



## Contents

Preface	iii
Design guidelines and specifications	
Structural design according to <i>fib</i> MC 2010: Comparison between RC and FRC elements <i>Marco di Prisco, Giovanni Plizzari, Lucie Vandewalle</i>	1
Design based approaches for fibre-reinforced concrete: An overview of ACI committee 544 activities <i>Barzin Mobasher</i>	17
FRC design according to the draft Australian bridge code Stephen Foster	29
An introduction to the Chinese guideline for fibre-reinforced concrete structures <i>Christopher K. Y. Leung</i>	41
FRCC: Design and application in Japan Yuichi Uchida, Minoru Kunieda, Keitetsu Rokugo	51
French recommendations and feedback on experience with ultra-high-performance fibre-reinforced concrete (UHPFRC) <i>Jacques Resplendino</i>	61
Steel-fibre-reinforced concrete (SFRC) in fire: Normative and pre-normative requirements and code-type regulations <i>Frank Dehn, Annemarie Herrmann</i>	75
Material properties for design	
Translation of test results of small specimens of flowable fibre concrete to structural behaviour: A discussion paper of <i>fib</i> Task Group 4.3 <i>Steffen Grünewald, Luca Bartoli, Liberato Ferrara, Terje Kanstad, Frank Dehn</i>	81
Fibre-reinforced cementitious composites with adapted rheology: From state-of-the-art knowledge towards new boundaries for structural concrete applications <i>Liberato Ferrara</i>	91
Study of rheological and mechanical performance of ultra-high-performance glass concrete <i>Nancy Soliman, Arezki Tagnit-Hamou</i>	103
Feasibility of using recycled steel fibres to enhance the behaviour of recycled aggregate concrete <i>Khaleel H. Younis, Kypros Pilakoutas, Maurizio Guadagnini, Harris Angelakopoulos</i>	113





Effect of steel fibres on the tensile behaviour of self-consolidating reinforced concrete blocks	123
Romildo Dias Toledo Filho, Ederli Marangon, Flávio de Andrade Silva, Barzin Mobasher	
Fracture behaviour of polyolefin fibre-reinforced self-compacting concrete Marcos G. Alberti, Alejandro Enfedaque, Jaime C. Gálvez	131
Modelling early age drying in fibre-reinforced concretes Tara Rahmani, Mehdi Bakhshi, Barzin Mobasher, Mohammad Shekarchi	141
Behaviour and design of beams and columns	
Shear design of full-scale prestressed SFRC girders Tim Soetens, Stijn Matthys	151
Numerical modelling of large scale steel-fibre-reinforced reinforced concrete beams failing in shear <i>Ali Amin, Stephen J. Foster</i>	161
Structural applicability of polypropylene fibres: Deep and wide-shallow beams subjected to shear Antonio Conforti, Andrea Tinini, Fausto Minelli, Giovanni Plizzari, Sandro Moro	171
The effect of fibres in UHPFRC beams with longitudinal steel reinforcement Norbert Randl, Tamás Mészöly	181
Experimental and numerical study on the use of high-strength and ultra-high- performance fibre-reinforced concrete in columns <i>Dario Redaelli, Ana Spasojevic, Aurelio Muttoni</i>	193
Experimental and analytical behaviour of RC members strengthened by means of a high-performance jacket Serena Mostosi, Consuelo Beschi, Alberto Meda, Paolo Riva	203
Behaviour and design of slabs and other structures	
The behaviour of SFRC flat slabs: The Limelette full-scale experiments to support design model codes <i>Benoit Parmentier, Petra Van Itterbeeck, Audrey Skowron</i>	213
Precast fibre-reinforced self-compacting concrete slabs Luca Facconi, Fausto Minelli, Giovanni Plizzari, Andrea Pasetto	223
Precast plates made with lightweight fibre-reinforced concrete Alessandro P. Fantilli, Andrea Gorino, Bernardino Chiaia	239
Mechanical behaviour of slabs made of strain-hardening cement-based composite and steel reinforcement subject to uniaxial tensile loading <i>Eric Mündecke, Viktor Mechtcherine</i>	249





Innovative precast HPFRC barriers for bridges Jean-Philippe Charron, Matthew Namy, François Duchesneau, Bruno Massicotte	259
Effectiveness of fibres for structural elements in case of fire <i>György L. Balázs, Éva Lublóy, Olivér A. Czoboly</i>	269
Steel-fibre reinforcement for large hydraulic concrete structures: Numerical investigations on a semi-spiral case <i>Mahdi Ben Ftima, Bruno Massicotte, Sébastien Mousseau</i>	279
Numerical models for designing steel-fibre-reinforced concrete structures: Why and which ones? <i>Pierre Rossi, Jean-Louis Tailhan, Dominic Daviau-Desnoyers</i>	289
Load-bearing capacities of SFRC elements accounting for tension stiffening with modified moment-curvature relations <i>Peter Heek, Peter Mark</i>	301
Behaviour and design of foundations and underground components	
Design of glass-fibre-reinforced concrete floors according to the <i>fib</i> Model Code 2010 Bryan Barragán, Luca Facconi, Olivier Laurence, Giovanni Plizzari	311
A comprehensive methodology for the design of fibre-reinforced concrete pavements <i>Sunitha K. Nayar, Ravindra Gettu</i>	321
Experimental and numerical study on the load-bearing behaviour of steel-fibre- reinforced concrete for precast tunnel lining segments under concentrated loads <i>Rolf Breitenbücher, Günther Meschke, Fanbing Song, Michael Hofmann, Yijian Zhan</i>	331
Developments in design for fibre-reinforced concrete tunnel segments Mehdi Bakhshi, Verya Nasri	341
Optimization of input parameters for material modelling of fibre-reinforced concrete and application to the numerical simulation of tunnel lining <i>Tereza Sajdlová, Radomír Pukl</i>	353
Steel-fibre reinforcement for precast lining in tunnels with different diameters <i>Alberto Meda, Zila Rinaldi</i>	363
Numerical simulation of steel-fibre-reinforced concrete pipes using constitutive equations based on the Barcelona test <i>Renata Monte, Albert de la Fuente, Antonio D. de Figueiredo, Antonio Aguado</i>	373
Optimum fibre content for precast steel-fibre-reinforced concrete pipes Nedal Mohamed, Ahmed Soliman, Moncef Nehdi	383





## Applications in structure and underground construction projects

FRC structural applications according to the <i>fib</i> Model Code 2010: A unified approach <i>Marco di Prisco, Matteo Colombo, Pamela Bonalumi, Carlo Beltrami</i>	393
Steel-fibre-reinforced concrete elevated suspended slabs: Design cases in Europe and the USA <i>Xavier Destrée</i>	409
Design and construction of SFRC bridge decks: Building on past experiences and recent developments Bruno Massicotte, Léa Faggio, Nicola Cordoni, Ali Nour, David Conciatori	419
Footbridge over the Ovejas ravine in Alicante: An economical alternative made only of ultra-high-performance fibre-reinforced concrete (UHPFRC) <i>Pedro Serna, Juan Ángel López, Esteban Camacho, Hugo Coll, Juan Navarro-Gregori</i>	435
Examples of bridge, tunnel lining and foundation design with steel-fibre-reinforced concrete Agnieszka Winkler, Carola Edvardsen, Thomas Kasper	451
Earthquake-resistant fibre-reinforced concrete coupling beams without diagonal bars <i>G.J. Parra-Montesinos, J. K. Wight, C. Kopczynski, R.D. Lequesne, M. Setkit, A. Conforti, J. Ferzli</i>	461
Design of FRC tunnel segments considering the ductility requirements of the <i>fib</i> Model Code 2010: Application to the Barcelona Metro Line 9 <i>Albert de la Fuente, Liao Lin, Sergio Cavalaro, Antonio Aguado</i>	471