Preface

ConCrack is a series of international workshops dedicated to the control of cracking in concrete structures. Although cracking may not be a systematic and immediate concern for structural safety of reinforced or pre-stressed structures, it is becoming an increasing concern due to growing awareness and demand regarding durability issues. Moreover, cracking may alter the operation ability of the structures, especially when tightness is requested.

Prevention of early-age cracking of concrete structures, which is mainly associated to control of thermal effects and restrained endogenous and thermal shrinkage, is a key aspect of the control of cracking. It has important economic consequences and influence on job sites practice as well as on contractors / checkers / owners everyday relations. Temperature limitation and quality control at early age, especially for mass concrete, also have long term benefits in reducing the risk of delayed ettringite formation.

Scientific advances in terms of concrete constitutive behavior and modeling, chemo-physical and mechanical couplings, numerical computations, knowledge in hydrates stability, as well as technical evolutions in terms of cement blends, admixtures and construction practice, have given the opportunity to exchange and synthesize rationally-based and cost-effective methods for a better control of the cracking risk in concrete structures at early age, especially for large concrete structures realized with mass concreting operations, and for a better control of the long-term associated risks for durability.

This is the origin and scope of ConCrack 3, the RILEM-JCI International Workshop on Crack Control of Mass Concrete and Related Issues concerning Early-Age of Concrete Structures

ConCrack 1 and 2 were held in Paris, 10-11 Dec. 2009 and 20-22 June 2011, respectively. The ConCrack 3 workshop has been co-organized in Paris, France, from 15-16 March 2012, by the Japan Concrete Institute and IFSTTAR, the French Institute of Science and Technology for Transports, Development and Networks (formerly LCPC) under the auspices of RILEM and in partnership with the French National Project CEOS.fr dedicated to crack control of special concrete structures.

An important part of the technical content of the workshop is based on the presentation of the JCI guidelines for control of cracking of mass concrete and the associated scientific background, and on the analysis of the large-scale experiments and modeling advances provided by French CEOS.fr and Mefisto projects in terms of early-age concrete cracking due to restrained thermal strains and shrinkage. Further sessions are dedicated to provisions and background concerning Delayed Ettringite Formation prevention and associated thermal computation tools, and to the international experience in control of thermal effects at early age (experimental results, models and field applications).

The “JCI Guidelines for Control of Cracking of Mass Concrete” have been reprinted for the workshop attendees with grateful JCI permission. The present book, which is part of the RILEM Proceedings collection, comprises all the other contributions. It is organized in 4 sections, following the sessions of the workshop:
• Recent research results of the French CEOS.fr project on early-age thermal effects
• Early-age thermal effects and DEF prevention
• Control of thermal effects at early age: experimental results and models
• Control of thermal effects at early age: applications

The amount of knowledge documented in these Proceedings gives them a reference value for improving the control of early-age thermal effects and cracking risks in concrete structures and enhancing their durability.

As the editors of these Proceedings, it is our great honour and pleasure to thank all the authors, speakers and chairpersons who have made this Workshop a success, and give special thanks to the members of ConCrack3 Scientific Committee. We deeply acknowledge the Institutions having supported the organization of ConCrack3 International Seminar: RILEM, JCI and Ifsttar, as well as the IREX foundation for R&D in Civil Engineering as the support of CEOS.fr National Project, and those who helped publishing these Proceedings, namely Ifsttar, the French Foundation for Concrete Knowledge EFB, and The Directorate for Research and Innovation of the French Ministry in charge of Sustainable Growth. Our deepest gratitude is also expressed to Professor Jacky Mazars, as the Scientific Manager of CEOS.fr French National Project, and Professor Ryoichi Sato, as the Chairman of the JCI technical committees on Revision of JCI Guidelines for Control of Cracking of Mass Concrete and its English Version, who took a direct part in initiating this Workshop.

March 2012 in Paris, France

François Toutlemonde      Jean-Michel Torrenti

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