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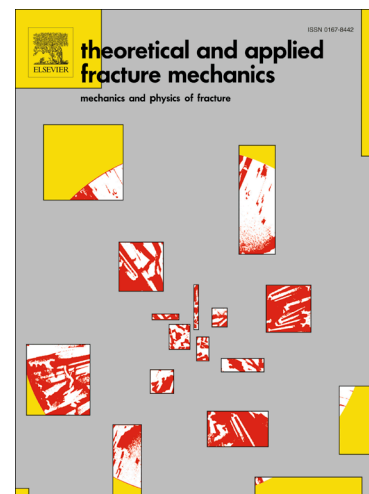
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Wedge-splitting tests for tensile strength and fracture toughness of concrete

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Abstract:

This study presents a new approach for determination of tensile strength f_t and fracture toughness K_{IC} of concrete using wedge-splitting (WS) specimens as neither property can be easily measured because of the heterogeneous material structures. The Boundary Effect Model (BEM) was extended to WS geometry and relevant equations were derived so that more concrete properties can be determined by the load and displacement measurements. The new model considers the influence of coarse aggregate structures on concrete fracture by linking the fictitious crack growth Δa_{fic} at peak load P_{max} to the maximum aggregate size d_{max} . The random aggregate distribution and inevitable variations in Δa_{fic} and P_{max} are considered by a discrete number β . WS results of concrete specimens with d_{max} from 10 mm to 25 mm

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