

CHAPTER III

RESEARCH METHODOLOGY

3.1 Introduction

The steps of this research are as follow.

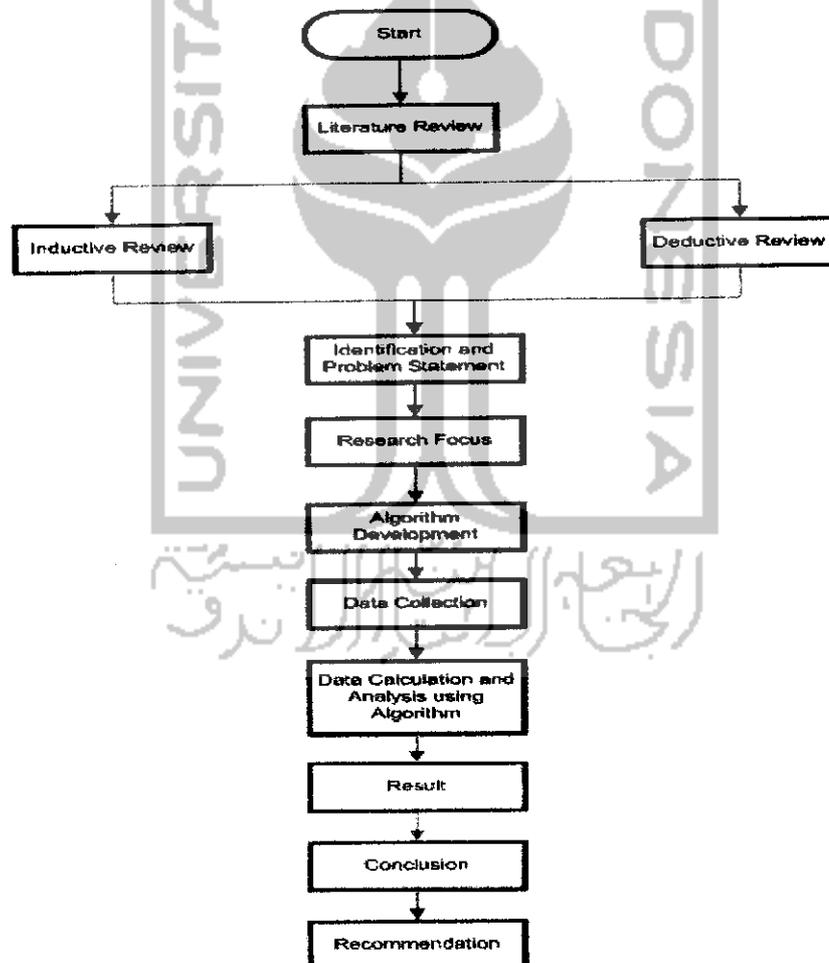


Figure 3.1 Research Methodology Flowchart

The research starts at literature review activities which are Inductive review and deductive review. Inductive review is a literature reviews to decide the current topic research. After that, the research study will continue to the identification and problem statement that finally will lead to research focus. By understanding the problem, the algorithm is being developed to solve the problem. After that, the data needed is being collected. The research study will calculate the data using the algorithm under the concept of literature that being chosen. Then, the result is being analyzed and discussed. At last, the conclusion is being got and the suggestion for the company and further research are raised.

3.2 Research Object

This research is being conducted in CHEVRON PACIFIC INDONESIA COMPANY (PT. CPI) in Sumatera Operation, Dumai with Sumatera Light Crude Oil (SLC) as the object that being analyzed.

3.3 Identification and Problem Statement

This process is being done to formulate the problems which already being explained and stated in the background of the problem.

3.4 Vendor Managed Inventory in Chevron Pacific Indonesia Company

In Oil Company such as Chevron Pacific Indonesia (CPI), their “vendor” term is referring to their oil production field under production system department which produces the constant amount of crude oil continuously in 24 hours. And their “retailer” term is refer to their inventory management area that consist of 16 storage tanks for keeping the

crude oil that came from oil production. Vendor that placed in Production System Department will create a replenishment policy by integrating the information for crude oil replenishment system. The replenishment policy is the best filling strategy which will decide when and how much the crude oil to be filled into the correct tank to overcome the stock out while the crude oil must fulfill consumer demand

3.5 Filling and loading System in Chevron Pacific Indonesia Company

The process of inventory management in CPI is started at the filling system. The filling system is similar to the replenishment activity in inventory term. Crude oil gathered from the production field is WIP inventory in filling and loading system. CPI has an oil production fields which produces the constant amount of crude oil continuously in 24 hours. While the loading activity is the activity that taking the crude oil from the storage tank to meet the demand.

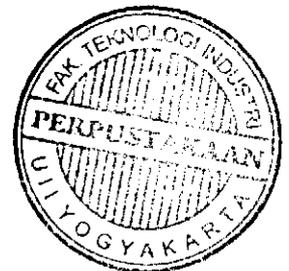
3.6 Algorithm Development

The algorithm is being developed under VMI concept in order to find the best filling strategy for filling system in PT. CPI based on Windi Winasti and Chairul Saleh (2007), the steps are stated as follow:

Step 1: Select x tank/s which is/are available and operable to be filled.

Step 2: Define XL_m that will become an input for filling planning.

Step 3: Select tank/s which is/are available for loading by calculate the fixed pumpable amount of each tank using formula (1), then choose tank/s which can cover XL_m



that previously defined in step 2. The remaining of tank/s will become the candidate of filling tank selected.

$$Fp_x = Cs_x - Up_x \quad \dots (1)$$

Where;

Fp_x = Fixed Pumpable stock on x tank; $x = 1, 2, \dots, y$

Cs_x = Current stock on x tank; $x = 1, 2, \dots, y$

Up_x = Unpumpable stock on x tank; $x = 1, 2, \dots, y$

XL_m = The largest loading or shipping plan at m day that unfulfilled; $m=1, 2, \dots, n$

Step 4:

- a. If XL_m at m day can be fulfilled, calculate Step 5 until Step 8 using XL_m at $m+1$, and respectively.
- b. If XL_m at current day cannot be fulfilled, skip Step 4.

Step 5: From tank/s selected, calculate each Filling Amount (ΔF_x) with each Current Stock (Cs_x) and Unpumpable Stock (Up_x) using formula (2).

$$\Delta F_x = XL_m - Cs_x + Up_x \quad \dots (2)$$

Where;

ΔF_x = Filling amount of x tank in cover XL_m

Step 6: Determine filling i priority based on ΔF_x value (P_i) by ranking the lowest value of ΔF_x as the highest priority to be filled and respectively.

Step 7: Determine the require Amount to be filled of the priority chosen (R_{ix}) using formula (3).

$$R_{ix} = (20\% * XL_m) + P_i \quad \dots (3)$$

Where;

R_{ix} = Required amount of i priority of x tank based on ΔF_x value; $i = 1, 2, ..j$

P_i = Filling amount of i priority tank based on ΔF_x value; $i = 1, 2, ..j$

Step 8: Determine the Filling amount based on the availability of E_{OIL} using formula (4), and (5).

$$\sum_{i=1}^j F \leq E_{OIL}; i = 1, 2, ..j \quad \dots (4)$$

$$F_i = \begin{cases} R_{ix}, & R_{ix} \leq E_{OILi} \\ E_{OILi}, & R_{ix} \geq E_{OILi} \end{cases}; i = 1, 2, ..j \quad \dots (5)$$

Where;

E_{OIL} = Estimation of oil will be received at current day

E_{OILi} = Estimation of oil will be received at current day which available to provide

Filling i .

Step 9: Get the result of filling amount decision and tank selection.

3.7 Data Collection

The Data Gathering was done in three ways:

1. Field Study by doing direct observation toward filling and loading activity.

2. Get statistical and primary data from company, such as 5 days shipping schedule, tank status, filling and loading records, etc.
3. Free interviews with the employees that undocumented well and unstructured. For example, the interview with head of department, general leader of department, head of filling and loading operator, filling and loading operator staff, etc.

3.8 Data Calculation

All data that had gathered related to filling activity will be processed using the algorithm development under VMI concept (Windi Winasti and Chairul Saleh, 2007).

3.9 Result

The result from data calculation will be analyzed and discussed in order to achieve the research objective.

3.10 Conclusion and Recommendation

From the discussion of results, the conclusion is being got. Based on the conclusion, the suggestion that will benefit the research and company will be recommended.