

Durability of lightweight OPS concrete under different curing conditions

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Abstract The use of waste materials and by products from different industries for building construction has been gaining increased attention due to the rapid depletion of natural resources. It has been found that oil palm shell (OPS), which is a waste from the agricultural sector, can be used as coarse aggregate for the manufacture of structural lightweight concrete. However, for OPS concrete to be used in practical applications, its durability needs to be investigated. Therefore, this paper presents the durability performance of OPS concrete under four curing regimes. The durability properties investigated include the volume of permeable voids (VPVs), sorptivity, water permeability, chloride diffusion coefficient and time to corrosion initiation from the 90-day salt ponding test, and Rapid Chloride Penetrability Test (RCPT). Results showed that the durability properties of OPS concrete were comparable to that of other conventional

lightweight concretes and proper curing is essential for OPS concrete to achieve better durability especially at the later ages.

Keywords Oil palm shell (OPS) · Solid waste · Lightweight concrete · Curing · Durability properties

1 Introduction

Concrete, known for its versatility and adaptability is the most widely used construction material. However, the production of concrete consumes a large amount of natural resources. As a step in ensuring the availability of resources for future generations, it is necessary to adopt engineering practices which focus on the conservation of non-renewable resources and energy. Researchers have been formulating new technologies, which provide a sustainable approach in the construction industry. One such approach is the use of alternative materials such as solid waste materials and by-products as building materials in the construction industry. It has been found that oil palm shell (OPS) solid waste can be used as coarse aggregate for the manufacture of structural lightweight concrete [1–4]. Malaysia being the world's largest producer of oil palm has an abundant supply of OPS. Over 4 million tonnes of OPS are generated

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