



CHAPTER IV

CRITERIA DETERMINATION

The main purpose of this chapter is to provide the understanding of how the criteria for selecting tank farm is determined. The following sections consist of the development of hierarchical structure, criteria determination, and interpretation for the criteria. This chapter is done by asking ten tank farm customers about the criteria that they pay attention to when selecting a tank farm. Then these criteria are grouped and reinterpreted.

Development of Hierarchy and Criteria

Based on interviews with three executive managers of independent tank farm, it is found that independent tank farm's main customers are petrochemical industries, and chemical trading company. Interviews with chemical trading companies, show that their main customers are paint-, adhesive-, and rubber industries. These industries are not directly serviced by independent tank farms but by chemical trading companies, so the information for criteria development can get by interview the executive managers of independent tank farms, petrochemical industry and chemical trading companies. They can be classified into two groups by area located, e.g. Bangkok and Map Ta Phut. These groups are different in objectives and usage as follows :

Bangkok customers :

1. short period contract
2. rent for storing and distribution to their customers
3. need small size of tanks because of product lot size

Map Ta Phut customers :

1. long period contract, some companies are join in investment for tank construction.
2. rent for storing for production process in their factories
3. need bigger tank size than that of Bangkok customers

In Bangkok, along Chao Pra Ya river, there are independent tank farms and the tank farms owned by chemical trading companies considered as a department of the companies. Customers are chemical trading companies. In Map Ta Phut, there are independent tank farms and some tank farms of which the factories located at the seaside. Their main customers are the industries in Map Ta Phut, which are mainly petrochemical industries. But in the near future chemical trading companies in Bangkok will be serviced by the tank farms in Map Ta Phut because of the demand of tank farm is growing and the expansion of tank farms in Bangkok is no longer permitted.

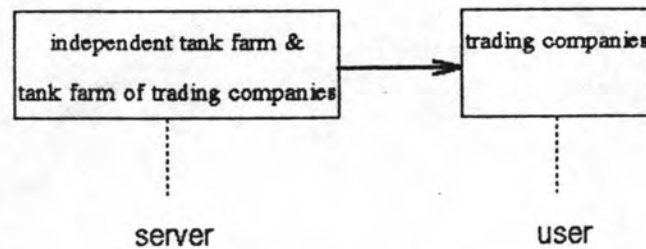


Figure 4.1 Tank Farm Server and User in Bangkok

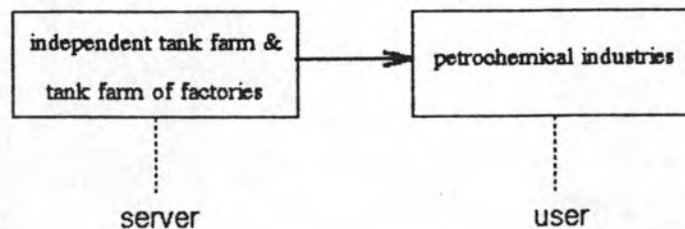


Figure 4.2 Tank Farm Server and User in Map Ta Phut

Data Collection

Data collection was done in two steps. The first step, or first-round interview, was done for criteria determination. The second step, or second-round interview, was done for comparison of the obtained criteria or weighing of the obtained criteria (described in the next chapter). The respondents or customers are divided into two groups by area their plants located, Map Ta Phut and Bangkok. In Map Ta Phut, the respondents are petrochemical industries. But in Bangkok, they are chemical trading companies. The large scale companies which are being customers or potential customers are selected. Five companies are interviewed in each group. In the first round, the interviews are conducted using two types of questionnaires, questionnaire 1 for Map Ta Phut customers and questionnaire 2 for Bangkok customers. But in the second round, questionnaire 3 is used for both area. The three types of questionnaires are attached in Appendix A in both Thai and English versions.

For finding customer requirements, many questions can be set up in very wide aspect. But they have to be in accord with the related activities among the enterprises. In the beginning, the questions are focused on that what are tank farms do, and with whom are tank farms concern which the result are described in the last chapter. Next, customers requirements and criteria for selecting tank farm data are collected. The question for objective in the hierarchy is "what are the criteria for selecting tank farm". The question can be adapted to be appropriate to each group of customers. Some criteria they reply are different in word but same or overlap in meaning. Therefore these criteria have to be analyzed and grouped according to similarities in meaning by the advice of tank farm managers and following the five principles which can be used to judge the set of criteria. The five principles are as follows : (Keeney and Raiffa, 1976, cited in Goodwin and Wright,1991)

1. Completeness. If the tree is complete, all the criteria which are of concern to the decision maker will have been included.

2. Operationality. This principle is met when all the lowest- level in the tree are specific enough for the decision maker to evaluate and compare them for the different options.

3. Decomposability. This principle requires that the performance of an option on one attribute can be judged independently of its performance on other attributes.

4. Absence of redundancy. If two attributes duplicate each other because they actually represent the same thing then one of these attributes is clearly redundant.

5. Minimum size. If the tree is too large any meaningful analysis may be impossible. To ensure that this does not happen, attributes should not be decomposed beyond the level where they can be evaluated. Sometimes the size of the tree can be reduced by eliminating attributes which do not distinguish between the options.

The set of criteria in Figure 4.3 is conform to the five principles, because of the following reasons ;

1. The criteria which are of concern to the decision makers have been all included.

2. The lowest- level criteria in the tree are specific enough for the decision makers to evaluate and compare them for the different options.

3. The performance of an option on one attribute can be judged independently of its performance on other attributes.

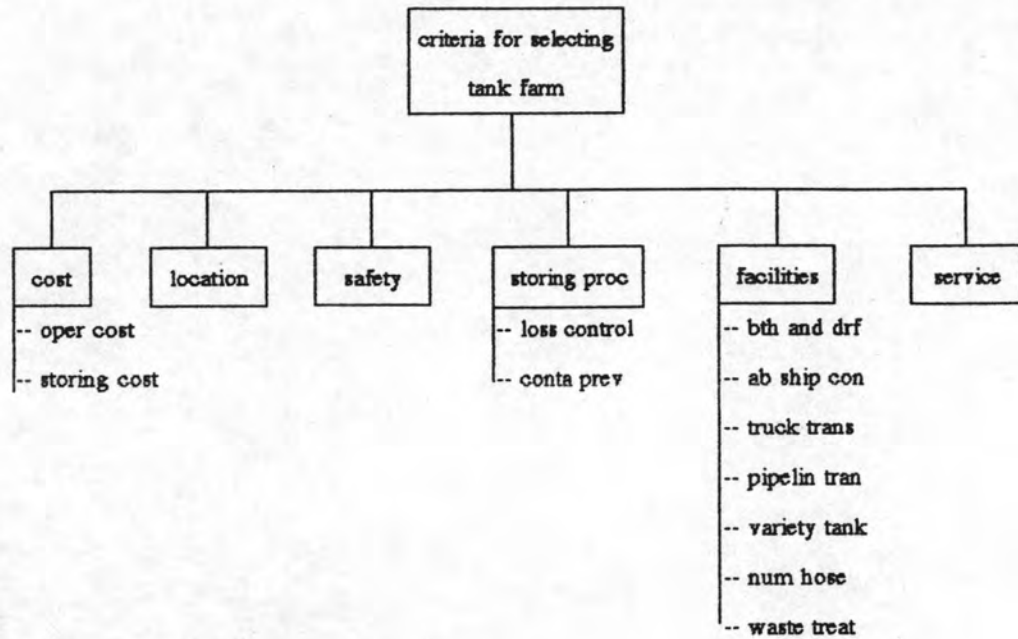
4. There are no attributes represents the same things with other attributes.

5. The attributes are not decomposed beyond the level where they can be evaluated.

The detail of collected criteria from ten users and the grouped criteria are in Appendix B.

Based on the set of criteria judgment principles and tank farm managers advice, the tree is constructed as figure 4.3.





oper cost ——— operating cost

storing proc ——— storing procedure

conta prev ——— contamination prevention

bth and drf ——— berth size and draft

ab ship con ——— absence of ship congestion

truck trans ——— tank truck transportation

pipelin tran ——— pipeline transportation

variety tank ——— having large variety of tanks

num hose ——— having large number of hoses available for loading and unloading

waste treat ——— waste treatment

Objective of the problem : determine criteria for selecting tank farm

Main criteria : cost, location, safety, storing procedure, facilities, service

Sub criteria : operating cost, storing cost, loss control, contamination prevention, berth size and draft, absence of ship congestion, tank truck transportation, pipeline transportation, having large variety of tanks, having large number of hoses available, waste treatment.

Figure 4.3 Criteria for Selecting Tank Farm Model

Interpretation for the Criteria

cost : means the cost of operating or storing.

– operating cost consists of the cost of ; loading, unloading of ship, drumming, circulating, transportation, or other fee such as sample test, cleaning tank.

– storing cost is the cost of storing products in tanks.

location : tank farm location. It includes some aspects such as distance from users, tank farm environment, not located in community.

safety : operation with safety, safety of equipment.

storing procedure : the process of storing such as temperature-, and pressure / vacuum control valve, fixed roof and floating roof of tanks, water spraying on tank surfaces, and piping system, etc. those affect loss control and contaminated prevention.

facilities : facilities are used for operating. The characteristic of some facilities to be accounted are as follows :

– berth size : the size of area that the ship can berth at. Bigger berth is more comfortable for a ship to berth and turn.

– draft : the deep of sea or river. More draft can accommodate bigger ship.

– absence of ship congestion : not have many ship in queue. If a ship have to wait for unloading, product owner will be charged.

– tank truck transportation : transportation from tank farm to users by tank truck.

– pipeline transportation : transportation from tank farm to users by established pipeline. This make cheaper for transportation but high investment.

– having large variety of tanks : having many sizes and types of tanks. Product owner can choose tanks suitable for their products and lot size.

- having large number of hoses available : number of hoses for load, unload products. This matter can help contaminated preventing, and unload many products simultaneously for time saving.

- waste treatment : have waste treatment system to conserve the environment and safety for human being. The waste water of cleaning tanks or sometimes the products accidentally mixed or contaminated, it is not so much but it have to treat before let out.

service : the quality of service such as service hours, lead time of delivery.

The shown hierarchy does not have alternatives of which tank farm to be selected because the objective is not choosing any thing but only determine the criteria for selecting tank farm and weight them. Weighing of these criteria is contained in the next chapter.

It can be concluded that the criteria determination can be done by interviewing the customers of tank farm and then grouping the criteria by following Keeney and Raiffa's principles. Next, the hierarchy is constructed with advice of tank farm managers and also following Keeney and Raiffa's principles for determining a set of criteria.