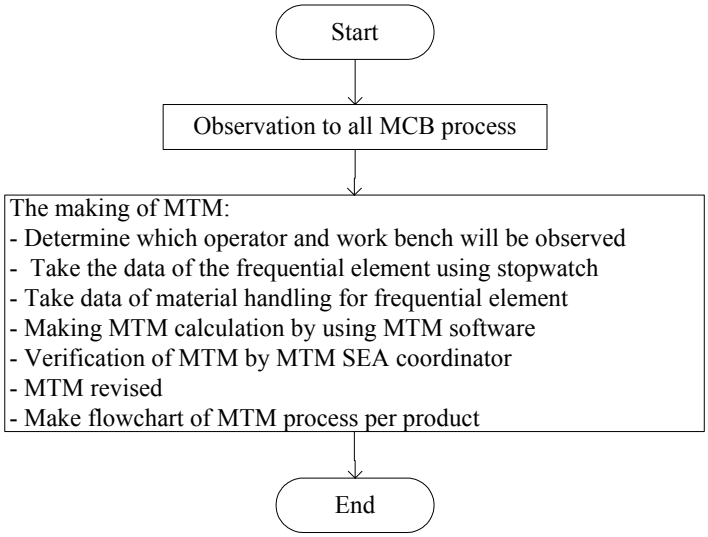
# 3. EXPERIMENT METHOD

## 3.1. Flowchart

This experiment method explain the steps that the author did during the final project. The steps are presented in the following flowchart.



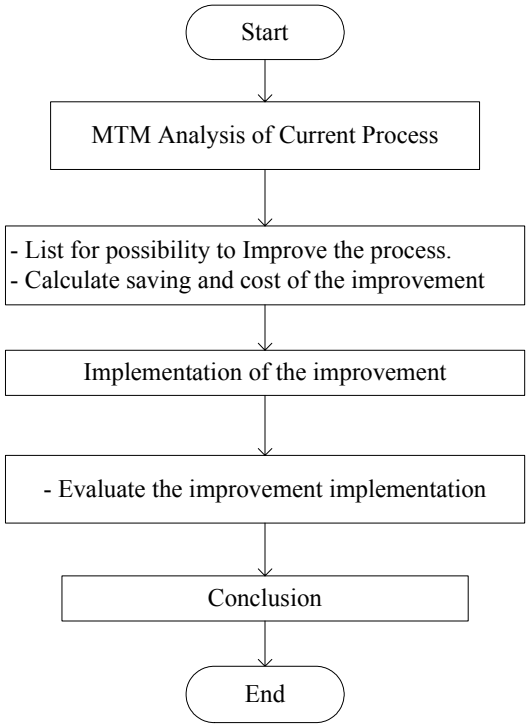

Picture 3.1. Flowchart For Motion Time Measurement Steps

In the beginning of this project, the author observed all process in MCB department. The observations included production process, process flow, work method, product variety and the components of MCB.

After the observation, data collection and observation for creating MTM began. The first step determined which operator will be observed. The objects observed are: detail work method, frequential element that is done by the operator, material handling and workbench location. MTM was made from observation of the process, both cyclic element and frequential element.

After MTM for every process was made, MTM must be verified by MTM SEA coordinator. MTM of every process is united in MTM process flowchart and the next step is creating MTM product flowchart.

MTM that was made in this final project included MTM from the actual process and MTM after improvement. MTM was made for all process in MCB department.




Picture 3.2. Flowchart For Improvement Process

After MTM for every current process was made, then MTM must be analyzed. From the analyses we can get the possibility to improve the current process. The improvement consisted of work method, tools making or making the workbench more ergonomic. The improvement that the author found was implemented in the plant. After the implementation finished, the improvement was evaluated.

### 3.2. The Data Needed

The data that needed in this final project are:

- Operation Process Chart of MCB line
- Productivity per shift in every work bench
- Cyclic element

- Frequential element
- Machine time in every work bench
- Products variation of MCB
- Actual time

### 3.3. Collection of the Data

The collection of the data used following method:

1. Observation to the current process.

   This observation was done for every process in MCB line. This method is very important for creating the MTM.

2. Making indirect interview with operator and all related person.

   Many frequential element data will be known from the interview with the operator. This method is also important during the identification of production process.

3. Determine the amount of the sample will be taken.

   Many frequential element data will be taken using stopwatch. PT Schneider has its own policy in data collection by using stopwatch. Number of data collected by stopwatch must be at least 21 data, which was assumed to have 5 % error.

### 3.4. Data Processing

All data was processed using MTM 2003 software. All cyclic and frequential data that have been taken was entered to MTM software. After all process MTM data was entered, the flowchart creation for every product begun to determine standard time per product.

After the standard time for each reference and process calculated the calculation of the useful time begun. Useful time was taken by reduced standard time with waiting time in every process. This useful time is needed to calculate Industrial Efficiency (IE).

Data processing for evaluation of implementation was gain by comparing the process before implementation and after implementation of the improvement. Data from daily output was taken only for operator that has performance rating 125.

### 3.5. Data Analysis

MTM software will provide some analysis and MTM result, included: motion analysis, task fixing result and simogram. Results of the MTM current process need to be analyzed to know the chances of improvement. This analysis is based on the MTM analysis guidance. MTM analysis can be seen in Appendix 1.

MTM improvement is separated in two differences improvement, they are reduce frequential element time and reduce cyclic element time. The first important to improve is reduce frequential element time. If the frequential element time cannot be improved again, then improve the second priority, cyclic element.

Another improvement can be made to solve the problem that happened in the production. The problem can caused red time in production and decreasing of product quality. So in the improvement for MTM analysis will be added another improvement for decreasing the red time production.