

**Structural behavior and internal crack mechanisms of fiber  
reinforced concrete under cyclic and static loads combined  
with CT Scan Images Processing**

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Abstract:

In this research we present a study of the behavior, and the effects of cyclic loading on the internal microstructure in Fiber-Reinforced Concrete (FRC).

The specimen tested has two different fiber dosage, one with 1% of fibers by volume and the other with 2% of fibers.

A total of 65 prismatic specimens were subjected to a three-point cyclic and static bending test.

The evolution of the residual tensile strength of the fiber-reinforced concretes and damage following cyclic flexural loading was analyzed. Four stages were applied to different specimens. First, an initial crack load was applied to all the specimens. Second, some specimens were subjected to fatigue until its failure. Third, other were subjected to a preset cyclic load without reaching failure. Finally static tests were applied to the specimens with cyclic load and those not tested yet.

These results were compared with fiber content and fiber orientation. Both fiber content and fiber orientation were measured using computed tomography (CT) scans.

The results showed that the damage provoked a progressive reduction in the residual tensile strength

The differences in the behavior of both series were mainly related to their fiber content and, to a lesser extent, to their fiber orientation.