

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

To know what, where, and when production should be done is the fundamental problem of scheduling for a manufacturing company. Scheduling is an important step at a manufacturing industry. It can give a big impact in the performance of production process. By scheduling the production, a company can decrease the production time, production cost, waiting time, and increase the profit of the product.

Later, this thesis will be applied at Stamping Tools division PT Mekar Armada Jaya. PT Mekar Armada Jaya is a manufacturing company that produces vehicle like buses, minibuses, and cars. Stamping Tools division has 16 kinds of product that can be produced in the plant. Usually stamping tools division only produces 10 of them because the rest of the products are only made for special demand.

All of the products are produced by using 4 types of machines: MC 500 Tons (Ts), MC 600 Ts, MC 1000 Ts, and MC 2000 Ts. The available time of each machine is the same with the working hours of the employee. From Monday to Friday there are 2 shifts with 8 hours working time for each of them. For overtime, stamping tools division usually allocates the working hours in Saturday for 3 shifts with 4 hours working time per shift.

From January until May 2010, Stamping Tools Division produced 10 out of 16 of products. In this

period, the demand of the product could not be fulfilled in available time and they might do some overtime shifts. Although overtime had been done, some orders still could not be fulfilled and they had to send the rest of the demand to another branch in Tambun, Bekasi.

This problem arose because stamping Tools Division has a problem with their scheduling plan, they have already scheduled an operation in a machine before the precedence operation in that machine has been finished. This condition makes some products cannot be processed and must wait until the required machine has finished with predecessor products. In addition, they must do overtime and the cost of production increases. Other result is some demand has to be allocated to Tambun plant.

Schedule Generation algorithm is used to solve the problem. Schedule Generation is a type of schedule that treats operation in an order consistent with the precedence relations of the problem (Baker, 1976). Using this algorithm, there will be no operation that is scheduled before precedence operation or previous operation in same machine is finished.

The other problems that appear in the schedule plan are repetitive days in the schedule, different number of demand, and the time needed to generate one schedule.

To solve those problems, a program can be developed to avoid the repetitive days, different number of demand and most importantly is the time needed to generate a schedule

## **1.2 Problem Statement**

Based on the background above, the problem of Stamping Tool Division at PT Mekar Armada Jaya is an operation that is scheduled in a machine before the precedence operation in that machine finished.

## **1.3 Research Objective**

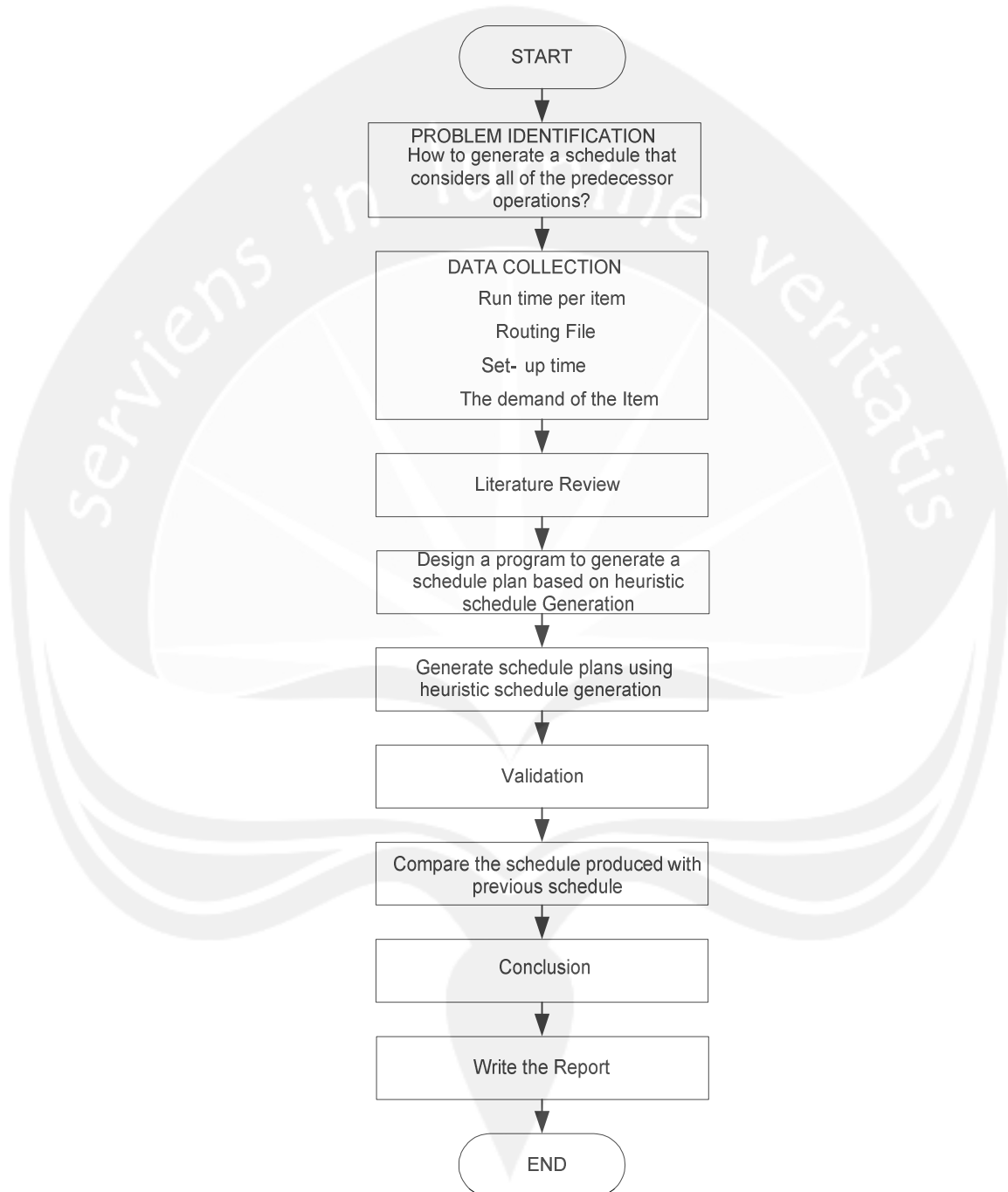
To create a scheduling program using Schedule Generation algorithm for Stamping Tools Division at PT Mekar Armada Jaya.

## **1.4 Scope of Research**

1. This thesis is not discussing about the material handling time and transportation time of material.
2. The program used to generate the schedule is developed using Microsoft Excel 2007 and Microsoft Visual Basic Application for Microsoft Excel 2007.
3. The data used for the thesis is taken from January until May 2010.

## 1.5 Research Methodology

The Research methodology can be seen in Figure 1.1



**Figure 1.1 Research Methodology**

There are 9 steps in this thesis's methodology research.

1. Step 1: Problem identification

The author identifies the problem that occurred at the Stamping Tools Division P.T. Mekar Armada Jaya Magelang.

2. Step 2: Literature Review

The author studies any references and literatures that are related to the problem statement.

3. Step 3: Data Collection

The author collects the data related to the problem: the run time per item, setup time per item, routing file, and the demand of the item.

4. Step 4: Design a program

Using the data collected, the program is then developed.

5. Step 5: Generate schedule plans

Generate the schedule plans using the developed program.

6. Step 6: Validation

Do the internal and external validation to the program to check if there is any error.

7. Step 7: Compare the schedule produced with previous schedule

Compare the schedule produced by the program with the previous schedule

8. Step 8: Conclusion

Conclude the result of the data.

9. Step 9: Write the report

The author writes all of the results and activities in the research.

## **1.6 Report Outline**

There will be 6 chapters in this thesis, which are:

- Chapter 1: Introduction

This chapter contains background, problem statement, research objectives, scope of the research, research methodology and report outline.

- Chapter 2: Literature Review

This chapter contains brief explanation about previous researches and current research. This chapter also contains the comparison between the researches.

- Chapter 3: Theoretical Background

This chapter contains some theories related to the current research. The theories are taken from references and literatures.

- Chapter 4: Data and Company Profile

This chapter contains the Data used in this research and the profile of the company.

- Chapter 5: Analysis and Discussion

This chapter contains the explanation about the program developed and explanation about the result of the processed data.

- Chapter 6: Conclusion and Recommendation

This chapter contains the conclusion of the current research and the recommendation of the next research.