

Precast c-channel floor for rural and estate housings

Abstract

Rapid urbanisation due to exponential growth of population in the world today has significantly resulted in housing demand. Adversely, the annual worldwide concrete usage standing at 2.7 billion m³ has caused serious depletion of non-renewable natural stones used in concrete production. In Sabah, Malaysia alone, the annual usage of non-renewable construction aggregates have reached about 12 million tons. It therefore becomes crucial to explore the alternatives of renewable resource particularly the Oil Palm Shell (OPS) solid waste, a by-product from the agricultural sector. Malaysia being the largest palm oil producer in the world has produced more than 4 million tons of OPS annually. The use of OPS as coarse aggregates in concrete production known as OPS concrete has been recommended as structural lightweight concrete (LWC). Due to the low modulus of elasticity of OPS concrete, conventional crushed granite was added to OPS concrete mix to produce concrete known as OPS hybrid concrete chiefly used in precast flooring slabs fabrication. In line with Industrialised Building System (IBS), precast floor system has been known for its many advantages over the cast in-situ concrete slab. This paper discusses the behaviour of precast C-channel floor of 3, 4, 5, 6, 7, and 8 m span subjected to Uniformly Distributed Loading (UDL). Under UDL, the corresponding load capacity of C-channel of varying spans reduced as the span increased. The deflection recovery of C-channels has satisfied the requirement based on National Building Code of India. This has proved that the C-channels of 3, 4, 5, 6, 7 and 8 m span can be fabricated using OPS hybrid concrete with minimum compressive strength of 22 MPa.