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Use of plastic waste (high density polyethylene) in concrete mixture as aggregate replacement

Abstract

Rapid industrial development causes serious problem all over the world such as depletion of natural aggregates and creates enormous amount of waste material from construction and demolition activities. Quantities of polymer wastes also have been increased these recent years due to the boost in industrialization and the rapid improvement in the standard of living. In Malaysia, most of polymer wastes is abandoned and not recycled. This situation causes serious problems such as wastage of natural resources and environmental pollution. Polymer products such as synthetic fibers, plastics and rubber belong to petrochemical compound and not easily biodegradable even after a long period. One of the ways to reduce this problem is to utilize waste materials in the production of concrete. Use of these materials not only helps in getting them utilize in cement, sand, aggregate, concrete and other construction materials, it helps in reducing the cost of concrete manufacturing, but also has numerous indirect benefits such as reduction in land-fill cost, saving in energy and protecting the environment from possible pollution effects. An experimental research is made on the utilization of plastic waste, High Density Polyethylene (HDPE) as coarse aggregates in concrete with a percentage replacement of 10%, 20% and 30%. The laboratory tests include slump test, compressive strength and water absorption were conducted in this research. The samples content 10% of HDPE has better performance in term of strength.

Keywords

High density polyethylene (HDPE); Plastic waste; Recycle material in concrete