Book review

Steel Corrosion-Induced Concrete Cracking

Y. Zhao and W. Jin. Butterworth-Heinemann, Oxford, UK, 2016, ISBN 978-0-12-809197-5, £76.00, 180 pp.

Steel corrosion-induced concrete cracking is a major problem in concrete structures. Cracking may compromise structural performance. Also, the formation of cracks can provide routes for harmful chemical species into concrete and thus accelerate the corrosion of reinforcement. In order to design durable reinforced concrete structures it is essential to understand not only why the reinforcing steel will corrode in concrete but, more importantly, to know what is the consequence of reinforcing steel corrosion. *Steel Corrosion-Induced Concrete Cracking* presents the latest advances in the field related to the deterioration of reinforced concrete structures caused by steel corrosion. The book provides in-depth coverage of the mechanisms relating to how cracks are formed and propagate in concrete cover during the corrosion of reinforcement. The book also fills an important gap in the literature by providing a comprehensive analysis of the concrete cracking process specifically caused by steel corrosion.

The book is structured in ten chapters. After the background introduction and literature review in Chapter 1, Chapter 2 describes the mechanisms of steel corrosion in concrete. The composition, expansion coefficient and elastic modulus of steel corrosion are discussed in Chapter 3. The following two chapters (4 and 5) present the damage analysis of

a corrosion-induced concrete cracking process and the critical thickness of the rust layer at the moment when surface cracking of the concrete cover takes place. Chapters 6 and 7 discuss the rust distribution in corrosion-induced cracks and present a Gaussian function to describe the non-uniform spatial distribution of corrosion products. The cracking shape of corrosion-induced cracking in concrete cover is discussed in Chapter 8. The mechanism of development and penetration of corrosion products into the porous zone of concrete and the formation of a corrosion layer at the steel-concrete interface are discussed in Chapter 9. Finally, an improved corrosion-induced cracking model is presented in Chapter 10, which considers the corrosion layer accumulation and corrosion product filling occurring simultaneously in concrete. Each chapter provides very detailed references. Following on from the chapter text, there is a well-defined subject index.

The book was written by two international leading researchers, who are experts in the fields of concrete materials and reinforced concrete structures. Compared to other books in the field, this book not only provides a systematic investigation of the cracking of concrete cover induced by steel corrosion, but also contains many original experimental data. The book, in many respects, reflects the recent achievement of the authors' research work in the field. This book can serve as an essential reference for academics, practitioners and graduate students who are interested in reinforced concrete structures.

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