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The Dynamic System Economic Simulation Model To Forecast The Inventory Of Laminate Wood Industry Materials: A Case Study At Pt. Cahaya Samtraco Utama

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ABSTRACT

Currently, the wood industry in Indonesia is facing a lot of problems. The most annoying problem which has to be solved immediately is the decreasing quantity of wood resources as well as the imbalance between the demand and supply of forest wood products as a result of the unsynchronized policy of forest management and wood industry development in the past. PT. Cahaya Samtraco Utama is the only laminate wood industry in East Kalimantan Province, Indonesia. The forecasting analysis result for wood industry materials at PT. Cahaya Samtraco Utama seems to continuously decrease. Therefore, to anticipate such a situation, the industry should manage the inventory of materials.

Keywords : Dynamic System, Economic, Inventory, Laminating Wood Industry.

1. Introduction

As the global population increases, the demand for forest products increases and the availability of raw materials decreases. The increased awareness and conflict regarding the environment has resulted in more stringent regulations concerning the use of natural forests. In many regions of the world, the forest industry has turned to plantations to satisfy demand. The continuation of a wood industry highly depends on the availability of its main materials, namely wood. At the moment, the wood industry in Indonesia has a high production capacity. This is shown by the fact that wood industries produce approximately 80 milions m^3 each year. The problem arises when the natural resources such as forests as the source of wood have been decreasing. In addition, the supply of raw material, which has been obtained mostly from the forest economic sector people, has experienced deficits in different fields due to some factors such as forest fires, immense illegal logging and land clearance for farming (Wright et al. 2000).

Until now, the demand for wood has been mostly fulfilled from the natural forests. The wood inventory from the natural forests becomes less every year, both in terms of quality and volume. This is caused by the harvest speed which is not balance with the cultivation speed; therefore the pressure on the natural forest is getting bigger. Furthermore, the need of wood as the raw material for industry is increasing. This means the supply of raw material for industries is getting more difficult if it depends only on the wood gathered from the natural forests. There are several factors affecting the long-term global demand for wood fiber, such as world population, gross domestic product (GDP), growth of developing economies, and environmental policies and regulations. The harvest of natural forests has decreased while harvests on plantation forests have increased; the combination of these two factors has greatly affected the global supply for wood fiber, which has indirectly affected demand (Food and Agriculture Organization of the United Nations [FAO] 2009). The world population is expected to grow from 6.7 billion in 2010 to 8.2 billion in 2030, while the global GDP is expected to increase from US$55 trillion in 2010 to US$100 trillion in 2030 (FAO 2009). Many nations throughout the world are becoming more developed, with an increased standard of living and demand for wood and paper products. The environmental policies and regulations in several countries greatly restrict the ability to use the domestic forests for wood production. Additionally, energy policies are encouraging the use of woody biomass for fuel, hi 2005, the world production of wood products was approximately 417 million m3 and the world consumption was 42 1 million m3. By 2030, these numbers are expected to rise to 603 and 594 million m3, respectively (FAO 2009). The highest growth in production is expected to occur in the Russian Federation, Eastern Europe, and South America, while increased consumption is expected to dominate in Africa, Asia, and the Pacific (FAO 2009).

Why forecast technology? The questions seems natural enough, but it falsely implies that there is a choice between forecasting and not forecasting. Any Individual, organization, or nation that can be affected by technological change inevitably engages in forecasting technology whenever there is a decision that allocates resources to particular purposes. There are, however, alternatives to rational and analytic forecasting and it is worthwhile to examine them briefly (Joseph, 2003). Social and economic impact. An innovation at this stage has, in some way, changed the behavior of society or has reached the point where a significant portion of the economy is somehow involved with it. Not every innovation goes through all these used the concept of stages of innovation to anticipate what may happen later to an innovation still in an early stage of development (Joseph 2003).

Wood procurement practices will continue to become increasingly relevant to the sustainable management of forest resources for all segments of the forest products industry. Those forest products operations that continue to develop their wood procurement management systems to improve forestry practices on all forestlands will improve their productivity as well as short- and long-term competitiveness. To further facilitate the improvement of wood procurement management systems across the industry, future research efforts should focus on testing wood procurement strategies that simultaneously lead to cost savings and improved forest management. This will be particularly critical to the sawmill operations that currently lack the resources to incorporate EMS for wood procurement (Stephen and Lianjun, 2003).

PT. Cahaya Samtraco Utama is a manufacture company which has operated in the field of wood industry since 1984. The continuation of this company depends on the forest economic sector people as the supplier of wood, in which wood is indeed the main raw material for this company. In order for this company to survive in the future, the supplies of raw material have to be ensured.

Wood industries have to think about the manufacturing sustainability in which the companies have to guarantee the continuation of their production activities by ensuring the sustainability of the raw material supply. In respond to such a condition, every wood industry like PT Cahaya Samtraco Utama has to own an appropriate way to maintain its production process. Industries need a research in order to determine and ensure the availability of production input. The aim of this research is to forecast the inventory of shorea tree, to find out the management value of shorea tree inventory, to find out the availability of shorea tree as the main raw material for wood industry as well as to know the production simulation model of the raw material inventory in the period of 15 years at PT. Cahaya Samtraco Utama.

2. Raw Material Inventory Management System

The basic principle of decomposition method would be to decomposize (break) the periodical time series data into several patterns and identify each component of the time series data separately. This separation was done to help increase the speed of prediction and help understand the behavior of rime series data better. Trend was defined as the tendency of increasing or decreasing movement in the data which occured in a long term. The season variation was the increasing and decreasing movement which happened periodically (repeteadly in the same period of time). Cyclic component was the change of flux and reflux which was repeated in a rather long period of time, for instance: 10 years, the 20th quarter, and so on. The error component (random) was the random movement and occured suddenly as well as hard to predict. This movement could occur due to the war, natural disaster, monetary crisis, and so on. The components of trend, cycle, season and error from time series data could be assumed into two different models, i.e. multiplicative and additive models. The formulas were as follows:

Multiplicative Model of Decomposition Method:

$$Xt = It \times Tt \times Ct \times Et$$

Additive Model of Decomposition Method:

$$Xt = It + Tt + Ct + Et$$

Furthermore, the prediction result would be tested by using the Selanjutnya Mean Absolute Percentage Error Method, which would be the average of all error (difference) percentage between the actual data and the prediction data. The accuracy measurement would be fitted to the multiplicative and additive model time series data and displayed in a form of percentage. A model could be said to have a very good performance if the MAPE value is under 10 % and a good performance if the MAPE value ranges from >10% to 30%.

$$MAPE = \left(\frac{1}{n}\right)\sum\left[\frac{Y - Yt}{Y} x100\%\right]$$

Onawumi (2011), Using the principles of the classical EOQ model, the following assumptions are`made:

1. Demand rate is determinable and constant.
2. Supplies are delivered in batches.
3. Replacement is instantaneous on request.
4. Inflation rate is assumed constant over a period of time.
5. Unit purchase cost and other relevant costs are affected by inflation.
6. Shortages are allowed at a cost and over a given back-ordering time frame.
7. Purchase costs per unit change with quantity with discount.

The situation of a determinable demand rate in which shortages are allowed is illustrated in Figure 1. The shortages could be backordered within the limit of the backlogged of the demand. The maximum inventory level is S and occur when the inventory is replenished. The lot size is less than the order level as a result of the backorder.

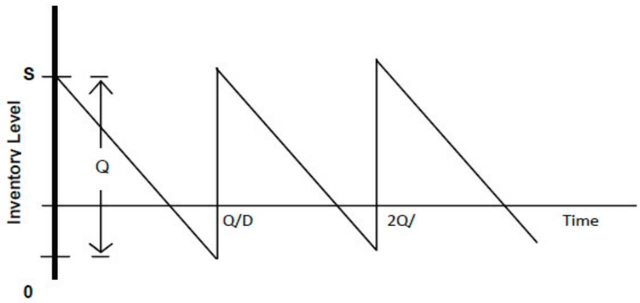

Figure 1. Lot-size model with shortages allowed

The implicit assumption of the EOQ model is that the items are obtained from the outside supplier. Given this assumption, it is reasonable to assume that the entire lot is delivered at an instant of time with infinite rate of replenishment. However, in some other places like production processes, manufacturing units, warehouses, the replenishment (production) is not instantaneous and may have finite rate. In the study of non-instantaneous inventory models, economical production quantity (EPQ) model plays an important role. An EPQ model is an inventory model that determines the quantity of product to be produced on a single facility so as to meet the demand over an infinite planning horizon. The two most important decision variables in any EPQ model are the production run time and the optimal quantity to be produced (Muluneh, 2013). Period Order Quantity (POQ) method is one of the lot sizing methods in which the needs of components would be fulfilled by determining the number of demand period which has to be responded (excluding the zero demand) for every order. This method is related to EOQ, i.e. that the number of periods where the needs of the components which have to be fulfilled is obtained based on the calculation of EOQ value divided by the average demand per period.

$$POQ = \frac{EOQ}{D}$$

Economic production quantity (EPQ) models for deteriorating inventory have been investigated by many researchers in recent years. In this paper, we develop EPQ models for deteriorating items with rework and stochastic preventive maintenance time. The models are solved using a search method, since a closed form solution cannot be derived. A numerical example and sensitivity analysis are provided to evaluate the models. The sensitivity analysis shows that the deteriorating cost has a significant effect on the optimal inventory cost; however, the production and the demand rate have the most significant effect on the optimal total cost and the optimal production up-time period (Widyadana, 2012).

The product inventory in a manufacturer depends on the production volume and market demand. Companies/ manufacturers should have a policy to determine the production volume which is adjusted with the market demand so that the inventory could stay at the minimum cost level. The problem could be solved by using the *Economic Production Quantity* (EPQ) method. The EPQ method is used to determine the optimum production volume, which means ‘enough’ to fulfill the needs with the budget that is as low as possible.

$$Q = \sqrt{\frac{2.S.D}{H(1-\frac{d}{p})}}$$

Enrico Briano (2012), approach allows studying current and future behavior of continuous systems over time, analyzing internal feedback loops and time delays, which significantly affect the whole system behavior. The main difference between System Dynamics and other approaches is the utilization of feedback loops and stocks and flows, which help describing how even seemingly simple systems display nonlinearities. This methodology also allows formulating “What If” analysis in order to test policies devoted to provide an aid on understanding the system changes over time. System Dynamics approach has been intensively used for studying company supply chains, even in case regarding short life cycle products.

Wu and Aytac (2006), present a new approach to characterize the short life cycle technology demand,mindicating how companies can structure their supply chains in order to better respond to upside demand and to absorb downside risks avoiding excessive inventory or capacity levels.

Kamath and Roy, hanks to a loop dominance analysis method, discovered that the dynamics of the “capacity growth” variable is significantly affected by the loop that connects retail sales with production order. This means that, in order to satisfy the market demand, changes over time on the plant capacity are needed. In our research the plant capacity has assumed to be fixed, because the capacity adaptation takes a long time, if compared with the speed of change in demand for short life cycle products.

The level of wood raw material inventory which is not calculated before can cause either the surplus or the lack of raw material inventory. The too high inventory level (surplus of raw material) causes the high number of idle resources- moreover the holding cost will also increase. On the other hand, the low level of inventory would hinder the production process. Therefore, an effort to optimize the number of available raw material as well as a careful consideration of re-order time should be done. To optimize the raw material inventory level, an appropriate combination of lot size number and reorder point should be determined.

3. Findings And Discussion

a. Trend Effect

Trend effect was used to measure the forecasting of the inventory related to the increase or decrease of raw material in a long term. The multiplicative and additive models resulted in different inventory patterns- however they experienced linear decrease, as could be seen from Figures 2 & 3 below.

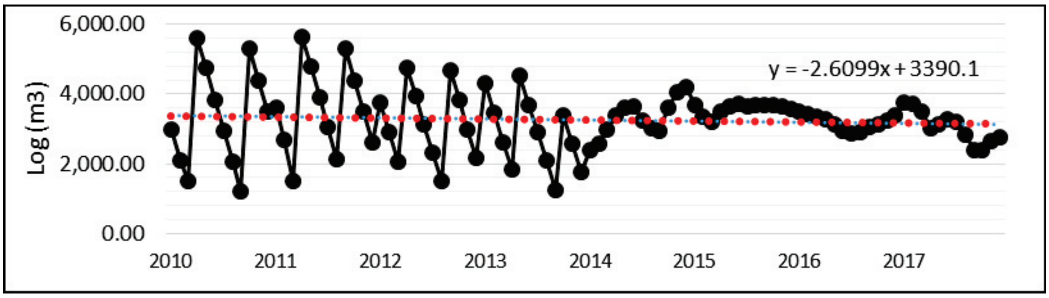

Figure 2. Forecasting the Trend Effect of Log Inventory by using Multiplicative Model

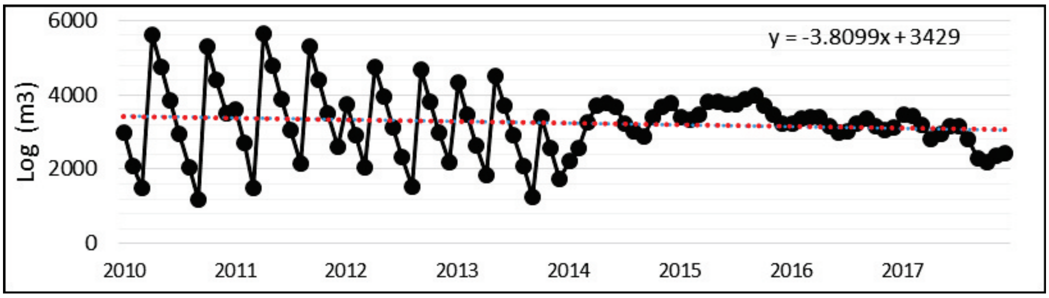

Figure 3. Forecasting the Trend Effect of Log Inventory by using Additive Model

The average results of the log inventory from 2010 to 2017 for the multiplicative and additive models revealed different values. The multiplicative model result was 3.264m^3/month whereas the additive model result ws 3.246m^3/month. The value for the additive model was smaller than the multiplicative model, however, both values produced the average value of raw material under the value of raw material capacity. It was found that the long term raw material inventory pattern continuously decreased. However, if seen from the trend effect forecasting result by using the Mean Absolute Percentage Error (MAPE) method, the results were as follows:

$$MAPE\ (multiplicative) = \left(\frac{1}{n}\right)\sum\left[\frac{Y - Yt}{Y}x100\%\right] = \frac{1{,}627{,}34}{47} = 34.61\%$$

$$MAPE\ (Additive) = \left(\frac{1}{n}\right)\sum\left[\frac{Y - Yt}{Y}x100\%\right] = \frac{1{,}524{,}22}{47} = 32.43\%$$

The MAPE value result of the multiplicative trend effect model was 34.61% whereas the result for the additive model was 32.43%. Still, the two forecasting result models indicated the values which were higher than 30%. Thus, the trend effect couldn't be used. This was due to the trend effect function to measure the long term forecasting; therefore it needed more historical data. Even though resulted in a high error level, the figure above could already explain the prediction of raw material in the future.

b. Seasonal Effect

The term 'season' described the marketing pattern which was repeated in each period. The seasonal component could be elaborated into weather factor or trade tendency. The decision for inventory which was taken from the purchase tended to have a short term characteristic. The prediction or forecasting which led to this decision had to fulfill the same needs as the short term scheduling forecast. For the decision related to raw material inventory and scheduling which included a lot of types, it would be necessary to make a big number of predictions. Clearer details could be seen from Figures 4 & 5 below:

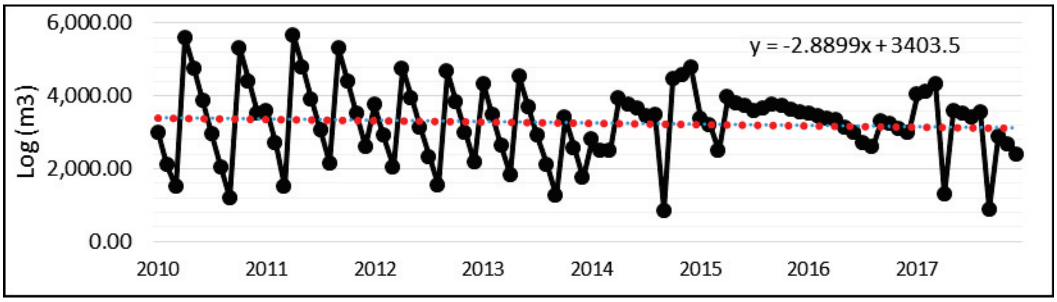

Figure 4. Forecasting for the Seasonal Effect of the Log Inventory using Multiplicative Model

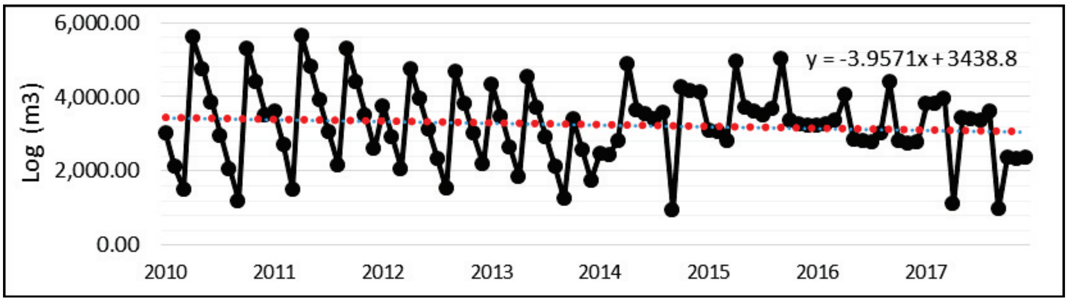

Figure 5. Forecasting for the Seasonal Effect of the Log Inventory using Additive Model

The average results of the log inventory from 2010 to 2017 by using the multiplicative and additive models were different. The value resulted from the multiplicative model was $3.263m^3$/month whereas for the additive model, it was $3.247m^3$/month, which was smaller than the multiplicative one. Both of these models resulted in the raw material average values which were under the value of raw material capacity. If seen from the result of the trend effect forecasting test by using the mean absolute percentage error (MAPE) method, it would be as follows:

$$MAPE\ (multiplicative) = \left(\frac{1}{n}\right)\sum\left[\frac{Y - Yt}{Y}x100\%\right] = \frac{1{,}274}{47} = 28\%$$

$$MAPE\ (Additive) = \left(\frac{1}{n}\right)\sum\left[\frac{Y - Yt}{Y}x100\%\right] = \frac{1{,}278}{47} = 27\%$$

The result of the multiplicative model of seasonal trend MAPE calculation was 28% whereas for the additive model, it was 27%. The results of both forecasting models indicated values which were less than 30%, therefore the seasonal effect could be used. The additive model resulted in a smaller value so it was more appropriate to be used to forecast the raw material inventory. The trend and seasonal effect forecasting of raw material showed the values which were still lower than the manufacturer's ability in managing the raw material, therefore the manufacturer often took the capacity management for granted. This was also caused by the failure of the manufacturer to understand fully about raw material management and production capacity. If the manufacturer were serious in managing those two aspects, it could be seen clearly from the costs they spent. A good management of raw material could clearly show the total asset of the manufacturer, which were the circulating capital other than money. The management of manufacturer's raw material capacity also influenced the effort to maximize the manufacturer's performance (i.e. reducing the unemployed time of machine and labors). Thus, it could be concluded that this influenced the brand image of PT. Cahaya Samtraco Utama, whose almost all of its products were exported.

Period Order Quantity (POQ) was an approach which used the concept of the sum of economic order to be used in a period with discreeet order characteristic. This technique was based on the EOQ method. By basing the calculation on the economic order method, the quantity of order that should be executed would be obtained and the interval of the order period was one year.

PT. Cahaya Samtraco Utama was a manufacturer which has done business in the field of wood products, therefore, to execute its production activity, the manufacturer had to obtain raw material and manage the inventory so that it could handle the orders which were not planned. The POQ method in this research was used because it was a method of raw material inventory management system which aimed at economizing the total inventory cost (TIC) by determining the order frequency and the quantity of raw material order economically.

The appropriate management of raw material inventory would be by using the Period Order Quantity method, which could be clearly seen from Figure 6.

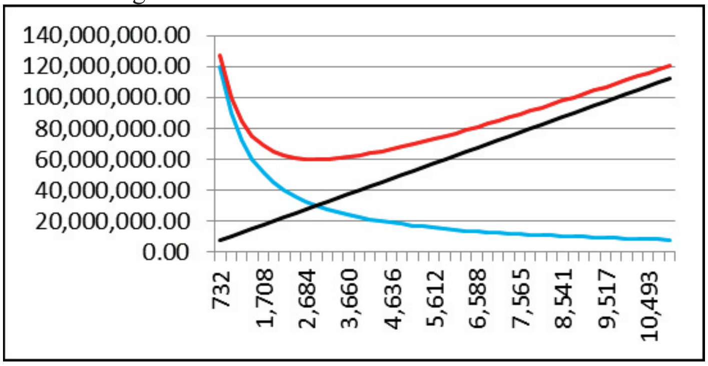

Figure 6. Period Order Quantity from 2010 to 2013

The figure explained the order value which was based on the period was located on the meeting point between the order cost and the raw material inventory cost, with the amount of 2,928m^3. To reach the order of raw material as much as 35,162m^3/year, the manufacturer needed to place an order 12. The total cost based on POQ was Rp. 63,351,640,341/year. This sum was based on the accumulation of the raw material purchase cost, order cost and holding cost.

In a manufacturer which processed farming and forestry products, there was still such a problem to manage the raw material as running out of the raw material so that they had to buy to the suppliers first. The ordered product could be different since it would be related to the number of consumer demands and the total inventory in the warehouse; however the interval for the order time remained the same. The POQ method enabled the order with particular number in each period. If compared with the annual average of raw material forecasting from 2014- 2017 as many as 38,962m^3, assuming that the raw material price, holding cost and order cost stayed the same, the results obtained could be seen from Figure 7.

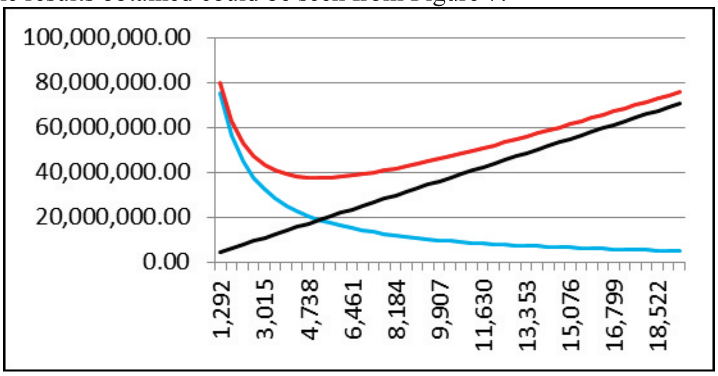

Figure 7. Period Order Quantity from 2014 to 2017

Figure 7 explained the period order quantity which was at the meeting point between the order cost and raw material holding cost, with the value of 5,169m^3, where in order to achieve the raw material demand of 38,962m^3/year, the manufacturer needed to order 5 times. Even though the average value of raw material demand from 2014-2017 was bigger than 2010-2013, the raw material order was only done 5 times a year. The total cost based on POQ was Rp.70,104.,452.,913/ year. This cost was derived from the accumulation of raw material purchase cost, order cost and holding cost. When compared with the total cost of raw material from 2010-2013 to 2014-2017, the total cost increased by 10%. The management policy in determining the price of wood product had not been appropriate if it was only targeted at replacing or covering all the spent costs. It also had to ensure the profit although the circumstances were not that good. The demand and offer were normally the factors determining the price, however the profitable product price would also depend on careful consideration on the costs.

Consequently, PT. Cahaya Samtraco Utama should try to reduce the costs, especially the ones related to the raw material management activities, such as raw material acquisition cost, order cost, holding cost and so on. If the manufacturer could reduce the cost to the minimum level, the manufacturer could reach the cost excellence so that the profit value gained by the manufacturer would increase. Moreover, in the marketing strategy, whether the manufacturer would decrease the product price or stick to the market price, it would all depend on the manufacturer itself. The most important thing would be that all the raw material should always be available. Still, it would be necessary to remember that some costs might change proportionally towards the change in terms of input and output volumes, while the others might stay relatively constant in numbers. The tendency of the cost to change towards the input should be considered by the management if the manufacturer would like to order from the supplier other than the current one. The manufacturer should be successful beforehand to plan and manage the costs.

To produce laminate wood, an effort to control the production in order to make it more effective and efficient would be needed. By controlling, the manufacturer could also be helped to economize the costs. The control which should be done included:

a. Controlling the raw material quality

Controlling the raw material quality must be done. If the raw material quality was not as expected, it would bring disadvantage to the manufacturer. Quality control needed to be done to maintain the appropriate standard quality as well as to investigate the broken materials. With the quality control, it was expected that everything related to final products such as size, resistance, color, shape and other aspects be maintained. Shorea tree wood belonged to the hard wood with weight ranging from light to medium-heavy. The density ranged from 0.3 – 0.86 with the water content of 15%. The terrace wood was pale pink, brownish pink, crimson red or even brownish crimson. Based on its density, the wood was differentiated into lighter pinkish Shorea and heavier crimson Shorea. This type of wood was not really resistant to the weather effect, therefore it was not recommended that it be used outdoor and in a direct contact with the ground. However, it was easy to preserve Shorea wood, by using the mixture of diesel oil and creosote.

b. Controlling the Raw material Re- Ordering

Each manufacturer needed to determine when it would be the right time to re-order the raw material. The manufacturer had to calculate the lead time appropriate for the raw material. The most appropriate lead time would be used to calculate the re-order point for the raw material needed by PT. Cahaya Samtraco. By determining the optimal ROP, the risk for the manufacturer to have excessive raw material could be reduced.

The calculation of lead time had to be done by PT. Cahaya Samtraco, considering that the raw material used were very important to sustain the production process. A good lead time should be controlled by the manufacturer if they did not want the production process to be hindered. Since this manufacturer would need the raw material up to 35,162m^3/year, an accurate calculation should be made. The analysis results of POQ and EPQ of the raw material order as many as 12 times a year meant that each month, the manufacturer had to order the raw material.

c. Supplier

In this case, PT. Cahaya Samtraco could do the controlling by determining suppliers with values or raw material with high quality. The manufacturer should have a relationship or cooperate with more than one supplier, because one supplier only could lead to the possibility of not being able to provide the materials. If there was more than one supplier, the manufacturer would not be confused if there was no ready stock for the raw material since there would be other suppliers to order from. Therefore, a good relationship between the manufacturer and the suppliers would be necessary. For the time being, the raw material for Shorea wood managed by the manufacturer were still located in Samarinda Municipality area. However, to ensure the availability of the raw material inventory, the manufacturer could also order them from the areas outside Borneo.

The raw material inventory dynamic system model for PT. Cahaya Samtaco Utama was needed as one of the efforts to anticipate and forecast the needs and wood raw material inventory. This model would be applied in the simulation period of 15 years, from 2014 to 2041.

In this model, all assumptions would be entered as a preliminary input which was obtained from the data concerning the analysis results of EOQ and EPQ.The simulation results during that period are presented on Figure 14 and Table 9. From the developed model, the speed or need level of raw material of PT. Cahaya Samtaco Utama from year to year as well as its production level could be seen. Those aspects could also be forecasted and the manufacturer could make a policy based on the results, to anticipate the decrease of raw material and the increase of production in the market by providing adequate inventory level.

Model is a form created to imitate a symptom or process. The symptom or process which would be imitated needed to be understood, for instance by determining the aspects which played a role in the process itself. The aspects would be interrelated, interconnected and interdependent.

The decrease of the raw material inventory should be a special concern for the industry. This happened due to the decrease in the production of log from the natural forests despite its significant order quantity. The production by manufacturers was still unable to fulfill the demand maximally. When there was a deficit between the raw material need and production, it would create the increase of wood raw material price in which the manufacturer would automatically increase the price of the product which might burden both the manufacturer and consumers. The simulation results showed the pattern of wood raw material inventory and the production, which could be seen more clearly from Figure 8.

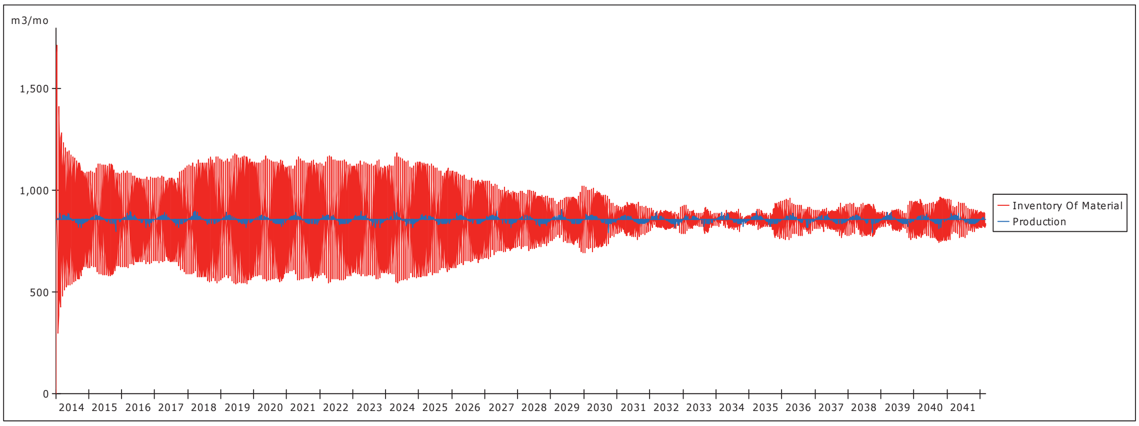

Figure 8. Inventory Of Material and Production 2014 to 2041

The figure explained that almost each month the manufacturer placed an order for raw material and the simulation results showed that in 2041 the quantity of of raw material inventory would be the same as the number of production. This means the manufacturer would no longer have the stock of raw materials because they would all be used up. The action that could be taken by the manufacturer after seeing the raw material inventory position rend would be to manage the stock position when they had surplus, to be reserved for the deficit time. This could possibly be done by reserving more raw materials or placing orders outside the area of East Borneo Province, however this would add the costs especially (holding cost) and order cost.

System dynamics and its instruments such as Powersim Studio 7 could model our understanding about the management system of wood raw material inventory for the wood processing manufacturers, especially for PT. Cahaya Samtraco Utama. The model developed here was not the model aimed at targeting the prediction or forecast with the high level of accuracy and precision. If this were to be done for a very high level of accuracy, the model development would need more resources such as time and money.

4. Managerial Implication

The action that could be taken by PT. Cahaya Samtraco Utama after seeing the raw material stock position trend would be to manage the stock position during the surplus time to reserve it in times of deficit. However, this reserving more mechanism would risk more costs. There were some factors which influenced the production quantity of PT. Cahaya Samtraco Utama:

1) Demand.

The quantity of consumers' need of the products manufactured by the manufacturer was normally limited. Therefore, demand would be one of the problems or limitations in planning the quantity of production.

2) Factory Capacity.

The maximum capacity owned by factories or machines might also be a problem in planning the quantity of production, because the manufacturer could not produce exceeding its maximum capacity.

3) Human Resource Capacity.

Employees or human resources with special skills would also be problems. People with special skills were rarely found, thus, it might be difficult to increase the capacity.

4) Raw Material Supply.

The raw material supply available would usually be limited. This limitation was not only on the quantity, but also on the continuity of supply, the age of the raw materials and the price fluctuation.

5) Work Capital.

Work capital would be used to finance the daily activitiy of the manufacturer. The capability of work capital to finance the production activity was as much as the quantity of work capital multiplied by the circulating level. So, the capability of work capital in financing the production activity (in production unit) would be as much as the work capital divided by the average cost of production subtracted by the depression of each unit.

6) Government Regulation.

Government regulation might sometimes be a problem in production. Instances for this would be when there was a ban on particular products, maximum production quantity; the government interference in determining the price and so on.

7) Technical Requirement.

Technical requirement could also be a problem. The examples of technical requirement were as follows: the necessary input composition to produc a particular product as well as the output composition which was obtained in a particular production process.

5. Conclusion

Further research is necessary for manufacturers whose raw materials are obtained from the natural resources. This is especially for the other wood processing manufacturers because in the future the wood raw materials will be more difficult to obtain.

The production problem is an important problem for PT. Cahaya Samtraco Utama because it influences the profit gained by the manufacturer. If the production process runs smoothly, the aim of the industry can be reached. On the other hand, if the production process does not run well, the aim of the industry will not be achieved. The smoothness of the production process itself is influenced by the availability of raw materials which will be processed in the production.

One of the managerial functions which are very important in the operational activity of a manufacturer is inventory control. It's because the policy of physical inventory will be related to the investment in fixed assets on one hand. On the other hand, it is related to the service to the customers. The inventory control will influence all business functions (operation, marketing, dan finance). Related to the inventory at PT. Cahaya Samtraco Utama, there is a conflict of interest among the business functions themselves. The financial management wants a lower level of inventory while the marketing and operational would like to have a high level of inventory so that the consumers and production needs could be fulfilled.

The manufacturer could eventually solve this by raw material inventory control, which is a very important thing. The raw material inventory is aimed at fulfilling the needs of raw materials for the future production process. There are some possible things that can happen if there is a demand but no stock:

1. Losing the sales due to the supply delay
2. Losing the trust and the delay in payment from the customers if the order is not fully shipped yet
3. Higher cost of transportation to accelerate the order fulfillment
4. Problems in production process
5. Inefficient production scheduling
6. Small volume purchase with a high price to fulfill the shortage

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