ISSN: 2615-3114

INTERNATIONAL SEMINAR ON MARINE TECHNOLOGY

SENTA 2016

"Marine Technology for Fulfilling Global Maritime Axis"

PROCEEDING

Faculty of Marine Technology
December, 15th-16th 2016
website: senta.its.ac.id

ISSN: 2615-3114

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Supply Chains Management in the Planning of BBM (Fuel Oil) Distribution in Anambas Island of Kepri Province

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Keywords: Supply chains management, distribution, fuel oil (BBM).

Abstract. Anambas islands districts in the province Kepri. Problems distribution of fuel oil in Anambas very complex, among others scarcity resulting distribution is uneven and the absence of regulation of the government and relevant agencies, and also the difficulty of access to transport distribution is constrained by infrastructure within the island, demographics resulting in price exceeds the normal price of both fuel and non-subsidized makes no difference. The absence of gas stations (SPBU) and their only APMS (Labor agents Oil and Diesel). It will be solved by applying supply chains management for planning the distribution of fuel (petrol) in order to obtain settlement Anambas and pattern formation / fuel distribution system. Expected equitable distribution planned system and also help the community.

Introduction

The government of Anambas islands is one of the districts that exist in Riau province. The region of Anambas islands is located in 2'10'0" – 3'40'0" south latitude and 105'15'0" east longitude, on the northern part of Anambas islands districts directly adjacent with South China Sea/ Vietnam, on the southern part adjacent with Tambelan islands, on the western part adjacent with South China Sea /Malaysia and on the eastern part adjacent with Natuna sea. Anambas islands ditricts are relying on water trasportation as a transportation that connects an island to the other islands, transportation operations used fuel oil (BBM) that in fact always have a problem to obtain it. This will hinder citizen activities in the benefits of transportation.

Fuel oil scarcity especially in anambas islands when the price become higher or price is higher beyond incident caused by some factor, which are distribution problems about how to manage fuel oil distribution (BBM), what kind of intitutions or instance that affects fuel oil distribution, and how the proper distribution system based regions condition on each district. From some of that factor, each of them gave an impact. Direct impact that could cause by an error in fuel oil distribution system is fuel oil scarcity which resulted in unrest social, and it can cause *panic buying* that could hinder economic and social life. As indirect impact could cause higher price on item price and services related to fuel oil. Another problem is the citizen of Anambas island districts are really hard to obtain fuel oil, especially gasoline because it is not sell freely in this district. Until now Anambas islands district have not had any filling station (SPBU). Even gasoline sold in retail could not be found in Anambas. Citizen obtained the gasoline in anambas from jetty. Jetty does not sell every day and does not has special schedule to sell gasoline. The gasoline sale sells unexpectedly without any notice by the owner of the jetty and the quickest buyer will get the fuel first.

An effective s*upply chain* is a *supply chain* that has planned where the plan started from *supply chain design* continued by implementation and evaluation step and followed by *continous improvement*. According to Schroeder (2000) in rangkury (2004) *Supply Chain*

Management (SCM) is plan, design, and control the flow of material and information along the supply chain with goals customer satisfaction for now and in the future dengan tujuan kepuasan konsumen sekarang dan di masa depan. Acoording to Simchi-Levi et al. (2000) *supply chain management* is an approach in integrating various organizations that organize the procurement or distribution of items, those are *supplier, manufacturer, warehouse* and *stores* until those items are able to produce and distribute in right quantities, right location, right time and the most minimal cost. According to those descriptions, *Supply Chain Management* (SCM) is a method or tools as supervise or manage organization or companies to the flow of material, financial, and information along the supply chain with goals the products and services can be delivered to last user.

Method and Results

Quantitative Descriptive. This analysis used to know or describe tendency of converging data in the form of frequency tables or graphs. Quantitative Descriptive analysis is for presenting findings of data such as the proportion of the number of vehicles and the amount of fuel oil consumption. Method used in vehicle fuel oil consumption calculation is using speedometer and following formula formulation:

IE = KE x JK x HT (1)

Description:

IE = Energy intensity per vehicle per year (Liters/Year),

KE = Energy consumption per Km Fuel mileage (Liters/Km),

JK = Mileage vehicles per day (Km/Day),

HT = The amount of working days in a year (Day/Year).

The formula used to calculate the fuel consumption of fishing vessels in the KKA in this study are (assuming the boat using the sail):

Class III : K = 17,26875 x n (2)

Explanation :

K = Fuel consumption of the whole fishing vessels 17,26875 = Fuel consumption per vessel {720 minutes (12 hours): 128 minutes (2 hours 8 minutes)} x 3.07 liters.

Trend analysis

Trend analysis conducted to estimate fuel needs in the coming year , so the demand planning and fuel supply can be predicted and policy mapping fuel distribution patterns can be done well. One method of forecasting with simple regression line is by using a Least Square method. The equation used in the method of least squares are:

$$\hat{Y} = a + bx \quad (3)$$

where:

Ŷ = The value of variable Y based on the regression line

a = Constant

b = coefficient of linear regression directions

x = independent variable x

As for the equation a and b are:

$$a = \frac{\sum y.\sum x^2 - \sum x.\sum xy}{n.\sum x^2 - (\sum x)^2} \quad (4)$$

$$b = \frac{n.\sum x.y - \sum x \sum y}{n.\sum x^2 - (\sum x)^2} \quad (5)$$

When the coefficient b has been calculated in advance the coefficient a can be determined by another equation.

$$a = \bar{Y} - b\bar{X} \quad (6)$$

$\bar{Y}$ and $\bar{X}$ each are an average for the variable Y and X.

Table 1. Data the amount of vehicles in operation at anambas island districts of the year 2012.

No	Ditricts	Vehicle						
		Taxi Bike	**Water Trans**	**Two-Wheeled**	**Three-Wheeled**	**Four-Wheeled**	**Roda 6**	**Alat Berat**
1	Kec. Siantan (Tarempa)	114	300	2300	25	20	5	0
2	Kec. Siantan Selatan	0	210	127	0	0	0	0
3	Kec. Siantan Timur	0	828	65	3	0	0	0
4	Kec. Siantan Tengah	0	430	125	0	0	0	0
5	Kec. Palmatak	25	995	508	10	30	15	4
6	Kec. Jemaja (Letung)	20	401	525	12	30	15	0
7	Kec. Jemaja Timur	20	101	430	10	10	5	5
JUMLAH		**179**	**3265**	**4080**	**60**	**90**	**40**	**9**

Source: Department of transportation anambas districts 2013

System Distribution and Consumption Pattern of Fuel (BBM) in Anambas Island

The data on the fuel distribution system in Anambas Island are needed to know the strengths and weaknesses of the distribution to obtain a suggestion form the fuel distribution system appropriately in Anambas districts. This data will be processed qualitatively using SWOT analysis. Anambas islands ditricts obtain the fuel oil supply point from fuel oil terminal that is located in Natuna districts by supplier institution that is 3 APMS and 1 AMT. This cause Anambas islands districts have not had any filling station until now.

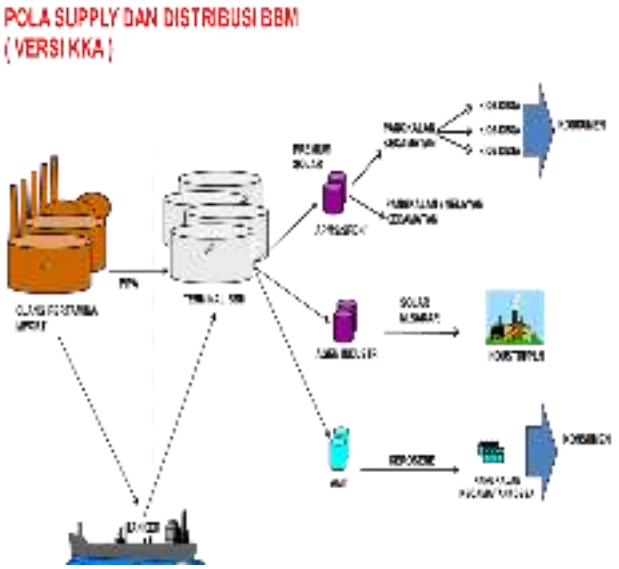

Figure 1. Trend analysis of fuel gasoline requirement in KKA.

Fuel oil supplier who sold kerosene type of fuel also still join with Natuna ditricts. Furthermore, the flow distribution of kerosene in Anambas is as follows:

1. Kerosene Agent BKG / Bandi Tpi Delivery Order (DO) to Pertamina.
2. Obtain approval from Pertamina.
3. Kerosene Agent BKG / Bandi Tpi contact the kerosene jetty in Anambas Island Districts.
4. Kerosene jetty take / transporting kerosene from straits of Lampa depot, then distributed to consumers / citizens.

5. Distribution of allocation kerosene based on kerosene user data filed by the district and registered on the jetty.
6. Taking kerosene on the jetty using control cards incurred by districts

Table 2. The amount of fuel oil requirement in KKA year 2013.

Vehicle	Requirement
Two-Wheeled	1131605
Taxi bike	61747.2
Three-Wheeled	26127.36
Four-Wheeled	3736.314
Speedboat	703258.9
Genset	81490.42
Total	**2007965**

Vehicle	Requirement
Two-Wheeled	1554897
Taxi bike	69644.67
Three-Wheeled	83278.65
Four-Wheeled	4611.524
Speedboat	806397.1
Genset	93441.6
Total	**2612271**

According to the table above, the required amount of gasoline in the KKA in 2013 is 2,612,271 liters / 2612.3 kilo liters per year. This amount does not include the requirement for speed boat and gasoline generator in Central Siantan and Eastern Jemaja. When compared with the quota gasoline fuel in KKA in 2013 that there is a shortage quota 2355,642 256.63 kilo liters on premium fuel in KKA.

After processing the data, obtained an equation Y = 2310118 + 604306X. Based on these equations, the prediction of the requirement gasoline fuel in KKA up to 5 years (2014-2018) are as follows:

Table 3. The amount of fuel requirement in KKA.

Year	Liters	Kilo Liters
Y2014	3518730	3518.73
Y2015	4123036	4123.036
Y2016	4727342	4727.342
Y2017	5331648	5331.648
Y2018	5935954	5935.954

According to the table above, the requirement for premium fuel in 2017 KKA is 5331,648 kilo liter. The pattern of consumption of fuel oil (BBM) in a region greatly influenced by the amount and types of transportation model that are actively operating in the region. The greater the amount of transport operations, the amount of fuel oil (BBM) that is required will be increased. Vice versa, the fewer the number of transportation model operating, the less amount of fuel will be required.

For the distribution pattern will provide information about the distribution channels needed by the region. The distribution pattern is not only influenced by the volume supplies, but also person who behind it, the mechanism of each channel and the channel location. The volume of supplies "enough / more" will make it easier for people to obtain fuel, but not for the seller because it will cause a loss to the costs already incurred.

Easy mechanism and the exact location will encourage customers to come to the channel. The location also can affect the selling price of fuel due to the additional costs incurred according to the distance of the main suppliers.

The flow of supply and distribution systems can still be used to KKA considered infrastructure that support ground transportation between islands. In addition, the distribution system used by APMS to the jetty to be forwarded to the community is a closed distribution system. The distribution system is suitable to distribute subsidized items or certain items that have a limited supply but high demand thus more controllable. The strength factors that support KKA to continue the flow of the supply and distribution system ongoing are: The system has been established which is already available the APMS and well- coordinated jetty. Data about the amout of fuel oil user.

Conclusions

Steps that can be done by KKA to continue the flow of supply and fuel oil distribution system become better that is:

1) Perform another registering of fuel users. The government should provide an accurate database on the number of two-wheeled vehicles, taxi bike three-wheeled vehicle, four-wheeled vehicles, six-wheeled vehicles, heavy equipment, generators, speedboat complete with horse power, fishing vessel complete with horse power, and other facilities that requires fuel. Data is arranged by district and village levels for each vehicle would require a different fuel based on its location.
2) Calculate the fuel requirement. These activities require a plan and the initial steps will be harder but at later steps after the initial data obtained, the analysis will be easier. At the first analysis of the fuel requirement have to conduct a survey related to land and sea transportation systems and the use of heavy equipment. If the initial data has been obtained, the next stages will be easier so this should be considered to implemented in KKA.
3) Determine the stock is safe. KKA requires secure fuel stocks to anticipate in case the supply is slow.
4) Build a storage or fuel storehouses. Storage warehouse can be built on APMS, or by district so that people do not need to store fuel at home.

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