

# Numerical modelling of large scale steel fibre reinforced-reinforced concrete beams failing in shear

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## Abstract

Experimental and numerical studies on Steel Fibre Reinforced Concrete (SFRC) over the last 5 decades, or so, have indicated that the post cracking strength of concrete can be improved by providing suitably arranged, closely spaced, wire reinforcement. While the database of experimental and numerical shear tests of SFRC members is extensive, the pool of test data and numerical models, alike, of SFRC beams containing conventional transverse shear reinforcement (stirrups) are limited. The behaviour of full scale steel fibre reinforced-reinforced concrete (SFR-RC) beams are analysed herein using a smeared crack model provided by ATENA 2D integrated with a constitutive law derived after an inverse analysis from prism bending tests. The numerical model is validated against experimental results obtained from four large scale SFR-RC beams and is shown to reasonably model the experimental responses. The model allows a better understanding of SFR-RC structures failing in shear and can be used as a basis for developing new design procedures for such structures.

## Keywords

Steel fibres, concrete, shear, stirrups, ATENA.