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INVENTORY CONTROL OF RAW MATERIALS FOR GUSSET, FR (SOZAI) PRODUCTS USING THE ECONOMIC ORDER QUANTITY METHOD AT PT XYZ

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ABSTRACT

PT XYZ is a national company that produces metal-based automotive components, and one of the products is Gusset, FR (Sozai). The problem that repeatedly occurs in the company is the unstable purchase and use of raw materials for Gusset, FR (Sozai) products, even at certain times the purchase of raw materials exceeds the needs. Therefore, this study aims to determine the number of raw material orders, the total cost of raw material inventory, safety stock and reorder points, and inventory control of raw materials for Gusset, FR (Sozai) products at PT XYZ. The analysis method uses the Economic Order Quantity method. The results showed that the order quantity of JSH590R T 2.0 raw materials was 211,580 units and JSC590R T 1.4 raw materials was 208,600. The calculation of the total inventory cost of JSH590R T 2.0 raw materials and JSC590R T 1.4 raw materials is IDR 38,229,645 each. The safety stock calculation for JSH590R T 2.0 raw materials totaled 49,597 units and a reorder point value of 128,201 units. As for the JSC590R T 1.4 raw material, the safety stock calculation results in 41,054 units and a reorder point value of 115,543 units. Inventory control of JSH590R T 2.0 raw materials and JSC590R T 1.4 raw materials by applying the EOQ method when compared to the company's process results in 32% savings in inventory costs. Thus, the Economic Order Quantity method is said to be able to help the company control its inventory.

Keywords: ***Raw Material Inventory, Gusset FR (Sozai), Economic Order Quantity***

INTRODUCTION

Raw material inventory management can affect the smoothness of the production process, the level of efficiency, and the effectiveness of marketing activities that can satisfy customers. The company plans raw material inventory control to minimize costs and maximize profits by its own goals so that companies can purchase and produce products in economical quantities. Poor raw material inventory management will potentially result in errors in calculating raw material requirements.

PT XYZ is a national company that produces metal-based automotive components, both two-wheeled and four-wheeled, where one of its products is Gusset, FR (Sozai). Gusset, FR (Sozai) is a metal plate installed at important corners and joints in a frame. This helps strengthen the corners and joints to increase the frame's strength on automatic motorbikes, such as beat, genio, and scoopy. The problem that occurs repeatedly is the purchase and use of Gusset, FR (Sozai) raw materials at PT XYZ is unstable, even at certain times when the purchase of raw materials exceeds the need. If the supply of raw materials does not match demand or the production of Gusset, FR (Sozai) does not match the order, it causes the company to have excess raw materials (Nuryatno, Sase, and Maulida 2023).

Based on initial observations, raw material inventory control at PT XYZ is calculated based on the Master Production Schedule (MPS) added with the safety stock policy of each item and adjusted to the initial stock estimate, so that the calculation results are used as the basis for purchasing raw materials. However, the company's inventory management system does not pay attention to quantity and economic reorder points in purchasing raw materials. As a result, the company experiences excess or shortage of raw material inventory for one or two working days each month.

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Table 1.Inventory Data JSC590R T 1.4 in 2023

Month	Initial Inventory	Purchase	Total Inventory	Usage	Ending Inventory	Buffer Stock	Residue	
Jan	4.725	20.000	24.725	17.596	7.129	3.893	3.236	Surplus
Feb	7.129	24.000	31.129	22.764	8.365	3.793	4.572	Surplus
Mar	8.365	14.000	22.365	19.547	2.818	4.191	- 1.373	Deficit
Apr	2.818	14.000	16.818	11.375	5.443	2.521	2.922	Surplus
May	5.444	10.000	15.444	12.296	3.148	3.597	- 449	Deficit
June	3.148	18.000	21.148	16.119	5.029	3.402	1.627	Surplus
July	5.029	18.000	23.029	19.326	3.703	3.264	439	Surplus
Aug	3.703	18.100	21.803	19.983	1.820	3.649	- 1.829	Deficit
Sep	1.820	22.200	24.020	20.441	3.579	3.650	- 71	Deficit
Oct	3.579	17.700	21.279	17.291	3.988	2.789	1.199	Surplus
Nov	3.988	16.000	19.988	13.052	6.936	3.561	3.375	Surplus
Dec	6.936	10.700	17.636	11.645	5.991	2.671	3.320	Surplus
Total	**56.684**	**202.700**	**259.384**	**201.435**	**57.949**	**40.981**	**16.968**	
Mean	**4.724**	**16.892**	**21.615**	**16.786**	**4.829**	**3.415**		

Table 2.Inventory Data JSC590R T 1.4 in 2023

Month	Initial Inventory	Purchase	Total Inventory	Usage	Ending Inventory	Buffer Stock	Residue	
Jan	3.296	15.500	18.796	10.865	7.931	3.369	4.562	Surplus
Feb	7.931	17.000	24.931	14.597	10.334	3.282	7.052	Surplus
Mar	10.333	13.000	23.333	21.809	1.524	3.626	- 2.102	Deficit
Apr	1.524	13.000	14.524	12.947	1.577	2.182	- 605	Deficit
May	1.578	19.000	20.578	17.149	3.429	3.113	316	Surplus
June	3.429	15.000	18.429	15.335	3.094	2.944	150	Surplus
July	3.094	14.000	17.094	15.908	1.186	2.825	- 1.639	Deficit
Aug	1.186	16.000	17.186	13.434	3.752	3.158	594	Surplus
Sep	3.752	19.000	22.752	21.626	1.126	3.158	- 2.032	Deficit
Oct	1.126	13.000	14.126	10.827	3.299	2.414	885	Surplus
Nov	3.299	13.000	16.299	13.786	2.513	3.081	- 568	Deficit
Dec	2.513	11.000	13.513	8.515	4.998	2.311	2.687	Surplus
Total	**43.061**	**178.500**	**221.561**	**176.798**	**44.763**	**35.463**	**9.300**	
Mean	**3.588**	**14.875**	**18.463**	**14.733**	**3.730**	**2.955**		

Table 1. and Table 2. present the raw material inventory data for JCC540R T 1.4 and JCC540R T 2.0 in 2023 in tabular format. This table contains monthly information from January to December, including variables such as initial inventory, raw material receipts, total inventory, raw material usage, and ending stock. At the end of the table, there is a cumulative total for each variable throughout the year. The initial inventory for each month is the basis for the calculation, which is then added to the raw material receipts and subtracted by usage, resulting in the monthly ending stock. The comparison between the two types of raw materials shows the differences in the receipt, usage, and stock management patterns for JCC540R T 1.4 and JCC540R T 2.0 throughout the year. This data is useful for stock management analysis and planning future raw material requirements.

The raw material purchasing process must be planned properly so that the company can work more efficiently (Wagiyo, Bella, and Pasya 2020). One alternative method in inventory control is Economic Order Quantity (EOQ). Where EOQ can help companies determine the number of goods that must be ordered to meet demand with the lowest inventory costs (Heizer, Render, and Munson 2020). In addition to the EOQ model, other methods can support the implementation of inventory control so that costs incurred are increasingly minimal, including calculating safety stock, reorder points, and maximum capacity.

According to Sutrisna, Ginanjar, and Lestari (2021), the total cost of raw material inventory that the company must bear is Rp186,214,000, higher when compared to the total inventory cost calculated using the EOQ method, which is Rp20,588,914.71. Meanwhile, according to Tiloly, Vikaliana, and Irwansyah (2022), costs decreased by 59%. Initially, with the company's policy, the total cost was Rp14,389,750.00, and when using the EOQ method, it decreased to Rp5,842,587.60. The two studies show that economic order quantity (EOQ) plays a role in making inventory costs more efficient because ordering goods is adjusted to the company's operational needs.

Based on the background, this study discusses the Control of the Gusset Raw Material Inventory, FR (Sozai) using the Economic Order Quantity Method at PT XYZ. The application of this EOQ method can help companies in determining the optimal quantity of raw materials to be ordered when to reorder, and the amount of safety stock that the company must have to ensure that production activities are not disrupted. In addition, it can provide benefits to the company, especially in terms of cost efficiency in providing or procuring stock of goods to meet customer demand.

RESEARCH METHODS

The research method is a scientific way to collect data for specific purposes and benefits. This type of research is quantitative research using a descriptive approach to explaining the object of research and research results. So what is meant by descriptive quantitative research is collecting various data in the form of numbers from the results of analysis and interviews or observations about the problems studied and occurring in the field, as well as analyzing, describing, and summarizing various conditions and situations (Tiloly et al. 2022). The problems analyzed in this study are determining the economic order quantity (EOQ), reorder point (ROP), and safety stock which can be used as a measuring tool to determine the optimal inventory level in a company to control raw material inventory to make raw material inventory costs more efficient at PT XYZ. The location of this research was conducted at PT XYZ with a research time in 2024.

This study uses raw material inventory control data using company policies for the period January - December 2023. The sampling method in this study uses purposive sampling which is based on several special considerations according to the desired criteria to determine the number of samples to be studied (Sugiyono 2013). For this reason, the sample in this study is the production and raw material inventory data of Gusset, FR (Sozai) PT XYZ for the period January - December 2023. The reason for selecting the sample is because the raw materials selected are raw materials with high production variations and product demand with the fastest sales turnover, the selected product is one of the products whose entire production process is carried out internally by the company, so there is no interference from third parties (Subcon), and the data used is the latest so that the research results are very possible to be used as considerations in making company policies in the future.

In collecting the required data, the methods used in this research include:

1. Observation
   Observations were conducted with the aim of obtaining valid data regarding the production process at PT XYZ regarding the control of raw material inventory for the Gusset product, FR (Sozai).
2. Interview
   The interview method used in this study was an unstructured interview to obtain unexpected information from the company parties (PPIC, Purchasing, and Production departments) to describe the things needed in compiling the research.
3. Documentation
   The documentation method in this research is by taking documents regarding control of the raw material inventory for Gusset products, FR (Sozai) at PT XYZ.
4. Literature review
   This study was conducted by reviewing various references in the form of books, journals, scientific articles, and other relevant sources to obtain supporting theories in analyzing problems in the research.

To answer the purpose of the research to find out the appropriate raw material inventory control applied at PT XYZ, the research data is compiled, described, and analyzed using a formula approach. This approach is carried out by applying mathematical formulas to see the most economical orders. The formula used to calculate the Economic Order Quantity (EOQ) is:

$$EOQ = \sqrt{\frac{2 \times D \times Oc}{Hc}}$$

Where.
EOQ = Economic order quantity
D = Total needs in a period
Oc = Ordering cost for each order
Hc = Holding cost per unit of inventory

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RESEARCH RESULTS

In making Gusset, FR (Sozai) products, PT XYZ requires raw materials in the form of JSH590R 2.0 X 174 X COIL and JSC590R 1.4 X 180 X COIL. PT XYZ routinely orders or purchases raw materials every month from suppliers. The company purchases raw materials based on forecasting calculations by the PPIC Department. Data obtained from the purchase of raw materials in 2023 at PT XYZ can be seen in the following table:

Table 3T 2.0 Raw Material Purchase Data for 2023

Month	Purchase (kg)	Shipping Frequency
Jan	15,500	4 times
Feb	17,000	6 times
Mar	13,000	7 times
Apr	13,000	4 times
May	19,000	5 times
June	15,000	5 times
Jul	14,000	4 times
Ags	16,000	6 times
Sep	19,000	5 times
Oct	13,000	3 times
Nov	13,000	4 times
Dec	11,000	3 times
Total	**178,500**	**56 times**
Average	**14,875**	**5 times**

The table shows that the JSH590R T 2.0 raw material has more raw material purchases in May and September 2023 than in other months, with raw material purchases of 19,000 kg. The average purchase is 14,875 kg with an average frequency of raw material delivery of 5 times a year.

Table 4T 1.4 Raw Material Purchase Data for 2023

Month	Purchase (kg)	Shipping Frequency
Jan	20,000	5 times
Feb	24,000	7 times
Mar	14,000	9 times
Apr	14,000	6 times
May	10,000	4 times
June	18,000	5 times
Jul	18,000	5 times
Ags	18.100	7 times
Sep	22,200	6 times
Oct	17,700	5 times
Nov	16,000	5 times
Dec	10,700	3 times
Total	**202,700**	**67 times**
Average	**16,892**	**6 times**

The table shows that the raw material JSC590R T 1.4 was purchased more in February 2023 than in other months, with 24,000 kg purchased. The average purchase is 16,892 kg, and the average frequency of raw material delivery is 6 times a year.

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Table 5T 2.0 in 2023

Month	Usage (kg)	Gross	Needs (units)
Jan	10,865	0.12839	84,626
Feb	14,597	0.12839	113,696
Mar	21,809	0.12839	169,868
Apr	12,947	0.12839	100,837
May	17,149	0.12839	133,568
June	15,335	0.12839	119,441
Jul	15,908	0.12839	123.903
Ags	13,434	0.12839	104,632
Sep	21,626	0.12839	168,442
Oct	10,827	0.12839	84,330
Nov	13,786	0.12839	107,373
Dec	8,515	0.12839	66,321
Total	**176,798**		**1,377,039**
Average	**14,733**		**114,753**

The table explains that the raw material requirements for JSH590R T 2.0 in 2023 are calculated based on usage per kg converted into units, resulting in a raw material requirement figure for one period. The raw material requirement is calculated by dividing the usage per kg by the gross of the JSH590R T 2.0 raw material. Thus, the raw material requirement for JSH590R T 2.0 during 2023 is 1,377,039 units, with an average of 114,753 units.

Table 6T 1.4 Raw Material Requirement Data for 2023

Month	Usage (kg)	Gross	Needs (units)
Jan	17,596	0.14837	118,594
Feb	22,764	0.14837	153,427
Mar	19,547	0.14837	131,745
Apr	11,375	0.14837	76,664
May	12,296	0.14837	82,872
June	16,119	0.14837	108,642
Jul	19,326	0.14837	130,253
Ags	19,983	0.14837	134,684
Sep	20,441	0.14837	137,772
Oct	17,291	0.14837	116,539
Nov	13,052	0.14837	87,969
Dec	11,645	0.14837	78,486
Total	**201,434**		**1,357,646**
Average	**16,786**		**113,137**

The table explains that the raw material requirements for JSC590R T 1.4 in 2023 are calculated based on usage per kg converted into units, resulting in a raw material requirement figure for one period. The raw material requirement is calculated by dividing the usage per kg by the gross of the JSC590R T 1.4 raw material. Thus, the raw material requirement for JSC590R T 1.4 during 2023 is 1,357,646 units, with an average of 113,137 units.

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Table 7Products, FR (Sozai) in 2023

Raw Material Ordering Cost Gusset Product, FR (Sozai) PT XYZ Year 2023		
Purchase Administration Fee	Rp	1,778,552
Communication Costs	Rp	4,518,175
Freight and Loading and Unloading Costs	Rp	25,238,099
Acceptance Inspection Fee	Rp	3,708,713
Total Order Cost	**Rp**	**35,243,539**

Based on the table, it can be seen that the total ordering cost for each raw material for the Gusset product, FR (Sozai) in 2023 is IDR35,243,539. With the ordering cost for one order of raw materials JSH590R T 2.0 and JSC590R T 1.4 of IDR2,936,962/order.

Table 8*Raw Material* Storage Cost Data PT XYZ Year 2023

***Raw Material* Storage Costs PT XYZ Year 2023**		
Warehouse Electricity Costs	Rp	669,079,572
Warehouse Administration Fee	Rp	104.445.120
Warehouse Fire Insurance Costs	Rp	498,960,000
Warehouse Depreciation Cost	Rp	469.203.060
Total Storage Cost	**Rp**	**1,741,687,752**

Based on the table, it can be seen that the total cost of storing PT XYZ's raw materials in 2023 is IDR1,741,687,752. The raw materials used by PT XYZ consist of carbon steel or mild steel with 7 types of raw materials. Therefore, the storage cost of each raw material for the Gusset, FR (Sozai) product in 2023 is IDR248,812,536. With details of the total cost per storage of raw materials for the Gusset, FR (Sozai) product in 2023, as follows:

Table 9per Raw Material Storage

Raw material	**Storage Fee/ year**		**Raw Material Requirements/year**	**Cost per Storage**	
JSH590R T 2.0	Rp	248,812,536	1,377,039 units	Rp	181
JSC590R T 1.4	Rp	248,812,536	1,357,646 units	Rp	183
Total	**Rp**	**497,625,072**	**2,734,685 units**	**Rp**	**364**

Based on the interviews that have been conducted, the manufacturing time for the raw materials of the Gusset product, FR (Sozai) is 7 working days, the procurement time is 5 working days, and the average shipping time is 4 working days. Thus, the total lead time required to order raw materials for the Gusset product, FR (Sozai), both JSH590R T 2.0 and JSC590R T 1.4, is 16 working days.

DISCUSSION

The following are the results of data processing for controlling raw material inventory for Gusset products, FR (Sozai) consisting of

JSH590R 2.0 X 174 X COIL and JSC590R 1.4 X 180 X COIL,

1) The raw material requirement for JSH590R T 2.0 is 1,377,039 units and the raw material requirement for JSC590R T 1.4 is 1,357,646 units.
2) The ordering/reservation cost for raw material JSH590R T 2.0 is Rp2,936,962 and raw material JSC590R T 1.4 is Rp2,936,962.
3) The storage cost/unit of raw material JSH590R T 2.0 is Rp181 and raw material JSC590R T 1.4 is Rp183.
4) *Lead time* for both raw materials is 16 working days.

Inventory Control Using *Economic Order Quantity* (EOQ)

Economical Order Quantity

1) JSH590R T 2.0

$$EOQ = \sqrt{\frac{2 \times D \times Oc}{Hc}}$$

$$EOQ = \sqrt{\frac{2\,(1{,}377{,}039)(2{,}936{,}962)}{181}}$$

$$EOQ = 211{,}579.77 \text{ unit} = \mathbf{211{,}580\ unit}$$

2) JSC590R T 1.4

$$EOQ = \sqrt{\frac{2 \times D \times Oc}{Hc}}$$

$$EOQ = \sqrt{\frac{2\,(1{,}357{,}646)(2{,}936{,}962)}{183}}$$

$$EOQ = 208{,}600.18 \text{ unit} = \mathbf{208{,}600\ unit}$$

The economical order quantity for each order in 2023 for JSH590R T 2.0 raw material is 211,580 units and 208,600 units are the economical order quantity for JSC590R T 1.4 raw material.

Optimal Order Frequency

1) JSH590R T 2.0

$$N = \frac{D}{Q^*}$$

$$= \frac{1{,}377{,}039 \text{ units}}{211{,}580 \text{ units}} = 6.51 \text{ times} = \mathbf{7\ times}$$

2) JSC590R T 1.4

$$N = \frac{D}{Q^*}$$

$$= \frac{1{,}357{,}039 \text{ unit}}{208{,}600 \text{ unit}} = 6.51 \text{ times} = \mathbf{7\ times}$$

The optimal ordering frequency for both raw materials is 7 orders, both for JSH590R T 2.0 raw material and JSC590R T 1.4 raw material, each of which is carried out during a period of one year.

Estimated Order Delivery Time

1) JSH590R T 2.0

$$T = \frac{W}{N}$$

$$= \frac{285 \text{ days/year}}{6.51 \text{ times}} = \mathbf{44\ days}$$

2) JSC590R T 1.4

$$T = \frac{W}{N}$$

$$= \frac{285 \text{ days/year}}{6.51\ times} = \mathbf{44\ days}$$

Estimated time between orders for both raw materials, both JSH590R T 2.0 raw material and JSC590R T 1.4 raw material is every 44 working days calculated within one year.

Total Inventory Cost

- Booking Fee

1) JSH590R T 2.0

$$OC = \frac{D}{Q} \times Oc$$

$$OC = \frac{1{,}377{,}039 \text{ units}}{211{,}580 \text{ units}} \times Rp2{,}936{,}962$$

$$OC = \mathbf{Rp19.114.822}$$

2) JSC590R T 1.4

$$OC = \frac{D}{Q} \times Oc$$

$$OC = \frac{1{,}357{,}646 \text{ units}}{208{,}600 \text{ units}} \times Rp2{,}936{,}962$$

$$OC = \mathbf{Rp19{,}114{,}822}$$

- Storage Costs

1) JSH590R T 2.0

$$HC = \frac{Q}{2} \times Hc$$

$$OC = \frac{211{,}580 \text{ units}}{2} \times Rp181$$

$$OC = \mathbf{Rp19{,}114{,}822}$$

2) JSC590R T 1.4

$$HC = \frac{Q}{2} \times Hc$$

$$OC = \frac{208{,}600 \text{ units}}{2} \times Rp183$$

$$OC = \mathbf{Rp19{,}114{,}822}$$

To calculate the total inventory cost according to EOQ, a number of data are needed, as follows:

1) JSH590R T 2.0

- Economical order quantity = 211,580 units
- One-time order cost = Rp2,936,962
- Storage cost per unit of inventory = Rp181

$$TIC = \frac{D}{Q}\,Oc + \frac{Q}{2}\,Hc$$

$$TIC = \frac{1{,}377{,}039 \text{ units}}{211{,}580 \text{ units}} \times Rp2{,}936{,}962 + \frac{211{,}580 \text{ units}}{2} \times Rp181$$

$$= \mathbf{Rp38{,}229{,}645}$$

2) JSC590R T 1.4

- Economical order quantity = 208,600 units
- One-time order cost = Rp2,936,962
- Storage cost per unit of inventory = Rp183

$$TIC = \frac{D}{Q} Oc + \frac{Q}{2} Hc$$

$$TIC = \frac{1{,}357{,}646 \text{ units}}{208{,}600 \text{ units}} \times Rp2{,}936{,}962 = \frac{208{,}600 \text{ units}}{2} \times Rp183$$

$$= \mathbf{Rp38{,}229{,}645}$$

The total inventory cost that the company will spend for raw materials JSH590R T 2.0 and JSC590R T 1.4 is IDR38,229,645 with *the total ordering cost* being the same as *the total holding cost* of IDR19,114,822.

Safety Stock

Safety *stock* is additional inventory to anticipate the possibility of a shortage of raw materials *(stock out material)*. By using the *service level value* determined by the company of 95%, the Z value with a normal table of 1.64 is obtained.

1) JSH590R T 2.0

$$SS = \sqrt{\frac{\sum(x - \bar{x})^2}{n}} \times Z$$

$$SS = \sqrt{\frac{10{,}910{,}440{,}330}{12}} \times 1.64 = \mathbf{49{,}597 \text{ units}}$$

2) JSC590R T 1.4

$$SS = \sqrt{\frac{\sum(x - \bar{x})^2}{n}} \times Z$$

$$SS = \sqrt{\frac{7{,}475{,}622{,}342}{12}} \times 1.64 = \mathbf{41{,}054 \text{ units}}$$

Safety stock for Gusset product raw materials, FR (Sozai) is 49,597 units for JSH590R T 2.0 raw materials, while for JSC590R T 1.4 raw materials it is 41,054 units.

Maximum Stock

inventory is the largest amount of inventory held by a company to avoid losses due to excessive raw material procurement costs or losses due to shortages of raw materials (stock out materials).

1) JSH590R T 2.0

$$MI = SS + EOQ$$
$$MI = 49{,}597.27 \text{ units} + 211{,}579.77 \text{ units}$$
$$MI = \mathbf{261{,}177 \text{ units}}$$

2) JSC590R T 1.4

$$MI = SS + EOQ$$
$$MI = 41{,}054.46 \text{ units} + 208{,}600.18 \text{ units}$$
$$MI = \mathbf{249{,}655 \text{ units}}$$

The maximum inventory *of JSH590R T 2.0* raw materials is 261,177 units. While for JSC590R T 1.4 raw materials it is 249,655 units.

Re-order

PT XYZ in ordering raw materials has a waiting time from the order until the raw materials arrive 16 working days, with an average number of working days during the year of 285 working days for 2023, with a raw material usage rate for JSH590R T 2.0 of 4,832 units/day and JSC590R T 1.4 of 4,764 units/day.

1) JSH590R T 2.0

$$ROP = (L \times d) + SS$$
$$ROP = (16 \text{ days} \times 4{,}832 \text{ units}) + 49{,}597 \text{ units}$$
$$ROP = \mathbf{128{,}201 \text{ units}}$$

2) JSC590R T 1.4

$$ROP = (L \times d) + SS$$
$$ROP = (16 \text{ days} \times 4{,}764 \text{ units}) + 41{,}054 \text{ units}$$
$$ROP = \mathbf{115{,}543 \text{ units}}$$

The company must reorder when the raw material inventory in the warehouse has reached 128,201 units of raw material JSH590R T 2.0 and 115,543 units of raw material JSC590R T 1.4 in order to prevent shortages or even running out of raw material inventory.

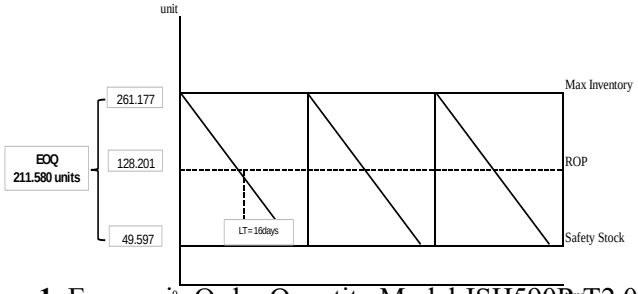

Figure 1. Economic Order Quantity Model JSH590R T2.0

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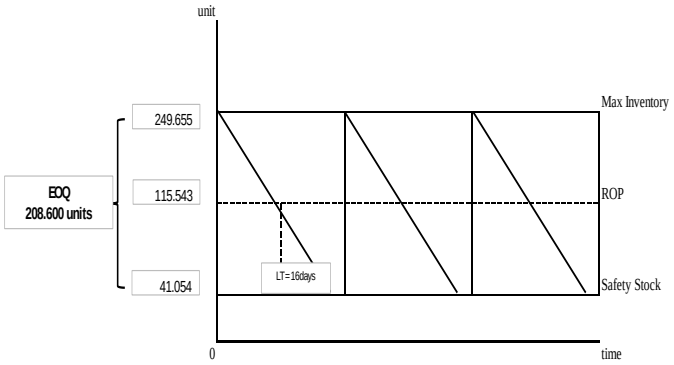

Figure 2. Economic Order Quantity Model JSC590R T 1.4

Comparison of Raw Material Inventory Control Using the *Economic Order Quantity Method* with the Company Method

By knowing the results of the comparison, the company can find out and determine which method is optimal and capable of producing minimum or economical costs in controlling raw materials JSH590R T 2.0 and JSC590R T 1.4 in Gusset, FR (Sozai) products.

1) JSH590R T 2.0

Table 10 Comparison of Raw Material Inventory Control Calculation Results JSH590R T **2.0**

No	Information	Company Method	EOQ method
1.	Quantity Order per Order (unit)	114,753	211,580
2.	Frequency Orders / year (times)	12	7
3.	Total cost Stock (Rp)	56,177,523	38,229,645
4.	Supply Security (unit)	276,211	49,597
5.	Point Reorder (units)	-	128.201
6.	*Maximum Inventory* (units)	-	261,177

It is seen that the research findings using the EOQ method are said to be able to save costs compared to calculations using the company method. The following is the calculation of total inventory cost savings,

$$\text{Cost Savings} = \frac{\text{TIC Company Method} - \text{TIC EOQ}}{\text{TIC Company Method}} \times 100\%$$

$$\text{Penghematan Biaya} = \frac{\text{Rp56,177,523} - \text{Rp38,229,645}}{\text{Rp56,177,523}} \times 100\%$$

$$= \mathbf{32}\%$$

2) JSC590R T 1.4

Table 11 Comparison of Raw Material Inventory Control Calculation Results JSC590R T 1.4

No	Information	Company Method	EOQ method
1.	Quantity Order per Order (unit)	113,137	208,600
2.	Frequency Orders / year (times)	12	7
3.	Total cost Stock (Rp)	56,108,231	38,229,645
4.	Supply Security (unit)	276,211	41,054
5.	Point Reorder (units)	-	115,543
6.	*Maximum Inventory* (units)	-	249,655

It is seen that the research findings using the EOQ method are said to be able to save costs compared to calculations using the company method. The following is the calculation of total inventory cost savings,

$$\text{Penghematan Biaya} = \frac{\text{TIC Metode Perusahaan} - \text{TIC EOQ}}{\text{TIC Metode Perusahaan}} \times 100\%$$

$$= \frac{\text{Rp56,108,231} - \text{Rp38,229,645}}{\text{Rp56,108,231}} \times 100\%$$

$$= \mathbf{32}\%$$

Based on the second calculation mentioned, it obtained results that save cost supply by 32%. Savings cost when a company applies EOQ method in control supply material standard JSH590R T 2.0 for Rp17,947,878 and raw materials JSC590R T 1.4 amounting to Rp17,878,587 For that's it, can it is said that company can save cost supply annual when use EOQ method.

Control of supply materials to the right standard will help in achieving production targets. If there is a lack of supply material raw materials, then the production process will obstructed, so that No can fulfill the request of customers impact the level of sales, and trust customers to the product. Meanwhile, if there are excess supply material standards, then the company must bear more costs For storage and maintenance material standards and quality material standards can be decreased matters resulting in the profit company (Handayani and Silalahi 2022).

Explained more carry on in research conducted at CV Bina Usaha Mandiri, that if the company has supplied sufficient raw materials, the production process becomes easier and the product will fulfill the requests of customers. However, the company will lose the chance to capture the market and not be able to provide products to customers, whenever the supply material standard is not sufficient (Maulana et al. 2023). In addition, the cost supply with the EOQ method has proven more efficient and productive mark economic in line with a study previously at PT Jatisari Furniture Work that the EOQ method is capable save expenditure cost in booking material standard than policy management supply material standard running during this by the company (Sutrisna et al. 2021).

CONCLUSIONS AND SUGGESTIONS

Conclusions

Based on the results of data processing and analysis, it can be concluded that the quantity of raw material orders for JSH590R T 2.0 for each order using the EOQ method is 211,580 units with an order frequency of 7 times in one year. The order quantity for raw material JSC590R T 1.4 is 208,600 units with an order frequency of 7 times in one year. The calculation of the total inventory cost of raw material JSH590R T 2.0 and raw material JSC590R T 1.4 using the Economic Order Quantity method is Rp38,229,645 each. By using the EOQ method, the calculation of safety stock raw material JSH590R T 2.0 amounted to 49,597 units and a reorder point value of 128,201 units. For raw material JSC590R T 1.4, the calculation of safety stock obtained results of 41,054 units and a reorder point value of 115,543 units. Control of raw material inventory JSH590R T 2.0 by applying the EOQ method when compared to the company's method, the results obtained were inventory cost savings of 32% or Rp17,947,878. While for raw material JSC590R T 1.4 obtained the result of inventory cost savings of 32% or Rp17,878,587. Thus, the Economic Order Quantity method is said to be able to help companies determine the number

of goods to be ordered for raw materials for Gusset, FR (Sozai) products to meet demand with the lowest inventory costs.

Suggestions

Based on the results of the analysis and research findings, the suggestions that can be given to support the research output are as follows:

1. The company can conduct further studies and testing on the Economic Order Quantity method before being optimally implemented in the raw material inventory control system at PT XYZ.
2. The Economic Order Quantity method has good calculation elements in knowing how much raw material should be ordered and when the order should be made so that it can overcome demand uncertainty due to safety stock. Thus, by applying the EOQ method to raw material inventory control, it can be used as the best solution in supporting inventory cost savings and increasing the company's financial profitability.
3. For further research, it can conduct a study on the raw material inventory control system using other scientific methods, such as Material Requirement Planning (MRP), Just In Time (JIT), ABC Model, and so on so that comparisons can be made to obtain optimal results for the sustainability of the company's operations.

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