CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

Nowadays, plastic getting more popular among the industry of fabrication container compare to other material because of their properties that are light weight, high wear resistance and easy to fabricate. Most important characteristic of the plastic is a low production cost and this make plastic become more valuable.

Thermoplastic are plastic that softened and can form any shape using heat and it returns to a solid upon cooling. Thermoplastic also called a thermo softening plastic. The most thermoplastic criteria are having high molecular weight. The example of some thermoplastic type is polypropylene, polycarbonate and acrylic.

The thermoplastic material type used in this project is Polypropylene (PP). The properties of this (PP) material are economical material, good resistance to fatigue and also has a high melting point of temperature. The most important, polypropylene (PP) is recyclable and has number 5 as its identification. Polypropylene (PP) is useful for such diverse products as reusable plastic food containers, microwave and dishwasher safe plastic containers.
Thermoforming is the process that used in industry for plastic part. Thermoforming process is a process of changing flat thermoplastic sheet to three dimensional shapes. There are three types of thermoforming process which are vacuum forming, pressure forming and match die forming.

Therefore, the design consideration for thermoplastic container is also important. The design of mould containers needs a practical design so that the container has a good quality, value and the part can be vacuum during thermoforming. The type of material used for mould also may affect the thermoforming process.

1.2 PROBLEM STATEMENT

Nowadays, the plastic container cannot last longer and can be easily leak because of the unpractical design and material used.

Thermoforming process is the process that rarely used in the fabrication of the container compare to injection moulding. The Injection moulding process most uses for fabrication of thermoplastic material, but has high cost of tooling and equipment compare to thermoforming process.

This project built to study about the suitable of PP thermoplastic material as a thermoplastic container fabricates via thermoforming process. Plus, to investigate the benefits of using thermoforming process in preparing thermoplastic container.

1.3 OBJECTIVE

The objectives of this project are:

1. To design and fabricate the mould of the container.
2. To fabricate Polypropylene (PP) thermoplastic container using thermoforming process.
3. To analyse polypropylene container product fabricated via thermoforming process.
1.4 SCOPE OF PROJECT

This project used thermoplastic material such as polypropylene (PP) for the preparation of thermoplastic container. This is because the ability of this material which has good impact resistance, high melting point, and cost effective plastic for thermoforming process.

The mould was designed using Catia V5 2013 software and simulated the g-code to generate in CNC milling machine. Based on this software the part can be machined by simulating it to make sure no mistake during machine the part.

The thermoforming process for preparing of PP thermoplastic container as main of this research. Thermoforming process has a low of tooling cost and equipment cost compare to blow moulding and injection moulding. Thermoforming process is selected for fabrication of PP thermoplastic container because thermoforming has less thermal stress compares to injection moulding and compression moulding. Thermoforming process also used in both production operations either high and low volume.