Appraisal and Repair of Timber Structures

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Second edition

Andrew Lawrence and Peter Ross

Arup

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Peter Ross joined Arup in 1958. Since 1986 he has specialised in the assessment of historic building fabric, and timber as a construction material. In 1990–94 he was Technical Secretary for the draft timber Eurocode. He has also written four books as principal author and was the structural engineer for the new roof over the South Transept of York Minster, one of the largest green oak roofs of modern times, following the fire in 1984.

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Thanks are also due to Ove Arup & Partners for permission to include the projects referred to throughout the book. All photographs are copyright of the authors, unless noted otherwise.

Cover photo

The roof of the Brighton Dome Corn Exchange (Case study 20.4) part way through repair, showing the shining heads of the screws fixing the new splice plates to the arches.

The Church of St Andrew, Greensted-juxta-Ongar, Essex. Perhaps the oldest standing timber building in the UK, dating from around AD 1000, and the only surviving example of vertical oak staves. The dormers were added in Tudor times, and the Victorians removed a by-then rotten sole plate, trimmed the bottom of the staves, and stood them on new oak plates and strip footings, thus preserving the most significant part of the structure.

(Source: Louis Champion, Alamy Stock Photo)

Preface to the second edition

The first edition of this book was published in 2002 and referred to BS 5268, which was based on permissible-stress design. BS 5268 has now been replaced by Eurocode 5, which is in limit state format. In order that this book continues to be of value to those engineers who work in the field of existing timber structures, a second edition is now necessary. The text is now fully referenced to Eurocode 5 procedures and the various related Euronorms. In addition, some comparison calculations are made using the two codes, and these will assist engineers in reviewing projects from the 1950s onwards. They also usefully show that the overall factor of safety over this period has remained more or less unchanged.

This new edition is not confined solely to 'historic' buildings, but also discusses modern materials and building methods, such as the large cross-laminated timber (CLT) panels that have enabled the economic construction of multistorey blocks. Larger panels require larger fasteners, resulting in the development of long self-tapping screws, which are proving very useful in repair work generally, providing strong low-profile connections.

The emphasis of the book has been changed to reflect the fact that structural engineers today would generally employ a timber specialist to check timber condition and grading, rather than undertaking such work themselves.

This new edition is also in colour, including over 200 photographs and drawings. The new chapter dividers are arranged in chronological order and, together, give an informal picture of the development of timber structures over nearly 1000 years, to supplement the history of timber structures in Chapter 2.

Other changes include an extended range of case studies, and expanded text on structures in green oak to explain why carpenters chose to work with unseasoned material, and use its properties to their commercial advantage.

The book will be of value to both engineers and architects undertaking work on existing structures generally, not just timber. The sections on appraisal, load testing, building relocation and report writing are applicable to all forms of construction.