

Chapter 4

Research Methodology

This research aimed to study and compare mold costing systems, between traditional job order costing concepts and Activity-Based Costing concept. These methods were different in practice. Thus, the study had to be planned for the methodology and steps carefully, so the results were comparable to each other credibly.

The research methodology included 1) information acquisition, 2) cost structure modeling, 3) methods used for each cost category, and 4) Activity-Based Costing method.

4.1 Information acquisition

Many kinds of information were collected and studied from the company in the case. Most of the information was from the existing information system available, especially for numerical data such as costs, or expenses. These data was collected mainly from the accounting report. However, some information was needed to be collected in addition from the existing system, but only in small part that was necessary. Otherwise, the study would use much longer time and could not be finished in time.

4.1.1 Cost information

The information of actual cost consumed in each month was drawn from the accounting report. The data used was the actual figure shown at the end of each month for the cost of each department or function. The existing report did not cover detail information of how much resource each mold consumed. The information existed only in functional level.

In this case, the information belonged to November, 1999. The example of these data was in the Table 3-1 to 3-3. Every costing method used in this study started from the same amount of actual cost, before being allocated by different concepts.

4.1.2 Process information

Processes were studied to know the characteristic of operations and the relation with other information. The processes were classified into two main categories namely processes of mold manufacturing, and processes of support functions. Processes of mold manufacturing were inside the mold shop and had close relationship with the mold. These processes could be further categorized into machining processes, and other processes within mold shop. These processes could be seen in the figure 3-3.

Processes of support functions were outside the mold shop and had indirect relationship with the mold. Some processes concerned mold manufacturing, while some processes did not. Thus, the nature of the processes was studied to find out the relationship of the processes and the mold.

4.1.3 Mold information

Time limitation made this study to select two sample molds for the case. These two molds were manufactured right in the interval of this study. Thus, some specific detailed information, which was needed in additional from the existing system, could be collected. There were also many other molds manufactured in the same period. Nevertheless, the necessary information of those molds was unavailable and impossible to collect, after the time passed. Besides, working on the detailed information of all molds was over the capacity and time of this study, given that the information could be attained.

For example, specific information of the mold was raw material used, machining reports, design report, assembly report, and etc.

4.1.4 Activity information

Operation reports from mold shop and the nature of each manufacturing process were studied to determine the significant activities contained in mold manufacturing process. Activity information was useful for the application of ABC to the case's factory.

4.2 Cost structure modeling

According to the available cost information from the company, the cost was classified into 4 groups, one group of direct cost, and three groups of indirect cost. Direct cost comprised mostly direct material and direct expenses of each individual mold. Indirect cost consisted of variable cost of mold department, fixed cost of mold department, and fixed cost of support functions. All the actual cost items occurred in a month could be put into one of these four groups as below. Besides, most of the conventional job order costing worked well under this structure. Therefore, this cost structure was used as the main structure in calculation and comparison of mold cost through out this study.

Although the normal practice of Activity-Based Costing did not follow this cost structure, which was quite conventional, the concept would also be applied to workout the mold cost under this structure, as same as the conventional methods. Because this manner made the comparison of result between methods obvious, group by group.

4.2.1 Direct cost

The direct costs of mold manufacturing considered were as following.

- 1) Direct material
- 2) Standard parts
- 3) Equipment
- 4) Other direct expenses

4.2.2 Overhead-variable cost of mold department

The variable costs of mold manufacturing consisted of six items below.

- 1) Power cost
- 2) Supplies cost
- 3) Other materials cost
- 4) Tools & Equipment cost
- 5) Maintenance cost (unplanned)
- 6) Welfare cost

4.2.3 Overhead-fixed cost of mold department

There were four items of fixed cost for mold department.

- 1) Direct labor salary
- 2) Supervisor salary
- 3) Depreciation of machines, systems, and knowhow
- 4) Maintenance cost (planned)

4.2.4 Overhead-fixed cost of support functions

Eight support functions consumed many fixed costs. All were under the categories listed as following.

- 1) Plant service
- 2) Plant manager office
- 3) Maintenance department
- 4) Statistical and production data
- 5) Lab and product development
- 6) Mold design
- 7) Accounting and procurement
- 8) Personnel and administration

4.3 Methods used for each cost category

The four groups of cost being direct cost, FOH-VC, FOH-FC mold department, and FOH-FC support functions, were different in nature. To allocate the right proportion of cost to the right mold, the proper allocation base was needed. Most of traditional job order costing used single-base allocation, while the Activity-Based Costing used multiple-base allocation. This study employed both approaches to tryout the most beneficial result. The lists of methods used to analyze each group of cost were as following. The results from the calculation of these methods were compared and discussed later.

4.3.1 Direct cost

The calculation of direct cost was straightforward and almost common for both traditional methods and Activity-Based Costing. No allocation was needed. The cost was simply charged directly to the mold. The only little difference was at the direct expenses. Using activity as the allocation base, Activity-Based Costing was accountable for such an expense, while other traditional costing methods ignored to include direct expenses into direct cost.

4.3.2 Overhead-variable cost of mold department

These overhead costs required one stage allocation. The methods used for variable cost were listed under classification of single-base and multiple-base allocation as following.

4.3.2.1 Single-base allocation

1. Existing system (based on total direct cost-YTD)
2. Existing system after modifying (based on total direct cost-YTD)
3. Allocation based on machine hour
4. Allocation based on raw material

4.3.2.2 Multiple-base allocation

1. Activity-Based Costing

4.3.3 Overhead-fixed cost of mold department

Similar to variable cost, these overhead costs were also allocated in one stage. These fixed costs were allocated by the following list of methods.

4.3.3.1 Single-base allocation

1. Existing system (based on total direct cost-YTD)
2. Existing system after modifying (based on total direct cost-YTD)
3. Allocation based on machine hour

4. Allocation based on raw material

4.3.3.2 Multiple-base allocation

1. Activity-Based Costing

4.3.4 Overhead-fixed cost of support functions

Fixed cost of support functions needed to be allocated in two stages, from the support functions to mold department first, then from mold department to the mold. A combination of first and second stage bases built up a method to allocate cost. Methods in this cost category were listed under three groups, being the existing system, the single-base, two stages allocation, and the multiple-base, two stages allocation, as following.

4.3.4.1 Existing system (fixed cost was not allocated to the mold)

4.3.4.2 Single-base. two stages allocation

1. Weighted average % of services, and Total direct cost-YTD
2. Estimated % of services, and Machine hours
3. Sales ratio, and Total direct cost-YTD
4. Area ratio, and Number of molds
5. Man power ratio, and Machine hours

4.3.4.3 Multiple-base. two stages allocation

1. Activity-Based Costing

4.4 Activity-Based Costing Method

Most of the information needed to be collected in addition was for the allocation under Activity-Based Costing. Because the method needed more input information than other conventional methods.

4.4.1 Activity and activity center determination

First, the processes were studied to determine the significant activities and activity centers involved mold manufacturing. However, the classification was performed within the frame of cost structure, of 4 cost categories, specified above.

4.4.2 Cost

All range of actual cost was listed and related to the activities determined.

4.4.3 Cost pools

Some cost items of common nature by activity and activity center, were integrated into a common cost pool.

4.4.4 Cost drivers

The activities were studied to determine the proper indicator, to be used as the cost drivers for each cost pool.

4.4.5 Cost driver rate calculation

The total number of cost driver was used to divide the cost pool, to generate the cost driver rate, or the cost per cost driver unit. The rate was used in cost tracing of Activity-Based Costing, by multiplying the number of cost driver with the rate to generate the cost allocated to an activity.

4.4.6 Cost allocation by ABC

Costs of activities a mold consumed were collected together to add up the total cost of the mold.