CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

There are many types of manufacturing processes. One of them is the thermoforming process where the plastic sheets are formed with the application of heat, pressure, and vacuum to a mold. Aluminum is one of the materials that are used for molds.

Firstly, the part is designed and then proceeds with the mold design by using CATIA V5R21. The plastic sheet is put horizontally over the mold surface and clamped with the holding device. Heater is a heating element that is used to predetermine the temperature for heating the plastic sheet. The temperature of the heater is maintained by the thermostat. When the plastic sheet softens with the application of heat, then it is pressed over the mold surface by using drape forming process. The softened plastic sheet will form by following the mold shape and it is held in place until it cools. The plastic part will open when the mold cavity is opened. As we know some of the plastic materials have low thermal conductivity, so air cooling is needed in order to make that rigid part quickly. Trim out the excess plastic sheet from the finish part.

Clamping unit, air cooling system, heaters, and mold are the basic of the thermoforming set-up. Here, there is a precaution to mold such as we need to take more
attention to the mold surface like clean it after every cycle because it will cause the change shape to the plastic part after forming.

1.2 PROBLEM STATEMENT

In my project, I had made a research regarding the one of the thermoforming process which is drape forming process. To produce the plastic part which fully follows the mold shape by using drape forming process is not easy because it need to create venting hole or venting line to the mold design. Based on the journal, many ways they use to produce the actual shape of plastic sheet without any damage and the shape which follow the mold shape design. Therefore, venting hole is one of the methods used in industry to form a plastic sheet which follow the mold. For the female mold, plug is used to assist the forming so that the hot sheet follows the shape of the mold. While, venting line is also method that can use to form a plastic which will follow mold’s shape without using a plug.

1.3 OBJECTIVE

This project is about the flow of thermoforming process. There are several objectives that should be achieved at the last of this project. The objective is as below:

a) To review engineering design process for engineering plastic part  
b) To design thermoforming process  
c) To produce plastic part by using drape forming process

1.4 SCOPE PROJECT

For this project, there are several scope of study which are:

a) To review engineering design process for engineering plastic part  
b) To study regarding the features at the thermoforming mold  
c) To design the part and mold of the thermoforming process by using CATIA V5R21
d) To fabricate the thermoforming mold by using milling machine & EDM Wire Cut

e) To produce a plastic part by using drape forming process based on the part and mold design

1.5 FLOW CHART

This project had been planned in the sequence in order to achieve the objectives. The flow chart is important to make sure all works concerning the project will be carried out as planned and smoothly. Figure 1.1 shows the process begins by refining the objectives and project background of the project. Research had been done by journal and reading material about project, this step is significant to make sure that project will run smoothly and to keep the project within its scope. Journal and reading material are review according to the project title and scope.

Procedure and methodology of the project are planned and recorded. Figure 1.1 shows the project flow chart. Whereas Gantt chart can be referred in appendices A.