INTRODUCTION

1.1 Background

During last decades, the great population increase worldwide together with the need of people to adopt improved conditions of living led to a dramatically increase of the consumption of polymers (mainly plastics). Materials appear interwoven with our consuming society where it would be hard to imagine a modern society today without plastics which have found a myriad of uses in fields as diverse as household appliances, packaging, construction, medicine, electronics, and automotive and aerospace components. A continued increase in the use of plastics has led to increase the amount of plastics ending up in the waste stream, which then becomes a threat to the environment when the wastes are not decomposable(Hamad *et al.,* 2013). Environmental issues are becoming prioritized in most government and community development agendas. This has motivated the search for economically efficient and ecologically effective material and energy recycling technologies (Petts, 2000). For example, the development and use of strategic technologies driven by recycling credit scheme and the imposition of the landfill tax to preserve landfill void for the future disposal of untreatable residues in England(Read *et al.,*1998). The potential environmental impacts from plastics are categorized under global warming, acidification, eutrophication and photochemical ozone creation(Bos *et al.,* 2007).

Polypropylene account for around 22% of the total production of plastics in 2008, making it the second largest plastic produced beside polyethylene which is 23.7% (Plastic waste Management Institute, 2009).Polypropylene plastics or also known as polypropene, are materials that are used worldwide since the 19th century (Scheirs, 1998). Polypropylene plastics are widely used in our daily life as kitchen utensils, in toy productions, as insulators for electrical devices, and also in industrial sites as safety equipment(Gaurina-Medijumurec, 2014). Since polypropylene is widely used today in industries and also at home, its production has increase drastically over the years with increasing production of polypropylene made products. Therefore, polypropylene products is a major contributor to the pollution in the world today and now acting as a threat to both man and the whole biodiversity(Anthony, 2003). Itsnon-biodegradability makes post-consumer polypropylene a major environmental issue. Disposal of polypropylene waste by burning is not an environmentally friendly as the gases released are toxic.

Several options have been considered to reduce polypropylene waste such as reuse and recycling (Aurrekoetxea*et al.,* 2011). The most common examples of reuse are with glass containers, where milk and drinks bottles are returned to be cleaned and used again(Hamad *et al.,* 2013). Reuse is not widely practiced in relation to plastic packaging of plastic products in general tend to be discarded after first use. However, there are examples of reuse in the marketplace. For example, a number of detergent manufacturers market refill sachets for bottled washing liquids and fabric softeners. Consumers can refill and hence reuse their plastic bottles at home, but in all of these cases the reusing of the plastic bottles and containers do not continue for long time especially in the food applications which makes recycling the best alternative.

Mechanical recycling and chemical recycling are the most widely practiced of these methods. However, from industrial point of view, the mechanical recycling is the most suitable because its low cost and reliability (Hamad *et al.,* 2013). Mechanical recycling also known as physical recycling, the plastic is ground down and then reprocessed and compounded to produce a new component that may or may not be the same as its

original use (Cui and Forssberg, 2003).

As to this, the recycling of post-consumer polypropylene polymer products is one of the factors in reducing the amount of wastes material produced every day (Harold, 2003). 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 are:

a) To design and fabricate a mold for purpose of this research

b) To determine how physical and chemical properties of polypropylene changes with recycling.

1.3Justification

Polymer recycling is a way to reduce environmental problems caused by polymeric waste accumulation generated from day-to-day applications of polymer materials such as in packaging and construction. The recycling of polymeric waste helps to conserve natural resource because the most of polymer materials are made from oil and gas. Since recycling has been a solution to reduce environmental problem therefore the limit at which the properties of the materials produce through this method is of high importance.

It is proven theoretically that polypropylene materials take a long time for the properties to deteriorate and also reduce cost of production since no or little virgin polymer is required and energy is conserved.

Regards!!!