overcomplicated. It is certainly not the sort of text where the reader becomes saturated with complex concepts and formulae. There is, however, some repetition in the first two chapters, e.g. the parameters affecting the choice of bridge deck are discussed on pages 1, 3 and 17. Most pages are well illustrated with colour photographs or neat hand-drawn diagrams, and the tabulated rates in the appendix are presented clearly. I found the cost data straightforward to use when trialled on a current project, and particularly liked the rules of thumb such as those concerning reinforcement detailing and effective deck thickness on pages 16 and 24 respectively.

Although the guide is intended for professionals, the comprehensive explanation of the range of concrete bridge decks would be useful for students with an interest in the subject. In summary this new technical guide is an excellent addition to the range of publications already available from the CBDG.

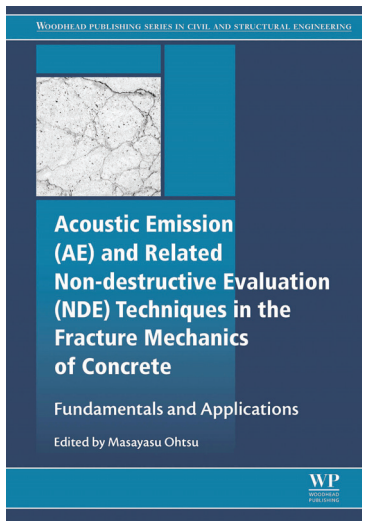
References

► 1) Benaim R. (2008) *The Design of Prestressed Concrete Bridges, Concepts and Principles*, Abingdon, UK: Taylor & Francis

► 2) Bourne S. (2013) 'Prestressing: recovery of the lost art', *The Structural Engineer*, 91 (2), pp. 12–22

This book provides a valuable snapshot of the recent state-of-the-art in this important field, says John Bungey, and will be useful to students, researchers and forward-thinking practising engineers alike.

Acoustic Emission (AE) and Related Non-destructive Evaluation (NDE) Techniques in the Fracture Mechanics of Concrete: Fundamentals and Applications



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This book comprises 13 chapters based on a specialist conference session held in Spain in 2013, and is edited by a widely recognised international authority in the field. The chapters focus on recent findings related to innovative non-destructive assessment methods associated with fracture mechanics which are under development for concrete, with particular emphasis on acoustic emission (AE). Ultrasonics, X-rays and thermography also feature. The 32 contributors are from a wide range of countries, including Japan, India and the USA, as well as a strong European input – although, sadly, there is no UK participation.

There is a very useful introduction by the Editor explaining the basic principles of AE at an easily understandable level. This includes recommendations for applications to in situ concrete based on recent RILEM work which cover standardisation of measurement, damage quantification and crack classification. The majority of chapters are largely theoretical in nature, dealing with analysis and interpretation of results, supported by laboratory studies. AE testing involves the detection of sudden strain energy release from localised sources, such as crack development, and alternative analysis approaches for use on concrete are discussed and compared.

Some chapters include details of equipment development, while there is a strong emphasis on monitoring situations, including the use of wireless sensing systems. These range from AE detection and classification of earthquake damage, to corrosion of reinforcing and pre-stressing steel, low-level load testing, fire damage and creep effects. The potential for use of artificial neural networks to assist analysis of AE results for corrosion monitoring of post-tensioned concrete is also considered in detail in one chapter, while another describes interesting preliminary studies into thermographic imaging of corroding reinforcing bars. Unfortunately only limited examples are provided of application outside of the laboratory. Among these are laboratory X-ray CT scanning of cores cut from earthquake-damaged concrete for crack visualisation, and AE monitoring of a historic masonry structure during seismic activity, showing clear correspondence of observed data.

AE has been proposed for testing concrete for many years, and is already an established laboratory tool. This new document contains a wealth of references, both historic and recent, and provides a valuable snapshot of the recent state-of-the-art in an important and ever-developing field. The general standard of content and presentation is high, with relatively little repetition between chapters. The book will be particularly useful for students and researchers, as well as engineers seeking to move innovative research forward from the laboratory into practical on-site applications, including structural health monitoring.

John Bungey
John Bungey is Emeritus Professor of Civil Engineering at the University of Liverpool, and a chartered engineer with more than 40 years of teaching, research and consultancy related to non-destructive testing of concrete. John has published over 150 relevant papers and a textbook on *Testing of Concrete in Structures*. He is a former chair/member of numerous UK and international committees.