IMPLEMENTING ECONOMIC ORDER INTERVAL FOR MULTI ITEM TO REDUCE TOTAL INVENTORY COST

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ABSTRACT

Nowadays, Inventory management has become a major concern for company because it can bring value added. Inventory management focused on maintaining and managing the inventory level in order to fulfill the customer demand with the lowest cost. In retailing and wholesaling, multi items from the same supplier are jointly ordered. This mean, the order interval of each item must be the same. But, there are several manufacturing companies that have not achieving the optimum solution in inventory management for multi items. It leads the company to increase the total inventory cost. Most of them are caused by the improper order interval. Thus, appropriate of inventory management may reduce the total inventory cost. This research tried to identify this problem. The first step that should be done is by identifying the problems, scopes, and objectives of the research which aimed to minimize the inventory control management. Then collecting data and analyzing the supported data in inventory management. By using the total inventory cost analysis as a parameter in comparing the actual system and the proposal system. This research also used forecasting methodology in order to predicting the future demand. In the final section is by implementing the Economic Order Interval in ordering process for determining the optimum order interval. The result in this thesis show that the proposal system can reduce the total inventory cost over 21% from the current condition.

Keywords : *Inventory control and management, multi-item, Economic Order Interval, total inventory cost, forecasting.*

I. INTRODUCTION

Nowadays, the business competition is getting harder. The companies compete to one another in order to show their strength in quality and service. Due to survive in the Business competition, the companies should give their best performance. Beside the customer, satisfaction has become the major concern for company. The criteria of customer satisfaction are on-time delivery, product quality, and price. Based on that qualification, the company challenged to have continuous improvements in every aspect to reduce the total cost. One of its aspects is inventory management (Ballou, 1996).

PT. X is one of developing chemical industry in Cikarang. It runs on manufacturing chemical product for wet processing in textile industry. PT. X has five major group of products, there are pretreatment products, printing products, dyeing products, finishing products and others. There are two main process in PT.X, there are blending process and simple mixing. Blending process is manufacturing process that need high pressure and longer time using boiler. Simple mixing is manufacturing process using mixer

In this research, the observation was performed for finishing products with the higher demand than others product group. The finishing products consist of Silofin Hals-B, Silofin Ham, Silofin AM25E, Finisoft RWT Pasta, Finisoft NIT, Lubric WE and Fillant SH.

The inventory is important for some reasons. For example, for economical reason. By purchasing the raw material in big scale, it can save the cost in purchasing, ordering or transportation. Other reasons are for balancing supply and demand, price protection, uncertainty demand, etc (Lambert, et al, 1998, and Muller, 2003).

In retailing and wholesaling, ordering process for multi items from the same supplier is done by a joint order. In order to do joint order, the order interval for all items must be the

same. Therefore, determining the right order interval will minimize the inventory cost for a group as whole (Sipper and Buffin, 1997).

After doing the observation, it was found that the number of order occurrences of each product was different.It is made high ordering cost that could increase the total inventory cost. The total inventory cost is increasing by 2% every year. In addition, the order interval of each product was different. Therefore, the ordering process cannot do in joint order. Thus, appropriate inventory management should be proposed in order to reduce the total inventory cost without neglecting the customer satisfaction.

II. METHODS

A. Initial Observation

The first step of this research is initial observation. The purpose of initial observation is to gather information about the current condition happened in company. Firstly, the author did observation in the area that will be focusing in this research. After determine the area that will be focused in this research, then observation and direct interview technique is used to gather the information and data needed. The direct interview with the supervisor and some staff needed to get more information.

B. Problem Identification

The next step is identifying the problem. After gathering the information and data needed during the initial observation, the author found that the number of order occurrence between one and another product was different. The ordering process could not do in joint order. Therefore, the ordering cost is high and the impact is higher total inventory cost. According to the observation, it was found that PT. X does not use any inventory management method in determining the order interval. The order interval of each item is different. Thus, the ordering process cannot be performed in a joint order. This situation may cause the increasing of total inventory cost.

C. Literature Study

Inventory management has become a major concern in business activity. The purpose of inventory management is maintaining and managing the inventory level in order to fulfill the customer demand with the lowest cost. According to inventory principle, the fewer inventories that company has, the less cost that will be spend. However, inventory is needed in order to cover the demand during lead-time and become a buffer if the demand suddenly increases. Therefore, company should has a good inventory management.

1. Peterson Silver Rule

In order to measure the lumpiness of demand, Peterson and Silver propose a method called Peterson-Silver Rule **(**Terzine, 2000**).** The formula is:

$$V = \frac{n \sum_{t=1}^{n} D_t^2}{(\sum_{t=1}^{n} D_t)^2} - 1 \quad (1)$$

where:

D_t = Demand per period
n = Horizon period length

Peterson and Silver determine the condition for lumpiness test:
If $V < 0.25$ then, the demand is not lumpy. Thus, use static lot sizing.
If $V \geq 0.25$ then, the demand is lumpy. Thus, use deterministic lot sizing.

2. Economic Order Interval

The objective of Economic Order Interval is to determine the optimum order interval in order to minimize the total inventory cost.The formula of EOI is:

$$T^* = \sqrt{\frac{2(C + nc)}{F \sum_{i=1}^{n} P_i R_i}} \tag{2}$$

where:

R_i = annual requirement for item i,
P_i = purchase cost of item i,
N = total number of joint order item,
C = order cost for the joint order,
c = order cost associated with each individual item,
T = order interval in years,
F = annual holding cost as a fraction of purchase cost.

In deterministic situation, there is no difference between the fixed order size system and the fixed order interval. The order quantity for fixed order interval is:

$$Q_i^* = R_i T^* \tag{3}$$

where:

Q_i^* = Order quantity for item i,
T^* = Optimum order quantity.

In order to satisfy the customer demand, the maximum inventory for each item must be large enough. Therefore, the maximum number of inventory must be set.The formula is:

$$E_i = \frac{R_i(T^* + L)}{N} \tag{4}$$

where:

E_i = maximum inventory for item i,
L = lead time,
N = operating day in year.

***3.* Forecasting**

Forecasting is the prediction, projection or estimation of the occurrences of uncertain future events or level of activity (Tersine, 1994). In today's market, forecasting is more important ever to predict or estimate future demand. Forecasting is very crucial; it could bring high rewards as well as high penalties. By using personal computer package, forecasting is easier and cheaper than ever, but the understanding of the forecasting principles is still a requirement. After all, the program would give an answer, even it is bad. For forecasting the future demand, independent demand is needed. In contradiction, the dependent demand, such as components, could not be forecasted since the demand is related to another demand. Thus, in order to calculate the dependent demand, the demand of end item of dependent product (independent demand) should be forecasted.

a. Forecast Method

i. Simple average (SA)

Simple average is simply the average of all of previous period's actual data value. The formula of this methodology is:

$$F_{t+k} = \frac{1}{N}\sum_{n=1}^{N} A_n \tag{5}$$

where:

F_{t+k} = forecast for time period $t+k$,
A_n = actual demand with period n,
N = number of time periods.

ii. Moving Average (MA)

Moving average is a forecasting methodology where summing up the value of demand in the last period. This methodology used several values from the last period for predicting the demand in the future time. This methodology is suitable for predicting items which has a stable distribution and does not show the special pattern such as trend pattern, cycles, and seasonal.

- **Simple Moving Average (SMA)**

  While simple average uses data from all of previous period, a moving average forecast uses a number of the most recent actual data values. The formula of this methodology is:

$$F_{t+k} = SMA_n = \frac{1}{n}\sum_{m=0}^{n} A_{t-m} \tag{6}$$

  where:

  F_{t+k} = forecast for time period $t+k$,
  SMA_n= simple moving average with n periods,
  A_{t-m} = actual demand with period $t - m$,
  n = number of periods in moving average.

- **Weighted moving average (WMA)**

  A weighted average is similar to a simple moving average but in weighted moving average, weight could be assigned to the most recent values in time series. The formula of this methodology is:

$$F_{t+k} = WMA_n = \frac{\sum_{m=0}^{n} \omega_{t-m} \cdot A_{t-m}}{\sum_{m=0}^{n} \omega_{t-m}} \tag{7}$$

  where:

  F_{t+k} = forecast for time period $t+k$,
  WMA_n= weighted moving average with n periods,
  ω_{t-m} = weight for each period t-m,
  A_{t-m} = actual demand with period t-m,
  n = number of periods in moving average.

b. Forecast Measurement

i. Mean Absolute Deviation (MAD)

MAD places equal weight on all errors. The lower value of MAD, the more accurate the forecast. The formula is:

$$MAD = \frac{\sum|Actual - Forecast|}{n} \tag{8}$$

ii. Mean Square Error (MSE)

MSE is average quadratic of forecast error. The formula is:

$$MSE = \frac{\sum(Actual - Forecast)^2}{n} \tag{9}$$

iii. Mean Absolute Percent Error (MAPE)

MAPE measures the absolute error as a percentage of actual value rather than per period. It avoids the problem of interpreting the measure of accuracy relative to the magnitudes of the actual and the forecast value. The formula is:

$$MAPE = \frac{\sum|Actual - Forecast|}{\sum Actual} \times 100\% \tag{10}$$

c. Tracking Signal

Tracking signal measures whether the forecast is statistically in control in actual value. A tracking signal is computed for each period, with cumulative forecast error (CFE) divided by MAD.

$$Tracking\ Signal = \frac{\sum(Actual - Forecast)}{MAD} \tag{11}$$

Positive tracking signal shows that the actual value is greater than forecast value, and the other side, negative tracking signal shows that the actual value less than forecast value. A tracking signal called good tracking signal if have low CFE and a balance number of positive and negative tracking signal. Tracking signal is called in control if the tracking signal have value within ± 4 which corresponds roughly to three standard deviation.

D. Data Collection

The next step is collecting necessary data for this research. The historical data were taken from January 2012 until December 2012 as shown as table 1 below.

1. **Products Demand**

Table 1. Products Current Demand from January to December 2012

	Silicone Softener			Organic Softener			Filler
Month	Silofin Hals-B	Silofin Ham	Silofin AM25E	Finisoft RWT Pasta	Finisoft NIT	Lubric WE	Fillant SH
Jan	1,240.00	1,030.00	5,950.00	17,450.00	11,250.00	6,850.00	20,350.00
Feb	1,850.00	1,540.00	6,650.00	12,400.00	9,860.00	7,780.00	17,350.00
Mar	1,050.00	880.00	6,350.00	16,700.00	12,450.00	6,570.00	22,140.00
Apr	1,750.00	1,460.00	7,100.00	20,510.00	10,200.00	7,650.00	18,360.00
May	920.00	730.00	7,520.00	14,820.00	13,200.00	6,320.00	17,030.00
Jun	1,650.00	1,380.00	6,850.00	18,670.00	10,200.00	7,480.00	23,150.00
Jul	1,100.00	920.00	7,150.00	15,420.00	11,530.00	6,650.00	16,050.00
Aug	2,230.00	1,520.00	6,350.00	17,250.00	9,250.00	8,620.00	20,120.00
Sep	1,100.00	1,250.00	6,750.00	19,750.00	12,050.00	6,250.00	15,850.00
Oct	1,520.00	890.00	5,850.00	12,650.00	10,100.00	7,050.00	22,100.00
Nov	900.00	1,350.00	7,450.00	16,800.00	8,340.00	6,550.00	16,350.00
Dec	1,300.00	920.00	7,150.00	18,520.00	12,300.00	6,850.00	19,350.00
Total	16,610.00	13,870.00	81,120.00	200,940.00	130,730.00	84,620.00	228,200.00

From the product demand data, the total requirementraw materials can be determined. The calculation for raw materials requirement will be explained in the next sub chapter.

2. Product Composition

The raw materials requirement can be calculated using product composition. The product composition is shown in Table 2.

Table 2. Composition of Each Product

Raw Material	Silofin Hals-B	Silofin Ham	Silofin AM25E	Finisoft RWT Pasta	Finisoft NIT	Lubric WE	Fillant SH
RMN006	20%	25%					
RMF001	10%	10%	10%	15%	10%	10%	
RMF003	10%	5%	5%	15%	5%	5%	5%
RMF005				30%	25%		
RMS002						30%	
RMS25E			30%				
RME005							25%
RML019							15%
RMF06S							10%
RMA001	60%	60%	55%	40%	60%	55%	45%
Total	100%	100%	100%	100%	100%	100%	100%

3. Inventory Cost

Total inventory cost is the sum up of ordering cost and holding cost. In this section, the total inventory cost will be explained.

a. Ordering Cost

Ordering cost is the expenses for processing an order from supplier. In PT. X, there are two kinds of ordering cost, which are:

- Ordering cost associated with each individual item, which consists of:
  Shipping : 100,000
  Receiving : 25,000
  Communication : 20,000
  Administration : 5,000
  Total ordering cost per item per order is IDR 150,000.
- Ordering cost for joint order is IDR 500,000.
  This cost incurred due to the certain amount of two or more items where the cost of ordering single item cannot be logically used for multi item. The cost for joint order covers documents such as invoice, bill of landing, insurance certificate, and inspection certificate.

b. Holding Cost

Holding cost is the cost to hold the goods for a certain time. It consists of:

- Warehouse Expense, 3% of purchasing cost
- Cost of capital, 6% of purchasing cost
- Tax and Insurance, 6% of purchasing cost.
- Damage and Obsolescence, 5% of purchase cost.

The total holding cost is 20% of purchasing material per year.

E. Data Calculation and Problem Analysis

After gathering supporting data that needed in this research, the next following step is calculating the data. Several steps used in data calculation, there are:

- Calculating the aggregate of raw material using demand data.
- Calculating current total inventory cost (ordering cost and holding cost).
- Measuring the demand pattern lumpiness using Peterson-Silver Rule.
- Applying Economic Order Interval as inventory management system to determine optimum order interval.
- Calculating the optimum order interval using Economic Order Interval.
- Calculating the order quantity and maximum inventory for each item.
- Calculating the total inventory cost using proposed method.
- Comparing the total inventory cost of current and proposed method.
- Plotting the demand data to know the demand pattern.
- Forecasting the current demand for future planning.
- Calculating the aggregate of raw material for future planning.
- Calculating total inventory cost for the future planning.
- Analyzing the problem, current and proposed system.

III. RESULT AND DISCUSSION

A. Current Inventory Cost

1. Aggregate Raw Material

From the product demand and product composition data, the raw materials needs can be determined.The aggregate of raw materials requirement can be seen in Table 3.

Table 3. Aggregate of Raw Material Needs

Month	Raw Material (Kg)				
	RMN006	RMF001	RMF003	RMF005	RMS002
Jan	505.50	5,249.50	5,013.00	8,047.50	2,055.00
Feb	755.00	4,628.00	4,204.00	6,185.00	2,334.00
Mar	430.00	5,235.00	5,029.50	8,122.50	1,971.00
Apr	715.00	5,892.50	5,490.00	8,703.00	2,295.00
May	366.50	5,092.00	4,555.00	7,746.00	1,896.00
Jun	675.00	5,556.50	5,418.50	8,151.00	2,244.00
Jul	450.00	5,048.00	4,538.00	7,508.50	1,995.00
Aug	826.00	5,384.50	5,103.50	7,487.50	2,586.00
Sep	532.50	5,702.50	5,180.00	8,937.50	1,875.00
Oct	526.50	4,438.50	4,349.00	6,320.00	2,115.00
Nov	517.50	4,979.00	4,612.00	7,125.00	1,965.00
Dec	490.00	5,630.00	5,236.50	8,631.00	2,055.00
Total	6,789.50	62,836.00	58,729.00	92,964.50	25,386.00

Table 3.Aggregate of Raw Material Needs (Cont.)

Month	Raw Material (Kg)				
	RMS25E	RME005	RML019	RMF06S	RMA001
Jan	1,785.00	5,087.50	3,052.50	2,035.00	31,289.50
Feb	1,995.00	4,337.50	2,602.50	1,735.00	28,654.00
Mar	1,905.00	5,535.00	3,321.00	2,214.00	32,377.00
Apr	2,130.00	4,590.00	2,754.00	1,836.00	32,624.50
May	2,256.00	4,257.50	2,554.50	1,703.00	30,113.50
Jun	2,055.00	5,787.50	3,472.50	2,315.00	33,705.00
Jul	2,145.00	4,012.50	2,407.50	1,605.00	29,110.50
Aug	1,905.00	5,030.00	3,018.00	2,012.00	31,987.50
Sep	2,025.00	3,962.50	2,377.50	1,585.00	30,822.50
Oct	1,755.00	5,525.00	3,315.00	2,210.00	29,606.00
Nov	2,235.00	4,087.50	2,452.50	1,635.00	28,131.50
Dec	2,145.00	4,837.50	2,902.50	1,935.00	32,527.50
Total	24,336.00	57,050.00	34,230.00	22,820.00	370,949.00

The data show the aggregate of raw materials demand from January to December 2012 in order to fulfil customer demand. These data are used to calculate the total inventory cost in the next sub chapter.

2. Current Total Inventory Cost for Current Demand

The current total cost will be used as a parameter for the proposed inventory model. By using the data from company, the author can find the current total cost of inventory as explained in Table 4.

Table 4. Current Total Inventory Cost

Item	Demand in year	Order Occurance (Time)	Ordering Cost (IDR)	Holding Cost (IDR)	Total Cost (IDR)
i	Ri	(*T*)	(n.c)		
RMN006	6,789.50	12	1,800,000.00	212,171.88	2,012,171.88
RMF001	62,836.00	21	3,150,000.00	1,346,485.71	4,496,485.71
RMF003	58,729.00	36	5,400,000.00	938,032.64	6,338,032.64
RMF005	92,964.50	24	3,600,000.00	2,517,788.54	6,117,788.54
RMS002	25,386.00	16	2,400,000.00	1,427,962.50	3,827,962.50
RMS25E	24,336.00	33	4,950,000.00	811,200.00	5,761,200.00
RME005	57,050.00	64	9,600,000.00	579,414.06	10,179,414.06
RML019	34,230.00	30	4,500,000.00	1,540,350.00	6,040,350.00
RMF06S	22,820.00	58	8,700,000.00	590,172.41	9,290,172.41
RMA001	370,949.00	72	10,800,000.00	437,925.90	11,237,925.90
				Total	65,301,503.65

The total inventory cost for current condition is IDR 65,301,503.65.

B. Proposed Inventory Management Calculation

1. Demand Pattern Lumpiness

Before determining the proposed inventory management, the demand pattern needs to be determined whether it is static or dynamic by using formula (1).

Table 5. Demand Pattern Lumpiness using Peterson-Silver Rule

No.	Product	*V*
1.	Silofin Hals B	0.08
2.	Silofin Ham	0.06
3.	Silofin AM25E	0.01
4.	Finisoft RWT Pasta	0.02
5.	Finisoft NIT	0.02
6.	Lubric WE	0.01
7.	Fillant SH	0.02

From table 5 above, it can be concluded that the demand pattern (*V*) is static because the value of *V* is less than 0.25.

2. Economic Order Interval for Current Condition

Before calculating the total inventory cost, fixed order interval should be determined using the formula (2), Economic Order Interval for the current situation is12 times or once a month.The order quantity per item using formula (3).The maximum inventory for each item must be large enough to satisfy demand during the lead time (*L)*, which is known to be one month using formula (4). The summary of maximum inventory for each item is listed in table 6.

Table 6. Order Quantity and Maximum Inventory using EOI

Item	Q_i^*	E_i (Kg)
RMN006	565.79	1,131.58
RMF001	5,236.33	10,472.67
RMF003	4,894.08	9,788.17
RMF005	7,747.04	15,494.08
RMS002	2,115.50	4,231.00
RMS25E	2,028.00	4,056.00
RME005	4,754.17	9,508.33
RML019	2,852.50	5,705.00
RMF06S	1,901.67	3,803.33
RMA001	30,912.42	61,824.83

3. Proposed Total Inventory Cost for Current Demand

After calculating the optimum order interval, the result is used to calculate the proposed total inventory cost. Since the order interval between one and another item is the same, the materials are ordered jointly. The detailed calculation can be seen in table 7.

Table 7. Proposed Total Inventory Cost

Item	Demand in year	Order Occurance (Time)	Ordering Cost (IDR)	Holding Cost (IDR)	Total Cost (IDR)
i	Ri	(T)	(n.c)		
RMN006	6,789.50	12.00	1,800,000.00	212,171.88	2,012,171.88
RMF001	62,836.00	12.00	1,800,000.00	2,356,350.00	4,156,350.00
RMF003	58,729.00	12.00	1,800,000.00	2,814,097.92	4,614,097.92
RMF005	92,964.50	12.00	1,800,000.00	5,035,577.08	6,835,577.08
RMS002	25,386.00	12.00	1,800,000.00	1,903,950.00	3,703,950.00
RMS25E	24,336.00	12.00	1,800,000.00	2,230,800.00	4,030,800.00
RME005	57,050.00	12.00	1,800,000.00	3,090,208.33	4,890,208.33
RML019	34,230.00	12.00	1,800,000.00	3,850,875.00	5,650,875.00
RMF06S	22,820.00	12.00	1,800,000.00	2,852,500.00	4,652,500.00
RMA001	370,949.00	12.00	1,800,000.00	2,627,555.42	4,427,555.42
Cost for Join Order		12.00	6,000,000.00	-	6,000,000.00
				Total	50,974,085.63

From the Table 7, the total inventory cost for proposed inventory model is IDR 50,974,085.63

4. Total Inventory Cost Comparison

In this section, the current total inventory cost will be compared with the proposed inventory cost. The proposed inventory cost should have the lower cost than the current cost. The detailed comparison can be seen in table 8.

Table 8. Total Inventory Cost Comparison of Current and Proposed system

	Current system	Proposed system
Ordering Cost (IDR)	Rp 54,900,000.00	Rp 24,000,000.00
Holding Cost (IDR)	Rp 10,401,503.65	Rp 26,974,085.63
Total (IDR)	Rp 65,301,503.65	Rp 50,974,085.63

Percentage	21.94%

From table 8, it can be concluded that the proposed inventory model is better than the current model. Economic Order Interval succeeds in reducing the total inventory cost by determining the optimum order interval, so the raw material can be ordered jointly. Furthermore, by using proposed system, the company could save IDR 14,327,418.02 or save more than 21% of the cost as can be seen in figure 1.

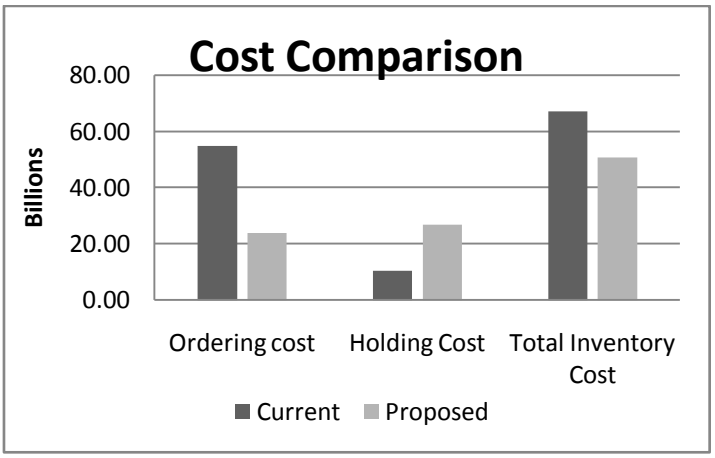

Figure 1.Inventory Cost Comparison of current and proposed system.

C. Future Planning

1. Forecasting Calculation

From the forecast calculation, tracking signal is used as forecast method validation. Then, the valid forecast method that has the smallest value of MSE will be chosen as the best forecast method. The Summary of best forecast method for each product can be seen in table 9.

Table 9. Best Forecast Methods for Each Product

Product	Forecast Method
Silofin Hals-B	2-MA
Silofin Ham	4-MA
Silofin AM25E	2-MA
Finisoft RWT	4-MA
Finisoft NIT	SA
Lubric WE	SA
Fillant SH	SA

Those methods could only forecast one period. The result for the next period would be the same since the demand pattern is static.

2. Future Demand

As stated in the previous sub chapter that the data is static, the forecast result for several months will be the same. From the best forecast methods, the future products demand can be shown as table 10.

Table 10. Future Demand for January 2013

Product	Demand
Silofin Hals-B	1,100.00
Silofin Ham	1,102.50
Silofin AM25E	7,300.00
Finisoft RWT Pasta	16,930.00
Finisoft NIT	10,894.17
Lubric WE	7,051.67
Fillant SH	19,016.67

From the data in table 10 and product composition, the future raw materials requirement can be calculated and the aggregatecan be seen as table 11.

Table 11. Aggregate of Raw Material needs for January 2013

Item	Quantity (Kg)
RMN006	495.63
RMF001	5,284.33
RMF003	4,917.75
RMF005	7,802.54
RMS002	2,115.50
RMS25E	2,190.00
RME005	4,754.17
RML019	2,852.50
RMF06S	1,901.67
RMA001	31,080.92

The data above shows the aggregate of raw materials demand from January 2013 and will be used for calculating the total inventory cost for future planning.

3. Economic Order Interval for Future Planning

From the data above, the total inventory cost for future planning can be calculated. Before calculating the total inventory cost, the optimum order interval should be determined. The EOI calculation can be seen below.

From the inventory cost data, the holding cost for one year is 20%, but in this case, the inventory cost will be calculated monthly. Thus, the holding cost for one month is:

$$F = \frac{20\%}{12}$$
$$F = 1{,}7\ \%$$

By using the formula in (2), Economic Order Interval for the future planning is once a month.

4. Total Inventory Calculation

After calculating the optimum order interval, the next step is to calculate total inventory cost for future planning. The detailed calculation can be seen in table 12.

Table 12. Total Inventory Cost for Future Planning

Item i	Demand (Kg) Ri	Order Occurance (Time) (*T*)	Ordering Cost (IDR) (n.c)	Holding Cost (IDR)	Total Cost (IDR)
RMN006	495.63	1	150,000.00	15,488.28	165,488.28
RMF001	5,284.33	1	150,000.00	198,162.53	348,162.53
RMF003	4,917.75	1	150,000.00	235,642.21	385,642.21
RMF005	7,802.54	1	150,000.00	422,637.72	572,637.72
RMS002	2,115.50	1	150,000.00	158,662.58	308,662.58
RMS25E	2,190.00	1	150,000.00	200,750.00	350,750.00
RME005	4,754.17	1	150,000.00	257,517.41	407,517.41
RML019	2,852.50	1	150,000.00	320,906.31	470,906.31
RMF06S	1,901.67	1	150,000.00	237,708.38	387,708.38
RMA001	31,080.92	1	150,000.00	220,156.53	370,156.53
Cost for Join Order		1	500,000.00	-	500,000.00
				Total	4,267,631.93

As seen in table 12, the total inventory cost for January 2013 is IDR 4,267,631.93

IV. CONCLUSION

The results of this research are:

- The order interval is calculated using Economic Order Interval method. The ordering process is performed as a joint order. It reduces the ordering cost to 56%.
- The total inventory cost for proposed system can be reducedby21% of current total inventory cost. The company could save IDR 14,327,418.02.

The future studies regarding this topic is needed in order to give better development and improvement in more complex situation and condition or to be integrated by implementing integrated inventory management software for ordering process in the right time and quantity.

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