FIBRE-REINFORCED CONCRETE: FROM DESIGN TO STRUCTURAL APPLICATIONS - FRC 2014: ACI-FIB INTERNATIONAL WORKSHOP
fib BULLETIN 79

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Abstract:
The FRC-2014 Workshop Fibre Reinforced Concrete: from Design to Structural Applications was the first ACI-fib joint technical event. The Workshop, held at Polytechnique Montreal (Canada) on July 24th and 25th 2014, was attended by 116 participants from 25 countries and 4 continents.

The first international FRC workshop was held in Bergamo (Italy) in 2004. At that time, the lack of specific building codes and standards was identified as the main inhibitor to the application of this technology in engineering practice. Ten years after Bergamo, many of the objectives identified at that time have been achieved. The use of fibre reinforced concrete (FRC) for designing structural members in bending and shear has recently been addressed in the fib Model Code 2010. Steel fibre reinforced concrete (SFRC) has also been used structurally in several building and bridge projects in Europe and North-America. SFRC has been widely used in segmental tunnel linings all over the world. Members of ACI544 and fib TG-4.1 have been involved in writing code based specifications for the design of FRC structural members.

More than fifty papers were presented at the Workshop from which forty-four were selected for this joint ACI/fib publication. The papers are organised in the document under six themes: Design guidelines and specifications, Material properties for design, Behaviour and design of beams and columns, Behaviour and design of slabs and other structures, Behaviour and design of foundations and underground components, and finally, Applications in structure and underground construction projects.

PARTIAL FACTOR METHODS FOR EXISTING CONCRETE STRUCTURES
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Abstract:
For a large part of the existing buildings and infrastructure the design life has been reached or will be reached in the near future. These structures might need to be reassessed in order to investigate whether the safety requirements are met. Current practice on the assessment of existing concrete structures however needs a thorough evaluation from a risk and reliability point of view, as they are mostly verified using simplified procedures based on the partial factor method commonly applied in design of new structures. Such assessments are often conservative and may lead to expensive upgrades.

Although the last decades reliability-based assessment of existing concrete structures has gained wide attention in the research field, a consistent reliability-based assessment framework and a practically applicable codified approach which is compatible with the Eurocodes and accessible for common structural engineering problems in everyday practice is currently missing. Such an approach however allows for a more uniform, more objective and probably more widely applied assessment approach for existing concrete structures. Hence, in this bulletin two different partial factor formats are elaborated, i.e. the Design Value Method (DVM) and the Adjusted Partial Factor Method (APFM), enabling the incorporation of specific reliability related aspects for existing structures. The DVM proposes a fundamental basis for evaluating partial factors whereas the APFM provides adjustment factors to be applied on the partial factors for new structures in EN 1990. In this bulletin both methods are elaborated and evaluated and a basis is provided for decision making regarding the target safety level of existing structures.

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