

Accepted Manuscript

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

Hamidreza Salehian, Joaquim A.O. Barros

PII: S0263-8223(16)30807-8

DOI: <http://dx.doi.org/10.1016/j.compstruct.2017.03.002>

Reference: COST 8320

To appear in: *Composite Structures*

Received Date: 2 June 2016

Revised Date: 24 January 2017

Accepted Date: 1 March 2017



Please cite this article as: Salehian, H., Barros, J.A.O., Prediction of the Load Carrying Capacity of Elevated Steel Fibre Reinforced Concrete Slabs, *Composite Structures* (2017), doi: <http://dx.doi.org/10.1016/j.compstruct.2017.03.002>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

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

Hamidreza Salehian¹, Joaquim A.O. Barros²

1- Assistant Professor, Seismic Geotechnical and High Performance Concretes Research Centre,
Department of Civil Engineering, Semnan Branch, Islamic Azad University, Semnan, Iran, e-mail:
h.salehian@semnaniau.ac.ir (corresponding author)

2- Full Professor, ISISE, Department of Civil Engineering, University of Minho, Guimarães,
Portugal, e-mail: barros@civil.uminho.pt

Abstract

A novel methodology is developed for predicting the load carrying capacity of elevated steel fibre reinforced concrete (E-SFRC) slab systems. In the proposed approach the depth of slab's cross section is discretized into several layers, and the number of steel fibres per each layer is determined by considering the distribution of fibres along the depth of cross 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 class and content of fibres, have provided the stress-crack width laws for defining the post-cracking behaviour of each layer. These constitutive laws are implemented in a numerical 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 yield line theory, the load carrying capacity of E-SFRC slab is predicted for the most 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 simulation. The developed model is utilised in a parametric study to evaluate the influence of parameters that affect the load-carrying capacity of E-SFRC slabs.

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

Download English Version:

<https://daneshyari.com/en/article/4912044>

Download Persian Version:

<https://daneshyari.com/article/4912044>

[Daneshyari.com](https://daneshyari.com)