CHAPTER 1

INTRODUCTION

1.1 Background of Research

Construction industry consume substantial amount of raw materials in the process and the output is obviously the product and most importantly the waste material. Other than that, construction industry is well known as one of the worst environment polluters (Kamal, 2009). The environment is the main issue nowadays that affects everyone life and the level of awareness is steadily increasing as people become better informed to recognize the influence of both global and local environmental impacts on their quality of living. There are several methods to cover up the endanger that created by negative impact of construction industry. Government has introduced awareness program to cultivate about the non-renewable natural material and the production of waste from construction factory, which are endanger the earth in indirect way. In order to sustain the environment, 3R (Reduce, Reuse, Recycle) concept is much important to control the waste from natural material and by-product from industrial.

According to Municipal Solid Waste (MSW), increasing population and urbanization growth and other factor influence directly the MSW generation in
Malaysia. The solid waste composition in most Asian countries is highly biodegradable with high moisture contents such as food waste, plastic, plastic foam, agricultural waste, rubber, wood, metal, glass and textiles (Tarmudi, 2009). In order to reduce the solid waste, plastic, paper and glass are among three types of waste identified as main potential for recycling. To control the plastic waste, Asian countries are running the “No Plastic Day” activity to reduce the usage of plastic every weekend. In Year 2000, plastic waste in Kuala Lumpur was 24.4% by weight from MSW and most of the waste is still being disposed into landfills (Zhila, 2012).

There are many industries categorized under petrochemical and one of them is the plastic industry. As of today, the plastics manufacturing industry has become a major supporting industry of the electronics, packaging and automotive industries. The plastics industry has shown a very positive growth and have good prospect for the future. There is few major plastics resin being consumed by the Malaysian plastics manufacturing industries such as: Polyethylene (PE), Polypropylene (PP), Polystyrene (PS), Polyvinyl Chloride (PVC), Acrylonitrile-Butadiene-Styrene (ABS) and Polyethylene Terephthalate (PET).

One of the most popular plastic products is Polypropylene (PP), which is a polymer prepared catalytically from propylene. Polypropylene is a translucent material with excellent mechanical properties and it had gradually replaced the polyethylenes for many purposes. Polypropylene plastic have consistency enjoyed a very rapid growth globally since it was commercially produced. The major global products and markets for polypropylene are Flexible and Rigid packaging (37%), Automotive, Electrical & Electronics and Appliances (21%), Textile applications (18%), and others (24%) (Zaki, 2008).

Polypropylene is a thermoplastic polymer produced from propylene gas and used in an extensive variety of applications. Loop reactors are widely used in large-scale polymerization industries because they offers low capital and maintenance cost, high production rate, high heat removal, and maintain homogeneous temperature,
pressure and catalyst distribution. Homopolymers, random copolymers and impact
copolymers are three basic categories of polypropylene resins. Polypropylene
homopolymers exhibit high stiffness, high temperature resistance and excellent
chemical resistance. Polypropylene homopolymers are used to produce such as oriented
film, thermoformed deli containers, appliance parts and closures (Equistar, 3000).
Polypropylene does not have a good characteristic while at low temperature. The way
to improve the impact of strength of polypropylene at low temperature is to add second
component, ethylene. Polypropylene impact copolymers provide the highest level of
impact in strength. Since polypropylene has various types of requisites, process
upgrading is very essential in ensuring good quality and decreasing the producing of off
spec product.

In term of physical properties, polypropylene (PP) is a linear hydrocarbon
polymer and the typical density of the PP is 0.9g/cm$^3$. The products based on PP are
very significant commercial due to the advantages of being low in both density and the
cost. Besides that, its crystalline structure and high melting point results in resistance to
solvent and high temperature (Galpaya, 2009). However for the chemical properties,
polypropylene is suitable used in application which high speed fine denier fiber
production. Polypropylene having a high melt flow that reached 230°C and tensile
strength reached 330 kg/cm$^2$ (Titan, 2015).

Look into other perspective, soft clay is known as problematic soils. Soft clay
deposits are widespread, they present special problems. The characteristics of soft clay
are low strength and high compressibility. As a material, soft clay is a challenging type
of soil for engineers. The engineers must use very low factor of safety and the decision
he made can have a large economic consequences for the project. Ground
improvement technique is needed to improve the bearing capacity; however the
settlement and consolidation can be reduce if the soft soil is used in construction
process. Some of the preferred techniques are cylindrical sand drains, prefabricated
vertical drain (PVD), sand compaction piles and stone columns.