

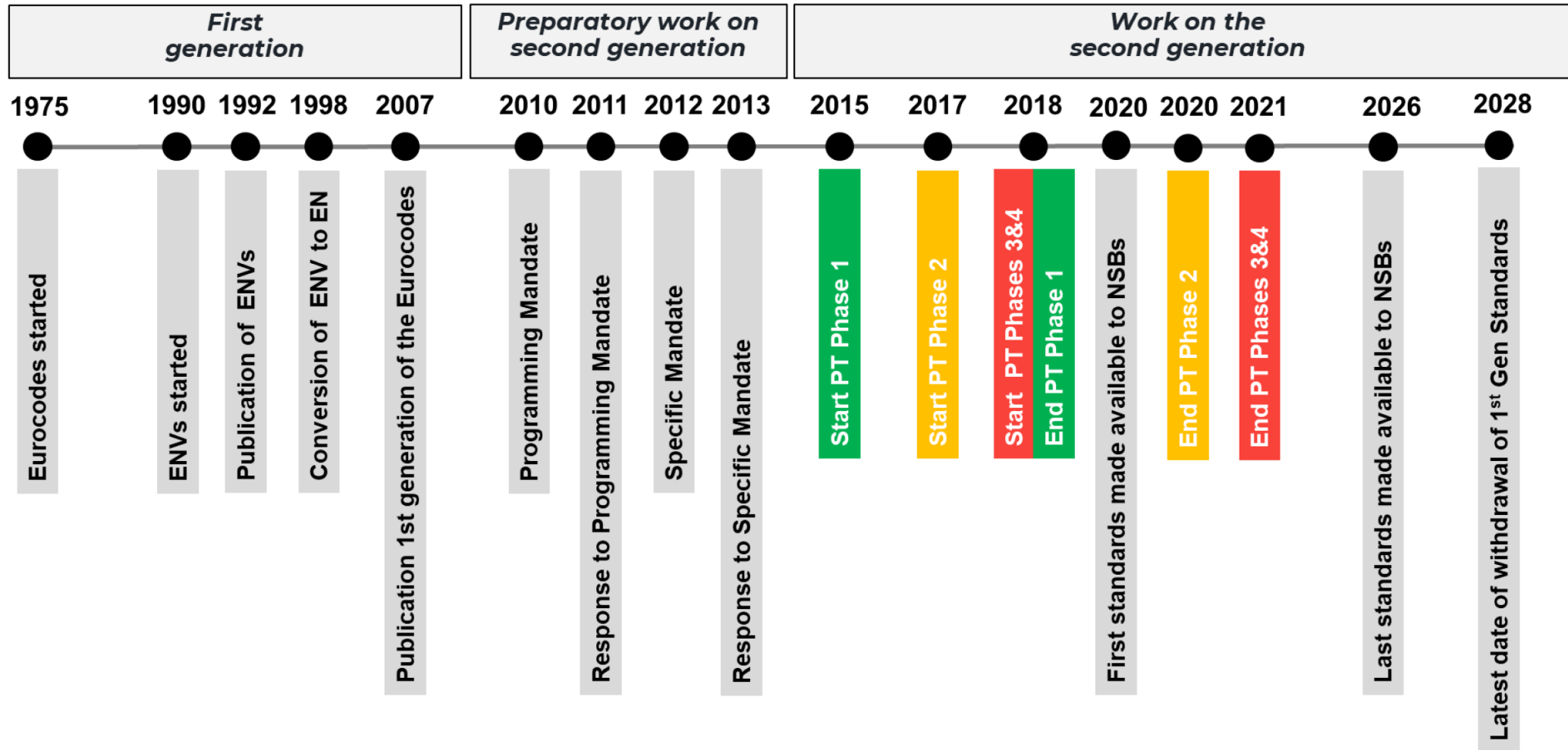
# Övergripande uppdatering om arbetet med 2:a generationens Eurokoder

Exemplifiering genom Eurokod 5 för träkonstruktioner

**30 januari 2024**

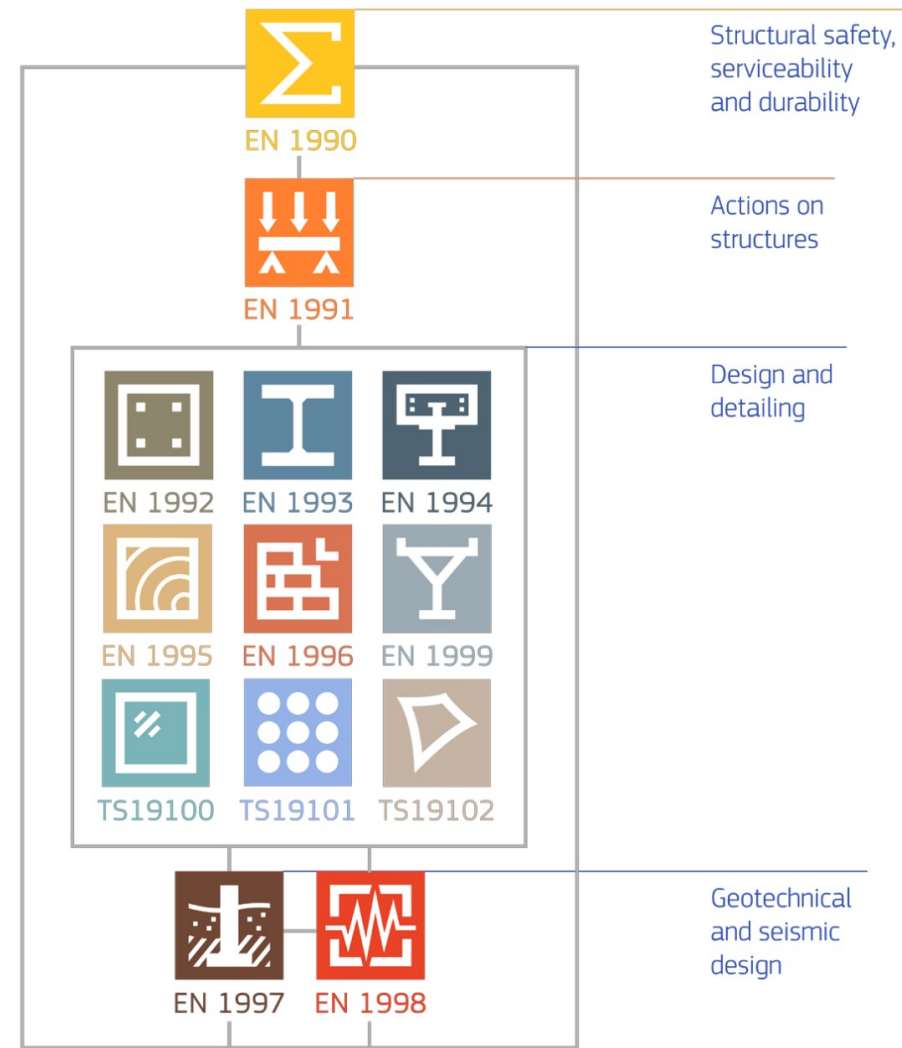
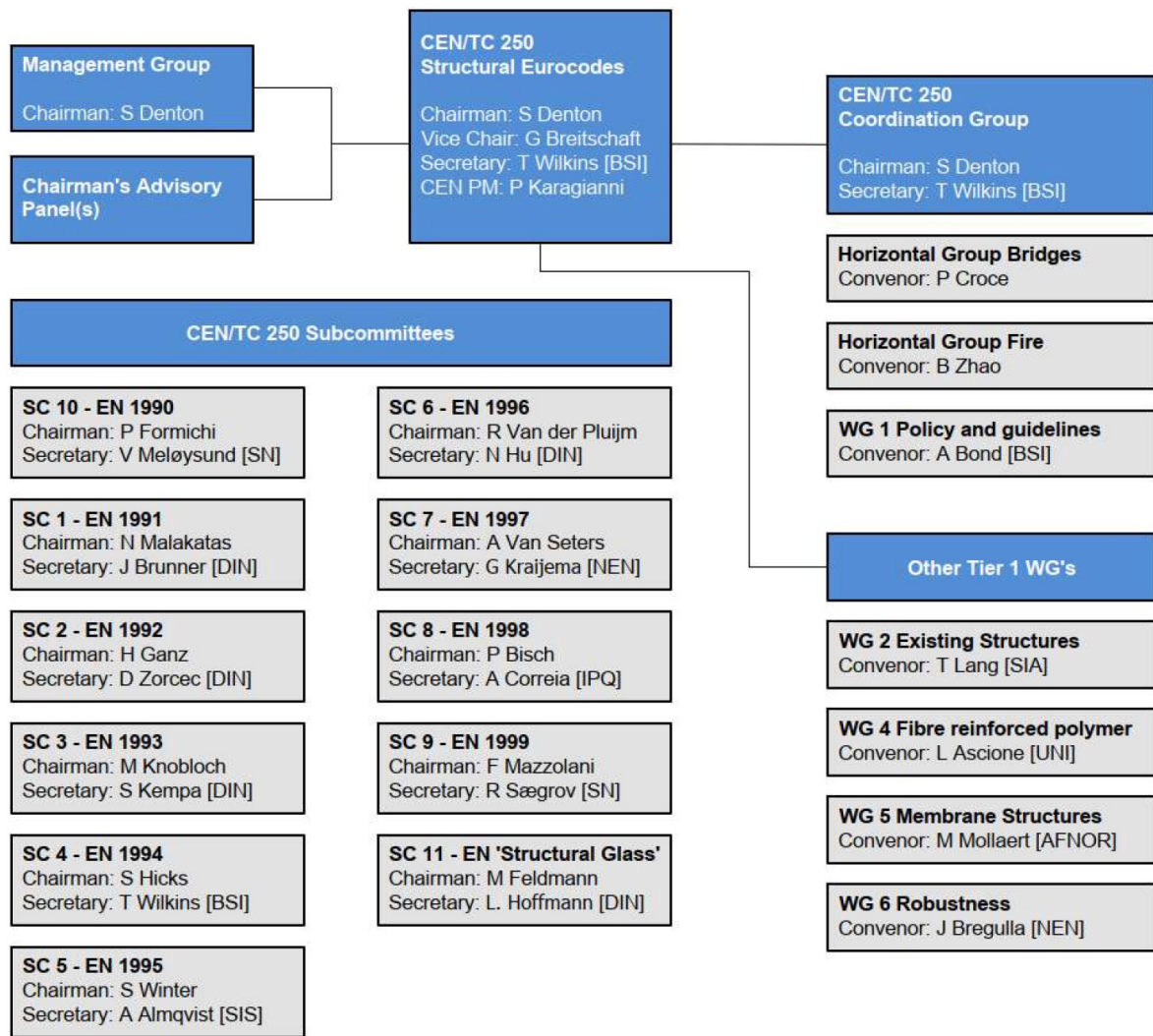
**(Patrice Godonou, Svenskt Trä)**

# Utveckling av Eurokoder – kort historik och tidslinje

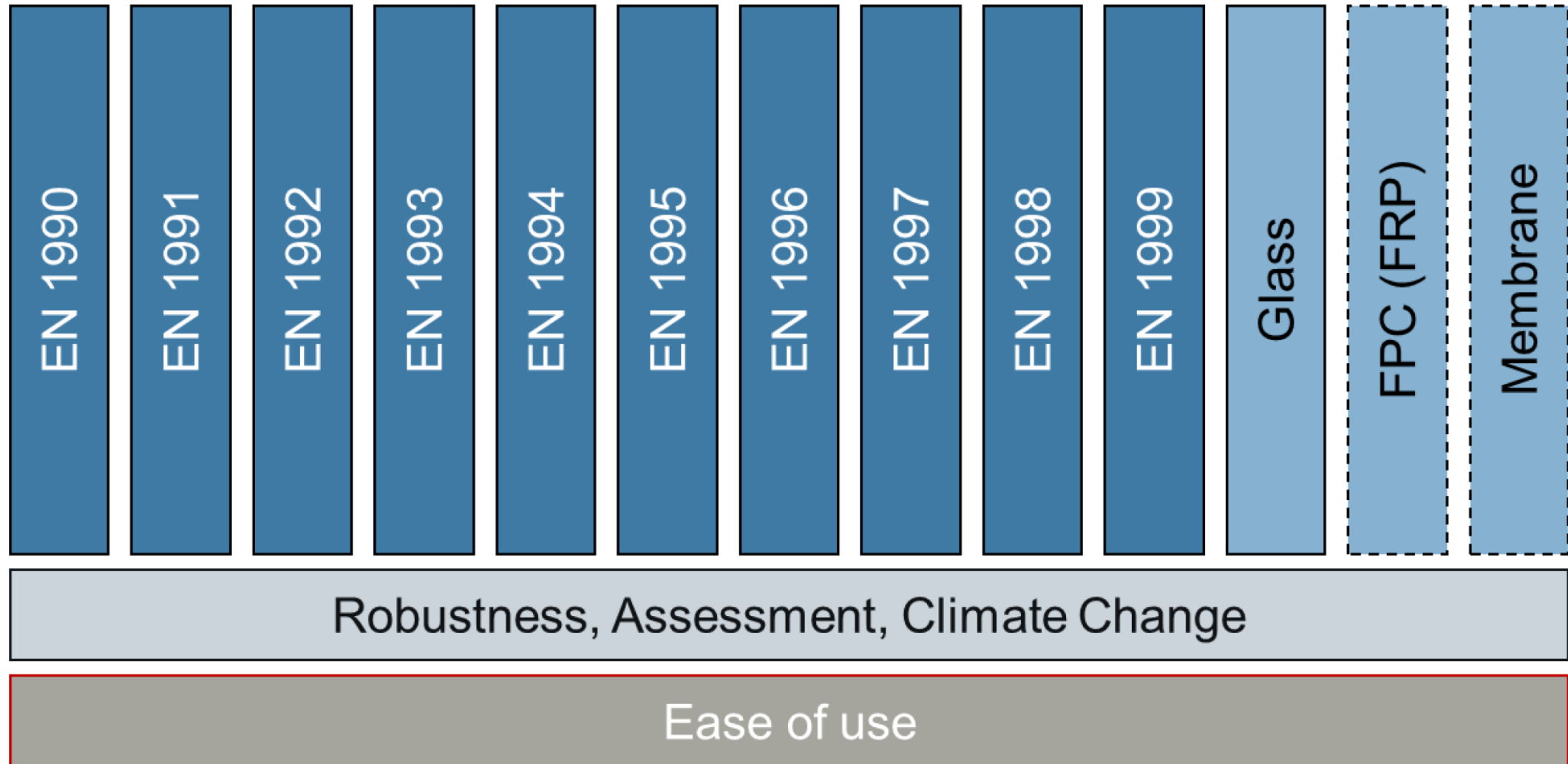


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# Arbetet med 2:a generationens Eurokoder (CEN TC250, i Sverige SIS TK203, SIS TK182/AG4 trä, m.fl.)



## 2:a generationens Eurokoder: befintliga och nya delar



# Målgrupper och relaterat syfte med nya Eurokoder

Huvudmålgrupp (enligt CEN TC 250)

## CATEGORIES OF EUROCODES' USERS

Practitioners – Competent engineers  
[Primary target audience]

Practitioners – Graduates

Expert specialists

Product Manufacturers

## CEN/TC 250 STATEMENTS OF INTENT

We will aim to produce Standards that are suitable and clear for all common design cases without demanding disproportionate levels of effort to apply them

We will aim to produce Eurocodes that can be used by Graduates where necessary supplemented by suitable guidance documents and textbooks and under the supervision of an experienced practitioner when appropriate

We will aim not to restrict innovation by providing freedom to experts to apply their specialist knowledge and expertise

Working with other CEN/TCs we will aim to eliminate incompatibilities or ambiguities between the Eurocodes and Product Standards

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# Principer och prioriteringar med nya Eurokoder (CEN TC250)

## General principles (primary)

- 1 Improving clarity and understandability of technical provisions of the Eurocodes
- 2 Improving accessibility to technical provisions and ease of navigation between them
- 3 Improving consistency within and between the Eurocodes
- 4 Including state-of-the-art material the use of which is based on commonly accepted results of research and has been validated through sufficient practical experience
- 5 Considering the second generation of the Eurocodes as an “evolution” avoiding fundamental changes to the approach to design and to the structure of the Eurocodes unless adequately justified

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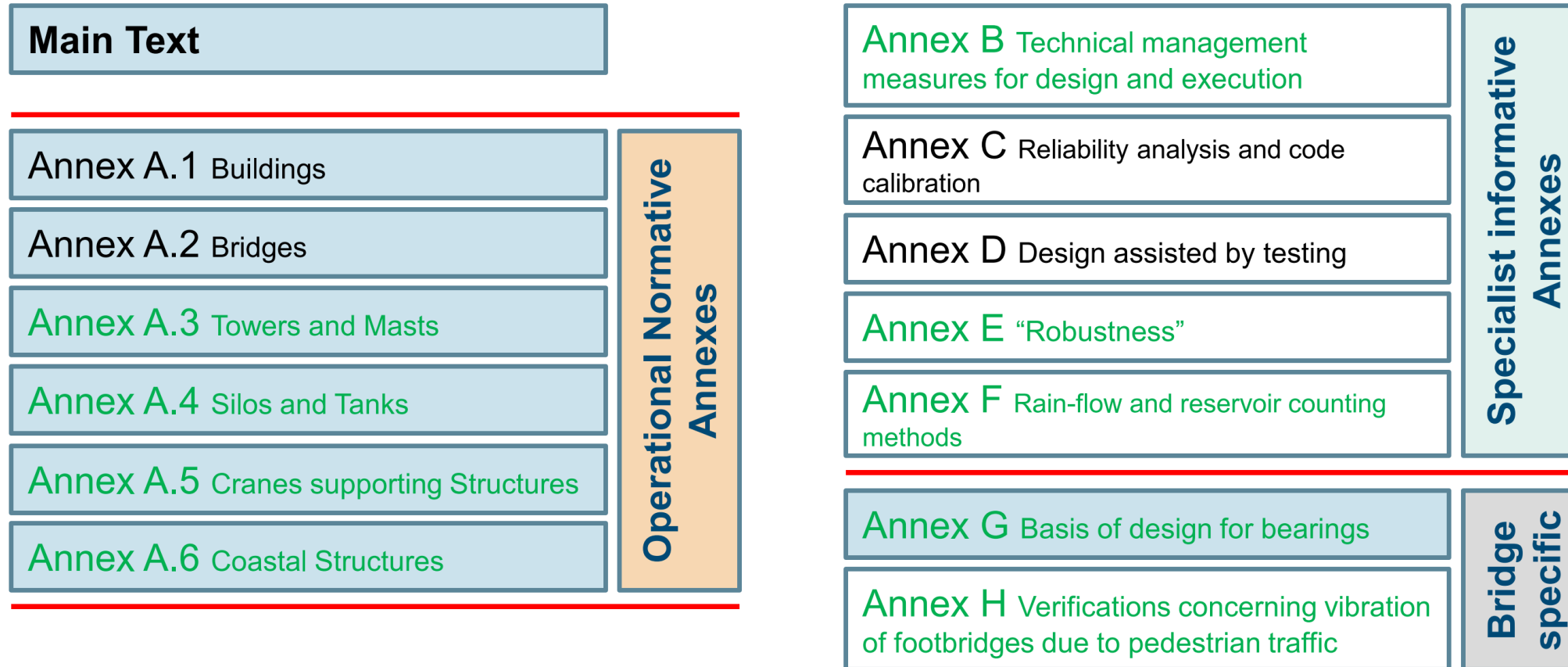
# Nya Eurokoder – EN 1990 Grundläggande regler

- EN1990-1 Eurocode - Basis of structural and geotechnical design, Part 1: New structures
- EN1990-2 Eurocode - Basis of structural and geotechnical design, Part 2: Assessment of existing structures

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# Nya Eurokoder – EN 1990-1 Nya byggnadsverk

## EN1990-1 New Structures



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# Nya Eurokoder – EN 1990-2 Befintliga byggnadsverk

## EN1990-2 Assessment of Existing Structures

### Main Text

1. Introduction
2. Scope
3. Normative References
4. Basic Requirements
5. General Rules
6. Assessment scope and objectives
7. Assessment approach
8. Basic Variables and Updating
9. Structural modelling, updating and analysis
10. Verification using quantitative assessment methods
11. Verification using qualitative assessment methods
12. Interventions

Annex A Additional guidance on assessment of existing structures

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# Lite nytt om säkerhetsklasser, dimensioneringskvalitet, m.fl.

Table 4.1 (NDP) — Qualification of consequence classes

Consequence class	Indicative qualification of consequences	
	Loss of human life or personal injury <sup>a</sup>	Economic, social or environmental consequences <sup>a</sup>
CC4 – Highest	Extreme	Huge
CC3 – High	High	Very great
CC2 – Normal	Medium	Considerable
CC1 – Low	Low	Small
CC0 – Lowest	Very low	Insignificant

<sup>a</sup> The consequence class is chosen based on the more severe of these two columns.

*Generally valid for all types of structures*

Table B.4 (NDP) — Minimum design quality level, design check level, execution class and inspection level for different consequence classes

Consequence class	Minimum design quality level (DQL)	Minimum design check level (DCL)	Minimum execution class (EXC)	Minimum inspection level (IL)
CC3	DQL3	DCL3	See relevant execution standards <sup>a</sup>	IL3
CC2	DQL2	DCL2		IL2
CC1	DQL1	DCL1		IL1

<sup>a</sup> Relevant execution standards might not be available for all materials, see B.6(2).

# Nya EN 1990: Utökade krav på kontroll vid utförande

Annex B  
(informative)

## Technical management measures for design and execution

“Framework  
Annex”

### B.2 Scope and field of application

(1) This Informative Annex provides a framework for technical management measures for

- |   |     |                                |
|---|-----|--------------------------------|
| [ | DQL | — design quality,              |
|   | DCL | — design checking,             |
|   | EXC | — execution quality,           |
|   | IL  | — inspection during execution, |

4 Levels

so that the intended level of structural reliability of a structure (or part of structure) that fulfils the provisions specified in the Eurocodes is achieved and the assumptions given in 1.2 are satisfied.

NOTE 1 The implementation of this Informative Annex depends on the legal system in force in each country. This Annex is provided as guidance to the writers of National Annexes that can enable a consistent approach to this subject.

NOTE 2 The National Annex can differentiate between technical management measures for the structures covered in the different parts of Annex A.

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# Nya EN 1990: Utökade krav på robusthet

Table E.1 —Design for identified accidental actions and design strategies for enhanced robustness

Design for accidental actions (EN 1991 (all parts))		Design for enhanced robustness (EN 1990)		
Explicit design of the structure (e.g. against explosion, impact)		Strategies based on limiting the extent of damage		
<u>Design structure to resist the action</u>	<u>Prevent or reduce the action</u> e.g. protective measures, control of events	<u>Alternative load paths</u> either providing sufficient ductility, resistance and deformation capacity and redundancy, or applying prescriptive design rules	<u>Key members</u> i.e. designing selected members to resist notional action(s)	<u>Segmentation</u> i.e. separation into distinct parts

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# Nya EN 1990: Utökade krav på hållbarhet

## 4.7 Sustainability

(1) The structure should be designed to limit its adverse impact on non-renewable environmental resources, on society, and on economy during its entire life cycle, as specified by the relevant authority or, where not specified, as agreed for a specific project by the relevant parties.

NOTE 1 The adverse impact of a structure on its environment, on society, and on economy can be minimized by for example appropriate choice of construction process and environmentally compatible building materials, including their manufacture, design solutions, durability, recyclability, and reusability.

NOTE 2 Supplementary requirements to account for sustainability in the design can be given in the National Annex.

# Nya Eurokoder för träkonstruktioner - prEN-1995

- 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

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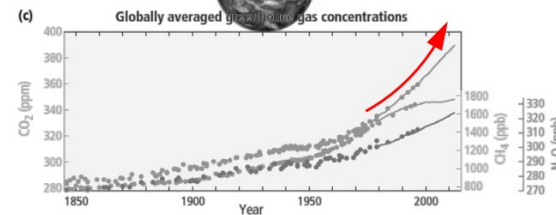
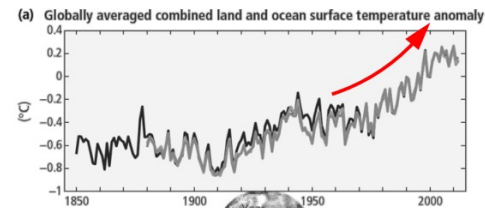


# Nya Eurokoder för träkonstruktioner prEN-1995

- 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



Sensations Strasbourg; Source: KOZ Architectes



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# Nya Eurokoder för träkonstruktioner prEN-1995

## ■ A variety of (new) construction products



Strength graded structural timber with rectangular cross-section



Structural Finger Jointed Solid Timber



Glued Solid Timber



Glued Laminated Timber



Cross Laminated Timber



Multi-layered solid wood panel



Laminated Veneer Lumber



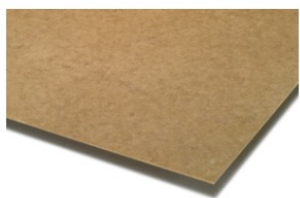
Plywood



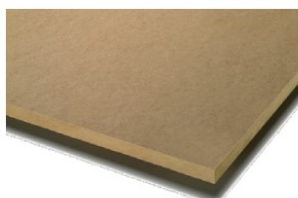
Oriented Strand Board



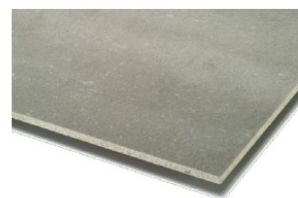
Fibreboard, hard



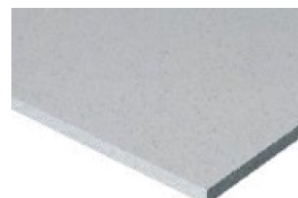
Fibreboard, medium



Softboard



Cement Bonded Particle Board



Gypsum fibreboards



I-Joist

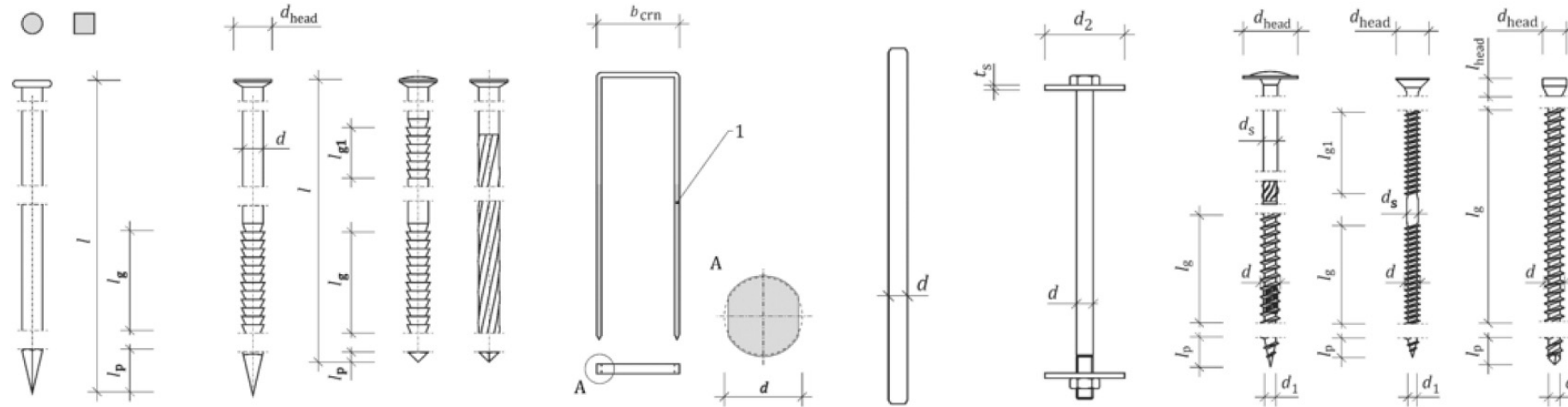
Source: dataholz.eu

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# Nya Eurokoder för träkonstruktioner prEN-1995

## ■ A variety of connection types



Smooth nail

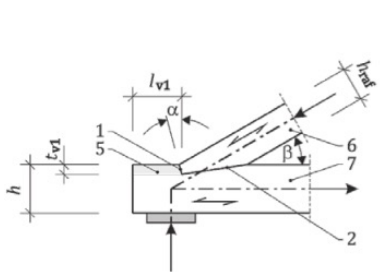
Rink shank nail

Staple

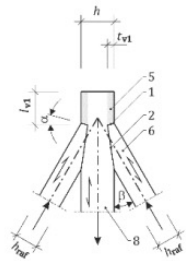
Dowel

Bolt with washers and nut

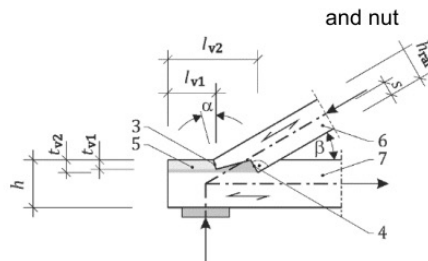
Screw with different threads, heads and points



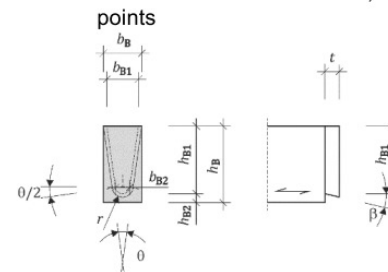
One sided single-step connection



Two sided single-step connections



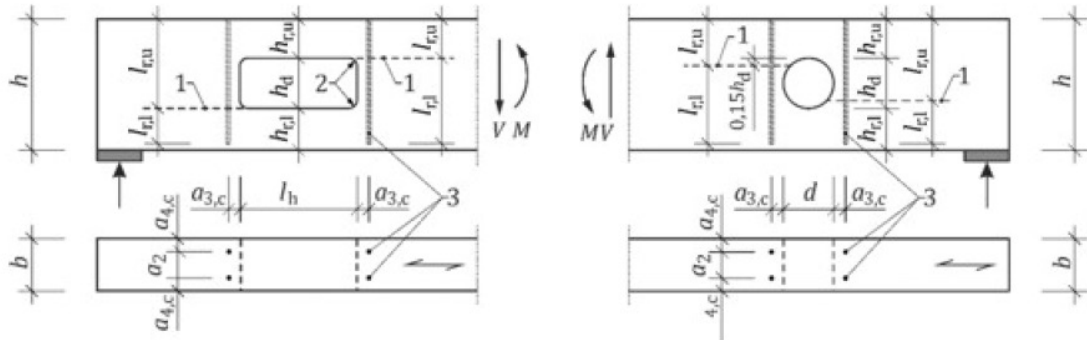
One sided single-step connection



One sided double-step connection

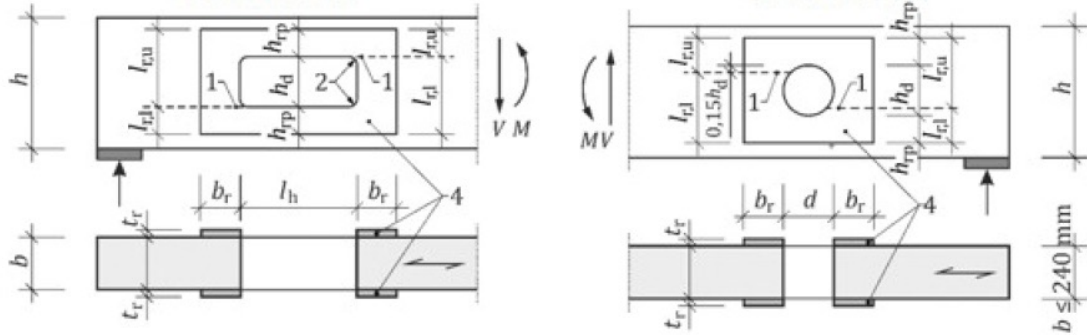
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# prEN 1995-1-1 Nya, bättre beräkningar av förstärkningar



a) Rectangular hole with internal dowel-type reinforcement

b) Circular hole with internal dowel-type reinforcement



c) Rectangular hole with external plane reinforcement

d) Circular hole with external plane reinforcement

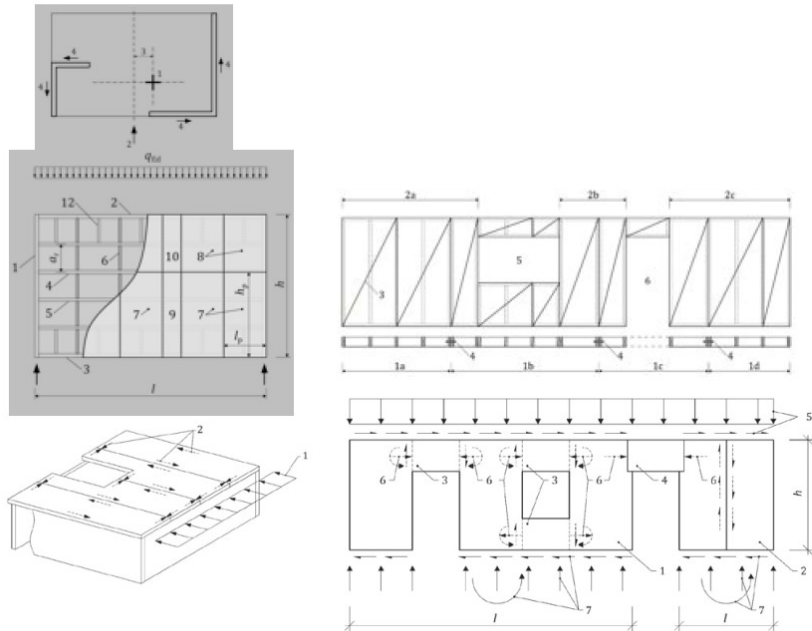


Source: Zukunft Bau Project SWD-10.08.18.7-17.22

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# prEN 1995-1-1 Nytt om excentricitet, bjälklag, tak och väggar

- Eccentricities in the ground plan
- Floors, roofs and walls

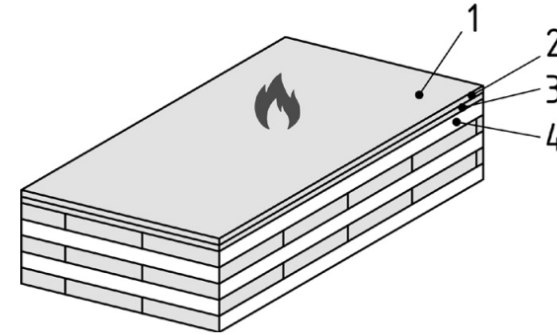


Kampa K8, Aalen, GER. Source: Thomas Wellner, Kampa

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# prEN 1995-1-2 Bättre och mer koncis branddimensionering

- 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



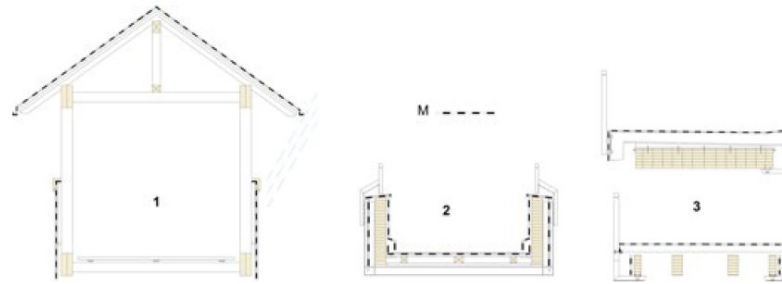
Source: prEN 1995-1-2:2023

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# prEN 1995-2 Träbroar

## ■ Extension of design rules:

- Durability and detailing, sealing
- Deck plates
- Integral bridges



Source: prEN 1995-2:2023

## ■ Revision of design rules for:

- Timber-concrete composites (TCC)
- Laminated veneer lumber (LVL)
- Vibrations and damping
- Fatigue



Blockträgerbrücke Neckartenzlingen; Source: holzbrueckenbau.com @ Fotograf Walther



Sprengwerkbrücke Benneckenstein; Source: holzbrueckenbau.com

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# prEN 1995-3 Utförande – helt ny del!

- Execution rules on which Eurocode 5 design directly relies
  - Tolerances in connections
  - Tolerances for member dimensions
  - Tolerances of erected members
  - Moisture control



Source: Informationsdienst Holz

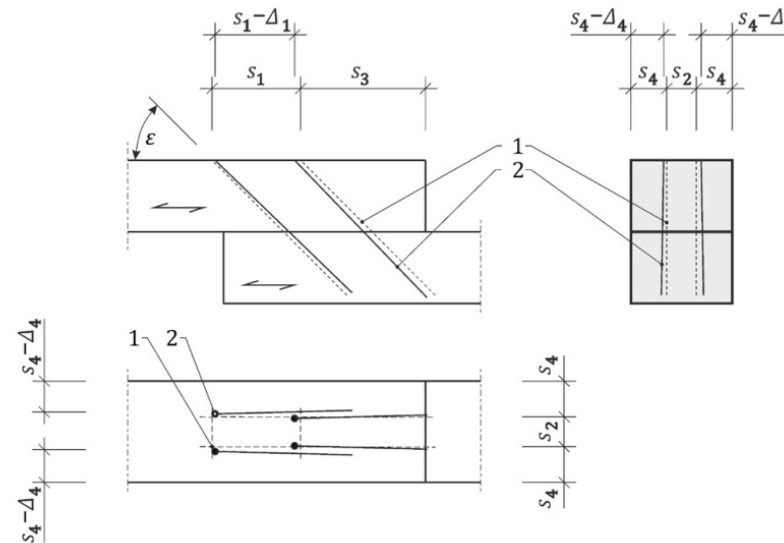
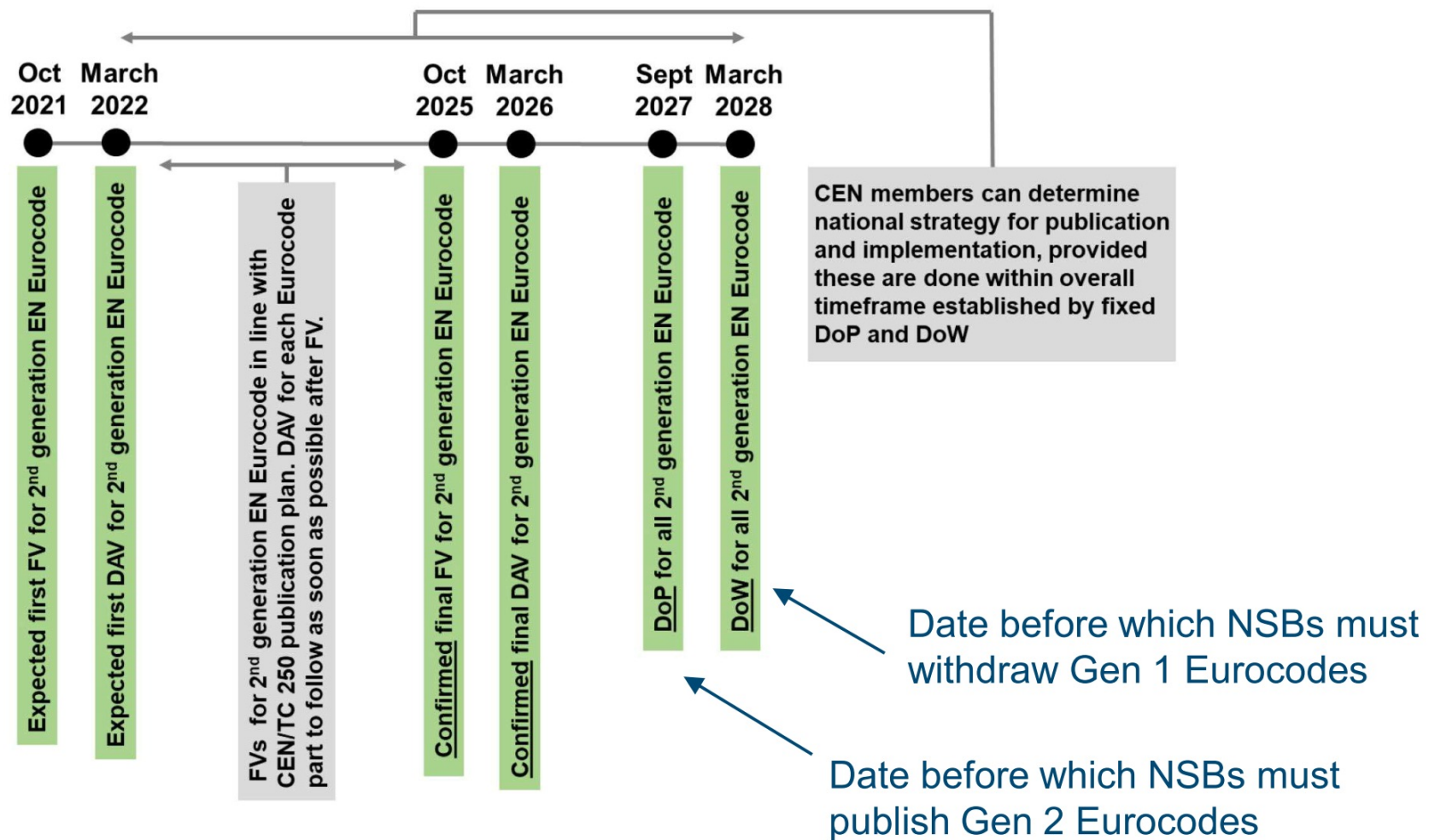


Figure 6.4 — Deviations  $\Delta_{n,max}$  from the specified spacings, end and edge distances  $s_n$  (for screw axes at angle  $\epsilon$  to the grain and parallel to the edge)

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# Nationell implementering av Eurokoder – tidslinje (Obs! inte bara EK95 för träkonstruktioner)



# Utmaningar och reflektioner

- Eurokoderna har ökat i volym (NDP har både minskat och ökat)
- Bakgrundsmaterial för att dokumentera ändringar
- Nationella val – huvudansvar för arbetet: Boverket, SIS, Industrin?
- Boverkets nya byggregler – vem gör vad, när och hur?
- Behov av samarbete över materialgränser
- Behov av nordiskt samarbete (Finlands exempel om NDP)
- EU: Green Deal, EcoDesign ESPR, Digital Product Passport
  - EPDer, klimatdeklarationer, cirkularitet, spårbarhet
- EU: CPR (Ny byggproduktförordning), CPR Acquis (effektivare standardiseringsarbete)