

Mechanical Properties of Recycled Aggregate Concrete Reinforced with Sisal Fiber

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Abstract:

A potential solution to the problem of limited disposal sites, is to use the waste from demolished structures as recycle-aggregate. Sisal fibre (SF) is a natural fibre from plant leaves, it has been used in concrete to improve the weak tensile and flexural properties of concrete. The materials were chosen to improve the strength properties of the concrete and ensure sustainability and improved quality. This paper presents an investigation of the mechanical properties of grade M30 recycle-aggregate concrete incorporated with sisal fibre at different fibre proportions of 0%, 0.5%, 1%, 1.5%, and 2%. The assessment of concrete properties will include the workability of concrete using a slump test, compressive strength test, splitting tensile test, and flexural strength test at the age of 7 and 28 days of curing. The slump values of concrete are lower to the tune of 1.44 – 6.52 %. The compressive strength of sisal fibre recycle-aggregate concrete (SFRAC) increased from 3.87% to 11.15%. The maximum increase in splitting tensile strength of 13% was obtained at a sisal fibre volume fraction of 1.5% along with 50% recycled aggregate. The addition of sisal fibres significantly improves the mechanical properties of concrete.

Keywords:

Sisal fibre, Recycle-Aggregate Concrete, Tensile strength, Compressive Strength, Sustainable Development