CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter discusses the project background, problem statement, the objectives, scope of the project, hypothesis, thesis overview and also research question.

1.2 PROJECT BACKGROUND

Nowadays, quality product and ability to deliver the customer demands are pivotal aspect and perspective that should be seriously considered especially in the automotive industry. The management system also plays a crucial role in order to take control, arranging and measuring parameter related to the areas of performance.

Organization or company ought to realize that the efficiency depends upon how well the production line in term of producing the output [Groover, 2001]. There are three basic types of layout design which are product layout, process layout and fixed-position layout [Heineke and Davis, 2005]. For this particular thesis, product layout is the types of layout that will be investigated.
Product layout can be defined as a layout of flow shop, where a number of machine and work processes are arranged so that the products will pass through several workstations. Due to higher request the resources need to be improved from process layout format to product layout. Thus, it required a succession steps to make product and run the production smoothly, which the industries often call it as an assembly line.

Assembly line systems are generally portrayed as dynamic assembly connected with some type of material handling. This can be discovered, particularly in industries that assembles product, such as electronic gadgets part, automotive component and so on. An example case of product layout is the cafeteria, where customer trays are traveling through the series arrangement of workstations. Nonetheless, the term “bottlenecks” are frequently happened in assembly line and this will cause a delay in term of time and reducing in line efficiency.

Computer simulation is being used in this project in order to investigate and examine the issues that happened in an assembly line. Comparison between the current design and new layout are carried out. Simulation and optimization is carried out by TECNOMATIX Plant Simulation to perform this study.

1.3 PROBLEM STATEMENT

Manual assembly lines technology has made a significant contribution to the advancement of American industry in twentieth century [Groover, 2001]. This phrase indicates the significance of assembly line, especially in the automotive industry and those industries that produced mass quantities product. This emphasizes the success factors are depending on the efficiency of the assembly line.

In order to produce assembly line with high productivity, the ideal amount of resources in terms of labour and workstation will need to be carefully considered. One way to do this is by performing a line balancing study. Line balancing is a capable tool to improve
the throughput of assembly line while reducing non-value added activity. Besides, line balancing ensure that the equal amount of processing time in each workstations.

On the contrary, simulation tool can provide a quick and effective implementing change where experimentation in the real life system can be very time-consuming and expensive. Evaluation and optimization of the line throughput, machine utilization and cycle time can be done easily with this simulation tool [Kumar & Mahto, 2013].

1.4 PROJECT OBJECTIVE

The objectives of this project are as follows:

(i) To perform simulation study in an automotive assembly line.
(ii) To evaluate the performance of the production system using simulation technique and to identify the root cause of the problem.
(iii) To propose new improvement strategies in order to increase the performance of the system.

1.5 PROJECT SCOPE

To achieve the objectives of the project, this study will focus on the existing production system at one of the automotive manufacturing company.

(i) Production data such as cycle time, production rate, number of workers and number of workstations are obtained at the automotive manufacturing company.
(ii) Simulation is conducted by using TECNOMATIX Plant Simulation Software.
(iii) The comparison will be made between the existing production layout and the proposed production layout.

1.6 HYPOTHESIS

It is expected from this study that by using simulation study to balance the line, the production performance such as line efficiency and the rate of productivity can be improved.