the disarray of the merchandise. The approaches taken in the Teaching Factory Manufacture of Electricity to pinpoint issues, generate concepts, and find answers. To detect problems, begin with observations, problem evaluations, and interviews. The 5S approach (Seiri, seiso, seiton, seiketshu, shitsuke) and designs, such as creating diagrams and the flow of logistical tasks in the TFME warehouse, are utilized for the development of concepts. The research plan outlines each of these techniques.

Results and Discussion

In addition to implementing an automated system using an Excel macro, which includes an inventory of goods and warehouses that can be utilized to facilitate the deposition of goods as well as inbound and outbound forms, we also use the 5S method to maintain and care for the warehouse on a regular basis. Seiri: Get rid of unused items. Seiton: Organize the location and storage of items. Seiso: Clean all items and work areas. Seiketsu: All work practices must be consistent and standardized. Shitsuke: Maintain and review standardized items on a regular basis.

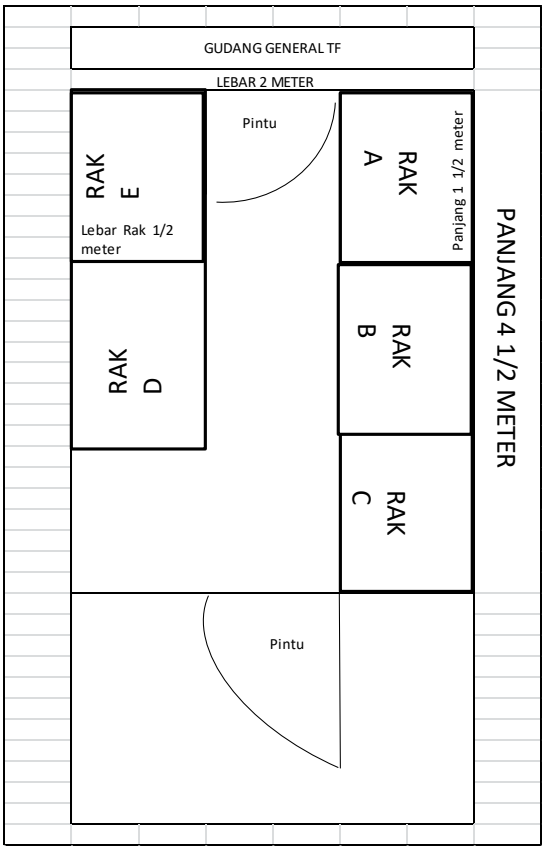

Figure 1 & 2 : Warehouse layout in General

The layout above is a picture in which there are 5 shelves of goods and 5 shelves each have 4 arrays for goods. In this warehouse there are many types of goods, one of which is masks, equipment for designing, and Personal Protective Equipment.

Figure 3: the result of implementing 5S

This is the result of doing 5S, We do this to keep the warehouse clean, organize the warehouse for example moving small or light items to the shelves above and large or heavy items are placed on the shelves below.

Figure 4: Moving the location of goods

Separating items that are fast to leave the warehouse and those that are slow to leave the warehouse, for example, moving masks from the back to near the main door.

Figure 5: Creation of Item Name in each shelf code

Creating an item name in each shelf code is useful for Quick and easy detection: By assigning a specific code or name to each product on the warehouse shelves, warehouse workers can easily and quickly identify and locate the desired product. This shortens the search time for items, improves operational efficiency and simplifies overall inventory management. Improve inventory accuracy: Accurate article naming helps reduce errors in inventory. This is important to avoid inventory shortages, overstocks, or discrepancies between inventory records and actual production quantities. High inventory accuracy supports efficient and accurate inventory management. Optimize product collection efficiency: For fulfillment warehouses, a structured product naming system simplifies the selection process. Warehouse workers can efficiently assemble products for customer orders without clutter, thus speeding up order processing time and improving overall productivity.

Figure 6: Stock Card

Implementing Stock cards in your electronics manufacturing Teaching Factory building will improve inventory management efficiency, minimize the risk of lost goods, and enable better decision making regarding inventory procurement or usage.

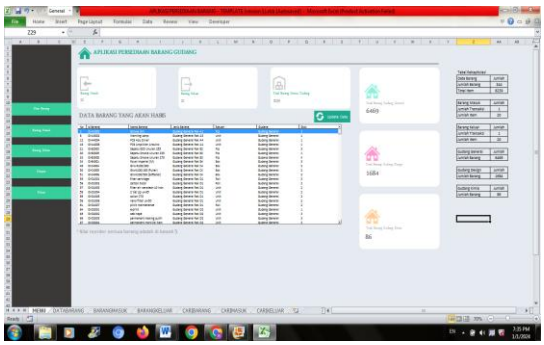

Figure 7: Excel Macro VBA

We apply this excel macro to make it easier to record goods automatically, in excel there is an incoming goods form and an outgoing goods form. In this excel view, there are 3 types of warehouses, namely general warehouse, design warehouse, and chemical warehouse. In this view there is also a recapitulation table which means a summary of all the data in the warehouse, the benefit is that it makes it easier to read the data.

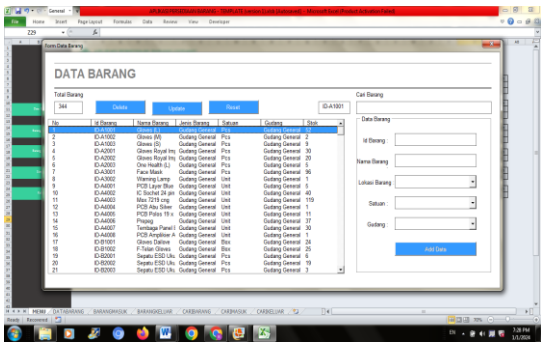

Figure 8: Here is the goods data form

In this item data form there is an item code, for example (ID-A1001) which means that the item is on shelf A1, in addition to the item code there is also an item name, item type, warehouse name, unit, and quantity. Besides being able to display data on goods in the warehouse, we can also search for goods in this form.

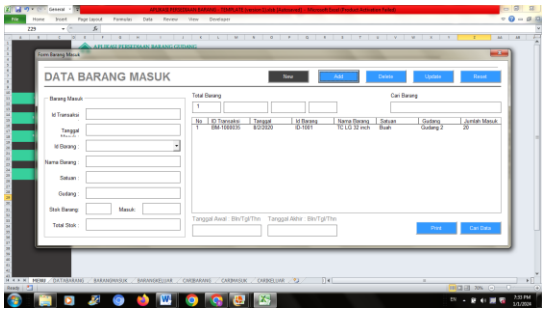

Figure 9: Here is the incoming goods form

This form can make it easier for the warehouse manager to enter goods into the warehouse, if you want to enter new items or items that are not yet in the warehouse list, the warehouse can click NEW, if the item already exists, the warehouse can click Item ID and search for the item according to the name of the item that the warehouse wants to enter, after that the warehouse can fill in the number of incoming items and if it is, click ADD.

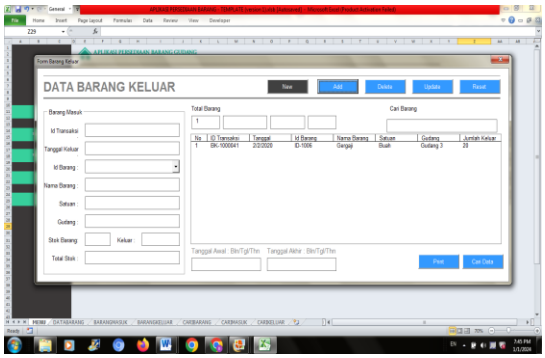

Figure 10: Here is the outgoing goods form

a. This form can make it easier for warehouse managers to issue goods into the warehouse, if you want to enter new items or items that are not yet in the warehouse list, then the warehouse can click NEW, if the item already exists, then the warehouse can click Item ID and search for the item according to the name of the item that the warehouse wants to issue, after that the warehouse can fill in the number of items to be entered and if so click ADD.

Conclusion

The results of our research can conclude that the goods storage system is not automated and chaotic. A holistic approach was applied to identify, address, and improve operational efficiency in the warehouse environment. Through observations, problem assessments, and interviews, we were able to identify the causes of problems related to manual systems and warehouse organization. This process provided detailed insights into the operational challenges TFME was facing. To improve storage conditions, our company uses 5S (sorting, maintenance, tidying, tidying, and shitsuke) as its basis. This involves sorting items, cleaning and organizing storage areas, assigning the location of each item, and establishing maintenance procedures.

The implementation of 5S can create a more orderly, efficient and controllable working environment. In addition, we incorporate a design approach by creating diagrams and flows of logistics tasks within the TFME warehouse. This helps you visualize the logistics process and identify one or more areas that require improvement. This allows you to develop targeted database action plans that improve warehouse efficiency and productivity. As part of the automation effort, we also implemented Excel macro VBA to facilitate item data capture.

This minimizes human error, speeds up the recording process and contributes greatly to the efficiency of warehouse management. electronics manufacturers can solve critical warehouse problems by combining the 5S approach, warehouse design, and automation with Excel macros and VBA. These measures not only improve operational efficiency, but also improve service quality and the accuracy of inventory information, thereby supporting further growth and development in the Teaching Factory Manufacture of Electronics.

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