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# Analysis of Raw Material Rice Inventory Control Using the Economic Order Quantity and Reorder Point Methods

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**ABSTRACT**

This research aims to analyze the Economic Order Quantity (EOQ) and Reorder Point (ROP) methods for controlling rice raw material inventory at Kedai Bubur Ayam Tuangyu. The study employs a descriptive exploratory approach with a case study methodology, utilizing both primary and secondary quantitative data. Data analysis was conducted using non-statistical research techniques with the EOQ method. Through EOQ, a more economical order quantity of 570 kg per order was determined, with a purchasing frequency of 14 times per year. Additionally, a safety stock of 170 kg was established, and the reorder point was set at 192 kg. The implementation of EOQ in rice inventory control is highly feasible, as this method optimizes inventory management and reduces costs by IDR 1,658,144.



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## 1. INTRODUCTION

In the business domain, particularly within the micro, small, and medium enterprises (MSMEs) sector, the management of raw material inventory is a critical aspect. Properly managed inventory can support the smooth running of the production process and optimally meet consumer demand. The implementation of efficiency in the production process is highly necessary to reduce production costs, enabling MSMEs to attain maximum profit. Furthermore, production continuity must be consistently maintained by MSME operators to fulfill consumer demand reliably [1].

Raw material inventory control is a crucial factor in the operations of small and medium enterprises (SMEs) because it affects production continuity and cost efficiency. Many SMEs face challenges such as overstocking or stockouts, which can cause cost waste and disrupt operations. The application of Economic Order Quantity (EOQ) and Reorder Point (ROP) methods has proven effective in helping SMEs determine the optimal order quantity and reorder timing for raw materials, thereby minimizing storage and ordering costs [2].

Kedai Bubur Ayam Tuangyu is an MSME operating in the culinary sector, located at Jalan Angkrek No.127, Situ, North Sumedang District, Sumedang Regency, West Java. In its production process, this MSME still uses simple equipment, such as a cooking pot for preparing chicken porridge from rice. The raw materials are procured from suppliers through an ordering system,

where the materials are delivered directly to the warehouse before processing.

Based on interviews with the owner of Kedai Bubur Ayam Tuangyu, it was found that there are currently challenges in managing raw material inventory, especially rice. The determination of purchase quantities and reorder timing is still done by estimation without a systematic method. This causes the owner to experience difficulties in establishing the optimal rice order quantity, which risks either overstock or understock conditions, ultimately increasing total ordering costs and reducing operational efficiency. To address this issue, one solution that can be implemented is the application of the Economic Order Quantity (EOQ) method, an inventory control technique that considers ordering costs and holding costs, aiming to obtain the optimal order quantity that minimizes total inventory costs.

The purpose of this study is to optimize the raw material inventory control at Kedai Bubur Ayam Tuangyu through a quantitative approach. First, the study aims to analyze the most efficient raw material order quantity by applying the Economic Order Quantity (EOQ) method to minimize storage and ordering costs. Second, the research is designed to determine the appropriate reorder timing using the Reorder Point (ROP) method to prevent stockouts during operations. Third, the study comprehensively analyzes the effectiveness of integrating EOQ and ROP methods in managing raw material inventory, including evaluating the impact on production continuity and operational cost reduction at the establishment.

## 2. LITERATURE REVIEW

Regarding the journal article being prepared by the researcher on the Analysis of Raw Material Inventory Control Using the Economic Order Quantity (EOQ) and Reorder Point Methods (A Case Study at Kedai Bubur Ayam Tuangyu Sumedang), the researcher will explain several relevant theories from experts that support this study.

The following are some theoretical foundations underpinning the research:

### *2.1 Management Accounting*

[3] formulated that Management Accounting is the process of identifying, measuring, compiling, preparing, analyzing, interpreting, and communicating economic events. Management, as the party responsible for company operations, uses this information to plan, control, make decisions, and evaluate the company's performance.

Meanwhile, according to [4], management accounting is a process that involves the identification and classification of accounting information aimed at supporting economic decision-making by the internal parties of the company. Furthermore, Prasetyo explained that management accounting is a process encompassing the measurement, analysis, and reporting of financial and non-financial information that assists managers in making decisions to achieve organizational goals [5].

### *2.2 Inventory*

According to [6], inventory constitutes company assets comprising raw materials and work-in-progress goods that are stored to be further processed into final products with higher economic added value before being distributed to consumers.

According to Nasution, inventory constitutes inactive resources awaiting further processing. With proper inventory planning, the company is able to fulfill customer orders quickly and accurately, while concurrently avoiding excess inventory that may lead to inefficient capital utilization [7].

### *2.3 Types of Inventories*

[8] state that based on the production process, inventory can be classified into four categories, namely:

a. Raw material inventory, which refers to materials that have been purchased but have not yet undergone any production process. These materials can be sourced directly from natural resources or purchased from

suppliers (raw material producers).

b. Work-in-process inventory, which consists of components or raw materials that have passed through one or more production stages but are not yet complete and still require further processing to become finished goods.

c. Maintenance, repair, and operating (MRO) inventory, which includes supplies kept for maintenance, repair, and operational purposes to ensure that machinery and production processes continue to run optimally.

d. Finished goods inventory, which refers to products that have been fully produced or processed and are ready to be marketed or sold to consumers.

### *2.4 Inventory Costs*

In the journal written by [9], Ishak's opinion is presented, classifying cost systems in inventory management into four categories: purchasing cost, ordering cost, holding cost, and shortage cost.

a. Purchasing Cost

Purchasing cost refers to the price paid for each unit of raw material. If suppliers offer discounts for bulk purchases, the purchasing cost may vary according to the order volume.

b. Ordering Cost

Ordering cost is divided into two types: ordering cost, which includes all expenses incurred to obtain goods from external parties, and setup cost, the cost incurred to prepare goods for the production process.

c. Holding Cost

Holding cost is directly related to the quantity of inventory stored. The larger the order quantity or the higher the average inventory level, the greater the holding cost per period.

d. Shortage Cost

Shortage cost occurs when a company cannot meet demand due to insufficient stock. Among all inventory cost components, the shortage cost is the most difficult to predict because it relates to the uncertainty of demand and supply.

Meanwhile, according [8], there are three main types of costs associated with inventory management, namely:

a. Holding Cost

Holding cost, which arises from storing or managing inventory over a certain period.

b. Ordering Cost

Ordering cost, which includes all expenses related to the inventory ordering process, such as administrative costs, form-filling, purchasing, and other administrative support. This cost also arises during order processing and includes setup costs.

c. Setup Cost

Setup cost, which involves expenses to prepare machinery or production processes to fulfill orders, including the time and labor required to clean and change equipment. Operational managers can reduce ordering costs by lowering setup costs and implementing more efficient procedures, such as using electronic ordering and payment systems.

### *2.5 Economic Order Quantity*

According to [8], Economic Order Quantity (EOQ) is an inventory control technique that is widely used and relatively simple, with the objective of minimizing the total costs arising from holding and ordering inventory.

Meanwhile, [10] explained that the Economic Order Quantity (EOQ) method is a classical and straightforward approach in inventory management used to calculate the minimization of total inventory costs. This method is based on

the equilibrium equation or point between holding costs and ordering costs curves.

### *2.6 Safety Stock*

According to Hansen and Mowen, safety stock is additional inventory prepared as a buffer against demand fluctuations. The function of safety stock is to address uncertainties in demand and inventory availability, thereby preventing stockouts. The presence of safety stock is crucial because during the lead time—from ordering to receipt of goods—there is a waiting period influenced by product availability as well as the distance between buyer and supplier [11].

According to Fahmi, safety stock is the company's ability to maintain inventory conditions that are always secure, so that the company is expected not to experience stock shortages. Meanwhile, Kasmir defines safety stock as a safety or additional inventory provided by the company to prevent raw material shortages. The existence of safety stock is crucial to anticipate unexpected demand surges [12].

Based on Nafarin's explanation in [13], safety stock is the core inventory of materials that must be maintained to ensure business operational continuity. This inventory should only be utilized in emergency situations.

### *2.7 Reorder Point*

[8] state that the Reorder Point (ROP) is the inventory level at which a company must place a replenishment order to restock inventory. They emphasize that determining this point is vital so that the company can maintain optimal inventory availability.

[14] explained that the reorder point is the inventory level that indicates when a reorder must be made so the ordered items arrive on time.

### *2.8 Total Inventory Cost*

Total Inventory Cost (TIC) is the overall calculation of raw material inventory costs used to demonstrate that by determining the optimal purchase quantity through the Economic Order Quantity (EOQ) method, total inventory costs can be minimized [15].

### *2.9 Raw material*

In general, raw materials are the basic materials used to produce a certain product, in which these materials undergo a transformation from one form into another. According to Hartoko, raw materials are the essential materials required in the production process to produce products. Meanwhile, Ratnasari defines raw materials as goods that will be processed into finished products [16].

## 3. RESEARCH METHODS

### *3.1 Research Methodology*

The type of research employed by the author is descriptive exploratory research with a qualitative approach. According to Husein Umar, descriptive research aims to describe the characteristics of a phenomenon taking place at the time the research is conducted, as well as to analyze the causes of certain symptoms. Descriptive exploratory research aims to present a detailed description of a phenomenon's condition. This study does not intend to test a specific hypothesis but rather to portray the state of variables, symptoms, or situations as they are. According to Sugiyono, the qualitative research method is based on certain philosophical foundations and is used to investigate a scientific condition (experiment) with the researcher acting as the main instrument. Data collection and analysis in qualitative research emphasize understanding meaning.

### *3.2 Types and Sources of Data*

In this study, the data examined include both quantitative and qualitative data, consisting of primary and secondary data. Primary data were obtained through observation and direct interviews. Data collection by observation was conducted by monitoring the raw material inventory control process and the costs incurred in raw material procurement. Direct interviews were conducted with the

business owner and several employees using prepared interview guidelines. Meanwhile, secondary data were obtained from pre-existing sources. In this research, secondary data were collected from various literature, records, and documents related to raw material inventory during a particular period owned by Kedai Bubur Ayam Tuangyu. These secondary data were sourced from the production department and include information on raw material requirements, inventory costs, and other data relevant to the research focus.

### *3.3 Operationalization of Variables*

The analysis process can be facilitated by classifying variables to elaborate on and measure the operationalization of variables, as presented in the following table:

Tabel 1. Operationalization of Variable

| Variable | Sub Variable (Dimension) | Indicator | Measurement Scale |
|---|---|---|---|
| Raw Material Inventory Control Using the Economic Order Quantity (EOQ) and Reorder Point Methods | 1. Economic Order Quantity (EOQ) | a. Ordering Cost per Order<br>b. Demand Quantity in Units per Period<br>c. Holding Cost per Unit per Period | Ratio |
| | 2. Total Inventory Cost (TIC) | d. Order Quantity per Purchase<br>e. Annual Raw Material Requirement<br>f. Ordering Cost per Order<br>g. Holding Cost per Unit per Period | Ratio |
| | 3. Safety Stock | h. Raw Material Usage Quantity<br>i. Average Usage<br>j. Raw Material Usage Quantity<br>k. Standard deviation<br>l. Safety Stock | Ratio |
| | 4. Reorder Point | m. Average Daily Raw Material Usage<br>n. Lead Time<br>o. Safety Stock | Ratio |

Source: Processed by the Author, (2025)

### *3.4 Data Analysis Method*

Data analysis is the step undertaken by researchers to systematically collect and arrange notes from observations, interviews, documents, and other sources relevant to the study. The goal of this analysis is to deepen the researcher's understanding of the case under investigation. In this research, the data analysis method used is non-statistical descriptive analysis, focusing on the elaboration and depiction of existing data or conditions. This method aims to describe or explain information in such a way that conclusions can be drawn to address the problem based on applicable theory or regulations. The steps include:

1. Collecting data on raw material usage, ordering costs, and holding costs.
2. Identifying raw material inventory control implemented according to Kedai Bubur Ayam Tuangyu's policies related to ordering and holding costs in their production activities by calculating the average raw

material purchases using the formula:

$$\textbf{Average Raw Material Purchase (Q)} = \frac{\textbf{Total Raw Material Requirement}}{\textbf{Ordering Frequency}}$$

Next, identify the total inventory cost incurred by Kedai Bubur Ayam Tuangyu according to its policy using the formula:

**TIC = (Ordering Frequency x S) + (Average Inventory x H)**

3. Determining the order quantity using the Economic Order Quantity method, with the following steps:
   a. Calculation of *Economic Order Quantity* (EOQ) Method
      The Economic Order Quantity (EOQ) method is an inventory control technique used to determine the most optimal raw material order quantity that minimizes total inventory costs, including ordering and holding costs. EOQ is calculated using the following formula:

      $$\textbf{EOQ} = \sqrt{\frac{2DS}{H}}$$

      Next, the order frequency is calculated with the formula:

      $$\textbf{Ordering Frequency} = \frac{D}{EOQ}$$

   b. Calculating Total Inventory Cost
      The total inventory cost calculation is performed to demonstrate that having an optimal raw material purchase quantity, calculated using the EOQ method, results in a minimum total raw material inventory cost. The formula for calculating Total Inventory Cost (TIC) according to [8] is as follows:

      $$\textbf{TIC} = \left(\frac{D}{Q}S\right) + \left(\frac{Q}{2}H\right)$$

   c. Calculating Safety Stock
      Safety stock is a method used to calculate the quantity of goods necessary to meet consumer demand. Generally, inventory activities are highly influenced by market dynamics. The benefits of safety stock include optimizing profits, preventing market demand fluctuations, and assisting business management in production scheduling. Additionally, the function of safety stock is to help companies accurately determine inventory levels. It is important to understand that excessive inventory can harm a company, while insufficient inventory risks stockouts. Safety stock is calculated using the following formula:
      ***Safety Stock* = SD x Z**
   d. Calculating Reorder Point
      Reorder Point (ROP) is the inventory level at which goods in a warehouse need to be replenished before stock runs out. The advantages of using the reorder point method include reducing inventory costs and increasing customer satisfaction. Furthermore, this method allows a company to maintain sufficient inventory to meet customer demand and ensures orders are received on time. The ROP method is calculated using the following formula:

      **ROP = (d x L) + SS**

4. The application of the optimal raw material inventory control method using EOQ aims to meet

production needs and prevent either shortages or surpluses of rice raw materials, while controlling inventory at low costs and optimal order quantities.

## 4. RESULTS AND DISCUSSION

### *4.1 Results*

In this study, the researcher used primary data obtained directly from the Kedai. The data collected pertained to the year 2024, with a focus on the type of Menir Super rice, which has good quality and is used as the raw material for making porridge. The following are the research data obtained from Kedai Bubur Ayam Tuangyu:

**a. Raw Material Rice Purchases**

The procurement of rice raw material represents a critical activity within the operational supply chain at Kedai Bubur Ayam Tuangyu Sumedang. This purchasing process not only aims to secure the main raw material but also requires careful planning to ensure rice availability is consistently aligned with production needs. Decisions regarding the quantity, timing, and frequency of rice purchases significantly affect the smoothness of the production process and operational cost efficiency. In practice, rice procurement must take several variables into account, such as estimated daily requirements, price fluctuations, rice quality, and supplier reliability. Effective purchasing management assists the kedai in avoiding the risks of raw material shortages that could impede production, as well as excess stock which potentially increases holding costs.

In the raw material inventory control for rice implemented by Kedai Bubur Ayam Tuangyu, no specific formal method is applied; instead, inventory management is conducted based solely on estimation. This condition results in uncertain effectiveness in controlling rice inventory, making it unclear whether the process is optimally managed.

Kedai Bubur Ayam Tuangyu adopts a conventional rice procurement strategy aiming to fulfill routine needs. The determination of purchase quantities is based on prior purchase history and adjusted according to the production plan for the upcoming period. The following table presents the rice procurement data at Kedai Bubur Ayam Tuangyu over 12 months in 2024, from January to December. The data obtained are as follows:

Tabel 2. Rice Raw Material Purchases in 2024

| Period (2024) | Type of Rice | Supplier | Quantity (kg) | Price (IDR/kg) | Total Price (IDR) |
|---|---|---|---|---|---|
| January | Menir Super | Tk Tjemara | 600 | 12.000 | 7.200.000 |
| February | Menir Super | Tk Tjemara | 700 | 12.000 | 8.400.000 |
| March | Menir Super | Tk Tjemara | 600 | 12.000 | 7.200.000 |
| April | Menir Super | Tk Tjemara | 900 | 12.000 | 10.800.000 |
| May | Menir Super | Tk Tjemara | 800 | 12.000 | 9.600.000 |
| June | Menir Super | Tk Tjemara | 650 | 12.000 | 7.800.000 |
| July | Menir Super | Tk Tjemara | 600 | 12.000 | 7.200.000 |
| August | Menir Super | Tk Tjemara | 550 | 12.000 | 6.600.000 |
| September | Menir Super | Tk Tjemara | 550 | 12.000 | 6.600.000 |
| October | Menir Super | Tk Tjemara | 550 | 12.000 | 6.600.000 |
| November | Menir Super | Tk Tjemara | 600 | 12.000 | 7.200.000 |
| December | Menir Super | Tk Tjemara | 650 | 12.000 | 7.800.000 |
| **Total** | | | **7750** | | **93.000.000** |

Source: Kedai Bubur Ayam Tuangyu, (2025)

Based on the data shown in Table 2, it can be seen that to meet raw material rice needs, Kedai Bubur Ayam Tuangyu purchased rice in fluctuating quantities throughout 2024. The total rice procurement during the year reached 7.750 kg, with the highest volume of 900 kg in April, while the lowest purchase volumes occurred during the period from August to October, amounting to 550 kg.

**b. Raw Material Rice Usage**

The usage of raw material rice at Kedai Bubur Ayam Tuangyu refers to the utilization of rice as the primary component in the chicken porridge production process, the signature dish of the kedai. The rice is processed by cooking for a considerable time to produce a soft and distinctive porridge texture in accordance with the quality standards and flavor preserved by the kedai. In daily operations, rice is consumed routinely in amounts adjusted based on production needs, ensuring customer demand is met without causing excess or shortage of stock.

Controlling rice usage is a highly critical aspect because this raw material plays a vital role in the smoothness of production as well as the consistency of the chicken porridge's flavor served to customers. Therefore, the management of rice raw material at Kedai Bubur Ayam Tuangyu encompasses not only the cooking process but also planning, procurement, and inventory control to ensure the kedai's operations are efficient and effective.

Tabel 3. List of Rice Raw Material Usage in 2024

| Period (2024) | Rice Usage Quantity (kg) |
|---|---|
| January | 585 |
| February | 697,5 |
| March | 607,5 |
| April | 900 |
| May | 798,75 |
| June | 650,25 |
| July | 600,75 |
| August | 549 |
| September | 551,25 |
| October | 553,5 |
| November | 600,75 |
| December | 648 |
| Total | 7743 |
| Average | 645,25 |

Source: Kedai Bubur Ayam Tuangyu, (2025)

According to Table 3, the usage of rice raw material at Kedai Bubur Ayam Tuangyu fluctuated over the past year, with the highest consumption recorded in April. From interviews with the kedai owner, this increase was attributed to a significant surge in demand during that month, coinciding with the Eid al-Fitr celebration when numerous visitors arrive in Sumedang.

**c. Raw Material Rice Price**

The type of rice raw material purchased by Kedai Bubur Ayam Tuangyu is Menir Super rice, procured from Tk Tjemara as the supplier at a price of Rp 12.000 per kilogram.

**d. Ordering Costs of Raw Material Rice**

Ordering cost refers to expenses incurred to procure rice raw materials. Based on interviews with the owner, the components of

ordering costs incurred by Kedai Bubur Ayam Tuangyu include transportation/delivery fees and telephone charges. A detailed breakdown of the ordering costs at Kedai Bubur Ayam Tuangyu is presented in Table 4.

Table 4. Ordering Costs of Rice Raw Material in 2024

| Period 2024 | Ordering Cost | | Total Cost (IDR) |
|---|---|---|---|
| | Loading and Unloading Cost (IDR) | Telephone Cost (IDR) | |
| January | 100.000 | 20.000 | 120.000 |
| February | 100.000 | 20.000 | 120.000 |
| March | 100.000 | 20.000 | 120.000 |
| April | 100.000 | 20.000 | 120.000 |
| May | 100.000 | 20.000 | 120.000 |
| June | 100.000 | 20.000 | 120.000 |
| July | 100.000 | 20.000 | 120.000 |
| August | 100.000 | 20.000 | 120.000 |
| September | 100.000 | 20.000 | 120.000 |
| October | 100.000 | 20.000 | 120.000 |
| November | 100.000 | 20.000 | 120.000 |
| December | 100.000 | 20.000 | 120.000 |
| Total | 1.200.000 | 240.000 | 1.440.000 |

Source: Kedai Bubur Ayam Tuangyu, (2025)

From Table 4, it is evident that the largest component of ordering cost is the loading and unloading fee, amounting to Rp 1,200,000 annually. This indicates that loading and unloading costs remain the highest cost component in raw material procurement because the kedai needs to incur additional labor expenses for workers assisting in this process.

**e. Holding Costs of Raw Material Rice**

Holding cost is the expense borne by Kedai Bubur Ayam Tuangyu for storing rice raw materials over a certain period. This cost is measured in two ways: as a percentage of the average annual inventory value and in absolute rupiah per year per unit item. Holding cost is one of the cost components used to determine the optimal inventory level. The monthly holding costs incurred by Kedai Bubur Ayam Tuangyu are presented in Table 5.

Tabel 5. Holding Costs of Rice Raw Material in 2024

| Period 2024 | Holding Cost | | Total (IDR) |
|---|---|---|---|
| | Employee Salaries (IDR) | Electricity (IDR) | |
| January | 1.800.000 | 50.000 | 1.850.000 |
| February | 1.800.000 | 50.000 | 1.850.000 |
| March | 1.800.000 | 50.000 | 1.850.000 |
| April | 1.800.000 | 50.000 | 1.850.000 |
| May | 1.800.000 | 50.000 | 1.850.000 |
| June | 1.800.000 | 50.000 | 1.850.000 |
| July | 1.800.000 | 50.000 | 1.850.000 |
| August | 1.800.000 | 50.000 | 1.850.000 |
| September | 1.800.000 | 50.000 | 1.850.000 |
| October | 1.800.000 | 50.000 | 1.850.000 |
| November | 1.800.000 | 50.000 | 1.850.000 |

| Period 2024 | Holding Cost | | Total (IDR) |
|---|---|---|---|
| | Employee Salaries (IDR) | Electricity (IDR) | |
| Dcsember | 1.800.000 | 50.000 | 1.850.000 |
| Total | 21.600.000 | 600.000 | 22.200.000 |

Source: Kedai Bubur Ayam Tuangyu, (2025)

Based on Table 5, it can be observed that Kedai Bubur Ayam Tuangyu maintains a constant monthly holding cost without any variation.

**f. Lead Time**

The lead time—defined as the time interval from placing an order to receiving the goods—can vary from several hours to several months. This lead time is heavily influenced by the availability of goods and the distance between buyer and supplier. In the case of Kedai Bubur Ayam Tuangyu, the lead time for ordering rice raw materials is only one day from the time the order is placed until the materials are delivered to the warehouse.

### *4.2 Discussion*

**1. Raw Material Inventory Control Implemented by Kedai Bubur Ayam Tuangyu Calculation of Ordering Cost and Holding Cost**

**a. Ordering Cost (Per Year)**

1) Loading and Unloading Costs IDR 1.200.000
2) Telephone Costs IDR 240.000

Total Ordering Cost in One Year IDR 1.440.000

Loading and unloading costs are expenses incurred by the kedai to pay labor services involved in moving rice from the transport truck and then transferring it to the warehouse of Kedai Bubur Ayam Tuangyu. Over the course of one year, the kedai allocates a loading and unloading cost of IDR 1,200,000 for 24 ordering activities.

Telephone costs refer to expenses incurred by the kedai to place raw material orders, amounting to IDR 10,000 per order. Therefore, Kedai Bubur Ayam Tuangyu spends a total telephone cost of IDR 240,000 for 24 orders within one year. This telephone expense is specifically allocated for the rice raw material procurement process.

**b. Holding Cost (Per Year)**

1) Employee Salaries IDR 21.600.000
2) Electricity IDR 600.000

Total Holding Cost in One Year IDR 22.200.000

The salary expense for employees incurred by Kedai Bubur Ayam Tuangyu amounts to IDR 1.800.000 per month, resulting in an annual employee salary budget of IDR 21.600.000 for the company.

Meanwhile, the monthly electricity cost incurred by the kedai is IDR 50.000, totalling IDR 600,000 for one year.

**c. Calculation of Ordering Cost and Holding Cost**

**1) Ordering Cost per Order (S):**

$$S = \frac{\text{Total Ordering Cost}}{\text{Ordering Frequency}}$$

$$S = \frac{\text{IDR } 1.440.000}{24}$$

S = IDR 60.000

**2) Holding Cost per Unit of Raw Material (H):**

$$H = \frac{\text{Total Holding Cost}}{\text{Total Raw Material Usage}}$$

$$H = \frac{\text{IDR } 22.200.000}{7743}$$

H = IDR 2.867,1057 Per kilogram
(Rounded to IDR 2.868 Per kilogram)

**3) Ordering Frequency:**

Kedai Bubur Ayam Tuangyu places raw material rice orders 24 times annually.

**d. Calculation of Ordering Cost and Holding Cost Calculating Raw Material Order Quantity According to Kedai Bubur Ayam Tuangyu's Policy**

The average raw material purchase quantity (Q) can be calculated based on company policy regarding ordering frequency, using the following formula:

$$Q = \frac{\text{Total Raw Material Usage}}{\text{Ordering Frequency}}$$

$$Q = \frac{7743 \text{ kilogram}}{24 \text{ Times}}$$

Q = 322,625 kilograms
(Rounded to 323 kilograms)

Based on the calculations above, the data shows that Kedai Bubur Ayam Tuangyu orders rice raw material 24 times per year, with an average order quantity of 323 kilograms per order.

**e. Calculating Total Inventory Cost Incurred by Kedai Bubur Ayam Tuangyu**

The Total Inventory Cost (TIC) calculation at Kedai Bubur Ayam Tuangyu, according to the owner's policy for 2024, is as follows:

TIC = (Ordering Frequency x S) + (Average Inventory x H)
Given:
S = Ordering Cost per Order
H = Holding Cost per Unit of Raw Material

$$TIC = (24\ x\ 60.000) + (645{,}25\ x\ 2.868)$$

TIC = 1.440.000 + 1.850.577
TIC = IDR 3.290.577

On this calculation, the raw material rice inventory cost according to the owner's policy at Kedai Bubur Ayam Tuangyu in 2024 amounts to IDR 3.290.577.

**f. Stock Established by the Kedai Bubur Ayam Tuangyu**

Safety stock is the reserve inventory that must be available at the company to anticipate demand uncertainty and prevent stock shortages. According to interviews with the owner, Kedai Bubur Ayam Tuangyu provides safety stock amounting to 2 bundles or 100 kilograms.

**g. Reorder Point Determined by Kedai Bubur Ayam Tuangyu**

Reorder point (ROP) is the inventory level indicating when a reorder should be placed so that ordered goods arrive on time. According to interviews with the owner, Kedai Bubur Ayam Tuangyu does not establish a precise reorder point. Reordering is conducted before raw material rice stock reaches the minimum safety stock threshold, which is between 100 kilograms and 200 kilograms.

**2. Raw Material Rice Inventory Control Using the Economic Order Quantity (EOQ) Method**

EOQ is an inventory management method or technique aimed at determining the most economical order quantity with the intent to minimize total inventory costs.

**a. Calculation of Raw Material Rice Purchases According to the EOQ Method**

The following is an overview of calculations regarding rice raw material usage, ordering cost per

purchase, and holding cost per kilogram of rice raw material in 2024, summarized as follows:

Table 6. Annual Raw Material Rice Usage, Ordering Cost per Order, and Holding Cost per Kilogram of Raw Material Rice in 2024.

| No | Data Type | Data |
|---|---|---|
| 1 | Annual Raw Material Rice Usage (D) | 7.743 kg |
| 2 | Ordering Cost per Order of Raw Material Rice (S) | IDR 60.000 per order |
| 3 | Holding Cost per Kilogram of Raw Material Rice (H) | IDR 2.868 per kg |

Source: Processed Data, (2025)

The calculation of the most economical rice raw material purchase quantity is conducted by applying the Economic Order Quantity (EOQ) method as follows:

$$EOQ = \sqrt{\frac{2.D.S}{H}}$$

$$EOQ = \sqrt{\frac{2x7.743x60.000}{2.868}}$$

$$EOQ = \sqrt{\frac{929.160.000}{2.868}}$$

$$EOQ = \sqrt{323.974,89539748}$$

EOQ = 569,18792625764 kilograms

(Rounded to 570 kilograms)

Based on analysis from Kedai Bubur Ayam Tuangyu, the total rice raw material usage in one year reached 7.743 kg. Using the EOQ method, the most economical rice raw material purchase quantity is 570 kg per order.

From the analysis using the EOQ method, the economically optimal ordering frequency for rice raw material can be determined for one year. The necessary data to calculate ordering frequency include the EOQ value of 570 kg per order and the total annual raw material usage (D) of 7.743 kg.

The ordering frequency calculation for rice raw material is as follows:

Ordering Frequency:

$$= \frac{D}{EOQ}$$

$$= \frac{7.743}{570}$$

= 13,584210526315 times → 14 times (rounded)

Based on the EOQ method analysis, it can be concluded that the optimal rice raw material procurement quantity in 2024 is 570 kilograms per order. The ordering frequency is 14 times per year, calculated by dividing the total raw material usage by the optimal order quantity as per EOQ results. This ordering frequency is lower than the current ordering frequency based on Kedai Bubur Ayam Tuangyu's existing policy.

**b. Calculation of Total Rice Inventory Cost**

To determine whether ordering calculations using the EOQ method are more efficient compared to the conventional method, the first step is to compare total inventory costs based on company calculations and EOQ results. This comparison will serve as a basis for Kedai Bubur Ayam Tuangyu to decide whether to maintain the existing inventory control policy or improve it by adopting the EOQ method.

The formula used to calculate total inventory cost according to the EOQ method is as follows:

$$TIC = \left(\frac{D}{Q}S\right) + \left(\frac{Q}{2}H\right)$$

Description:
D = Annual raw material usage
Q = Order quantity per purchase
S = Ordering cost per order
H = Holding cost per kilogram

$$TIC = \left(\frac{7.743}{570}\ x\ 60.000\right) \left(\frac{570}{2}\ x\ 2.868\right)$$

TIC = 815.053 + 817.380
TIC = IDR 1.632.433

Thus, the total inventory cost for rice raw material that must be borne by Kedai Bubur Ayam Tuangyu using the EOQ method in 2024 is IDR 1.632.433.

**c. Determine of Safety Stock**

In determining safety stock, it is first necessary to know the desired service level. Kedai Bubur Ayam Tuangyu sets the service level at 95%, implying that the owner tolerates a 5% probability of raw material rice shortage. Accordingly, the safety factor for rice inventory is assumed to be 1.65 based on the normal distribution table.

Before calculating safety stock, the standard deviation must be computed first. Calculating standard deviation requires creating a specific table. The average rice raw material usage is obtained by dividing the total usage over one year by 12 (months), yielding the following data:

Table 6. Standard Deviation Calculation

| Month (2024) | Usage (X) | Average (X̄) | (X - X̄) | (X - X̄)² |
|---|---|---|---|---|
| January | 585 | 645,25 | -60,25 | 3.630,0625 |
| February | 697,5 | | 52,25 | 2.730,0625 |
| March | 607,5 | | -37,75 | 1.425,0625 |
| April | 900 | | 254,75 | 64.897,5625 |
| May | 798,75 | | 153,5 | 23.562,25 |
| June | 650,25 | | 5 | 25 |
| July | 600,75 | | -44,5 | 1.980,25 |
| August | 549 | | -96,25 | 9.264,0625 |
| September | 551,25 | | -94 | 8.836 |
| October | 553,5 | | -91,75 | 8.418,0625 |
| November | 600,75 | | -44,5 | 1.980,25 |
| December | 648 | | 2,75 | 7,5625 |
| Total | 7743 | | | 126.756,19 |
| Average | 645,25 | | | |

Source: Processed Data, (2025)

**d. Standard Deviation**

$$SD = \sqrt{\frac{\sum(X - \bar{X})^2}{n}}$$

$$SD = \sqrt{\frac{126.756,19}{12}}$$

$$SD = \sqrt{10.563}$$

SD = 102,78

After determining the standard deviation value, the safety stock calculation for rice raw material in 2024 can be performed as follows:

*Safety Stock* = Z x SD
*Safety Stock* = 1,65 x 102,78
*Safety Stock* = 169,587 kg
(Rounded to 170 kg)

Accordingly, the safety stock that needs to be prepared by Kedai Bubur Ayam Tuangyu is 170 kilograms. The presence of this safety stock allows the kedai to reduce the risk of rice raw material shortages that may arise due to delivery delays or uncertainties in arrival times.

**e. Determination of Reorder Point**

The Reorder Point (ROP) represents the raw material inventory threshold at which a reorder should be placed to avoid stock shortages during the lead time. At Kedai Bubur Ayam Tuangyu, the lead time from ordering rice raw material to stock arrival is one day, with the number of working days per year totaling 358 days. Therefore, the reorder point can be calculated as follows:

$$d = \frac{Raw\ Material\ Usage\ Quantity}{Number\ of\ Working\ Days}$$

$$d = \frac{7.743}{358}$$

d = 21,63 kg

(Rounded to 22 kg)

ROP = (d x L) + SS

ROP = (22 x 1) + 170

ROP = 22 + 170

ROP = 192 kg

This result indicates that when rice raw material stock in the warehouse reaches 192 kilograms, Kedai Bubur Ayam Tuangyu must initiate a reorder. This reorder aims to prevent stock shortages in the warehouse, which could disrupt production flow and potentially cause missed profit opportunities.

## 5. CONCLUSION

Based on the analysis, a comparison was made between rice raw material inventory control based on the owner's policy and the EOQ method. The purchase quantity carried out per order under the existing policy is 323 kg, while the EOQ method suggests a more economical purchase quantity of 570 kg per order. Implementing the EOQ method also results in fewer annual orders, totaling 14 times per year, compared to the owner's policy of 24 orders per year.

Furthermore, the total inventory cost for rice raw material in 2024 indicates that costs under the owner's policy are IDR 3,290,577, whereas using the EOQ method reduces them to IDR 1,632,433. This reflects a cost efficiency of IDR 1,658,144 if Kedai Bubur Ayam Tuangyu adopts the EOQ method, providing significant inventory cost savings for the owner.

Additionally, the EOQ method enables Kedai Bubur Ayam Tuangyu to determine safety stock in a more systematic and scientific manner by considering demand variability and lead time. The recommended safety stock is 170 kg, which is higher than the previously subjectively set safety stock of 100 kg by the owner, and the reorder point calculated at 192 kg.

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