

An investigation on suitability of sisal fiber reinforced concrete composites.

Yohakimu Myamba.

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University of Dar es Salaam, College of Engineering and Technology, 2018.

The use of fiber reinforced concrete (FRC) in various civil engineering applications is indisputable. Fiber reinforcement is widely used in construction engineering because it increases the concrete's strength and improves the concrete's mechanical properties. The inclusion of different types of fibers in concrete has shown better improvement of mechanical properties of fiber - concrete composites. During this investigation, the mechanical properties of sisal fibers reinforced concrete were assessed namely, flexural strength, tensile strength, water absorption capacity and interfacial bond strength. These mechanical properties were assessed in two types of reinforcement namely, randomly oriented chopped sisal fibers reinforcement and parallel sisal fibers reinforcement aligned in the direction of the stress field and it was done while varying the sisal fibers volume fractions. The sisal fibers reinforcement was shown to improve some of the mechanical properties assessed. The properties like flexural and tensile strength were found to increase considerably with increasing fiber volume fractions until optimum volume fraction is reached, thereafter, the strengths were found to decrease continuously. The prominent increment of 32.4% at fiber volume fraction of 2.0% on flexural strength for parallel reinforced fiber – concrete composite was observed. There was very small increment on both flexural and tensile strength for randomly oriented chopped sisal fibers reinforced concrete. The Interfacial bond strength was found to be 0.12 N/mm^2 and was observed to be prominent for chopped sisal fibers reinforced concrete specimens tested for flexural strength. During failure, the composite was observed to behave in a ductile manner whereby the fibers were able to carry more load while full fracture had occurred on the specimen. The water absorption capacity of the SFRC was found to increase with increasing sisal fiber volume fraction.