IV. METHODOLOGY

A. TIME AND PLACE

This research carried out for four months, divided into two stages as follows:

a. April 4, ‘12 – June 1, ‘12 : The data collection and observation of manufacturing process in PT Nestlé Indonesia-Panjang Factory located at Km 13 Jalan Raya Bakauhuni, Panjang, Bandar Lampung, Lampung, 35 241


B. METHOD

1. Observation of Manufacturing Process

Observation is conducted in the production area which includes manufacturing and filling packing.

2. Data Collection

The data that will be used is secondary data about cost component related to quality in January 2011 to March 2012. Definition of the cost related to quality is different for every company. At Nestlé, there are two types of cost related to quality that are quality cost and quality lost. The following are the data about cost component that should be collected:

<table>
<thead>
<tr>
<th>Data Types</th>
<th>Related department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of hours for quality training</td>
<td>Human Resource</td>
</tr>
<tr>
<td>Number of QA employee</td>
<td>Human Resource</td>
</tr>
<tr>
<td>Number of AG employee</td>
<td>Human Resource</td>
</tr>
<tr>
<td>Number of hours for quality audit</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>Number of trial product</td>
<td>Application Group</td>
</tr>
<tr>
<td>Number of monitoring analysis :</td>
<td></td>
</tr>
<tr>
<td>- Finished good</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>- Semi finished good</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>- Line sample</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>- Environmental</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>- Investigation</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>- Raw material</td>
<td>Quality Assurance</td>
</tr>
</tbody>
</table>
In order to make a quality cost ratio and quality lost ratio, the following data are also collected during the study.

Table 2. Component used for quality lost calculation

<table>
<thead>
<tr>
<th>Data Types</th>
<th>Related Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of complaint</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>Number of delayed released:</td>
<td></td>
</tr>
<tr>
<td>- Finished good</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>- Packaging material</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>- Raw material</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>Number of overfill</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>Number of downgraded product</td>
<td>Production &amp; Filling Packing</td>
</tr>
<tr>
<td>Number of destroyed product</td>
<td>Finance &amp; Controlling</td>
</tr>
<tr>
<td>Number of investigation hours</td>
<td>Human resources</td>
</tr>
<tr>
<td>Number of sample for analysis</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>Number of expired:</td>
<td></td>
</tr>
<tr>
<td>- Finished product</td>
<td>Finance &amp; Controlling</td>
</tr>
<tr>
<td>- Raw material</td>
<td>Finance &amp; Controlling</td>
</tr>
<tr>
<td>Number of residues from dust collector</td>
<td>Production</td>
</tr>
</tbody>
</table>

As the costs component that are related to quality are given the above tables, the following are the explanation of component used for quality related cost ratio calculation obtained from the site (in Nestlé Indonesia-Panjang Factory):

a. Number of training hours is the total of hours used to train workers in order to increase the knowledge and skills of workers. For example hygiene training, extraction training and sensory panelist testing.
b. Number of hours for quality audit is the total of hours used to audit suppliers of raw materials and packaging materials. This includes the number of hours needed to make a report.

c. Number of trial product is the amount of cost used to conduct trial of new products. This fee includes the cost of raw materials and overhead.

d. Number of monitoring analysis is the number of analyzes performed for the purpose of compliance to existing standards.

e. Number of complaint is the total complaints received from consumers and customers because of the quality of the product that does not comply with the wishes of the customer.

f. Number of delayed released is the total of day difference between a release products with a target of release time.

g. Number of overfill is the difference between the actual weight of the product with the declare weight.

h. Number of downgraded product is the total product that is defective but still worthy to be reprocessed into a final product.

i. Number of product destroyed is the total product that is defective and was not feasible to be reprocessed.

j. Number of investigation hour is the total time required by the QA employee to investigate issues that occur.

k. Number of sample for analysis is the amount of finished product used for routine analysis and monitoring analysis.

l. Number of expired product is the total products that out of expire date before could be marketed.

m. Number of expired raw material is the total raw materials that out of expire date and has not been used for production.

n. Number of residues from dust collector is the amount of semi-finished product which is trapped by the dust collector when filling and packing process.

o. Cost of production is all cost which are incurred for produce a finished product.

p. Production hour is the number of hours used for production activities.

q. Total production is the number of finished product that was produced during a certain period.

r. Total raw material is the amount of raw materials in the warehouse at a certain period.

s. Total output of finished product is the number of finished product out of the warehouse to be marketed.

t. Total output raw material is the number of raw materials that are out from warehouse to be used for production.

u. Total output packaging materials is the amount of packaging materials that are out from warehouse to be used for production.

3. Ratio Calculation

The data that have been obtained then converted into ratio. Each cost component has a denominator which is considered to represent total cost for certain cost categories.
To make the ratio, the cost component and its denominator must have the same units and give a view of how big the contribution of cost component to the total cost. For example, downgraded product divided by total output and investigation hours divided by production hours.

4. **Priority Concern**

After the quality cost and quality lost are converted into ratio, then these are sorted from largest to smallest value. After that, the data is converted into percent of the total ratio. After that these data is converted into Pareto diagram using Microsoft Office Excel 2007. Pareto diagram can be used to determine the components that have big contribution to the cost related to quality.

5. **Priority Action**

Priority action is focused only on costs that are considered important. Determination of priority action should be based on existing data and actual conditions.