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Book review

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Book review

Structural Concrete Strut-and-Tie Models for Unified Design

S. E. E. El-Metwally and W.-F. Chen. CRC Press, Balkema, the Netherlands, 2018, ISBN 978-14-9878-384-2, £65.60 (hbk), 230 pp.

This book presents the principles and details of the strut-and-tie method (STM) for the design of structural concrete elements. Since the introduction of the STM in various codes of practice, this topic has only been briefly covered in a chapter or less in only a few reinforced concrete design books. However, *Structural Concrete Strut-and-Tie Models for Unified Design* provides coherent coverage of the STM for various practical applications, making it unique.

The book is divided into eight chapters. The first three chapters are devoted to the principles of the STM, various techniques for developing STMs and failure criteria for the three main elements of STMs. Chapter 4 presents a few numerical design examples to illustrate application of the STM to typical reinforced concrete elements. The design examples considered include deep beams of different geometries and under different types of loading, a dapped end beam, a beam with a recess, concentric and eccentric local pressure problems as well as a deep beam and a wall with large openings. Each structural element is designed

in a clear, step-by-step way, with various assumptions explicitly explained and justified. Chapter 5 focuses on the STM of other deep beams, either simply supported, continuous or corbels, top or bottom loaded, directly or indirectly supported.

In Chapter 6, STMs for shallow and deep beams with openings are discussed and practical reinforcement detailing is recommended for these situations. Chapter 7 explains the application of STMs to various reinforced concrete frame joints, including knee corner joints under opening and closing moments, joints of wide beams supported on narrow columns, obtuse corner joints, exterior, tee and interior beam–column connections. Chapter 8 introduces two- and three-dimensional STMs for the design and strength assessment of pile caps.

This is a well-written and clearly illustrated book containing a wealth of experience and practical guidance on the application of STMs to reinforced concrete. It will be appealing to many readers interested in structural design, including professional structural engineers and postgraduate students. It would therefore be a worthy addition to university libraries and the bookshelves of practising structural engineers and postgraduate researchers.

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