



# **ANALYSIS OF RAW MATERIAL INVENTORY CONTROL OF POLYESTER YARN USING THE ECONOMIC ORDER QUANTITY (EOQ) METHOD AT CV INTAN CIWANGI, BANDUNG REGENCY**

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## **Abstract**

Inventory control of raw materials is a crucial factor in maintaining operational efficiency in manufacturing companies. CV Intan Ciwangi, located in Bandung Regency, still applies conventional methods in managing polyester yarn raw material inventory, resulting in inefficient inventory costs. This study aims to analyze inventory control using the Economic Order Quantity (EOQ) method. The research method used is qualitative with a case study approach. Data collection techniques include observation, interviews, and documentation. The results show that the optimal order quantity based on EOQ is 3,659 kg with an ordering frequency of 4 times per period and total inventory costs of Rp896,460. The implementation of EOQ has proven to improve efficiency and reduce inventory costs compared to the company's current method.

**Keywords:** Inventory Control, EOQ, Raw Materials, Textile Industry.

## **Abstrak**

Pengendalian persediaan bahan baku merupakan faktor penting dalam menjaga efisiensi operasional pada perusahaan manufaktur. CV Intan Ciwangi yang berlokasi di Kabupaten Bandung masih menerapkan metode konvensional dalam pengelolaan persediaan bahan baku benang polyester sehingga menyebabkan biaya persediaan menjadi kurang efisien. Penelitian ini bertujuan untuk menganalisis pengendalian persediaan menggunakan metode Economic Order Quantity (EOQ). Metode penelitian yang digunakan adalah kualitatif dengan pendekatan studi kasus. Teknik pengumpulan data meliputi observasi, wawancara, dan dokumentasi. Hasil penelitian menunjukkan bahwa jumlah pemesanan optimal berdasarkan metode EOQ adalah sebesar 3.659 kg dengan frekuensi pemesanan sebanyak 4 kali dalam satu periode serta total biaya persediaan sebesar Rp896.460. Penerapan metode EOQ terbukti mampu meningkatkan efisiensi dan menurunkan biaya persediaan dibandingkan metode yang saat ini digunakan perusahaan.

**Kata kunci:** pengendalian persediaan, EOQ, bahan baku, industri tekstil.



## INTRODUCTION

The manufacturing industry in Indonesia, especially the textile sector, has experienced significant growth in recent years. This development is driven by increasing market demand, technological advances, and the expansion of both domestic and export markets. The growth of the textile industry encourages companies to continuously improve their competitiveness through efficiency and effectiveness in managing operational activities. In this context, companies are required to optimize all available resources in order to maintain production continuity and achieve maximum profit.

One of the important aspects in operations management is raw material inventory control. Raw materials are the main supporting element in the production process because production activities cannot run smoothly without the availability of sufficient materials. Proper inventory management can help companies ensure the availability of raw materials according to production needs while minimizing unnecessary inventory costs. Therefore, inventory control becomes a strategic factor in supporting the operational success of a manufacturing company.

Improper inventory management can lead to various problems for the company. Excessive inventory or overstock conditions may increase holding costs, such as storage costs, maintenance costs, and the risk of material damage. On the other hand, shortages of raw materials or stockouts can disrupt the production process, delay product delivery, and reduce customer satisfaction. These conditions can ultimately affect the company's productivity and profitability. Therefore, an effective inventory control system is needed to balance inventory availability and inventory costs.

To overcome these problems, companies need an inventory control method that is able to determine the optimal order quantity. One method widely used in inventory management is the Economic Order Quantity (EOQ) method. EOQ is a quantitative approach that aims to determine the most economical order quantity by minimizing the total inventory costs, including ordering costs and holding costs. Through the application of EOQ, companies can plan raw

material purchases more efficiently and systematically.

CV Intan Ciwangi, located in Bandung Regency, is one of the textile companies engaged in textile production activities. In carrying out its production process, the company uses polyester yarn as its main raw material. The availability of polyester yarn greatly influences the continuity of the production process because it is the primary material used in manufacturing textile products. Therefore, proper inventory management of polyester yarn is essential to support smooth production activities.

Based on preliminary observations, CV Intan Ciwangi still uses conventional methods in determining the quantity of raw material orders. The ordering process is generally based only on estimates or previous experiences without using a scientific calculation approach. As a result, the company often faces inventory-related problems, such as excess stock or shortages of raw materials at certain times. These conditions indicate that the current inventory management system has not been fully efficient in minimizing total inventory costs.

Based on these conditions, this study aims to analyze raw material inventory control using the Economic Order Quantity (EOQ) method at CV Intan Ciwangi. By applying the EOQ method, it is expected that the company can determine the optimal order quantity, reduce total inventory costs, and improve the efficiency of raw material inventory management. In addition, the results of this study are expected to provide useful recommendations for the company in improving its inventory control system and supporting the effectiveness of production operations.

## LITERATUR REVIEW

Inventory control is an important activity in operations management that aims to regulate and supervise the availability of raw materials in a company. Effective inventory control ensures that the required raw materials are always available in the right quantity and at the right time to support the continuity of the production process. Through proper inventory management, companies can avoid production delays caused by shortages of materials while also preventing excessive inventory accumulation that can increase operational costs.



In manufacturing companies, raw material inventory has a major influence on production efficiency and overall company performance. If inventory levels are too low, the company may experience stockouts that disrupt production activities and delay product delivery to customers. On the other hand, excessive inventory or overstock conditions can result in high storage costs, maintenance expenses, and risks of damage or obsolescence of materials. Therefore, inventory control is essential to maintain a balance between inventory availability and inventory costs.

One of the methods commonly used in inventory management is the Economic Order Quantity (EOQ) method. EOQ is a quantitative approach designed to determine the optimal quantity of raw materials that should be ordered each time a purchase is made. The main objective of EOQ is to minimize total inventory costs, which include ordering costs and holding costs. By using the EOQ method, companies can make purchasing decisions more efficiently and systematically.

The EOQ method helps companies identify the most economical order quantity by considering several important variables, such as annual demand, ordering costs, and holding costs. Ordering costs refer to expenses incurred every time an order is placed, including administrative and transportation costs. Meanwhile, holding costs are costs associated with storing inventory, such as warehouse expenses, insurance, and maintenance costs. Through the balance between these two costs, EOQ can determine the ideal order quantity that minimizes total inventory expenses.

The formula used in the Economic Order Quantity method is as follows:

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

In this formula,  $D$  represents the annual demand quantity,  $S$  represents the ordering cost per order, and  $H$  represents the holding cost per unit per year. The result of the EOQ calculation indicates the optimal number of units that should be ordered each time to achieve the lowest possible total inventory cost.

## METHODS

This study uses a qualitative research method with a case study approach conducted at CV Intan Ciwangi, located in Bandung Regency. The qualitative method was chosen because it allows researchers to understand in depth the company's inventory management practices and the problems faced in controlling raw material inventory. Through the case study approach, the research focuses specifically on the inventory control system implemented by the company, particularly in managing polyester yarn as the main raw material used in the production process.

The case study approach enables researchers to obtain comprehensive and detailed information regarding the operational activities of the company. By directly examining the existing inventory management system, researchers can identify the strengths and weaknesses of the current methods used by the company. In addition, this approach provides an opportunity to analyze how inventory control practices affect production efficiency and inventory costs at CV Intan Ciwangi.

In collecting research data, several data collection techniques were used to obtain accurate and relevant information. The first technique is observation, which was carried out by directly observing the company's inventory management activities and production processes. Through observation, researchers were able to understand the actual conditions related to raw material storage, ordering activities, and inventory usage within the company. This technique also helps researchers identify problems that occur in the inventory control process.

The second data collection technique used in this study is interviews. Interviews were conducted with parties directly involved in inventory management and production activities, such as company managers, warehouse staff, and employees responsible for purchasing raw materials. Through interviews, researchers obtained information regarding the company's current inventory policies, the obstacles faced in managing inventory, and the considerations used in determining order quantities. The information obtained from interviews supports a deeper



understanding of the company's inventory control system.

In addition to observation and interviews, documentation was also used as a data collection technique. Documentation involves collecting company records and related documents, such as inventory reports, purchasing data, production data, and other documents related to raw material management. These documents provide quantitative and administrative data needed to support the analysis process. Documentation data also helps researchers verify information obtained through observation and interviews.

The data analysis techniques used in this study include descriptive analysis, Economic Order Quantity (EOQ) calculation, and comparison analysis between the company's current method and the EOQ method. Descriptive analysis was used to explain the existing inventory control system at CV Intan Ciwangi. Meanwhile, EOQ calculations were conducted to determine the optimal order quantity that can minimize total inventory costs. Furthermore, a comparison was made between the company's conventional inventory management method and the EOQ method to evaluate the efficiency and effectiveness of both approaches in controlling raw material inventory.

## RESULTS AND DISCUSSION

Based on the results of the study, the inventory control system implemented by CV Intan Ciwangi is still carried out using conventional methods. The company determines the quantity of raw material orders based on estimates and current stock conditions in the warehouse. This approach is considered less effective because it does not use a structured calculation method in determining the optimal order quantity. As a result, inventory management activities are highly dependent on managerial assumptions and previous experiences.

The use of estimation-based inventory control often causes inconsistencies in the ordering process. The company tends to place orders whenever stock is considered low without considering the economic order quantity. This condition results in irregular ordering frequency and inefficient inventory management. In some situations, the company

experiences excessive inventory levels, while in other situations it faces shortages of raw materials that may disrupt the production process.

In addition, the existing inventory system also affects the company's inventory costs. Frequent ordering activities increase ordering costs because the company must repeatedly incur administrative, transportation, and purchasing expenses. On the other hand, maintaining excessive stock levels also increases holding costs, such as warehouse expenses, maintenance costs, and the risk of raw material damage. Therefore, the company requires a more effective inventory control method to optimize inventory management and minimize total inventory costs.

To overcome these problems, the Economic Order Quantity (EOQ) method was applied in this study to analyze the optimal quantity of raw material orders. The EOQ method aims to determine the most economical order quantity by balancing ordering costs and holding costs. Through the EOQ approach, the company can identify the ideal number of raw materials to order in each purchase period so that inventory costs can be minimized.

Based on the results of the EOQ calculation, the optimal order quantity for polyester yarn at CV Intan Ciwangi is 3,659 kilograms for each order. The calculation indicates that by ordering raw materials in this quantity, the company can achieve a more efficient inventory management system. The EOQ method also produces a more regular and systematic ordering pattern compared to the company's previous conventional method.

The analysis also shows that the ordering frequency using the EOQ method becomes four times in one period. This ordering frequency is lower and more controlled compared to the company's current ordering system, which tends to fluctuate depending on stock conditions. By reducing the frequency of orders, the company can decrease ordering costs because purchases are made in larger quantities and within a more planned schedule.

Furthermore, the total inventory cost calculated using the EOQ method is Rp896,460. This result indicates that the EOQ method is capable of minimizing the company's total inventory costs by reducing unnecessary expenses related to ordering and



storage activities. The lower inventory cost demonstrates that the EOQ method provides a more efficient approach to managing raw material inventory compared to the conventional system currently applied by the company.

Based on the comparison between the company's existing method and the EOQ method, it can be concluded that the EOQ method provides better efficiency in inventory management. The EOQ approach reduces ordering frequency, minimizes total inventory costs, and optimizes raw material availability for production activities. Therefore, the implementation of the EOQ method is expected to help CV Intan Ciwangi improve operational efficiency, maintain production continuity, and support better inventory control performance in the future.

## CONCLUSION

Based on the results of the study, it can be concluded that the raw material inventory control system implemented by CV Intan Ciwangi is still not fully efficient. The company determines raw material order quantities based on estimates and current stock conditions without using a systematic calculation method. This condition causes irregular ordering frequency and increases inventory-related costs, both ordering costs and holding costs. As a result, the company has not been able to optimize its inventory management effectively.

The application of the Economic Order Quantity (EOQ) method in this study proved to be useful in determining the optimal order quantity for polyester yarn as the company's main raw material. Based on the EOQ calculation, the optimal order quantity is 3,659 kilograms per order with an ordering frequency of four times in one period. The EOQ method provides a more structured and efficient inventory management approach compared to the conventional method previously used by the company.

The results of the analysis also show that the EOQ method can minimize the company's total inventory costs. By applying EOQ, the total inventory cost is calculated at Rp896,460, which is lower and more efficient compared to the company's existing inventory control system. The reduction in inventory costs occurs because the EOQ method balances

ordering costs and holding costs, thereby preventing excessive inventory and unnecessary ordering activities.

In addition, the implementation of the EOQ method helps the company maintain the availability of raw materials needed for the production process. Proper inventory planning reduces the risk of stock shortages that may disrupt production activities and delay product delivery. At the same time, the company can avoid overstock conditions that increase storage and maintenance costs. Therefore, the EOQ method supports smoother and more effective operational activities.

Overall, it can be concluded that the Economic Order Quantity (EOQ) method is more effective and efficient in controlling raw material inventory at CV Intan Ciwangi. The use of EOQ not only reduces inventory costs but also improves inventory management performance and operational efficiency. Therefore, the company is recommended to implement the EOQ method as a reference in determining future raw material order quantities in order to achieve optimal inventory control and support the continuity of production activities.

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