UNIVERSITI TEKNOLOGI MARA

UTILIZATION OF LDPE PLASTIC BAG WASTES INTO BUILDING BLOCKS

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ABSTRACT

Plastic material is one of the biggest usages in the worldwide especially Low-Density Polyethylene (LDPE) types. The most common used of plastic material is LDPE plastic bags that being used for many applications. The wastes that were generated from the LDPE plastic bags became a great concern towards the whole world as it made with material that difficult to decompose. Besides, with the increment in application with LDPE plastic bags, the environmental pollution also increases and might affect the health of other people. This study is mainly to utilize the LDPE plastic bags into other useful products which is building block. With the replacement of certain proportions of raw materials with LDPE plastic bags materials can help to increase the quality of the blocks. The modified blocks were made from mixtures of some proportions of LDPE plastic bag, proportions of cement, fine sand and hardener. This study was mainly to test the quality of the modified block and the effect of replacement of plastic material to the properties of the block by conducting compressive strength test, water absorption test, heavy metal analysis and Fourier Transform Infrared Spectroscopy (FTIR) analysis. The test was conducted on five different sample with different proportions of plastic material and cement.

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CHAPTER 1 INTRODUCTION

1.1 Research Background

Plastic is the common material that are abundant in the whole world. Plastic materials consist of synthetic and semi-synthetic organic compound. It is organic polymer with high molecular mass and mostly being derived from petrochemical. The groups that include in the chemical structure of the plastics are acrylic, silicones, polyurethanes and halogenated plastics (Ahmed et al., 2018). The chemical process that being used commonly are condensation, polyaddition and cross-linking. Plastic comes in many classes such as thermoplastic and thermosets, amorphous plastics and crystalline plastics, also biodegradable and bioplastics but not including synthetic fibres (Hopewell, Dvorak, & Kosior, 2009).

Commonly, plastics has good properties such as high tensile strength, low density and resistance to heat and glass transition temperature. However, plastic degrades slowly. Therefore, plastic difficult to dispose and stay in the environment for hundred years. Many plastic wastes can be found in the air, seawater and soil. It also can cause drainage blockage as it contains properties of water resistance and can lead to excellent breading grounds that related to the disease-causing mosquitoes (Saikia & De Brito, 2012). Conventional plastics are persistent material that accumulate in the environment as they cannot be mineralized. As the plastic waste dispose slowly, the waste become smaller pieces. The smaller the size of the plastic, the bigger chances to pollute the environment as the waste difficult to be removed from the environment and microorganism easily access to ingest.

One of the waste plastics that become major concern nowadays is plastic bag as it is in form of Low-Density Polyethylene (LDPE) which difficult to decompose and cannot be recycle because it is low grade plastic that have no value. Based on the literature survey, plastic bag can be reused for making valuable product such as concrete blocks (Mohan, Vignesh, Iyyappan, & Suresh, 2018). Concrete block is widely used for