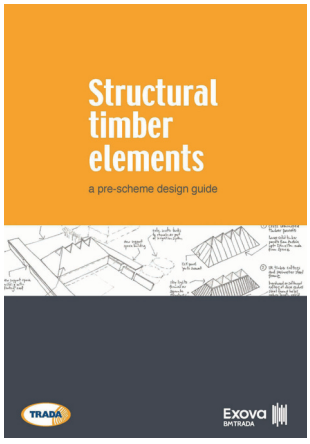
Review

With an enormous quantity of easily accessible information, this practical book deserves to be widely adopted for timber scheme designs, says Richard Harris, although a greater focus on timber's sensitivity to moisture movement would have been welcome.

Structural timber elements – a pre-scheme design guide



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Over the past 20 years, there have been spectacular advances in timber engineering, particularly through research and innovation in Germany, Austria and Switzerland. In the UK, the established building construction structural materials are steel and reinforced concrete (RC), and teaching and training has focused on these. However, as clients become aware of modern advances in timber engineering, it is inevitable that many UK engineers, even if they have little experience of timber engineering, will be called upon to use more timber in their structures.

The introduction states that the book's intent is to provide a competent structural engineer, who has little experience of timber engineering, with the tools to create a scheme design. Included in the *Manual for the design of timber building structures to Eurocode 5*, published by TRADA and the Institution of Structural Engineers in 2007, was a 28-page chapter on "Initial design". The new book uses 150 pages to cover a similar scope and the question arises as to whether the new book adds sufficiently previously published guidance.

There are key issues that, if not properly addressed, can lead to failure of timber structures. Timber is inhomogeneous (it is a natural material), anisotropic (it is orthotropic), only durable in certain conditions and weakest at connections. Therefore, the book should have accentuated the significance of the detailing necessary to address timber's sensitivity to moisture movement. These differences between timber design and steel/RC could, and should, have been included in preference to the space given to simplistic definitions of wood and wood products.

The five figures in the "Product selection" chapter, which show suitable timber solutions, provide useful guidance for floors, roofs, walls, beams and columns. They show load capacity as well as symbols to enable the designer to see relative performance in terms of complexity of design, suitability for prefabrication and building type, fire performance and acoustic separation.

The 90-page "Initial sizing" chapter of the book uses visual guide colours to enable the designer to gain a picture of key design constraints. This chapter, which is is 60% of the content of the book, contains numerous span-to-depth charts for floors, roofs, walls, beams and columns in a full range of wood-based materials, with comprehensive explanatory notes.

Timber structures are often limited by deflection and vibration and it is important that these are considered in scheme design. In this respect, the use of colour coding in the design charts, to indicate the larger picture of where the design lies in terms of the criticality of stress, deflection and vibration, is a good device. It is this chapter that makes the book of use to all structural design engineers, whether or not they are familiar with timber engineering.

It is a sign of the rapid development in timber engineering that the first European Technical Approval for a cross-laminated timber (CLT) product was as recent as 2006 and, when published in 2007, the TRADA/Institution manual did not refer to CLT at all. Eight years later, CLT production in Europe exceeds 1 000 000m^3 per annum and the product underpins new forms of prefabricated structures. *Structural timber elements* not only covers scheme design for CLT, but other commonly used materials such as glued laminated timber (glulam) and laminated veneer lumber (LVL).

Although the book could be useful for checking that solutions are of the right order, its methods and charts are not intended for final design. The structural engineer's input at scheme stage must lead to an architectural scheme and cost plan that proves to be dependable when developed in detail. The test of *Structural timber elements* will be in the book's use. Will the scheme designs produced using this book, when developed and checked using detail design methods (usually according to Eurocode), prove to be successful?

The book brings together an enormous quantity of easily accessible information. By working between the sections on "Product choice" and "Initial sizing", engineers should be able to produce scheme designs for a range of solutions. The content is drawn from the experience of "a number of timber engineers from a variety of practices", who are acknowledged in the preface, and, as a well-presented, practical source of useful information, it deserves to be widely adopted.

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Richard Harris began his construction career in civil engineering contracting, before spending 25 years with BuroHappold as a structural engineering designer. From 2005 until his retirement in 2016, he was Professor of Timber Engineering at the University of Bath. He is now an Honorary Professor at Bath and director of Time for Timber Ltd.