

3. RESEARCH METHOD

3.1. Flowchart of Research Method

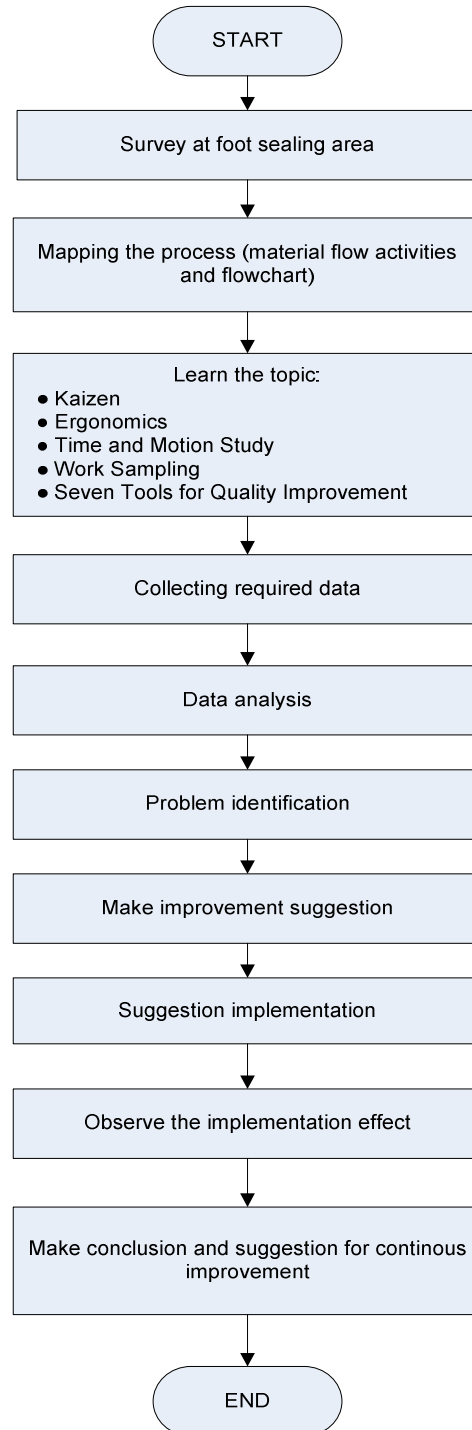


Figure 3.1. Research Methodology Flowchart

3.2. Data Required

The area needs to be improved is in the foot sealing area in the glost selection department. The required data are as follows:

1. Flow process, procedures and work instructions at foot sealing area.
2. SMV (Standard Minute Value) for each process.
3. Machine output per hour and per shift.
4. Quality after sealing data (from January 2008 until May 2008).
5. Utilization data (from March 2008 until May 2008).

3.3. Collecting Data Method

There are several data used in this final project. Those data are obtained by writers from observation in production floor. There are two methods used for collecting the data, which are:

a. Observation

This is a method of data collecting by directly observing on processes at foot sealing area and process auditor area.

b. Interview

This is a method of data collecting by interviewing persons who have directly relation with this project.

The method of each process will be described in the table below.

Table 3.1. Observation Method in Foot Sealing Area

No	Data Required	Method of Observation			Observation Location
		Observation	Interview	Archives	
1	Flow process diagram	x	x	√	Foot sealing area.
2	Material flow activities	√	x	x	Foot sealing area.
3	Procedures	x	x	√	Foot sealing area.

Table 3.1. Observation Method in Foot Sealing Area (continued)

No	Data Required	Method of Observation			Observation Location
		Observation	Interview	Archives	
4	Work Instructions	x	x	√	Foot sealing area.
5	Utilization data	√	x	x	Foot sealing area.
6	Work sampling productivity percentage data	√	x	x	Foot sealing area.
7	Interview with foot sealing operators and shift leaders	x	√	x	Foot sealing area.
8	Output data	√	x	√	Foot sealing area and process auditor area.
9	Quality data	x	x	√	Foot sealing area and process auditor area.
10	SMV data	√	x	x	Foot sealing area.

3.4. Processing Data Method

After collecting datas, there are steps need to be done to process those datas resulting information that can be analyzed. The steps to transform the collected data becoming information will be shown below.

3.4.1. Mapping Process

After several observations at the production floor, the author mapped the data observations into flow process diagram and material flow activities. Flow process diagram is used to map all the flow of processes that happened at the production floor; and the material flow activities is used to map the material flow activities in the foot sealing area.

3.4.2. Statistical Tests

There are few statistical tests that needs to be done to gain SMV. The first test is Kolmogorov-Smirnov normality test using Minitab software, the next test is uniformity test. After passing those test, the datas need to pass the last test which is the sufficiency test.

3.4.3. Descriptive Statistic

Descriptive statistic is used to summarize and describe data using various graphics, tables and diagrams. There are many ways to represent data using Microsoft Excel software, such as: pie chart, column chart, bar chart, scatter, area, surface, etc. In this thesis, the author represent the data using pie chart and column chart.

3.4.4. Fishbone Diagram

From the obtained data, analysis for quality problem can be made by using fishbone diagram. Man, method, machine, measurement, material and environment are the factors that can effect the quality problems, by using this diagram the author can diagnose the root cause of the defects.

3.4.5. Simulation Program

Simulation program can be used to find out process output for the desired working condition. Using the SMV for each process, simulation program can be made to compare the initial condition to the optimal condition for each process.

3.5. Data Analysis Method

Once all the data are obtained, the next step is to analyze the data. The analysis is focusing to optimize the machine and the labour in foot sealing area and also to discover any change for continuous improvements. Several suggestions can be made from the analysis. The given suggestions are expected to maximize the labour productivity, the machine utility and the product quality in foot sealing area.