CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This project investigates issues related to the preparation of polypropylene material for making containers with thickness of sheet is 0.5 mm. Before undertaking this project, it is important to know about the mechanical properties of materials and methods that should be used in this project. Besides that, to make this project succeed a few literature research has been done on the previous investigations in which to provide the necessary polypropylene food containers using thermoforming method.

Thermoforming is the process that involve of heating plastic sheet to a pliable status and forming it directed toward shape. Thermoforming offers processing advantages when do an injection moulding and blow moulding, which include decline pressures, degrade mould costs, work of multilayer structures, and soften of large parts. By using a multi cavity appliance, smaller, thin blank wall parts, a well known as those used for cuisine packaging, bounce be formed in lavish volume by all of relatively swiftly cycle time.

1.2 PROBLEM STATEMENT

The polypropylene used to make a container by using a method that called thermoforming. The process of thermoforming that need to use is a conventional machine (made by own) therefore, assume that it will be many problem occur during that process such as temperature control for the polypropylene sheet during thermoforming, pressure control during vacuum section, and plug assisted vacuum
thermoforming. However, by using this conventional method we can know more about the thermoforming process. To achieve the goals of this project, need to state and well known the problem will be occurs before doing this project. Therefore the design consideration for thermoplastic container is also important things. Besides that, design mould and fabricated process is an important process to produce a good plastic container. The number of vent holes and heating temperature may affect the thermoforming process.

1.3 PROJECT OBJECTIVE

The objectives of this project are:
   i. To design plastic part and mould container using CATIA software.
   
   ii. To study the effect of thermoplastic temperature and vent holes to the polypropylene plastic container via thermoforming process.
   
   iii. To perform hardness test using Vickers Hardness machine and functional test on the fabricated plastic container.

1.4 SCOPE OF THE PROJECT

This project used thermoplastic polypropylene as the main material for the preparation of thermoplastic container. The mould was designed in CATIA V5 software and had been considered accordingly all the design specification to make sure that there is no defect would be occurred and the simulation was successfully done to machine the mould by using CNC milling machine. When the mould is ready then proceed to the next process that is thermoforming. Thermoforming was processes that heat the plastic and give shape by using mould guided. Thermoforming process was selected because has less thermal stress compares to injection moulding and extruded moulding.
CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter will explore about the previous research that is related to this final project. There are previous research on preparation of thermoplastic polypropylene and thermoforming process. This is the important thing that involve in this project and main part of the project. The material that use is polypropylene sheet with thickness 0.05 mm. The thermoforming method will be use in this project to make a container from plastic sheet to form shape.

2.2 THERMOPLASTIC

A thermoplastic or thermo plastic is a plastic material, which become mouldable when heated and will become hard or solid when cooled. Thermoplastic material can be hot and cool a few times. Thermoplastic can be categories as material that can be recycled. The process that is normally use to change the shape of thermoplastic material are injection moulding, extrusion blow moulding, compression moulding and thermoforming process. The types of plastic are divided into two that is thermoplastic and thermoset. There are big differences of these plastic which is properties itself and application used. Nowadays, industry used thermoplastic widely as main material to produce product such as polypropylene, polyethylene, polysterene, ABS, acrylic and many more. In this project, the focus of thermoplastic is about polypropylene (PP) sheet type with thickness 0.05 mm.