

Control Analysis Of Tobacco Raw Material Supplies Using Eoq Method (Economic Order Quantity) To Reach Efficiency Total Costs Of Raw Material In Pr. Sukun

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Abstract: The raw material inventory control system determines and guarantees the availability of raw material stock in the right quantity, quality and timing. The problem in this research is the procurement of raw materials of tobacco. PR. Sukun still often experiences the excess. This is related to the frequency of raw material purchases and the quantity of raw material purchases, which can lead to waste of working capital embedded in raw material inventory, raw material ordering costs and raw material storage costs. The purpose of this research is to know how to make an efficiency level in procurement of raw material inventory between EOQ method compared with policy of PR. Sukun. The type of research used is analytic descriptive type. Data analysis begins by analyzing raw material quantity comparison, total raw material inventory cost and raw material cost between PR Sukun policy with EOQ method. Based on the results of research known that by using EOQ method can be much more efficient compared to policy of PR. Sukun. The quantity and frequency of purchasing raw materials is less but still take into account the safety stock and reorder point, so the production process is not disturbed. In addition, the cost of purchasing, ordering costs and raw materials storage costs less so as to create efficiencies on the cost of raw materials inventory. PR. Sukun in the procurement of raw material inventory should use EOQ method to be more efficient, and take into account the safety stock and reorder point to avoid the inventory excess of raw materials.

Index Terms: EOQ, inventory, raw material, tobacco

1 INTRODUCTION

A commercial undertaking is always oriented to gain the most benefit or advantage. The efforts in that direction only allows to be realized by directing and utilizing all the potential or resources (resources) owned to create and increase the utility (utility) of goods and services. To organize these activities, it is necessary to make decisions related to efforts to achieve the goal for goods and services produced in accordance with what is planned. Thus, production management involves making decisions related to the production process to achieve organizational or corporate objectives. Concretely it can be seen that in every company there are always production activities, personnel, expenditure, management, accounting, and marketing. Among the above activities, production activities provide an important role in achieving corporate objectives. To support production activities, raw material inventory control factors require appropriate attention and measures, since raw material inventory is directly related to the company's production activities. The objective of inventory control is to maintain an optimum inventory level and turnover for business operations at maximum profit. Through inventory control will be known raw materials needed and total units of raw material inventory to be held in the correct quantity, when and where the raw materials can be obtained. A method to establish and ensure the availability of raw materials in the right quantity and time that is by the method of economic order quantity (EOQ). According to Hansen and Mowen (2005: 472) Economical Order Quantity will determine the number of inventory orders that minimize the cost of ordering and storage costs. During this PR. Sukun does not yet have the proper method of controlling raw materials. Determination of raw material inventory is done by looking at the purchase and use of raw materials of the previous period, so it is often happened overstock raw materials at the company. The company has not set a reorder point and safety stock. If this happens continuously, it will lead to waste of working capital because the company makes purchases of raw materials in large

quantities which are certainly followed by increased cost of ordering and storage by the company. The following is data on the inventory and use of raw materials of tobacco by companies in the period 2014-2016.

Table 1
Data Stock and Consumption of Tobacco in PR. Sukun
Year 2014-2016 (Kg)

Year	Stock	Used	Kg	%
2014	33.254	27.496	5.758	20,94
2015	33.425	24.022	9.403	39,14
2016	35.506	22.882	12.624	55,17

Source: PR. Sukun, 2016

From the table above can be seen the difference between the inventory of the use of raw materials of tobacco in PR Sukun from 2014-2016. Fair limit policy between the difference between inventory and use of raw materials applied PR. Sukun is 40%, while every year the difference between the level of raw material inventory and the use of raw materials is always increasing. In 2016 the difference exceeds the reasonable limit of more than 40%. So far the company only uses raw materials less than 60%. This shows that the company in providing raw material inventory not efficient so that it can lead to accumulation of raw materials. Raw materials accumulated in warehouses can be used for next year's production process, but with too much buildup will lead to an increase in storage costs that can cause harm to the company. Therefore the use of appropriate methods in the control of raw material inventory is important to obtain the optimum quantity of purchase and with optimum inventory cost. With the efficiency of raw materials will reduce the cost of production of the company which later can also increase the profit for the company.

2. LITERATURE REVIEW

Production Management by Assauri (2001: 12) is an activity of organizing and coordinating the use of human resources, tools

resources, and resources of funds and materials, effectively and efficiently, to create and increase the utility of goods and services. Meanwhile, according to Heizer and Rander (2001: 21) understanding of production management is a series of activities that make goods and services through the change from input (input) to output (output). Production planning and control is done to plan and control the flow of material into, inside and out of the factory so that the optimal profit position which is the company's goal can be achieved. Production control is intended to utilize limited production resources effectively, especially in the effort to meet consumer demand and create benefits for society. The intended resources include production facilities, manpower, and raw materials. Any company that carries out production activities will require raw materials. With the availability of raw materials inventory is expected an industrial company can perform production process in accordance with the needs or consumer demand. In addition to the availability of sufficient raw materials available in the warehouse is expected to facilitate the company's production activities and can avoid the occurrence of shortages of raw materials. Inventory is idle resources waiting for further process. The meaning of further process is in the form of production activities on manufacturing systems, marketing activities on the distribution system or food consumption activities on the household system. Furthermore, inventory as the main element of working capital is an asset that is always in a state of rotation, which is constantly changing. Factors affecting raw material inventory include usage estimates, raw material prices, inventory costs, expenditure policy, actual usage, and waiting times. Each company must be able to determine in advance the amount of raw material inventory required to produce a number of finished goods are planned in a certain period. This is important in order to prevent the lack of raw materials that can stop the production process and will cause losses for the company because it does not meet consumer demand for finished goods. One way used is to arrange the ordering of raw materials economically with a method or technique known as Economical Order Quantity.

3. METHOD

The type of research used is analytic descriptive type. The data used in this study is primary data in the form of data from the time series (time series) that is 2014, 2015, and 2016. In this study that includes primary data is the amount of raw material purchases, the amount of raw material needs, the cost of purchasing materials, the total cost of ordering of raw materials, and the amount of storage costs. While secondary data in the form of history of company establishment, organizational structure, production process of company and other data related to control of raw material inventory. Data collection techniques used in this study is through interviews, documentation and observation. The population is all the production and financial data owned by PR. Sukun. The sampling technique used is purposive sampling that is the technique of determining the sample with certain considerations. Sample used in this research is production data and finance of PR. Sukun in 2014, 2015 and 2016. The consideration is that the data from 2014 to 2016 is the latest data currently owned by the company so it is relevant to be analyzed as the basis for consideration in future decision-making. Data analysis techniques used in this study is to conduct a comparison analysis of EOQ method with company

policy which includes comparative analysis of raw material purchase quantity and comparison analysis of total raw material inventory cost.

4. RESULT AND DISCUSSION

The determination of the quantity of economic purchases is used to determine the quantity of purchases in order to minimize total inventory cost. Determination of economic purchases, in this study using the method EOQ or Economical Order Quantity. Previously will be presented on the amount of raw material purchase and purchase frequency based the PR Sukun policy as follows:

Table 2

The purchase of raw materials and the frequency of purchasing raw materials based on the policy of PR. Sukun Year 2014-2016

Year	Ordering Quantity of Raw Material (Kg)	Frequency of Purchasing
2014	31.627	15
2015	27.667	15
2016	26.103	13

Source : PR. Sukun, 2017

To calculate the required EOQ data in the form of the quantity of use of raw materials in a year, the cost of ordering each time the message, and storage costs per unit. Here are the data that will be used to calculate EOQ:

Table 3

The Used of Raw Material, Ordering Cost and Storage Cost of PR. Sukun

Year	Raw Material Used (Kg)	Ordering Cost (Rp)	Storage Cost (Rp)
2014	27,496	297,000,-	2,584.81
2015	24,022	312,000,-	3,610.38
2016	22,882	358,750,-	3,463.78

From the above table can be calculated optimal quantity of purchase each time a message by using the following formula of EOQ . After obtaining the optimal quantity of purchase each time the message can be searched optimal purchase frequency with the following formula:

$$\text{Frequency} = D/\text{EOQ}$$

The result of optimal quantity and frequency of purchase calculation using EOQ method formula can be seen in the following table:

Table 4

Quantity of Purchase of Tobacco Raw Material by Using EOQ Method in PR. Sukun 2014-2016

Year	EOQ (Kg) (a)	Frequency of Purchasing (Times) (b)	Optimal Quantity Purchasing (Kg) (axb)
2014	2.513,70	11	27.650,70
2015	2.037,61	12	24.451,32
2016	2.177,12	11	23.948,32

Source : Primary data processed, 2017

In the calculation of raw material purchases using EOQ method obtained results in 2014 amounted to 2513.70 kg with

the frequency of purchase as much as 11 times so that the total quantity of raw material purchases amounted to 27,650.70 kg. In 2015 amounted to 2,037.61 kg with the frequency of purchase of 12 times so that the total quantity of raw material purchase amounted to 24,451.32 kg. In 2016 amounted to 2,177.12 kg with the frequency of purchase of 11

times so that the total optimum quantity of purchase amounted to 23,948.32 kg. Whereas comparison of quantity of raw material purchase of tobacco between policy of PR. Sukun with EOQ Method 2014-2016 can be seen in the table below:

Table 5

Policy Comparison of Purchase Quantity of Tobacco Raw Material between PR. Sukun by Using EOQ Method Year 2014-2016

Year	Policy of PR. Sukun		EOQ with Safety Stock		Difference			
	Quantity/ Year	Freq. of Purchasing	Quantity/ Year	Freq. of Purchasing	Quantity/ Year	%	Freq. of Purchasing	%
2014	31.627	15	27.650,70	11	3.976,30	12,57	4	26,67
2015	27.667	15	24.451,32	12	3.215,68	11,62	3	20
2016	26.103	13	23.948,32	11	2.154,68	8,25	2	15,38

Source: Primary data processed, 2017

Based on the above table can be seen that the purchase of tobacco raw materials with EOQ method is smaller when compared with the purchase of raw materials derived from company policy. This can be seen from the difference in the year 2014 the company made a purchase of 31,627 kg with the frequency of purchase as much as 15 times, while based on EOQ method of purchase quantity of 27,650.70 kg with frequency 11 times. The difference in quantity of 3976.30 kg or 12.57% and in quantity increased as 4 times or by 26.67%. In 2015 the company made a purchase of 27,667 kg with the frequency of purchase of 15 times, when using EOQ purchase quantity of 24,451.32 kg with the frequency of purchase 12 times. The difference in the quantity are 3.215.68 kg or 11.62% and at the frequency of 3 times or by 20%. While in 2016 the company purchased raw materials of tobacco as much as 26,103 kg with the frequency of purchase as much as 13 times, whereas when using EOQ method of raw material purchase only as much as 23.948,33 kg with frequency as much as 11 times. The difference in the quantity are 2,154.68 kg or by 8.25% and in quantity as much as 2 times or by 15.38%. After comparing the quantity of raw material purchases between company policies and EOQ method, then calculated the cost of purchasing raw materials issued by the company between EOQ method and compared with PR Sukun policy. The cost of purchasing raw materials of tobacco is based on the PR Sukun policy can be seen in the table below:

Table 6

Comparison of Tobacco Raw Material Purchase Costs between PR Sukun policies with EOQ Methods Year 2014-2016

Year	PR. Sukun Policy	EOQ Method	Difference	%
2014	481.382.500	421.673.175	59.709.325	12,40
2015	459.783.500	412.004.742	47.778.758	10,39
2016	489.054.000	449.031.000	40.023.000	8,18

Source: Primary data processed, 2017

Based on the above table can be seen that by using the EOQ method the cost of purchasing raw materials can be more efficient when compared with the policy of PR. Sukun. In 2014 the cost of purchasing raw materials based on the PR Sukun policy is Rp 481.382.500,00 whereas when using EOQ method is Rp 421.673.175,00 so it can be calculated the difference of Rp 59.709.325,00 or equal to 12,40%. In 2015

the cost of purchasing raw materials based on the PR Sukun policy is Rp 459.783.500,00 whereas when using EOQ method is Rp 412.004.742,00 so it can be calculated the difference of Rp 38.779.432,00 or equal to 10.39%. In 2016 the cost of purchasing raw materials based on the PR Sukun policy is Rp. 489.054.000,00 whereas when using EOQ method of Rp 449.031.000,00 so that can be calculated difference of 40,023.000,00 or equal to 8,18%. Furthermore, will be presented on the ratio of the total cost of tobacco raw material inventory between the PR Sukun policy with EOQ Method. Cost of raw material inventory based on PR Sukun policy is as follows:

Table 7

Comparison of Total Cost of Raw Material Inventory (TIC) between PR. Sukun Policy with EOQ Method Year 2014-2016

Year	PR. Sukun Policy	EOQ Method	Difference	%
2014	7.180.000,00	6.497.440,25	682.559,75	9,51
2015	8.010.000,00	7.356.535,48	653.464,52	8,16
2016	8.141.250,00	7.541.072,11	600.177,89	7,37

Source: Primary data processed, 2017

From the table above it can be seen that the total cost of inventory / inventory cost (TIC) with the EOQ method is smaller than the cost of raw material inventory based on PR.Sukun policy, resulting in inventory cost savings. From the above data it can be seen that in 2014 the total cost of raw material inventory based on the PR Sukun policy is Rp 7,180,000.00 while using EOQ method is Rp 6.497.440,25 so it can be calculated the difference is Rp 682.559,75 or 9,51%. In 2015 the total cost of raw material inventory is based on the PR Sukun policy is Rp 8,010.000,00 while using EOQ method is Rp 7,356,535,48 so it can be calculated the difference of Rp 653,464,52 or equal to 8,16%. In 2016 the total cost of raw material inventory is based on the PR Sukun policy is Rp 8.141.250,00 whereas when using EOQ method is Rp 7.541.072,11 so it can be calculated the difference of Rp 600.177,89 or equal to 7.37%. Efficiency on total cost of tobacco raw material inventory is influenced by raw material quantity efficiency and frequency efficiency of raw material purchase based on EOQ method. If the quantity of raw material purchase and frequency is more efficient then it will be followed by efficiency in total cost of raw material inventory. Then will be presented about the ratio of total costs issued PR. Sukun in the purchase of raw materials of tobacco which

includes the cost of purchasing raw materials coupled with the total cost of raw materials inventory between the PR. Sukun policy with EOQ method. Furthermore, it can be seen the comparison of total costs incurred in the purchase of raw materials of tobacco between the PR. Sukun policy with EOQ Method as follows:

Table 8

Comparison of Total Costs Expended in the Purchase of Tobacco Raw Materials between PR. Sukun policy with EOQ Method

Year	PR. Sukun Policy	EOQ Method	Difference	%
2014	488.562.500	428.170.615,30	60.391.884,70	12,36
2015	467.793.500	419.361.277,48	48.432.222,52	10,35
2016	497.195.250	456.572.072,10	40.623.177,90	8,17

Source : Primary data processed, 2017

From the table above can be seen that the total cost of raw materials based on EOQ method is lower when compared with the policy of PR. Sukun, there is a difference of Rp 60,391,884.70 or 12.36% in 2014. In 2015 the difference is Rp 48,432,222.52 or 10.35%. And in 2016 the difference is Rp 40,623,177.90 or 8.17%. This is influenced by the quantity of purchases on the EOQ method is smaller than the company policy and by the decrease in inventory costs after using the EOQ method. If PR. Sukun continues to use its policy and does not change the method of controlling raw materials by using EOQ method, then the cost efficiency of purchasing raw material is less than the maximum.

5. CONCLUSION AND FUTURE ENHANCEMENT

Based on the results of research on controlling the supply of raw materials of tobacco in order to achieve total inventory cost efficiency, the authors can draw the following conclusions:

1. Using the Economical Order Quantity (EOQ) method, the quantity of tobacco material purchases can be more efficient when compared to the PR policy. Sukun. The level of efficiency that can be achieved in 2014 is 12.57%, in 2015 was 11.62% and in 2016 was 8.25%. Although there is efficiency in the quantity of raw materials but the security of raw material availability is more secure because it has been taken into account the existence of safety stock to avoid the lack of raw materials so that the production process is not disturbed.
2. Using the Economical Order Quantity (EOQ) method, the total inventory cost achieved can be more efficient than the total raw material inventory cost incurred by the PR. Sukun. The total efficiency of inventory cost in 2014 was 9.57% in 2015 was 8.16% and in 2015 was 7.37%. Efficiency in total raw material inventory cost is influenced by the efficiency of raw material ordering cost caused by reduced frequency of ordering of raw materials.
3. By using the Economical Order Quantity (EOQ) method, the costs incurred for the purchase of raw materials can be more efficient. The level of efficiency that can be achieved is 12.36% in 2014, amounting to 10.35% in 2015, and by 8.17% in 2016. The achievement of this efficiency is influenced by the efficiency in the cost of purchasing raw materials caused by the reduced the quantity of raw materials purchased and the efficiency in the total cost of raw material inventory achieved when using the EOQ method.

Based on the results of the research conclusions described above, it shows that using EOQ method is more efficient when compared with the policy of PR. Sukun. Therefore, researchers provide some suggestions that can be used as input for consideration for the PR. Sukun for the company to get a higher level of efficiency by using this EOQ method, that is by:

1. In controlling the supply of raw materials of tobacco should PR. Sukun uses EOQ method. For the implementation of the next period, the company should forecast raw material requirements so that it can know the estimated use of raw materials needed during the production process for the next period. EOQ method will help companies in managing the quantity and frequency of optimal raw material purchases. However, to note is the company must still take into account the safety stock so that the occurrence of shortages of raw materials can be avoided.
2. To achieve efficiency in the cost of raw materials inventory, which can be done by the company is by reducing the frequency of purchase. But with so the quantity of material purchases in one message will be greater so that sufficient working capital is required. In addition, by reducing the cost of raw material storage is done by keeping the amount of raw materials stored in the warehouse not to overstock. Because if it happens the company must spend more in terms of storage of raw materials.
3. To achieve efficiency in costs incurred for the purchase of raw materials is to make efficiency on the cost of purchasing raw materials and raw material inventory costs. Determining the exact quantity of purchases is what needs to be done. Using the EOQ method is one way that companies can do to determine the optimal quantity and frequency. With the optimal quantity and frequency then the total cost efficiency of raw material inventory can also be achieved.

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