

Book reviews

EXAMPLES IN STRUCTURAL ANALYSIS

W. M. C. McKenzie. Taylor and Francis, 2006. ISBN 978 0 415 7054 7, £37.50, 720 pp.

This book, which is primarily aimed at undergraduate students, comprises eight chapters each of which gives a brief overview of the subject to be covered together with a series of worked examples. Chapter 1, Structural Analysis and Design, covers mainly two topics—structural modelling and the calculation of degree of indeterminacy and degrees of freedom. This chapter contains some useful advice on modelling and reminds the reader that any model is only an approximation of the real behaviour of the structure. The subsequent seven chapters all have a similar format, a brief review of the relevant theory followed by worked examples. The chapters cover, in order: material and section properties, followed by the analysis of pin-jointed frames, beams, rigid-jointed frames, buckling instability, the direct stiffness method and finally plastic analysis of frames. Many of these chapters, similarly to Chapter 1, include useful practical information that will help students understand some of the modelling concepts. For example in the chapter on rigid jointed frames there are some diagrams indicating details of those joints which should be modelled as rigid and those to be modelled as pinned; the chapter on buckling instability has figures and examples which remind the reader that ‘Euler’ buckling can occur about either axis of a member. There are three appendices on elastic section properties of geometric figures, beam reactions, bending moments, deflections, and matrix algebra.

The strength of this book is in the number of worked examples; these are extremely well presented with plenty of useful information both on how they have been solved and the results of the analysis. The presentation used for the examples could act as an exemplar for those presenting the results of structural analysis. The coverage of the theory is occasionally rather cursory with only the main results being given, so this book, if used on a structural analysis course, will need to be partnered by a structures textbook. The tips on modelling are also very useful. One criticism is the lack of examples, without detailed solutions but with answers, for students to attempt.

It is likely that when students move into industry they will be expected to use software for the analysis of structures—for example, it is unlikely that a practitioner will be required to

analyse a sway frame. However, there is a requirement to be able to carry out a set of checks to validate the results of the analysis. Unfortunately no guidance is given in the book on how to do this even though it forms an important part of the modern undergraduate’s education.

I particularly enjoyed this book because of its wide range of traditional structural analysis techniques; however, as indicated above I suspect that in view of the increasing use of computer software much of the material covered will be superfluous to a modern structures course.

Despite my reservations discussed above I am sure that this is a book that will prove useful as an additional resource for both students and lecturers. Those in the design office responsible for structural analysis and design may also find it a useful reference book.

I. M. MAY

DESIGNERS’ GUIDE TO EN 1991-1-4 EUROCODE 1: ACTIONS ON STRUCTURES, GENERAL ACTIONS PART 1–4. WIND ACTIONS

N. Cook. Thomas Telford, 2007. ISBN 9 780 7277 3152 4, £50, 112 pp.

The transition from British Standards to Eurocodes is gaining momentum and this publication by Thomas Telford is the latest in a series of books aimed at easing that transition. Having read EN 1991-1-4, the final draft of the UK National Annex to EN 1991-1-4 and the *Guide to the use of EN 1991-1-4 – Wind Actions* produced by the Department for Communities and Local Government, I came to the conclusion that the transition from BS 6399:2 to EN 1991-1-4 would be less painful than the transition from CP3 Ch V Pt 2 had been. I still feel this is true, but this new book from Nick Cook has taught me a great deal; in particular why the UK National Annex needs 63 nationally determined parameters for the main text and eight for the Annexes.

The layout of this guide and others in the series has been chosen as an aid to reading a number of documents side by side. The book is structured to mirror the layout of EN 1991-1-4, which has a foreword, eight sections and six annexes. Chapters 1 to 8 of the guide correspond to the eight sections of

EN 1991-1-4; Chapter 9 corresponds to the six annexes. To give additional help, the relevant clause numbers of EN 1991-1-4 and of the UK National Annex appear in the margins against the corresponding commentary.

Chapter 1 explains the scope of EN 1991-1-4, how it fits into the family of Eurocodes and how, with the relevant National Annex, the EN produces a different national code for each member state. UK designers should be aware of the new notation for symbols and, to emphasise this point, the author points out the care required, particularly in the interpretation of equations. To draw key areas such as this to the attention of the reader, the author has placed the note 'Important warning' in the margin.

Chapter 2 deals with 'Design Situations' and Chapter 3 is much more comprehensive than either the EN or the NA in explaining the 'Modelling of wind actions'. However, it is Chapters 4 to 9 that will provide designers with an explanation of, and the background to, the main technical requirements of EN 1991-1-4. For example, in section 4.2, the author explains that the fundamental value of basic wind velocity is the 10-minute mean wind velocity with a 0.02 annual risk of being

exceeded, irrespective of direction and season, at 10m above ground in terrain Category II. He then continues to explain why this averaging period was adopted and why this results in different map values in Calais when compared to Dover.

As a postscript, the author provides us with an insight into the difficult process involved when attempting to produce harmonised rules across Europe. He acknowledges that the first implementation of EN 1991-1-4 has many flaws, omissions and contradictions. The EN also acknowledges this by inviting changes that extend the National Annex well beyond its normal role. National Annexes are due to be amalgamated into their EN at the end of their coexistence period, but, given the extent of disagreement across member states, the author feels that this task will be difficult.

There are very few books that come to the attention of designers who work with many different materials, but whichever material you design in, this should prove to be an essential guide.

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