

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.0 BACKGROUND OF RESEARCH**

Polypropylene plastics or also known as polypropene, are materials that are used worldwide since the 90's century. The main source of synthetic plastics is crude oil. Besides that, coal and natural gas are also used in producing this material. Unlike metals, they are light, easy to manufacture, resistance to water, low in cost production, resistance to corrosion and chemicals. Polypropylene plastics are widely used in our daily life as kitchen utensils, in toy productions, as insulators for electrical devices, as our daily attire and also in industrial sites as safety equipments. They play a huge role in reducing the world's economic growth where they are low in cost production and can be easily produced.

Since Polypropylene is widely used today in industries and also at home, the production of polypropylene has increase drastically over the years with increasing production of polypropylene made products. This increase in polypropylene productions also increases its waste productions, which then becomes a threat to the environment when the wastes are not decomposable. In addition to that, it was found that not many researchers have put their effort into solving this issue as a solution in solving the increasing of polypropylene wastes that is now acting as a threat to both human kind and the whole biodiversity.

As to this, this research was done to widely explore the effects of mixing recycled polypropylene with virgin polypropylene towards its mechanical property of Ultimate Tensile Strength (UTS).

## 1.1 PROBLEM STATEMENT

The usage of polypropylene in the production of plastic products today has spread throughout many industries in the world. Since polypropylene plastic presents more benefits to the users around, industries use more polypropylene materials for their production. Industries today tend to use polypropylene material up to more than the required amount. This causes the wastes of this material to be thrown without any proper usage of the heated waste materials. The wastes materials are stated as non-usable waste which useless to the industry. Throwing away the wastes may be harmful to the environment since polypropylene materials do not degrade in the near future. The non-degradable polypropylene wastes may also harm the human health as it is not kept in a proper storage but instead, thrown away in the sewers or brought to recycling centres to be recycled.

Therefore, polypropylene plastic products are the major contribution to the pollution in the world today. Its characteristic which cannot be able to degrade becomes harmful to the consumers as it cannot be eliminated in any way. Burning polypropylene in order to eliminate it may be more harmful to the consumer as the gas released by burned plastic is toxic to the human being, thus leading to a major crisis to the whole environment. As to this, the recycling of polypropylene plastic products is one of the factors in reducing the amount of wastes polypropylene materials that is produced every day. However, until today, the research on the mechanical properties of recycled polypropylene is not widely explored in open literature. Besides that, not much input of the properties of the recycled products either in mechanical or physical properties is comparable with the pure polypropylene materials. Thus, the study on the mechanical properties of the recycled polypropylene product is necessary.

## **1.2 PROJECT OBJECTIVE**

The main objective of this project is:

- a) To design and fabricate a mould of standard size ASTM D638 for the purpose as a specimen in this research by using Autodesk Inventor and AutoCAD software.
- b) To study the effects of mixing percentage of recycled polypropylene with virgin polypropylene to the mechanical properties in terms of tensile strength by carrying out Ultimate Tensile Strength (UTS) test on specimen.
- c) To determine the optimum range of mixing percentage of recycled polypropylene to virgin polypropylene in terms of the highest Ultimate Tensile Strength.

## **1.3 PROJECT SCOPE**

This research is focused on carrying out tests and analysis in determining the percentage of recycled Polypropylene that is suitable to be mixed with virgin Polypropylene and analyzing mechanical property of Ultimate Tensile Strength (UTS) or in other words, tensile strength. The tensile strength is tested by using Universal Testing Machine (UTM) with an American Society of Testing and Materials (ASTM) standard for a mixed recycled polypropylene and pure polypropylene of D638. The tests and experiments are carried out in the laboratory located in Faculty of Manufacturing Engineering, Universiti Malaysia Pahang.