

Experimental Study on mechanical properties of Transparent Concrete by using Rice Husk Ash

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Abstract— Transparent concrete is comparatively a new emerging building material which has good light - transmissive properties which is composed of fine concrete and Optical fibers. The chief necessity to produce transparent concrete is to utilize the sunlight as a natural light source to reduce the power consumption of radiance. Also its use in concrete gives good pleasant and artful appearance to the building. In the present investigation, it was aimed to assess the mechanical properties and light transmittance of transparent concrete by partial replacement of cement with Rice Husk Ash (RHA) in 10, 20 and 30 percentages by volume fractions. Plastic Optical Fibers (POF) of 400 micrometer diameter and Glass Optical Fibers (GOF) of 1.5mm diameter were added to the concrete in 4% of total volume. Based on the test results, it was found that the Compressive strength and tensile strength was found to decrease with increase in the percentage of replacement of cement with RHA. But regarding the Light Transmittance, the Glass Optical fibers of 1.5 mm diameter gave a good light guiding property and there was no light transmittance in Plastic Optical Fibers of 400 micrometer diameter fibers.

Keywords— Transparent concrete, Optical fibers, Fine concrete, Rice Husk Ash and Strength

I. INTRODUCTION

Transparent concrete is a good exterior material which is used widely used in many countries, because of its aesthetics and energy saving applications. Transparent concrete is similar to ordinary concrete except that it uses coarse aggregate with a maximum nominal size of 10 mm and Optical Fibers which transmits the light through the core of the optical fiber. Transparent concrete has found its main applications in green buildings, interior partition walls and illumination facade which are manufactured as prefabricated building blocks or panels. Transparent concrete was produced by mixing Optical Fibers in 4% of total volume of the concrete mixture. Also the transparent concrete was found to possess reduced weight when compared to the conventional concrete, due to lesser size of coarse aggregates. The main objective of the present study have involved assessing the mechanical properties and Light transmittance of transparent concrete with POF and GOF by partial replacement of cement with Rice Husk Ash (RHA) in 10%, 20% and 30% of volume fractions.

II. MATERIALS USED

A. Cement

OPC of 53 Grade with specific gravity 3.15 was used conforming to IS 12269 – 2013.

B. Fine Aggregate

Fine aggregates which passes through 2.36 mm IS sieve with a specific gravity of 2.65 and conforming to zone I as per IS : 383-2016 was used.

C. Coarse Aggregate

To make the concrete transparent, the Coarse aggregates having a maximum nominal size of 10 mm and specific gravity of aggregates of 2.67 was used.

D. Water

Water used for casting and curing of the specimens, which was conforming to IS 456-2000.



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