A Simplified Finite Element Model for Assessing Steel Fibre Reinforced Concrete Structural Performance

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ABSTRACT

The present numerical investigation offers evidence concerning the validity and objectivity of the predictions of a simple, yet practical, finite element model concerning the responses of steel fibre reinforced concrete structural elements under static monotonic and cyclic loading. Emphasis is focused on realistically describing the fully brittle tensile behaviour of plain concrete and the contribution of steel fibres on the post-cracking behaviour it exhibits. The good correlation exhibited between the numerical predictions and their experimental counterparts reveals that, despite its simplicity, the subject model is capable of providing realistic predictions concerning the response of steel fibre reinforced concrete structural configurations exhibiting both ductile and brittle modes of failure without requiring recalibration.

KEYWORDS: Steel fibres; Concrete; Finite-element analysis; Cracking; Numerical modelling; Nonlinear behaviour

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