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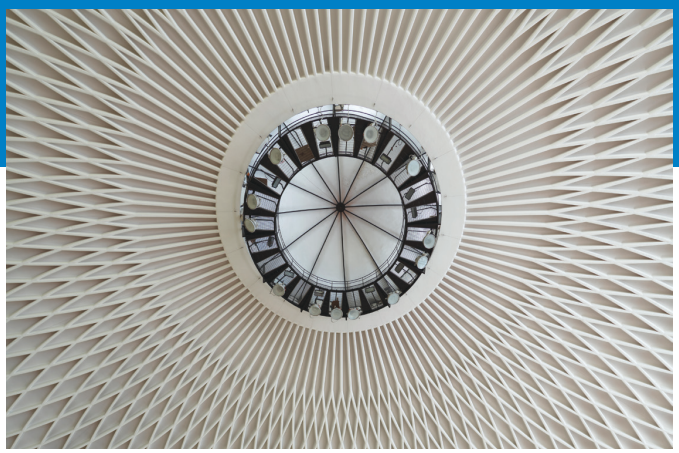

Durability and Sustainability of Concrete Structures – Workshop Proceedings

SP-305

Editors:
Mario Alberto Chiorino, Luigi Coppola, Claudio Mazzotti, Roberto Realfonzo, and Paolo Riva

American Concrete Institute
Always advancing

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Preface

With the dawn of twenty-first century, the world has entered into an era of sustainable development. The main challenge for concrete industry is to serve the two major needs of human society, the protection of the environment, on one hand, and - on the other hand - meeting the infrastructural requirements of the world growing population as a consequence of increase in both industrialization and urbanization. In the past, concrete industry has satisfied these needs well. Concrete is an environmentally friendly material useful for the construction of vast infrastructures. Skyscrapers, highway bridges, roads, water retaining structures and residential buildings are all testimonials to concrete's use and versatility. However, for a variety of reasons the situation has changed dramatically in the last years. First of all, the concrete industry is the largest consumer of natural resources. Secondly, portland cement, the binder of modern concrete mixtures, is not as environmentally friendly. The world's portland cement production, in fact, contributes to the earth's atmosphere about 7% of the total CO_2 emissions, CO_2 being one of the primary greenhouse gases responsible for global warming and climate change. As a consequence, concrete industry in the future has to face two antithetically needs. In other words how the concrete industry can feed the growing population needs being – at the same time - sustainable?

ACI Italy Chapter has been playing a significant role in the last years in the broad area of concrete technology in Italy and, in particular, in the field of concrete durability and sustainability. ACI Italy Chapter has become increasingly involved in research and development dealing with durability and sustainability issues such as reduction in CO_2 emissions, use of recycled materials and innovative products, design of durable structures and maintenance, repair and refurbishment of concrete infrastructures.

In October 2015, the American Concrete Institute Italy Chapter (ACI IC) and the Department of Civil, Chemical, Environmental, and Material Engineering (DICAM) of the University of Bologna sponsored the First International Workshop on "Durability & Sustainability of Concrete Structures" in Bologna (Italy). The workshop was co-sponsored by the American Concrete Institute and ACI Committee 201. The proceedings of the workshop were published by ACI IC as SP305. The proceedings consist of forty-eight refereed papers concerning reduction in green house gases in cement and concrete industry, recycled materials, innovative binders and geopolymers, Life Cycle Cost Assessment in concrete construction, reuse and functional resilience of reinforced concrete structures, repair and maintenance, testing, inspection and monitoring.

Many thanks are extended to the members of the technical paper review panel. Without their dedicated efforts it would not have been possible to publish the proceedings. The cooperation of the authors in accepting reviewers' comments and suggestions and in revising the manuscripts accordingly is greatly appreciated.

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