Preface to STEP 1

European harmonisation

The unification process in the European Union (EU) has led, and will continue to lead, to changes which will impact on m•any aspects of life in the member countries, including industrial practice. A key objective of the EU is the creation of a stronger and more competitive industrial base. This is being achieved in a number of ways including technological innovation, intensification of training, and the standardisation of key practices and operations within industry. The harmonisation of component and product quality standards is an important element of this process. Such harmonisation facilitates not only for freer movement of goods and services within the EU but also for enhanced cohesion and competitiveness in the presentation of the products of EU industry in external markets.

New standards require adjustments in training

Within the industrial sectors of timber processing, manufacture and utilisation, new European standards are being prepared. In the specific area of the utilisation of timber for structural purposes a series of standards is being developed in support of Eurocode 5. It is anticipated that the European standards will eventually replace the various equivalent national standards. The introduction of the new standards will require adjustment both in education and training institutions and on the part of practising professionals in the architectural, engineering, building, and manufacturing sectors. A lead-in time is required to facilitate a smooth transition for industry to the changed environment of a transnational harmonised market.

STEP/Eurofortech, background

In its role as the transnational EU network for training and education for the forest and wood industries, EUROFORTECH has recognised the educational implications of the changes being experienced by Europe's forest and wood sector industries. During the past three years it has helped to create STEP, the Structural Timber Education Programme and assisted a large team of European experts to prepare the STEP/EUROFORTECH teaching materials relating to the use of timber in structural applications. The two volumes of this compendium of technical information were made possible through the financial contributions of the European Union and 14 participating countries. It will assist teachers, students, and practising professionals in applying and implementing new European standards for the structural use of timber. This pool of information will both contribute to the structural use of timber and increase technical expertise within the industry.

Timber Engineering - STEP 1 is the first volume of the STEP compendium and will be complemented by the second volume, Timber Engineering - STEP 2. In addition, a supporting slide collection is available.

The purpose of the compendium is to assist engineers, lecturers, and students to implement Eurocode 5 Design of timber structures - Part 1-1: General rules and rules for buildings and Part 1-2: General rules - Supplementary rules for structural fire design. Since the Eurocodes are not yet available in their final form at the time of printing, minor discrepancies between Eurocode 1 and Eurocode 5 still exist and are addressed in the relevant lectures. The chapters of the book contain timber engineering lectures and were written by specialist lecturers and experienced civil engineers and correspond to the best available knowledge in 1994. Lecturers using the teaching material can select subjects from this comprehensive compendium and compose their own timber engineering courses. The two volumes are also available in German and French and other countries are planning to translate at least a selection of lectures into their languages.

Structure of Timber Engineering - STEP 1

Timber Engineering - STEP 1 covers in three sections the basis of design, material properties of timber and wood-based materials, structural components, and joints. Section A, 'Basis of design and material properties' comprises general topics applicable to all Eurocodes such as European standardisation, limit state design and safety format or actions on structures. Production and material properties of sawn timber glued laminated timber, laminated veneer lumber, and parallel strand lumber as well as wood-based panels are presented. Aspects such as strength grading, fire resistance, durability and long-term behaviour are taken into account as well as the serviceability of timber structures and the environmental impact of timber as a building material.

Section B, 'Structural components' , closely follows Eurocode 5 chapter 5 'Ultimate limit states'. The first part contains basic rules such as tension, compression or bending necessary for the design of members including specific features like volume effects or stress concentrations in notched beams. Then, stability aspects of columns and beams are addressed. I-beams, boxed beams, stressed skin panels and mechanically jointed beams and columns represent components typical for timber structures. Assemblies like trusses, diaphragms and shear walls and frames illustrate the use of timber and wood-based materials in common structures. Bracing and load sharing complement this area.

Joints are vital for a timber structure and often determine its economy as well as its appearance. Section C 'Joints' presents both mechanical and glued joints in timber structures. The design of joints with different types of mechanical fasteners is demonstrated, covering dowel-type fasteners such as nails, bolts, dowels, or screws as well as ring and toothed-plate connectors or punched metal plate fasteners. In addition, traditional carpentry joints and modern cold-formed steel plate joints are discussed. Finally, special aspects such as tension perpendicular to the grain, joints under seismic actions or fire resistance are presented to provide a comprehensive view.

Slide collection

The STEP slide collection consists of two parts: firstly, diagram and text slides illustrating the majority of the figures included in the lectures. Photographic slide collections form the second part and cover different topics such as examples of timber structures, structural systems, fasteners and connections, materials, prefabrication, and erection or strengthening and repair.

The editors and Eurofortech would specifically like to acknowledge the vision of the UK Timber Engineering Group (UKTEG) in recognising the need for and of Mr A. van der Velden in initiating the Structural Timber Education Programme and the efficient administrative support provided by Ms A. Majoor and Mr J. Banga (Centrum Hout).

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Preface to STEP 2

The second volume of the STEP book series completes both the Eurofortech/STEP programme and the production of a unique education and training package for the structural use of timber. Based on the first volume, Timber Engineering - STEP 2 covers in two sections the design of details and structural components.

Section D, 'Design - Details' covers joints such as connections with dowel-type fasteners and connector joints, frame corners or the detailing of bracing structures. Aspects such as rehabilitation, transport and erection, design for structures in seismic regions or computer aided design are also taken into account.

Section E, 'Design - Structural systems', demonstrates the use of timber and woodbased material in structures. After general topics such as history of timber structures and conceptual design, different structural components like beams, trusses, frames and arches are addressed. Timber frame houses, beam and post structures and timber bridges represent typical uses for timber in structures. Finally, special aspects such as timber shell roof structures, fatigue design and learning from failures are presented to provide a comprehensive view.

To assist lecturers and trainers in their use of the training materials, a set of supporting illustration materials has also been developed. The complete package should now provide trainers at all levels of professional education with a tool to instruct future generations of engineers and architects about the use and potential application of wood and wood products as a legitimate, attractive and competitive material. For practising professionals this technical resource should further increase their confidence in the use of this versatile and aesthetically appealing material obtained from a natural and renewable resource.

As contractor, EUROFORTECH is pleased to have facilitated the STEP programme. During its three years it has completed an enormous task in bringing together extensive and diverse European expertise. EUROFORTECH would like to acknowledge the commitment and contributions of all the participants who have enabled this project to be realised. The drive and commitment of the STEP Review Group, supported by the STEP secretariat at Centrum Hout, has played a key role in the realisation of the programme. The result will provide the wood industry with a significant tool to assert itself as a genuine material in the market place.

It is gratifying to EUROFORTECH and all participants and contributors to the STEP/Eurofortech Programme that the successful implementation of the STEP project has been a major factor in the award to Centrum Hout of the UNIVERSITY ENTERPRISE EUROPEAN AWARD 1994 - Section ENTERPRISE TRAINING PROJECTS by 'SERVICIO EUROPA FUNDACION UNIVERSIDAD EMPRESA' -

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