Design of timber structures

Stefan Winter
Design of timber structures
A team of ~200 subcommittee members (and many more in the subgroups)
CEN/TC 250/SC 5 Design of timber structures

**CEN/TC 250/SC 5**

**Design of timber structures**

- **Chairman:** S. Winter
- **Vice Chair 1:** T. Toratti
- **Vice Chair 2:** A. Frangi
- **Secretary:** H. Burkart (SN)
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**CEN/TC 250/SC 5 Working groups**

- **WG 1 Cross laminated timber**
  - Convenor: T. Wiegand
  - PSS: Michael Scholtyssek (DIN)
- **WG 2 Timber concrete composite**
  - Convenor: J. Schänzlin
  - PSS: Michael Scholtyssek (DIN)
- **WG 3 Cluster Eurocode 5**
  - Convenor: R. Steiger
  - PSS: Michael Scholtyssek (DIN)
- **WG 4 Structural fire design**
  - Convenor: A. Frangi
  - PSS: Giuseppe Martino (SNV)
- **WG 5 Connections and fasteners**
  - Convenor: U. Hübner
  - PSS: Karl Stumwoehrer-Gleich (ASI)
- **WG 6 Timber bridges**
  - Convenor: M. Gerold
  - PSS: Hauke Burkart (SN)
- **WG 7 Reinforcement**
  - Convenor: P. Dietsch
  - PSS: Michael Scholtyssek (DIN)
- **WG 8 Seismic design**
  - Convenor: M. Fragiacomo
  - PSS: Pending (UNI)
- **WG 9 Execution**
  - Convenor: A. Lawrence
  - PSS: Sophie Sherwood (BSI)
- **WG 10 Basis of design and materials**
  - Convenor: J. Marcroft
  - PSS: Sophie Sherwood (BSI)
- **WG 11 Finite element based design**
  - Convenor: Pending
  - PSS: Pending

**CEN/TC 250/SC 5 Ad-hoc groups**

- **Ad-hoc group Background documents**
  - Head: C. Short
- **Ad-hoc group Existing timber buildings**
  - Head: V. Rajčić
- **TG prEN 1995-1-1**
  - Head: Stefan Winter

**TG prEN 1995-1-1**

- **Head:** Stefan Winter

**Ad-hoc group Existing timber buildings**

- **Head:** V. Rajčić

**TG prEN 1995-1-1**

- **Head:** Stefan Winter
The second generation of Eurocode 5: An overview

- EN 1995-1:
  - Part 1: General rules and rules for buildings
  - Part 2: Fire Design
  - Part 3: Timber Concrete Composite Structures (currently CEN/TS19103)
- EN 1995-2: Bridges
- EN 1995-3: Execution
The second generation of Eurocode 5: An overview

- Harmonization with the whole Eurocode family
- Tremendous developments of timber structures in the past 30 years
  - Extensions and revision of several rules for timber design
  - Low-threshold interface between EN 1995 and product standards
- Reduction of NDPs and alternative design methods
- Outsourcing of very specific design rules to normative Annexes
prEN 1995-1-1: General rules and rules for building
prEN 1995-1-1: General rules and rules for building

- A variety of (new) construction products

Source: dataholz.eu
prEN 1995-1-1: General rules and rules for building

- A variety of connection types

Source: prEN 1995-1-1:2023
prEN 1995-1-1: General rules and rules for building

- new content, e.g. holes in beams and reinforcement

Source: Zukunft Bau Project SWD-10.08.18.7-17.22

Source: prEN 1995-1-1:2023
Diaphragms

- Eccentricities in the ground plan
- Floors, roofs and walls
prEN 1995-1-1: General rules and rules for building

- Outsourcing of very specific design rules to normative Annexes:
  e.g. foundations with timber piles and connections with punched metal plate fasteners
prEN 1995-1-2: Fire design

Cross laminated timber before (left) and after (right) a 30 minutes fire occasion
prEN 1995-1-2: Fire design

- Extension of design rules for:
  - Effective cross-section method (application i.e. on timber I-joists, cross laminated timber, timber-concrete composite elements, etc.)
  - Design model for the verification of the separating function of wall and floor assemblies
  - Failure time (falling off) of the fire protection system

Source: prEN 1995-1-2:2023
prEN 1995-1-2: Fire design

- Revision of design rules for:
  - Charring
  - Timber-frame assemblies
  - Connections in fire
  - Detailing
  - Design of timber structures exposed to physically based design fires

![Diagram showing the classification of charring stages in fires.](source: prEN 1995-1-2:2023)
prEN 1995-1-3: Timber-Concrete composite structures
prEN 1995-1-3: Timber-Concrete composite structures
prEN 1995-1-3: Timber-Concrete composite structures

- Pilot stage period as CEN/TS 19103
- Load-carrying capacity and slip modulus of connections made with:
  - Dowel-type fasteners
  - Bonded-in rods
  - Notched connections
- Modification of creep coefficients for composite action in slab systems and in beam systems
- Calculation method for the effect of inelastic strains

Source: CEN/TS 19103
prEN 1995-2: Bridges
prEN 1995-2: Bridges

- Extension of design rules:
  - Durability and detailing, sealing
  - Deck plates
  - Integral bridges

- Revision of design rules for:
  - Timber-concrete composites (TCC)
  - Laminated veneer lumber (LVL)
  - Vibrations and damping
  - Fatigue
prEN 1995-3: Execution
prEN 1995-3: Execution

- Execution rules on which Eurocode 5 design directly relies
  - Tolerances in connections
  - Tolerances for member dimensions
  - Tolerances of erected members
  - Moisture control
The second generation of Eurocode 5: A conclusion

- EN 1995-1:
  - Part 1: General rules and rules for buildings
  - Part 2: Fire Design
  - Part 3: Timber Concrete Composite Structures

- EN 1995-2: Bridges

- EN 1995-3: Execution
The second generation of Eurocode 5: A conclusion

### Evolution of the document

<table>
<thead>
<tr>
<th>EN 1995-1-1:2010</th>
<th>prEN 1995-1-1:2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>1. Scope</td>
</tr>
<tr>
<td></td>
<td>2. Normative references</td>
</tr>
<tr>
<td></td>
<td>3. Terms, definitions and symbols</td>
</tr>
<tr>
<td>Basis of design</td>
<td>4. Basis of design</td>
</tr>
<tr>
<td>Material properties</td>
<td>5. Materials</td>
</tr>
<tr>
<td>Durability</td>
<td>6. Durability</td>
</tr>
<tr>
<td>Basis of structural analysis</td>
<td>7. Structural analysis</td>
</tr>
<tr>
<td>Ultimate limit states</td>
<td>8. Ultimate limit states</td>
</tr>
<tr>
<td>Serviceability limit states</td>
<td>9. Serviceability limit states</td>
</tr>
<tr>
<td>Connections with metal fasteners</td>
<td>10. Fatigue</td>
</tr>
<tr>
<td>Components and assemblies</td>
<td>11. Connections</td>
</tr>
<tr>
<td>Structural detailing and control</td>
<td>12. Mechanically and glued webbed or flanged beams</td>
</tr>
<tr>
<td>Annexes</td>
<td>13. Diaphragms</td>
</tr>
<tr>
<td></td>
<td>14. Foundations with timber piles</td>
</tr>
</tbody>
</table>

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244 pages main text

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prEN 1995-1-1:2023

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24 von 26
The second generation of Eurocode 5: A conclusion
Thank you for your attention.