Väylävirasto
Trafikledsverket

Puurakenteiden Eurokoodiseminaari - EN1995-2 Puusillat

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Content of EN1995-2 – Main text

CONTENT OF MAIN TEXT – EN 1995-2 Timber bridges

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Annexes – EN1995-2 Timber bridges

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Content of EN1995-2 - Annexes

The main changes compared to the previous edition are listed below:

— Categorization of bridges depending on intended service life (4.1.2);

— Major changes to clause on Durability (Clause 6);

— Examples for detailing of Timber Bridges (Annex D);

— Requirements for inspection (6.4);

— Design rules for timber concrete composite-bridges (8.2);

— Changes to clause on serviceability limit states (Clause 9);

— Changes to clause on Fatigue (Clause 10).

Suurimmat muutokset:

- Suunnittelukäyttöikä (Service Life)
- Pitkäaikaiskestävyys (Durability)
- Yksityiskohdat (Detailing)
- Tarkastus (Inspection)
- Puu-Betoni liittosillat (Timber-concrete composite bridges)
- Käyttörajatilat (Serviceability limit states)
- Väsytys (Fatigue)

Main changes – Design service life

- Suunnittelukäyttöikätaulukkoja ei aiemmin ollut
- Huomattava, että myös EN1990 A.2 antaa suunnittelukäyttöiän (EN1990 A.2 hierarkiassa ylempänä)

4.1.2 Design service life

4.1.2.1 General

(1) <RCM> The design service life of timber bridges T_{lf} should be specified according to FprEN 1990:2022, 4.5.

NOTE 1 The value of T_{lf} is given in Table 4.1 (NDP) for different categories of timber structures, unless the National Annex gives different values. These values align with those provided in FprEN 1990:2022, Table A.2.2(NDP).

(2) <RCM> Timber bridges should be designed as protected timber bridges.

NOTE 2 A lower value of design service life can be relevant, for example, for bridges in a low consequence class where the economic consequences of replacement after a shorter design service life are agreed to be acceptable by the relevant authority or relevant parties.

Table 4.1 (NDP) — Design service lives for categories of timber bridges

	Category of timber bridges	Design service life, T_{lf} [years]
1	Protected timber bridges (including their foundations and steel tension components according EN 1993-1-11), other civil engineering structures supporting road or railway traffic [a]	100 [b]
2	Timber bridges with the main structural members protected for a 50-year design service life [b]	50 [b]
3	Replaceable structural parts of bridges line 1 and 2 [c]	25
4	Temporary structures [d]	≤ 10

a see FprEN 1990:2022, Table A.2.2 (NDP) footnote a.

b see FprEN 1990:2022, Table A.2.2 (NDP) footnote b. Line 2 can be relevant, for example, for bridges in a low consequence class where the economic consequences of replacement after a shorter design service life are agreed to be acceptable by the relevant authority, or where not specified, agreed for a specific project by the relevant parties, for bridges in another building and noise barriers on bridges with walls made of timber elements

c A value of 25 years may be given for replaceable structures or parts of structures as well. The protection of steel elements against corrosion should fulfil the design service life. Steel tension components according EN 1993-1-11 shall be designed with a design service life of 100 years (see 4.1.2.2), even if they should be replaceable. Ancillary structures should be classified as replaceable parts of the main structure.

d see FprEN 1990:2022, Table A.2.2 (NDP) footnote c. Unprotected timber members should be classified as temporary structures. For timber with a high durability class see 6.1.2 (6).

Main changes – Durability

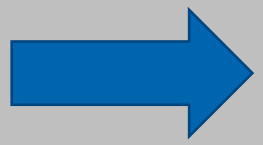
- Paljon uutta asiaa (1 sivu → 8 sivua)

Section 4 Durability

4.1 Timber

4.2 Resistance to corrosion

4.3 Protection of timber decks from water by sealing



6 Durability

6.1 Constructive measures

6.1.1 General

6.1.2 Protected members

6.1.3 Moisture protection of wood and wood-based materials

6.2 Water Management

6.2.1 General

6.2.2 Protection of timber decks from water by sealing

6.2.3 Sealing systems

6.3 Protection of steel elements against corrosion

6.4 Inspection and maintenance of timber bridges

Main changes – Detailing

- Aiemmin ei juuri mitään siltaosassa, nyt paljon esimerkkejä (sopivatko kaikki Suomen olosuhteisiin…?)

Section 9 Structural detailing and control

(1)P The relevant rules given in EN 1995-1-1 Section 10 also apply to the structural parts of bridges, with the exception of clauses 10.8 and 10.9.

(2) Before attaching a seal layer on a deck plate, the deck system should be dry and the surface should satisfy the requirements of the seal layer.

Figure D.4.1 — Examples of protected timber bridges (extension of Figure 3.1)

Figure D.4.2 — Examples of TCC bridge types with commonly used connections

Figure D.5.1 — Detailing T-Pos 1 – Durability: constructional wood protection – Possibility 1: Covered bridge (protective roof with boarding)

Figure D.5.2 — Detailing T-Pos 2 – Durability: constructional wood protection - Possibility 2: Covered bridge – weather protection of trough bridge

Figure D.5.3 — Detailing T-Pos 3 – Durability: constructional wood protection – Possibility 3: Closed road surface: sealing system

Figure D.5.4 — Detailing T-Pos 4 – Durability: constructional wood protection - Possibility 4: Closed road surface: reinforced concrete-plates

Figure D.5.5 — Detailing T-Pos 5 – Durability: constructional wood protection - Possibility 5: Closed road surface: Glass fibre reinforced plastic (GRP) board

Figure D.5.6 — Detailing T-Trans 1 – Durability: Transition joint – Closed solution with mastic asphalt – Sliding bearing

Figure D.5.7 — Detailing T-Trans 2 – Durability: Transition joint – Solution timber bridge with joint – Sliding bearing

Figure D.5.8 — Detailing T-Trans 3 – Durability: Transition joint - Solution timber bridge with mastic asphalt – Fixed bearing

Figure D.5.9 — Detailing T-Kerb 1 – Durability: Edge sealing system on timber deck slab with concrete kerb – Solution 1

Figure D.5.10 — Detailing T-Kerb 2 – Durability: Edge sealing system on timber deck slab with concrete kerb – Solution 2

D.6 Installation of monitoring systems

Miten tästä eteenpäin ??

- **Paikallisen käytännön sovittaminen Eurokoodin kanssa?**
  - muutama diplomityö alan ja Väyläviraston rahoittamana?
  - 1) Mitoituskysymykset (väsytys/värähtely), 2) Muut asiat
  - Shall-should-may-can → tarkka läpikäynti mistä voidaan tarvittaessa poiketa
  - *Arviolta 2*15…20k€? = 30-40k€*

- **Kansallisen liitteen tekeminen**
  - ei mahdoton tehtävä (laajuus riippuu tahtotilasta)
  - *Arviolta 10-20k€?*

- **NCCI-ohje (NCCI 5) → päivittäminen**
  - ei mahdoton tehtävä (mutta ohjeen tekeminen on aina laajempi tehtävä kuin kansallisen liitteen tekeminen)
  - *Arviolta 30-70k€?*

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EUROCODES
EN 1995
Design of timber structures

Kiitoksia mielenkiinnosta

Väylävirasto
Trafikledsverket
Finnish Transport Infrastructure Agency