CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

A mould is a block contained a shape cavity that is filled with a liquid or pliable material like polymer, glass, metal, or ceramic raw materials. The liquid hardens or sets inside the mould, copy its shape. Mould is the other option to a cast. The very common dual-valve moulding process utilized two moulds, one for each half of the object. Piece-moulding uses a number of different moulds, each creating a section of a object with complex geometry. This is usually only used for big and more hi-end objects. In all manufacturing process there are limitations or the ability of the process in moulding known as mouldability.

Plastic moulding is a type of manufacturing process which is the process of shaping plastic using a rigid frame or mould. This technique allows for the creation of objects of all shapes and sizes with highly design flexibility for both simple and huge complex designs. A popular manufacturing option, plastic moulding techniques are use for many car parts, containers, signs and other high volume items. Other than that, there are many plastic moulding processes and techniques, this investigation discusses on the techniques of drape forming.

The study shows that the thermoforming process is widely used to fabricate honeycomb base structure which is a highly valued engineering structure developed by the composites industry. It used extensively in automotive, aerospace and many other industries. The honeycomb sandwich provides the following key advantages over others
structures such as light weight, massive stiffness, high durability and production cost savings.
1.2 PROBLEM STATEMENT

The application of advanced thermoforming equipments is widely used in today industries to produces high potential product honeycomb based structure which is not cost affective for a small scale manufacturer and will use up a bigger space to place the machine itself.

As to this, this research is conducted to assess the possibility of producing Honeycomb structure using low cost in-house built Thermoforming equipment.

1.3 OBJECTIVE

The objectives of this project are:

- to design positive thermoforming mould for honeycomb cores.
- to design positive drape thermoforming process for honeycomb foil.
- to evaluate compression test on sandwiched structured composites with honeycomb cores.

1.4 SCOPE OF RESEARCH

This project started by reviewing the product shape and relates it to the type of mould that will be use. The crucial thing in this process is the relation of the mouldability, shapes, process and expected product. After the review several decisions will be made to get the best design to fabricate the positive mould. The decision should be fulfil several factors such that effect several process such as application of the mould during the thermoforming process, process removing the product from the mould after the thermoforming process and force apply during cutting process after thermoforming process. The selected design will be used in CAD software(ANSYS) to generate the mould analysis and the shape achievement to investigate the mouldability of the product. Based from the limitation, some feature will be added to the mould for improvement to ease the production of the product.