Efficiency of Raw Material Steel Inventories in Improving Supply Chain Performance at Honda Trading Indonesia

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Abstract—The production and number of processed automotive industries have slightly increased; as a result, the companies must compete to maximize their profits by conducting their efficient production process. PT. Honda Trading Indonesia is belong to Honda Motor group company, especially in support import material such as Raw Material and Parts that has implemented supply chain management. It is necessary for the company to take measurements of its performance and efficiency for the entire supply chain such as procurement of raw materials. The purposes of this study were to analyze the performance of the company’s supply chain and determine the most efficient method of procurement for its raw materials as well as to provide recommendations for the company to improve its performance of entire supply chain. This study used SCOR in analyzing the performance of supply chain and EOQ and POQ method to be compared with the method that the company uses to determine which method of procurement for raw materials is the most efficient one. The result showed that based on the matrix, the company's performance is unfavorable when it was compared to the benchmark performance of inventory days of supply.

Keywords—performance supply chain, SCOR, EOQ, POQ

I. INTRODUCTION

Facing strong competition from both overseas steel industries and domestic mini-mills which take advantage of newer technology and lower costs, integrated steel companies exist within an economic environment suffused with strong competition, shrinking markets and lagging long-term profitability. This highly competitive global steel market makes the old topic, cost reduction, generalized widely. Since carrying inventories for various reasons can cost the steel companies anywhere from 20 to 40% of their value a year, inventory management, which has been called and quite fairly so, one of the classics in operation management literature during the last few decades, has recently been the focus of attention. Since raw material inventories account for the largest part of the inventories in the iron and steel industry, mini-mizing them in a quantitative manner is of vital economic significance. Thus, improving the management level of raw material inventory is clearly of extreme importance.

The raw material inventory problem studied in this paper is to determine the fixed order size and fixed interval of the replenishment process for each material based on the minimization of the total cost attributed to raw material inventories. This inventory problem arises from the production of PT. Honda Trading Indonesia. PT. Honda Trading Indonesia is not only the largest and most advanced iron and steel
enterprise in China, but also one of the most profitable steel enterprises in the world enjoying international competence. Its annual production consists of over 20 million tonnes of steel, and its auto sheet accounts for more than 60% of the domestic market share. Therefore, each year it must consume large quantities of raw materials, for example, about 17,960,000 tonnes of iron ore per year. Obviously, the replenishment of raw materials in PT. Honda Trading Indonesia is a matter of great significance.

After an investigation that dealt with the issue of managing raw material inventories in PT. Honda Trading Indonesia has been made, we find it convenient to describe the entire process of raw material inventory management in PT. Honda Trading Indonesia using Figure 1. When the demand plan of raw materials submitted by the production department is received, the raw material control centre, which is responsible for raw material inventory management, will set corresponding inventory policies to provide guiding principles for the purchasing department. The main purpose of our research is to help the raw material control centre determine the optimal order interval and inventory level for each material.

However, generating an efficient raw material inventory plan for a large steel company is not an easy task for several reasons. First, the raw material inventory problems derived from iron and steel production are new and important research topics, which are seldom considered in previous researches. Although similar problems have been studied and solved, the effort required to find better plans for problems with different backgrounds may vary considerably. Therefore, they still deserve studying carefully. Second, the problem is characterized by large production demands, high inventory costs, no stockout, limited inventory capacities, finite storage time for some kinds, etc. These features that are often disregarded add extra difficulties to the inventory problem under our consideration. Moreover, in order to ensure the continuity of production, large inventories usually have to be maintained to compensate for the unexpected demand fluctuations as well as variability in the replenishment process. In view of these facts, how to best balance raw material inventory and production demands under capacity constraints in the iron and steel industry becomes a difficult task.

For the convenience of research, a logical grouping concept is introduced in this paper to divide raw materials according to their own properties, which is different from physical grouping that concerns actual storage positions. This grouping principle aims to centralize the scattered inventory capacities of stock yards. It is very helpful to determine the total capacity of these stock yards for each raw material group which consists of raw materials with common properties. To understand it better, the schematic diagrams about the comprehensive stock yard of PT. Honda Trading Indonesia are given in Figures 2–4. This comprehensive stock yard, including stock yard phase I and II and stock yard phase III, is in charge of the centralized management and handling of raw materials, aiming at smooth supplying to the complex. According to the principle of logical grouping, one imaginary auxiliary raw material yard is defined to include all the real auxiliary raw material yards in the PT. Honda Trading Indonesia comprehensive stock yard. The inventory capacity of this imaginary yard is determined to be the total capacities of the real yards included in it. The materials stored in those real yards compose the ‘Auxiliary Raw Material Group’. Since out-of-stock (OOS) will bring enormous losses to PT. Honda Trading Indonesia, it is not allowable here.

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**Figure 1** The institution of the replenishment plan for raw materials.

**Figure 2** Schematic diagram of the comprehensive stock yard.
In the remaining part of the paper, we first review the related works as well as the current state of research concerning inventory. A novel mathematical programming model is then formulated to solve the inventory problem. The solution methodology and the computational results are presented in the following part. The final section concludes our study.

II. METHODS

The primary data were collected from the interviews, direct observations and questionnaires distributed to the general manager, production and operation managers, distributors, and agents of PT. Honda Trading Indonesia. Technique sampling was done by purposive sampling on the basis that the respondents have the experience, expertise and competence so that they were considered to be the representatives in responding the questions in the questionnaire. Interviews were conducted to obtain information and data related to supply chains in the company, among others, the amount of production and sales, amount of supply and distribution as well as partnerships between suppliers and distributors.

This technique was supported by the filling out the questionnaire and field survey to obtain a picture of the implementation of the company supply chain. Direct observations were carried out to determine the condition of the company including mechanisms of raw material procurement, production process flow, and product distribution mechanism. Literature studies provide theoretical information as the reference to achieve the expected goals. The secondary data collection was based on company reports, data preparation and use of raw materials starting from October 2013 to September 2014. The raw material data used in this research were the primary raw materials commonly used in the production process by the company, namely, mechanical debone meat (MDM) and fore quarter chemical lean (FQ85CL).

Matrix Calculation of SCOR Performance

Gomes et al. [1] suggested that performance measurement evolved through two stages where the first phase began in the late 1880s, and the second phase began in the late 1980s. According to Melynk et al. [2], a performance measurement system usually contains: i) individual matrixes; ii) a series of performance matrixes, and iii) a comprehensive performance measurement system. Cagnazzo et al. [3] classifies the basic grouping of performance measurement systems into five models, namely: (1) Balanced Models, (2) Quality Models, (3) Questionnaire-based Models, (4) Hierarchical Models and (5) Support Models. There are 12 matrix performances as parts of the SCOR model to measure the performance process which is classified into: (i) Delivery reliability; (ii) flexibility and responsiveness; (iii) Costs; and (iv) Asset [4]. The parameters measured based on attributes as the performance matrix are as follows:

a. Perfect Order Fulfillment (POF)

POF is the percentage of orders delivered completely and on time in accordance with customer demand and the delivered goods have no quality problem. The following is the formula to determine the value of POF:

\[
POF = \frac{\text{Total Orders Perfect}}{\text{Total Orders}} \times 100\%
\]

b. Order Fulfillment Cycle Time (OFCT)

OFC is the number of days (time) required from the day when the order is received to the day when the product is received by customers. In determining the OFCT value, the average number of days required in the delivery of products to customers can be measured. The following is the formula to determine the value of OFCT:

\[
\text{OFC} = \frac{\text{The actual number of cycle time for all orders sent (days)}}{\text{Total number of orders sent (days)}}
\]

Analysis of ABC Classification

According to Gaspersz [5], there are several stages in the analysis according to the ABC classification:

1. Determining the volume per time period inventory for the classified materials 2). Calculating the total inventory cost per time period by multiplying the volume of inventory at a cost per unit. 3). Calculating the total value of the aggregate inventory of all ingredients. 4). Registering these materials in the ranking of the percentage of the total inventory cost from the largest to smallest amount. 5). Classifying these materials into groups of A, B or C. The use of software POM-QM two versions can also be used to help classify the raw materials into classes of A, B and C. The ABC analysis with software POM-QM can be used by: 1). Clicking and selecting Inventory Module, File, New and ABC Analysis; 2). Entering a title in the Title column and then click OK; 3). Filling in the data in accordance with the data of raw materials owned; and 4). Clicking Solve to see the results of the calculation.

Raw Material Procurement Analysis

Data processing for controlling the supply of raw materials was conducted by using EOQ and POQ methods. Maisuriya and Bhatwala [6] used EOQ method in their research as quantity controller and total cost per unit in which the main objective of the study was to produce a model that could maximize profits. Before performing the analysis, it is necessary to firstly estimate the preparation cost consisting
of order and storage costs by collecting and classifying the components of the storage and order costs in order to get the total cost of raw material supply.

1. The formula to calculate order costs is as follows:

\[ Oc = \frac{SD}{Q} \]

Description:

\( Oc \) = Order cost of raw materials per period
\( S \) = Order cost of raw materials per order in rupiah
\( D \) = Usage or demand estimated per time period
\( Q \) = Number of orders in units

2. The formula to calculate storage cost is as follows:

\[ Ch = \frac{HQ}{2} \]

Description:

\( Ch \) = Total storage cost of raw materials per period
\( Q \) = Average level of inventory
\( H \) = Storage cost per unit per period in rupiah

Total cost of preparation is as follows:

\[ TC = Oc + Ch \]

3. The formula to calculate inventory control of EOQ method is as follows:

a. Determination of Optimum Quantity

\[ EOQ = \frac{E_{OQ}}{R} \]

b. ROP determination without safety preparations

\[ ROP = d \times L \]

4. The formula to calculate inventory control of POQ method is as follows:

a. Interval order determination

\[ EOQ = \sqrt{\frac{2DS}{H}} \]

b. Inventory target determination

\[ R_{poq} = d_t + L + Z_{ai}d_L \]

Description:

\( D \) = Demand per period
\( H \) = Storage Cost

III. RESULTS

Supply Chain Model of PT. Honda Trading Indonesia

PT. Honda Trading Indonesia, in running its production operations (Figure 1), implements supply chain involving various stages from the supplier to the customer chain. The supply chain line is the order process line from raw materials to finished goods. In meeting the needs of its main raw materials in the production process of MDM and FQ85CL, it requires multiple suppliers. This is because the company cannot produce its own raw materials, and resources are limited, and it implements its stock production system of make to stock.

Performance Measurement of Supply Chain System

There are five performance attributes that are used in supply chain performance measurement using the SCOR method including supply chains of reliability, responsiveness, flexibility, costs, and assets. Each performance attribute has its own measurement method i.e. perfect order fulfillment for the reliability performance attribute, order fulfillment cycle time for the responsiveness performance attribute of the supply chain, flexibility of each supplier for the flexibility performance attribute of supply chain cost as well as cash to cash cycle and inventory days of supply for performance attribute of supply chain assets.

The results of performance measurement of supply chain companies based on external and internal measurements using SCOR methods can be seen in Table 1. The measurement results showed that the value inventory days of supply for MDM raw materials is 67 days and above the average benchmark value. Nevertheless, the value is not equal or exceeds the best benchmark value in its class that is 55 days, whereas for FQ85CL raw materials, the value of inventory days of supply is 88 days in which the value is worse when compared with the target of an average benchmark in its class that is 84 days. These results indicate that there are excessive inventories for FQ85CL raw materials.

These excessive raw materials resulted in rising storage costs incurred by the company so that it reduced its profits earned.
Analysis of ABC Classification

ABC classification analysis is an analytical tool that is used for companies to classify supply based on their level of importance. The product cost is the deciding factor used in the classification of the ABC analysis. The product cost is obtained by multiplying the amount of demand for raw materials at a price per unit. The ABC analysis result using POM-QM software showed that there are two raw materials with the highest inventory value with the cumulative percentage of 67.36% i.e. fore quarter (FQ85CL) (54.251%) and mechanical deboned meat (MDM) (13.111%) with the percentage of usage included in class A.

Analysis of Raw Material Supply

Order cost is a fee that is required each time the supply is made by the company. Storage cost is a cost that must be incurred by the company in the process of storage of raw materials. In its main procurement of raw material i.e. MDM and FQ85CL, the company places an order in accordance with the number of orders required, in which the quantity of MDM raw materials supply is as much as 2.405 kg for one time order and that of FQ85CL raw materials is as much as 2.047 kg for one-time order. By the quantity of the order, in one period the company places 68 times and 39 times of orders for MDM raw materials and FQ85CL raw materials respectively (Table 2).

Calculation of inventory using EOQ method was analyzed using POM-QM software for windows second version (Production and Operations Management, Quantitive Methods). The optimal quantity of raw materials MDM is as much as 9.252 kg, while the quantity of optimal order for FQ85CL raw materials is as much as 1.126 kg. By knowing the optimal quantity, the number of estimated orders can be calculated by dividing the usage value of D and optimum Q. The calculations showed that the number of orders for MDM raw materials is as much as 18 orders per year.

Figure 3. Supply chain model of PT. Honda Trading Indonesia

<table>
<thead>
<tr>
<th>Performance attribute of supply chain</th>
<th>Level 1 matrix</th>
<th>Actual (a)</th>
<th>Best in class (b)</th>
<th>Average (c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>Perfect order fulfillment</td>
<td>90.1%</td>
<td>92.4%</td>
<td>65.7%</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Order fulfillment cycle</td>
<td>4 days</td>
<td>1.8</td>
<td>4</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Flexibility of supply chain</td>
<td>99%</td>
<td>99%</td>
<td>N/A</td>
</tr>
<tr>
<td>MDM Suppliers</td>
<td>Rp2,384,201.105</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>FQ85CL</td>
<td>Rp4,790,987.669</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>Inventory Cost</td>
<td>MDM</td>
<td>FQ85CL</td>
<td></td>
</tr>
<tr>
<td>MDM</td>
<td>Rp2,384,201.105</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>FQ85CL</td>
<td>Rp4,790,987.669</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Assets</td>
<td>Inventory Days of Supply</td>
<td>MDM</td>
<td>FQ85CL</td>
<td></td>
</tr>
<tr>
<td>MDM</td>
<td>67 days</td>
<td>55 days</td>
<td>84 days</td>
<td></td>
</tr>
<tr>
<td>FQ85CL</td>
<td>88 days</td>
<td>88 days</td>
<td>88 days</td>
<td></td>
</tr>
<tr>
<td>Cash to Cash Cycle</td>
<td>MDM</td>
<td>FQ85CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDM</td>
<td>67 days</td>
<td>35.6 days</td>
<td>99.4 days</td>
<td></td>
</tr>
<tr>
<td>FQ85CL</td>
<td>72 days</td>
<td>99.4 days</td>
<td>99.4 days</td>
<td></td>
</tr>
</tbody>
</table>
In the company, EOQ method produces fewer orders for MDM raw materials compared with the number of orders that has been made by the company. Nevertheless, the EOQ and POQ methods on MDM raw materials when adjusted with a storage capacity of raw materials in the company cannot be applied because the storage capacity of the main raw materials (especially meat) only amounted to seven tons. If the company wants to apply POQ or EOQ methods, the company needs to add the storage capacity, and calculation of order and storage cost variables to determine the optimum order quantity have to be carried out. In addition, if the company cannot add storage capacity for its raw materials, the EOQ and POQ methods can still be applied but an adjustment with a storage capacity of its raw materials must be conducted.

### Tabel II

<table>
<thead>
<tr>
<th>Variables</th>
<th>MDM</th>
<th>FQ85CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usage (D) (Kg)</td>
<td>163.534</td>
<td>79.826</td>
</tr>
<tr>
<td>Order cost (S)</td>
<td>Rp178.500</td>
<td>Rp8.500</td>
</tr>
<tr>
<td>Storage cost (H)</td>
<td>Rp682</td>
<td>Rp1.071</td>
</tr>
<tr>
<td>Order quantity (Kg)</td>
<td>2.405</td>
<td>2.047</td>
</tr>
<tr>
<td>Total order</td>
<td>68</td>
<td>39</td>
</tr>
</tbody>
</table>

As many as 71 orders for FQ85CL raw materials are placed per year. Order quantity period method is a method that is performed at the fixed order interval and allows the size of orders size to vary according to the economic order interval obtained (Henmaidi and Heryseptemberiza, 2007). In determining the interval time of order or economic order interval, EOQ should be used as the basis. Economic order interval value can be obtained by dividing the EOQ with the monthly average requirement. EOQ value of MDM raw materials is 9.252 kg, whereas the EOQ value for the raw materials of FQ85CL is 1.126 kg. Results of calculation of economic order interval (EOI) for MDM raw materials is 0.68 months with the interval of 15 days once the company places an order, while the value of EOI for FQ85CL raw materials is 0.17 month or one order for every week with an order interval of FQ85CL raw materials of four days. When compared with the number of orders that has been made by the company, EOQ method produces fewer orders for MDM raw materials, but it has a more frequent order for FQ85CL raw materials. The large number of orders in the period is due to the quantity of booked orders; in addition, it is also caused by the order and storage costs of raw materials. The less frequency of orders made by using EOQ and POQ methods is due to the quantity of orders made using both methods where the quantity is also much greater compared to that made by the company. Table 3 shows that the optimal quantity in a single order for MDM raw materials using the EOQ method amounted to 9.252 kg; on the other hand, the optimal quantity is 9.085 kg using the POQ method. The opposite is shown in FQ85CL raw materials, where the quantity of an order made using the EOQ and POQ methods is less when compared to the quantity of an order made by the company. Result of calculation of reorder point (ROP) shows that the company needs to do a reorder for MDM raw materials to the supplier when the inventory is as much as 1,887 kg and reorder for FQ85CL raw materials when the inventory is as much as 921 kg.

### Tabel III

<table>
<thead>
<tr>
<th>Variables</th>
<th>MDM</th>
<th>FQ85CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Q*) Company (Kg)</td>
<td>2.405</td>
<td>2.047</td>
</tr>
<tr>
<td>Total Orders by the company method</td>
<td>68</td>
<td>39</td>
</tr>
<tr>
<td>(Q*) EOQ (Kg)</td>
<td>9.252</td>
<td>1.126</td>
</tr>
<tr>
<td>Total Orders by the EOQ method</td>
<td>18</td>
<td>71</td>
</tr>
<tr>
<td>(Q*) EOQ with the adjustment with the warehouse capacity (Kg)</td>
<td>4.626</td>
<td>-</td>
</tr>
<tr>
<td>Total Orders by the EOQ method with the adjustment with the warehouse capacity</td>
<td>36</td>
<td>-</td>
</tr>
<tr>
<td>(Q*) POQ (Kg)</td>
<td>9.058</td>
<td>1.222</td>
</tr>
<tr>
<td>Total Orders by the POQ method</td>
<td>18</td>
<td>65</td>
</tr>
<tr>
<td>(Q*) POQ with the adjustment with the warehouse capacity (Kg)</td>
<td>4.543</td>
<td>-</td>
</tr>
<tr>
<td>Total Orders by the POQ method with the adjustment with the warehouse capacity</td>
<td>36</td>
<td>-</td>
</tr>
</tbody>
</table>

**Comparison of Inventory Total Cost among the Three Methods**

Total cost of inventory is the result of the sum of the order, storage and product cost. The results shown in Table 4 show that the total storage for MDM raw materials using POQ method generates a total cost of inventory of Rp2,377,553,985 and provides inventory cost saving of Rp6,647,015 or by 51.29% when compared with the results using the company method, whereas the use of POQ method on FQ85CL raw materials generates inventory total cost of Rp4,790,766,881 and provides inventory cost saving by Rp220,819 when compared with the results using the method performed by the company. Nevertheless, the EOQ and POQ methods on MDM raw materials when adjusted with a storage capacity of raw materials in the company cannot be applied because the storage capacity of the main raw materials (especially meat) only amounted to seven tons. If the company wants to apply POQ or EOQ methods, the company needs to add the storage capacity, and calculation of order and storage cost variables to determine the optimum order quantity have to be carried out. In addition, if the company cannot add storage capacity for its raw materials, the EOQ and POQ methods can still be applied but an adjustment with a storage capacity of its raw materials must be conducted.
Adjustment with a storage capacity of raw materials using EOQ method gives the total inventory cost savings on MDM raw materials is Rp4,954,639 or 38.23% with an order frequency as much as 36 times a year, whereas the use of POQ methods with adjustment capacity provides a total cost savings of preparation of Rp4,982,975 or 38.45% and also booked for 36 times a year. The results of inventory control using the POQ and EOQ methods are consistent with the research conducted by Permana (2011) who analyzed alternative models of raw material procurement that can lower the total cost of the inventory to support the supply chain performance in PT Hadinata Brothers using the lot sizing method with four different techniques i.e. lot for lot, Economic Order Quantity (EOQ), Period Order Quantity (POQ), and Part Period Balancing (PPB).

The results showed that POQ technique produces the lowest total cost for inventory for plywood materials and generates savings up to 11.44%, while LFL produces the lowest total cost of inventory for MDF raw materials and produces savings of 30% compared to that using the company method. These results are also consistent with the study conducted by Mathew [8] where he also used EOQ method as a forecasting model for controlling the raw material inventories in retail companies, in which the forecasting model of inventory management previously made by the company caused inaccurate supply levels. The results showed that by controlling inventories using EOQ method can reduce the total storage cost as much as 20% compared with that using by the company method.

**Comparison of Number of End Stocks among the Three Methods**

Total purchase of MDM raw materials using EOQ method is greater compared with that using the company method. Based on the amount of purchase and average usage of MDM raw materials which amounted to 13.63 tons, the amount of end stocks reaches up to approximately 4.74 tons on average (Table 5).
This end stock value produces a larger quantity when compared to the method performed by the company. This final larger stock quantity is the result of the addition of the larger amount of purchase for each order made using EOQ method; however, the frequency of purchase is less than before i.e. 18 times. The addition of the amount of the end stock does not significantly affect the total cost of inventories undertaken by the company using EOQ method. This is because the cost of purchasing raw materials using EOQ method is also less than that made by the company in a year in which the purchases of raw materials reach 68 times. Based on the usage amount of FQ85CL raw materials up to 79,83 tons in a year, the average monthly end stock amount of FQ85CL raw materials of 2.25 tons can be obtained, and this value of the end stock amount is greater compared that using the method performed by the company. Similar result was also obtained with the use of POQ method on MDM raw materials in which the average end stock value is greater when compared to that using the company methods, where the average end stock of each month reaches 5.45 tons. Different result was obtained from FQ85CL raw materials where the average end stock value gained is less compared with that of the company method and EOQ method that is 1.90 tonnes per month. These results indicate that POQ method can provide better cost saving and storage on FQ85CL raw materials.

### Table V

<table>
<thead>
<tr>
<th></th>
<th>Company method</th>
<th>EOQ method</th>
<th>POQ method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline stock (Ton)</strong></td>
<td>2,00</td>
<td>2.90</td>
<td>2.00</td>
</tr>
<tr>
<td><strong>Total purchase (Ton)</strong></td>
<td>163.49</td>
<td>79.42</td>
<td>166.54</td>
</tr>
<tr>
<td><strong>Total inventory (Ton)</strong></td>
<td>163.53</td>
<td>79.83</td>
<td>163.53</td>
</tr>
<tr>
<td><strong>Monthly average</strong></td>
<td>13.63</td>
<td>6.65</td>
<td>13.63</td>
</tr>
<tr>
<td><strong>End stock (Ton)</strong></td>
<td>1.95</td>
<td>2.49</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>Monthly stock average</strong></td>
<td>3.50</td>
<td>2.23</td>
<td>4.74</td>
</tr>
</tbody>
</table>

#### Managerial Implication

Supply chain performance in PT. Honda Trading Indonesia shows good results because the company has achieved several benchmark targets. A number of the performance targets needs to be improved by the company include the perfect order fulfillment order and inventory days of supply, and this will support the future performance of the company's order fulfillment order up to 100%. One way that can be carried out by the company in improving the delivery performance is by the delivery timing; i.e. in the morning as well as the well-routed delivery (selection of smooth and good road conditions) which can help the company to reduce delays and maintain quality of the goods to be shipped.

In the process of procurement of raw materials, the company needs to conduct ABC analysis in advance to determine which raw materials are prioritized in controlling supplies. There are several methods that can be used by the company as an alternative to control raw materials including EOQ and POQ methods. Both methods can be considered to be an alternative method in the control of raw materials, for those have been proven to deliver cost-savings for supplies. The high order cost of MDM raw materials occurred because the supplier did not deliver the product; therefore, it is necessary for the company to seek alternative suppliers of MDM raw materials so that delivery costs can be reduced in terms of transportation. Alternative MDM raw material suppliers chosen by the company also needs to meet the criteria of quality and quantity required by the company. In addition, to further maximize the profit, the company needs to improve its marketing areas as well as to increase its production capacity.

#### IV. Conclusions

The performance of the company supply chain analyzed using SCOR method based on the performance attributes of the order complete fulfillment, order fulfillment cycle, supply chain flexibility as well as cash to cash cycle showed good results. The performance of the company's assets viewed through inventory days of supply shows that there are still raw materials which are less economical because their values exceed the benchmark; therefore, it is necessary to conduct analysis on raw material control.

The results of the comparison of the total supply cost among the methods of the company, EOQ and POQ showed that the POQ supply method produces the lowest total cost with...
savings of Rp6,647,015 for MDM raw materials. For FQ85CL raw materials, EOQ method produces the lowest total supply costs with savings of Rp222,153,78. The results of the analysis also showed that the optimum number of orders using the EOQ analysis for MDM raw materials is equal to 9.252 kg in which the adjustment to the company warehouse capacity is 4.626 kg while for the optimum quantity of FQ85CL raw materials is 1.126 kg. The re-order point with EOQ method for MDM raw materials is 1.887 kg whereas for FQ85CL raw materials it is 921 kg.

To improve the performance of the supply chain in controlling raw materials, the company needs to keep continuous and detailed records of raw materials because they are useful to identify the re-order point and optimum quantity order. Furthermore, alternative selections of MDM raw material suppliers are expected to meet the necessary criteria for the company to reduce order costs.

In controlling raw material supplies, the company can apply the ABC analysis to help determine which materials should be prioritized. In addition, there should be continuous and detailed data-recording to determine the re-ordered point and optimum quantity order. However, further researches can be conducted on the influence of the main raw material quality due to an increase in order quantity. Moreover, further research can also be conducted on marketing strategies of PT. Honda Trading Indonesia products which are expected to increase sales and profit.

REFERENCE


