

Tensile Behavior of Oil Palm Fiber Concrete (OPFC) with Different Fiber Volume

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Abstract : Oil palm fiber (OPF) is a fibrous material produced from the waste of palm oil industry which is suitable to be used in construction industry. The applications of OPF in concrete can reduce the material costs and enhance concrete behavior. Dog-bone test provides significant results for investigating the behavior of fiber reinforced concrete under tensile loading. It is able to provide stress-strain profile, modulus of elasticity, stress at cracking point and total crack width. In this research, dog-bone tests have been conducted to analyze total crack width, stress-strain profile, and modulus of elasticity of OPFC. Specimens are in a dog-bone shape with a long notch in the middle as compared to the end, to ensure cracks occur only within the notch. Tests were instrumented using a universal testing machine Shimadzu 300kN, a linear variable differential transformer and two strain gauges. A total of nine specimens with different fibers at fiber volume fractions of 0.75%, 1.00%, and 1.25% have been tested to analyze the behavior under tensile loading. Also, three specimens of plain concrete fiber have been tested as control specimens. The tensile test of all specimens have been carried out for concrete age exceed 28 days. It shows that OPFC able to reduce total crack width. In addition, OPFC has higher cracking stress than plain concrete. The study shows plain concrete can be improved with the addition of OPF.

Keywords : cracks, crack width, dog-bone test, oil palm fiber concrete

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