

Description of near-tip fracture processes in strain hardening cementitious composites using image-based analysis and the compact tension test - DTU Orbit (09/11/2017)

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The cracking mechanisms assume a key role in the composite behavior of Strain Hardening Cementitious Composites (SHCCs). Due to their importance, in previous studies the mechanical behavior of SHCC materials, as well as of other strain softening fiber reinforced cementitious composites, was characterized under eccentric tensile loading using the Compact Tension Test (CTT). The present research further extends this investigation, with particular emphasis on cementitious composites reinforced with multiple types of fibers. The experimental tensile load-displacement results are discussed and compared to the numerically derived responses. Furthermore, the crack initiation and propagation at the early stages of the loading sequence are analyzed. The size of the specimens and the resolution of the digital images acquired allow the detection of relatively small displacements and crack openings. The results are discussed, with special emphasis on the topology of the cracks obtained near the crack tip and on the description of the fracture process zone.

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