

Combined Effect of Rice Husk Ash and Fibers on The Mechanical Properties of Concrete

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ABSTRACT

The current goal of the research is to examine the strength properties of hooked end steel-fibrillated polypropylene hybrid fiber concrete with Rice Husk Ash (RHA) as a partial substitute for cement. The concrete consists of various percentages of steel fibers and polypropylene fibers, and cement is partially replaced by rice husk ash with 8% by weight. At 0.5% and 1% by volume fraction, hooked end steel fibers were included. The fibrillated polypropylene fiber was added at 0.5% by weight fraction. At 28 and 56 days, cube compression test, split tensile strength test on cylinder and flexural strength tests on prism were performed. Optimal combination of steel and polypropylene hybrid fibers was evaluated from test findings. Results confirmed that the combination of RHA with fibers enhanced the concrete strength properties at 28 and 56 days curing periods. Concrete with hybrid form gave more strength than fiber in mono form. Among all the mixes considered in this investigation, hybrid mix 1% steel + 0.5% polypropylene fiber gave the highest compressive strength, split tensile strength and flexural strength at both 28 and 56 days curing periods. In this mix, the compressive strength was increased by 29% and 31% at 28 and 56 days respectively than control concrete. The split tensile strength was increased by 38% and 46% at 28 and 56 days respectively than control concrete. The flexural strength was increased by 47% and 57% at 28 and 56 days respectively than control concrete. To validate the test results, statistical mathematical models were created. The results revealed that the empirical mathematical models are in concurrence with the actual test findings.

Keywords: *Rice Husk Ash, Steel Fiber, Polypropylene Fiber, Strength Properties, Statistical Mathematical Models.*

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