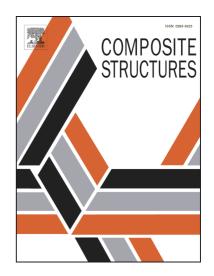
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Prediction of the Load Carrying Capacity of Elevated Steel Fibre Reinforced Concrete Slabs

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Prediction of the Load Carrying Capacity of Elevated Steel 1 **Fibre Reinforced Concrete Slabs** 2 3 Hamidreza Salehian¹, Joaquim A.O. Barros² 4 5 1- Assistant Professor, Seismic Geotechnical and High Performance Concretes Research Centre, Department of Civil Engineering, Semnan Branch, Islamic Azad University, Semnan, Iran, e-mail: 6 7 hrsalehian@semnaniau.ac.ir (corresponding author) 8 2- Full Professor, ISISE, Department of Civil Engineering, University of Minho, Guimarães, 9 Portugal, e-mail: barros@civil.uminho.pt 10 11 Abstract 12 A novel methodology is developed for predicting the load carrying capacity of elevated 13 steel fibre reinforced concrete (E-SFRC) slab systems. In the proposed approach the depth 14 of slab's cross section is discretized into several layers, and the number of steel fibres per 15 16 each layer is determined by considering the distribution of fibres along the depth of cross 17 section. This information, together with the one obtained from the three-point notched beam bending tests performed on four series of SFRC made of different concrete strength 18 class and content of fibres, have provided the stress-crack width laws for defining the post-19 20 cracking behaviour of each layer. These constitutive laws are implemented in a numerical 21 model developed based on the moment-rotation approach for determining the positive and negative resisting bending moment of the slab's unit width cross section. By using the 22 23 yield line theory, the load carrying capacity of E-SFRC slab is predicted for the most 24 current load conditions. Predictive performance of the proposed methodology is assessed comparing to the results recorded in experiment and the ones obtained by the numerical 25 simulation. The developed model is utilised in a parametric study to evaluate the influence 26 of parameters that affect the load-carrying capacity of E-SFRC slabs. 27 28

Keywords: Elevated slabs, steel fibre reinforced concrete, load carrying capacity, yield line
theory, fibre distribution.

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