SLOVENSKI STANDARD
oSIST prEN 1995-2:2023

01-december-2023

Evrokod 5 - Projektiranje lesenih konstrukcij - 2. del: Mostovi

Eurocode 5 - Design of timber structures - Part 2: Bridges

Eurocode 5 - Bemessung und Konstruktion von Holzbauten - Teil 2: Brücken

Eurocode 5 - Calcul des structures en bois - Partie 2 : Ponts

Ta slovenski standard je istoveten z: **prEN 1995-2**

ICS:

91.010.30	Tehnični vidiki	Technical aspects
91.080.20	Lesene konstrukcije	Timber structures
93.040	Gradnja mostov	Bridge construction

oSIST prEN 1995-2:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 1995-2

September 2023

ICS 93.040; 91.010.30; 91.080.20

Will supersede EN 1995-2:2004

English Version

Eurocode 5 - Design of timber structures - Part 2: Bridges

Eurocode 5 - Calcul des structures en bois - Part 2: Ponts

Eurocode 5 - Bemessung und Konstruktion von Holzbauten - Teil 2: Brücken

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 250.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. prEN 1995-2:2023 E

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European foreword

This document (prEN 1995-2:2023) has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes”, the secretariat of which is held by BSI. CEN/TC 250 is responsible for all Structural Eurocodes and has been assigned responsibility for structural and geotechnical design matters by CEN.

This document will supersede EN 1995-2:2004.

The first generation of EN Eurocodes was published between 2002 and 2007. This document forms part of the second generation of the Eurocodes, which have been prepared under Mandate M/515 issued to CEN by the European Commission and the European Free Trade Association.

The Eurocodes have been drafted to be used in conjunction with relevant execution, material, product and test standards, and to identify requirements for execution, materials, products and testing that are relied upon by the Eurocodes.

The Eurocodes recognize the responsibility of each Member State and have safeguarded their right to determine values related to regulatory safety matters at national level through the use of National 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).

Introduction

0.1 Introduction to the Eurocodes

The Structural Eurocodes comprise the following standards generally consisting of a number of Parts:

— EN 1990 Eurocode: Basis of structural and geotechnical design

— EN 1991 Eurocode 1: Actions on structures

— EN 1992 Eurocode 2: Design of concrete structures

— EN 1993 Eurocode 3: Design of steel structures

— EN 1994 Eurocode 4: Design of composite steel and concrete structures

— EN 1995 Eurocode 5: Design of timber structures

— EN 1996 Eurocode 6: Design of masonry structures

— EN 1997 Eurocode 7: Geotechnical design

— EN 1998 Eurocode 8: Design of structures for earthquake resistance

— EN 1999 Eurocode 9: Design of aluminium structures

— New parts are under development, e.g. Eurocode for design of structural glass

The Eurocodes are intended for use by designers, clients, manufacturers, constructors, relevant authorities (in exercising their duties in accordance with national or international regulations), educators, soft-ware developers, and committees drafting standards for related product, testing and execution standards.

NOTE Some aspects of design are most appropriately specified by relevant authorities or, where not specified, can be agreed on a project-specific basis between relevant parties such as designers and clients. The Eurocodes identify such aspects making explicit reference to relevant authorities and relevant parties.

0.2 Introduction to EN 1995 (all parts)

EN 1995 (all parts) describes the principles and requirements for safety, serviceability and durability of timber structures. It is based on the limit state concept used in conjunction with a partial factor method.

Numerical values for partial factors and other reliability parameters are recommended as basic values that provide an acceptable level of reliability. They have been selected assuming that an appropriate level of workmanship and of quality management applies. When EN 1995-2 is used as a base document by other CEN/TCs the same values need to be taken.

EN 1995 (all parts) applies to the design of buildings and civil engineering works in timber (solid timber, sawn, planed or in pole form, structural finger jointed timber, glued solid timber, glued laminated timber, cross laminated timber and structural laminated veneer lumber), wood-based panels and softboards as sheeting of timber frame members jointed together with adhesives or mechanical fasteners. It complies with the principles and requirements for the safety and serviceability of structures, the basis of their design and verification that are given in EN 1990.

EN 1995 (all parts) is only concerned with requirements for mechanical resistance, serviceability, durability and fire resistance of timber structures. Other requirements, e.g. concerning thermal or sound insulation, are not considered.

EN 1995 is subdivided in various parts:

— EN 1995-1 Design of timber structures — Part 1: General rules and rules for buildings

— EN 1995-2 Design of timber structures — Part 2: Bridges

— EN 1995-3 Design of timber structures — Part 3: Execution

EN 1995-1 in itself does not exist as a physical document, but comprises the following 3 separate parts:

— EN 1995-1-1 Design of timber structures — Part 1-1 General rules and rules for buildings

— EN 1995-1-2 Design of timber structures — Part 1-2: Structural fire design

— CEN/TS 19103 Eurocode 5 — Design of Timber Structures — Structural design of timber-concrete composite structures — Common rules and rules for buildings

EN 1995-2 “Bridges” refers to the common rules in EN 1995-1-1 and supplements, modifies or supersedes them, where relevant.

EN 1995-3 “Execution” refers to the common rules in EN 1995-1-1 and supplements, modifies or supersedes them, where relevant

0.3 Introduction to EN 1995-2

This document provides general design rules for the structural parts of timber bridges.

0.4 Verbal forms used in the Eurocodes

The verb “shall” expresses a requirement strictly to be followed and from which no deviation is permitted in order to comply with the Eurocodes.

The verb “should” expresses a highly recommended choice or course of action. Subject to national regulation and/or any relevant contractual provisions, alternative approaches could be used/adopted where technically justified.

The verb “may” expresses a course of action permissible within the limits of the Eurocodes.

The verb “can” expresses possibility and capability; it is used for statements of fact and clarification of concepts.

0.5 National annex for EN 1995-2

National choice is allowed in this document where explicitly stated within notes. National choice includes the selection of values for Nationally Determined Parameters (NDPs).

The national standard implementing EN 1995-2 can have a National Annex containing all national choices to be used for the design of buildings and civil engineering works to be constructed in the relevant country.

When no national choice is given, the default choice given in this document is to be used.

When no national choice is made and no default is given in this document, the choice can be specified by a relevant authority or, where not specified, agreed for a specific project by appropriate parties.

National choice is allowed in EN 1995-2 through notes to the following clauses:

4.1.2.1	4.3.1.3	9.2	10.4

National choice is allowed in EN 1995-2 on the application of the following informative annexes:

Annex B	Annex C	Annex D	Annex E

The National Annex can contain, directly or by reference, non-contradictory complementary information for ease of implementation, provided it does not alter any provisions of the Eurocodes.

1 Scope

1.1 Scope of EN 1995-2

(1) This document gives general design rules for the structural parts of bridges, i.e. structural members of importance for the reliability of the whole bridge or major parts of it, made of timber or other wood-based materials, either singly or compositely with concrete, steel or other materials.

1.2 Assumptions

(1) The general assumptions of EN 1990 apply.

(2) EN 1995-2 is intended to be used in conjunction with EN 1990, EN 1991 (all parts), EN 1995 (all parts), CEN/TS 19103, EN 1997 (all parts) and EN 1998-2.

(3) Rules for prestressed TCC elements are not covered by this document. Rules for the design of stress-laminated timber decks used as part of a TCC system are given.

(4) Systems which rely on friction between wood and concrete are with the exception of stress-laminated timber decks not covered by this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE See the Bibliography for a list of other documents cited that are not normative references, including those referenced as recommendations (i.e. in 'should' clauses), permissions ('may' clauses), possibilities ('can' clauses), and in notes.

EN 1990:2023, *Eurocode - Basis of structural and geotechnical design*

EN 1991 (all parts), *Eurocode 1 — Actions on structures*

EN 1992-1-1:—,[1] *Eurocode 2 — Design of concrete structures — Part 1-1: General rules and rules for buildings, bridges and civil engineering structures*

EN 1993-1-4:—,[2] *Eurocode 3 — Design of steel structures — Part 1-4: Stainless steel structures*

EN 1993-1-11:—,[3] *Eurocode 3 — Design of steel structure — Part 1-11: Tension components*

EN 1993-2:—,[4] *Eurocode 3 — Design of steel structures — Part 2: Bridges*

EN 1995-1-1:—,[5] *Eurocode 5 — Design of timber structures — Part 1-1: General rules and rules for buildings*

EN 1995-3:—,[6] *Eurocode 5 — Design of timber structures Part 3: Execution*

[1] Under preparation. Stage at the time of publication: prEN 1992-1-1:2021.
[2] Under preparation. Stage at the time of publication: prEN 1992-1-4:2023.
[3] Under development.
[4] Under development.
[5] Under preparation. Stage at the time of publication: prEN 1995-1-1:2023.
[6] Under preparation. Stage at the time of publication: prEN 1995-3:2023.

CEN/TS 19103, *Eurocode 5: Design of Timber Structures - Structural design of timber-concrete composite structures - Common rules and rules for buildings*

EN 1998-1-1:—,[7] *Eurocode 8 – Design of structures for earthquake resistance – Part 1-1: General rules and seismic action*

EN 1998-2:—,[8] *Eurocode 8 — Design of structures for earthquake resistance — Part 2: Bridges*

EN 13183-2, *Moisture content of a piece of sawn timber — Part 2: Estimation by electrical resistance method*

3 Terms, definitions, symbols and abbreviations

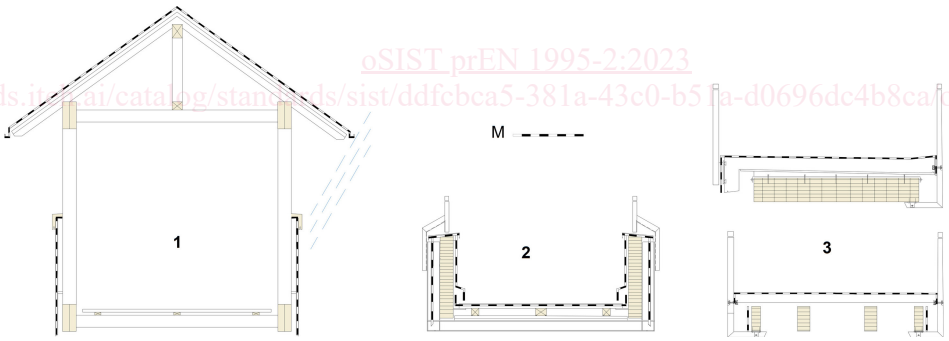
3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1995-1-1:—[5], CEN/TS 19103, EN 1995-3:—[6] and the following apply.

3.1.1
protected bridge
bridge in which all main bearing members are designed as *protected members* (3.1.2)

3.1.2
protected member
structural member not exposed to direct weathering such as rain, snow or other sources of moisture ingress

Note 1 to entry: Protected members are provided with weather protection, e.g. in form of claddings or side faces, sealed deck surface or an adequate roof overhang in both longitudinal and transversal directions (see Figure 3.1), so that an accumulation of moisture is unlikely. This includes truss nodes and end grain areas as well. For more in detail see design examples of detailing in Annex D.



Key
M Membrane or weather-resistant layer
1 Covered pedestrian bridge (bridge with a roof)
2 Trough bridge
3 Deck bridges

Figure 3.1 — Examples of protected bridges

[7] Under preparation. Stage at the time of publication: prEN 1998-1-1:2022.
[8] Under preparation. Stage at the time of publication: prEN 1998-2:2023.

3.1.3
unprotected member
structural member that is not protected or partially unprotected from weathering but is within the limits of Service Class (SC) 3

3.1.4
unprotected bridge
bridge where some main structural members have not a full protection and *durability* (3.1.9) requirements are not fully met

3.1.5
timber bridge protected for a 50-year design service life
bridge in which all main bearing members are protected to ensure a design service life T_{life} of 50 years (see Table 4.1, line 2)

3.1.6
covered bridge
bridge with roof structure

3.1.7
sealing system
layer preventing the penetration of water and moisture

Note 1 to entry: A sealing system consists of the layers primer, sealant membrane and protection (base) layer adapted to each other.

3.1.8
floating sealing system
sealing system (3.1.7) where there is no shear connection between surface composition and superstructure

Note 1 to entry: See e.g. a rear-ventilated road surface as it is shown in Annex D.

3.1.9
durability
ability of a structure or structural member to satisfy, with planned maintenance, its design performance requirements over the design service life

[SOURCE: EN 1990:2023, definition 3.1.2.31]

Note 1 to entry: For timber this also includes evaluation of its inherent resistance against wood destroying organisms.

3.1.10
ancillary structural element
replaceable structural element that does not form part of the main structure of the bridge but is provided for other reasons

Note 1 to entry: Examples of ancillary structural elements are handrails, plankings, claddings, guard rails, ladders, transition joints and pavements.

Note 2 to entry: Kerbs, bearings or parts of bearings, and cantilevered parapets are not ancillary structural elements.

3.1.11
secondary seismic element
structural member that is not considered as part of the primary system and whose resistance and stiffness against seismic actions are neglected

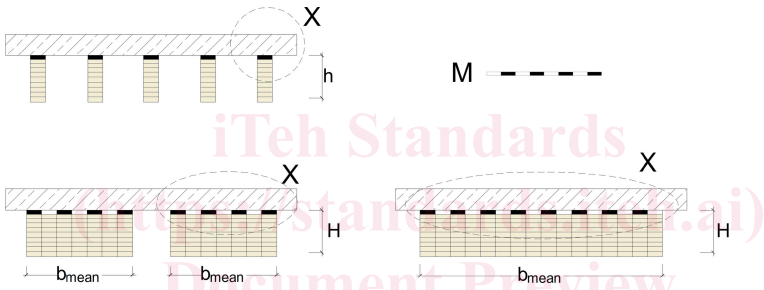
[SOURCE: EN 1998-1-1:—[7], 3.1.31]

3.1.12
shear connection
interconnection between two or more components that has sufficient strength and stiffness to enable the two components to be designed as parts of a single structural member

Note 1 to entry: Examples include reinforcing steel of any material, notches, plates and continuous fasteners, any of which can be either mechanically fixed or bonded.

3.1.13
timber-concrete composite
TCC
superstructure made of timber and concrete connected by *shear connections* (3.1.12)

Note 1 to entry: For examples, see Figure 3.2.



Key

X Connection between timber and concrete

M Membrane or weather-resistant layer

NOTE For established TCC connections, see Figure D.4.2.

Figure 3.2 — Examples of cross sections from TCC bridge types

3.1.14
notched connection
shear connection (3.1.12) consisting of a concrete cam embedded in the timber component and a reinforcing steel or similar aid that prevents the concrete component from lifting off

Note 1 to entry: for examples see Figure D.4.2 and CEN/TS 19103.

Note 2 to entry: an example of a notched connection in a girder that has no constant height is shown in Figure 8.2.

3.1.15
adhesively bonded timber-concrete composite (TCC) bridge
TCC bridge in which the *shear connection* (3.1.12) between concrete slab and the wooden longitudinal beams of the superstructure is achieved by direct bonding