DESCRIPTION

Steel-reinforced concrete is used ubiquitously as a building material due to its unique combination of the high compressive strength of concrete and the high tensile strength of steel. Therefore, reinforced concrete is an ideal composite material that is used for a wide range of applications in structural engineering such as buildings, bridges, tunnels, harbor quays, foundations, tanks and pipes. To ensure durability of these structures, however, measures must be taken to prevent, diagnose and, if necessary, repair damage to the material especially due to corrosion of the steel reinforcement.

The book examines the different aspects of corrosion of steel in concrete, starting from basic and essential mechanisms of the phenomenon,

moving up to practical consequences for designers, contractors and owners both for new and existing reinforced and prestressed concrete structures. It covers general aspects of corrosion and protection of reinforcement, forms of attack in the presence of carbonation and chlorides,

problems of hydrogen embrittlement as well as techniques of diagnosis, monitoring and repair. This second edition updates the contents with recent findings on the different topics considered and bibliographic references, with particular attention to recent European standards.
book is a self-contained treatment for civil and construction engineers, material scientists, advanced students and architects concerned with the design and maintenance of reinforced concrete structures. Readers will benefit from the knowledge, tools, and methods needed to understand corrosion in reinforced concrete and how to prevent it or keep it within acceptable limits.

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**ABOUT THE AUTHOR**

**Luca Bertolini** is Full Professor in the field of materials science and technology at the Polytechnic University of Milan, Italy, where he teaches Construction Materials and Durability of Materials to students of Civil Engineering and Building Engineering Faculties. The scientific activity of Luca Bertolini is focused on the durability of building materials, especially reinforced concrete.

**Bernhard Elsener** is Professor for materials science at the Faculty of Engineering at the University of Cagliari, Italy, and a lecturer at ETH Zurich, Switzerland. He is an internationally well-known expert on the durability of reinforced and prestressed concrete structures. His extensive research work and numerous publications focus on non-destructive methods to detect and quantify corrosion, the use of new electrically isolated post-tensioning tendons and electrochemical restoration techniques.

**Pietro Pedeferri** (1938-2008), a graduate in chemical engineering and former Professor of Electrochemistry at the University of Bari, has been Professor of Corrosion and Protection of Materials at the Technical University of Milan since 1983. His work has been mainly concerned with the corrosion of steel in concrete, and he has published more than 300 papers and a dozen books in the field of corrosion and materials technology.

**Elena Redaelli** is Assistant Professor in the field of materials science and technology at the Polytechnic University of Milan where she teaches Construction Materials to Building Engineering students. Her main scientific interests are connected with the corrosion of steel in concrete, its characterization and methods to prevent and control it. In particular, her research activity has focused on electrochemical techniques in concrete and methods for durability design of concrete structures.

**Rob B. Polder** is a senior materials scientist at the Netherlands Organization for Applied Scientific Research, and a full professor of materials and durability at Delft University of Technology in the Faculty of Civil Engineering and Geosciences. The main focus of his work is on corrosion of steel in concrete, from modeling and prediction to prevention and remediation, including electrochemical methods.
NEW TO EDITION

For the second edition the authors completely revised and updated the content to reflect the recent developments in the field of corrosion of steel in concrete. Moreover, the new edition includes: coverage of limestone cements, new durability tests in the framework of reliability centered maintenance, performance-based design of concrete, effects of curing on durability, recent insights on the corrosion chemistry of concrete, modern aspects of cathodic protection and, not the least, specific reference to new European rules and regulations.

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