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Control and Inventory of Raw Materials in Bread Companies To Minimize Raw Material Inventory

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Abstract: The high demand fluctuations caused SA Bakery to experience several problems such as lack of control over raw material inventory and excess shortages in raw material inventory. To help the company, this research aims to reduce inventory costs, reduce order frequency, and stabilize raw material inventory. In achieving these objectives, an operational management approach is applied in this study. One of the techniques in inventory control, namely, Material Requirement Planning (MRP) will be used. In implementing a good MPR system, the MRP Easy method integrates the inventory in the SA Bakery Bakery. In running the MRP Easy method by integrating information using software, one of the software is MRPEasy in the form of a dashboard and also an inventory management system to control the inventory system in it. The input used is BOM data, Orders, forecasting, MPS, and Inventory. The output obtained is in the form of purchase orders in the company every month in a period of 1 year, material plans, work orders and reports for the company. The results of the study found that the application of the control system in MRP provided forecasting results showing significant fluctuations in several months, such as June and September, which caused the potential for overproduction. In the context of MRP theory, this indicates the need for adjustments to safety stock and lead time so that the system can work optimally. MRP not only plays a role in purchasing planning, but also in managing production and distribution times, which in the case of SA Bakery is shown through the output of PO Quantity and capacity requirements analysis (CRP).

Keywords: Raw Materials, Bakery Company, Inventory Management

INTRODUCTION

In the manufacturing sector, manufacturing companies are the keepers of raw materials, both in the initial stage, semi-finished, and in finished form. Careful management of this important inventory is the foundation that supports the entire building of production, because without it, the wheels of industry will stop. These raw materials are basic substances that serve as the foundation for producing finished goods, careful management ensures that progress continues without obstacles (M. Safik, 2023). Good inventory management is essential to

ensure continuity of operations without any shortages of stock that can cause production disruptions, or excess stock that can result in excessive storage costs. Effective inventory management is essential for maintaining the continuity of manufacturing and trading operations. The benefits of inventory management are to ensure that goods (both raw materials and finished products) are available as needed, so that production is not disrupted and customer orders can be fulfilled on time.

Problems in inventory management can often pose significant risks to a company's operations, such as production disruptions, decreased customer satisfaction, or waste of resources. In the complex process of inventory management—where the balance between supply and demand is precarious—the Material Requirements Planning (MRP) method emerges as a guide. Its purpose is to carefully organize the procurement of raw materials and monitor the production process, ensuring that essential resources are available exactly when they are needed. Such a system seeks to prevent disruptive shortages or excesses, allowing production to operate smoothly and efficiently. MRP (Material Requirements Planning) is said to be a dependent demand because the calculation of material requirements in MRP is based on the demand of the final product to be produced, not on direct market demand. Dependent demand means the demand for raw materials, components, or parts of a product that are needed to meet independent demand. MRP is dependent because it varies and does not include one type but there are many types of components in it.

In the context of the food industry in Indonesia, the implementation of MRP can help companies overcome problems related to demand fluctuations and supply variability. Using MRP, companies can forecast raw material needs based on production plans and market demand, helping them avoid overstocking or shortages. For example, in bread production, which requires raw materials such as flour, eggs, and sugar, MRP can schedule raw material purchases, thereby reducing the risk of excess inventory or shortages that can hamper production.

The accuracy of MRP in the food industry in Indonesia also contributes to better cost management. With this system, companies can minimize the cost of storing and purchasing raw materials efficiently. In addition, MRP also supports companies in responding to changes in market demand more quickly and effectively, which is very important in the dynamic food industry. MRP not only improves operational efficiency but also helps companies maintain competitiveness in an ever-evolving market

Along with the rapid flow of globalization in Indonesia, the country's economy has also grown again, supported by various industries of various scales and styles. In the midst of the rapid flow of change, productivity emerges as a beautiful dance of art that combines discipline and innovation, which guides the nation's efforts to set meaningful goals, formulate strategic plans, and utilize resources with unwavering efficiency, while maintaining the integrity and excellence that are its hallmarks (Marco Marcelino, 2020).

Indonesia's relentless economic progress has made the competitive landscape increasingly fierce and unforgiving in every industry. Every company, in its pursuit of success, is required to utilize its resources more wisely—striving to increase productivity, maximize profits, and confront the challenges that threaten to hinder their efforts. In this relentless pursuit, efficiency becomes the guiding star that guides their journey through turbulent waters.

Raw material control serves many purposes for a company in the long term. One key is ensuring that there is sufficient stock. The goal is to have enough raw materials available to keep production running. Without inventory, a company risks failing to meet customer expectations, when they expect them (Yudha & Suseno 2022). In the ebb and flow of trade, it is inevitable that not every commodity will be available at all times; thus, opportunities for profit will simply slip through the fingers of unprepared companies. However, by keeping a close eye on their inventory, companies can prevent the danger of raw material shortages that threaten to bring production to a standstill. In addition, such prudent management serves to

reduce the burden of excessive inventory, ensuring that resources are not wasted or wasted—an important management measure in the pursuit of efficiency and prosperity (Wijoyo & Sari, 2024).

In the context of the food industry, planning and control of raw materials is a crucial factor that affects production efficiency and costs. One product that requires special attention in this case is flour, flour is a basic raw material in every food that is very much needed. Flour usage requires proper management control to ensure smooth operations and maintain product quality. The Material Requirements Planning (MRP) method can be an effective solution.

to overcome this challenge. Inventory control planning must have a proper and appropriate system and forecast so that there is no excess or shortage of stock in the company. By implementing MRP, companies can calculate the amount of raw materials needed, determine the time of purchase, and manage stock more accurately. This has the potential to reduce inventory costs that often arise due to overstocking or stockout

. In MRP planning, the first step is to define the raw material requirements based on the production plan and the list of raw materials required. Next, the MRP system calculates the exact raw material requirements based on historical data and demand projections. With this approach, companies can optimize the use of storage space, reduce the risk of waste, and improve cash flow. MRP implementation also allows for better control of raw material price fluctuations and more efficient purchasing scheduling.

SA Bakery is a cake business that sells various kinds of cakes, one of the best-selling cakes is green bean bread. This Saadah UKM has the SA brand which is located in the Manyar Gresik area. In running its business, it has been established since 1990 until now in 2024 and has grown rapidly as a bakery center. The inventories of raw materials such as wheat flour, butter, yeast, and eggs are not maintained in excess quantities because both of these ingredients do not last long. For eggs that can rot and also flour that can clump and change texture and can have an impact on the production process and quality of bread. In its production process, SA Bakery requires planning for purchasing and stocking the main raw materials, such as wheat flour, to avoid shortages during production.

Ultimately, this method not only helps in minimizing inventory costs, but also increases responsiveness to changes in market demand, which is very important in a dynamic industry such as snack foods. The use of MRP in planning and controlling raw materials for cracker production is expected to improve operational effectiveness and provide significant competitive advantages for the company.

The impact of the problems that occur in the company results in increased production costs because fluctuations in demand require the company to adjust the scheduling of raw material procurement, this has an impact on increasing overall production costs. Fluctuating demand also causes disruption to the supply chain. Fluctuations in demand can also cause instability in the supply chain, especially in terms of raw material inventory and logistics.

In Utomo's scientific study (2023), he emphasized the importance of managing raw material inventory carefully to maintain the sustainability of the company's operations. By exercising careful control over this vital resource, organizations can effectively reduce associated costs, thereby strengthening their resilience and efficiency in an increasingly competitive landscape (Pradana, 2020). By having sufficient inventory, companies can more easily respond to fluctuations in market demand. Companies can increase or decrease production according to actual demand, without having to face raw material supply constraints. Based on the description above, researchers are interested in analyzing raw material control efforts in companies with a study entitled "Control and Raw Material Inventory in Bread Companies to Minimize Bread Raw Material Inventory.

METHOD

This study is a quantitative descriptive approach, namely using a cloud-based MRP Easy approach specifically designed for small to medium-scale producers. The object of research at the Saadah Bakery located in the Sidomukti Village area, Manyar District, Gresik Regency. The subjects in this study focused on the green bean bread section and employees in the raw material procurement section. specifically, the process of managing and controlling raw materials applied to the bakery company that is the focus of the study. At the SA Bakery, a process using Material Reqruitment Planning is required in processing and converting raw data into more accurate information using MRPEasy software.

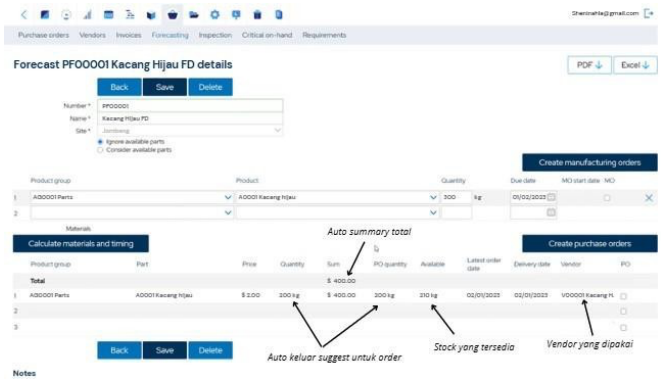
RESULTS AND DISCUSSION

A. Data Bill Of Material

Bill of Material or BOM is a complete and detailed list of all components or raw materials needed to make a product. BOM helps in more efficient production planning (Kamal, M. A., Effendi, F. D., Utomo, M. R., Sucipto, S., Santoso, I., & Effendi, U., 2021, April) at SA Bakery. By knowing exactly what ingredients are needed and in what quantities, you can avoid shortages or excesses of raw materials. BOM allows SA Bakery to better control raw material inventory. SA Bakery can determine the minimum inventory level that must be maintained for each raw material, so that there is no shortage during production

Bahan Baku	Jumlah	Satuan
Tepung Terigu	500	Gram
Ragi Instan	30	Gram
Gula Pasir	75	Gram
Kacang Hijau Halus	200	Gram
Telur	3	Butir
Margarin	100	Gram
Air Hangat	350	Mililiter

B. Forecasting Demand



Based on the MRPEasy software used for forecasting, it shows the suggested quantity figures for placing orders according to the description of the final results of the forecast process, so that there are not too many orders that can result in a buildup in the warehouse or too few orders that can increase shipping costs, SA Bakery is advised to place orders according to what is stated in the PO Quantity column

C. Inventory Analysis

In the Inventory Management section, there is input in the form of a sub-process of entering data into the inventory section, after entering the data, the software for the inventory data section comes out and finds the results of the data from the previous production process. The results obtained in the form of quantity are goods that are ready in the warehouse. By managing inventory effectively, cake shops can reduce storage costs, ordering costs, and potential losses due to damage or expiration of products. Inventory analysis helps in determining the optimal amount of raw materials that must be ordered, so that the production process can run smoothly without being constrained by shortages of materials. By knowing the safe minimum inventory level, SA Bakery can avoid running out of raw materials that can disrupt production and customer service.

D. Safety Stock

Safety stock, or safety stock, is additional inventory kept by a bakery (Paul, B., Tondihal, S., & Das, B. B., 2021). To overcome uncertainties in demand and supply. In the bakery business, where products tend to spoil quickly and demand can fluctuate, safety stock is very important at SA Bakery to maintain product availability for customers.

Variabel	Safety Stock	Satuan
Produk Roti KH	284	Pcs
Bahan baku total	979	Kg
Tepung terigu	281.17	Kg
Telur	220.69	Kg
Mentega	251.03	Kg
Kacang hijau	389.78	Kg
Ragi	72.84	Kg
Gula	301.40	Kg

E. Lead Time Analysis

Lead time itself can help SA Bakery in overcoming several problems, including by knowing the duration of lead time, SA Bakery can plan production better, avoid shortages of raw materials, and ensure the availability of raw materials according to the production schedule. Lead time analysis can also help in determining the right reorder point, so that SA Bakery bakery does not need to store too much stock or experience stock shortages. With lead time, you can also find out the performance of suppliers in terms of delivery, SA Bakery bakery can choose suppliers who are more reliable and can meet raw material needs on time.

F. Cost Analysis

To avoid confusion, the family name must be written as Cost Analysis or Cost Analysis is a systematic process to identify, record, and analyze all costs associated with the operation (Saptadi, S., Zahra, H. A., Arvianto, A., Wicaksono, P. A., & Budiawan, W., 2023) of the SA Bakery bakery. The goal is to understand the cost structure, identify inefficient areas, and make the right decisions to increase profitability. At the SA Bakery bakery, there are several types of costs at the Bakery. By conducting Cost Analysis the SA Bakery bakery can have better results about the cost structure at the SA Bakery bakery, identify areas that need to be optimized, and make the right decisions to increase business profitability

CONCLUSION

In the process of efficiency or control of raw materials, there is Lot For Lot efficiency where this method is very effective in minimizing overstock and ensuring stable ordering costs. However, storage costs become significant due to high net needs, especially for green beans and eggs. Therefore, bakeries need to consider factors such as demand forecasting accuracy, lead time, and raw material characteristics to ensure effective and efficient LFL

implementation. From these problems, SA Bakery can focus on critical raw materials, namely green beans with the highest total cost, green bean stock management must be more strategic, such as reducing the frequency of orders using the eoq method. As well as for egg raw materials that have high fluctuations in several months, it is necessary to anticipate to avoid stock shortages.

The strategy at SA Bakery is to use EOQ on green beans and eggs (EOQ allows ordering in optimal quantities to reduce total costs). Furthermore, it is necessary to digitize the ordering schedule using MRP software to automate the schedule and monitor monthly needs. SA Bakery also needs to collaborate with suppliers by negotiating shorter lead times and more competitive prices, especially for raw materials with high needs. Logistic efficiency can be applied to SA Bakery by combining several raw material orders if possible to reduce ordering costs. This strategy can help SA Bakery in dealing with shortages and excesses of raw materials as well as efficiency in raw material costs and store stock.

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