National Standards Authority of Ireland

IRISH STANDARD

**ENV 1995-2:1997**

ICS 91.010.30
91.080.20
93.040

# EUROCODE 5: DESIGN OF TIMBER STRUCTURES - PART 2: BRIDGES

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Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN PRESTANDARD

PRÉNORME EUROPÉENNE

EUROPÄISCHE VORNORM

**ENV 1995-2**

July 1997

ICS 91.010.30; 91.080.20; 93.040

Descriptors: timber construction, bridges, building codes, design, computation

English version

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

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

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

This European Prestandard (ENV) was approved by CEN on 1997-04-15 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into an European Standard (EN).

CEN members are required to announce the existance of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**

European Committee for Standardization
Comité Européen de Normalisation
Europaisches Komitee fur Normung

**Central Secretariat: rue de Stassart,36 B-1050 Brussels**



Ref. No. ENV 1995-2:1997 E

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# Foreword

## Objectives of the Eurocodes

(1) The "Structural Eurocodes" comprise a group of standards for the structural and geotechnical design of buildings and civil engineering works

(2) They cover execution and control only to the extent that it is necessary to indicate the quality of the construction products, and the standard of workmanship needed to comply with the assumptions of the design rules.

(3) Until the necessary set of harmonised technical specifications for products and methods for the testing their performance are available, some of the Structural Eurocodes cover some of these aspects in informative Annexes

## Background to the Eurocode Programme

(4) The Commission of the European Communities (CEC) initiated the work of establishing a set of harmonised technical rules for the design of building and civil engineering works which would initially serve as an alternative to the differing rules in force in the various Member States and would ultimately replace them. These technical rules became known as the "Structural Eurocodes".

(5) In 1990, after consulting their respective Member States, the CEC transferred the work of further development, issue and updating of the Structural Eurocodes to CEN, and the EFTA Secretariat agreed to support the CEN work

(6) CEN Technical Committee CEN/TC 250 is responsible for all Structural Eurocodes

## Eurocode Programme

(7) Work is in hand on the following Eurocodes, each generally consisting of a number of parts:

| | |
|---|---|
| EN 1991 Eurocode 1 | Basis of design and 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 provisions for earthquake resistance of structures |
| EN 1999 Eurocode 9 | Design of aluminium alloy structures |

(8) Separate sub-committees have been formed by CEN/TC 250 for the various Eurocodes listed above

(9) This part 2 of Eurocode 5 is being published as a European Prestandard (ENV) with an initial life of three years

(10) This Prestandard is intended for experimental application and for the submission of

comments

(11) After approximately two years CEN members will be invited to submit formal comments to be taken into account in determining future actions

(12) Meanwhile feedback and comments on this Prestandard should be sent to the Secretariat of CEN/TC 250/SC 5 at the following address:

Secretariat of CEN TC 250/SC 5
BST
Box 49044
S-100 28 STOCKHOLM

or to your national standards organization.

## National Application Documents (NAD's)

(13) In view of the responsibilities of authorities in member countries for safety, health and other matters covered by the essential requirements of the Construction Products Directive (CPD), certain safety elements in this ENV have been assigned indicative values which are identified as "boxed" or by [ ] The authorities in each member state are expected to review the "boxed values" and may substitute alternative definitive values for these safety elements for use in national application

(14) Some of the supporting European or International standards may not be available by the time this Prestandard is issued. It is therefore anticipated that a National Application Document (NAD) giving any substitute definitive values for safety elements, referencing compatible supporting standards and providing guidance on the national application of this Prestandard, will be issued by each member state or its Standards Organization.

(15) It is intended that this Prestandard is used in conjunction with the National Application Document valid in the country where the building or civil engineering work is located.

## Matters specific to this Prestandard

(16) This prestandard contains only clauses in addition to ENV 1995-1-1, i.e no provisions or application rules which are in ENV 1995-1-1 are repeated in this prestandard.

(17) In this draft provisions and application rules are given which cover design situations which are specific to bridge design (e.g serviceability limit states) of pedestrian/cycle track bridges, road and railway bridges

(18) Other parts of the text deal with design situations or structural components which are not specific to bridges but normally mostly used in bridge design. Examples of the second group are design situations such as fatigue and structural components such as reinforced timber, laminated timber decks and glued-in bolts.

(19) Verification methods for glued-in rods are given in annex A (informative).

(20) This prestandard does not cover bridges with longitudinally pre-stressed timber

(21) In the case of fatigue verification, with the exception of fatigue damage due to vibrations caused by wind, no provisions are given where a verification should be made. A simplified verification method is given in annex B (informative)

(22) The project team used the following references

- Brücken und Stege aus Holz Schweizerische Arbeitsgemeinschaft für Holzforschung, 1989
- DIN 1074, Holzbrücken. Ausgabe Mai 1991
- Kreuzinger, H and Mohr, B: Holz und Holzverbindungen unter nicht vorwiegend ruhenden Einwirkungen. Technische Universität München, Institut für Tragwerksbau, Fachgebiet Holzbau, 1994
- Ontario highway bridge design code 3rd edition, Ministry of Transportation, 1992
- Recommended guide for the design of stress laminated timber plate bridge decks Part 1 - Design procedures. Roads and Traffic Authority - New South Wales, 1995
- Ritter, M : Timber bridges - Design, construction, inspection and maintenance United States Department of Agriculture, Forest Service, 1990
- Taylor, R J and Keenan, F J Wood highway bridges. Canadian Wood Council, 1992

(23) Several of the above mentioned national bridge codes/recommendations include informative text which is not included in this prestandard, since it should be found in design manuals or text books

# Section 1 General

## 1.1 Scope

(1)P ENV 1995-2 deals with the design of the main 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 and other wood based materials, either singly or composite with concrete, steel or other materials.

(2)P ENV 1995-2 does not cover the special rules of seismic design of timber bridges, for which ENV 1998-2 is relevant.

## 1.2 Relationship to other Eurocodes

(1)P The relevant rules given in ENV 1995-1-1 also apply to the main structural parts of bridges, unless otherwise specified in 1 2(2)P or in the text.

(2)P The following clauses of ENV 1995-1-1 do not apply to the main structural parts of bridges

- 2.1 Fundamental requirements
- 2.2 Definitions and classifications
- 2.3 Design requirements
- 2.4 3(2) Examples of minimum corrosion protection
- 3.4.2 Particleboard
- 3 4 3 Fibreboard
- 5 4.1 3 Simplified analysis of trusses
- 5 4.1.4(3) Assemblies - strength verification of members
- 5 4.1.5 Trusses with punched metal plate fasteners
- 5 4 2 Roof and floor diaphragms
- 5 4.3 Wall diaphragms
- 6 5.1.2(3) Reduction of bolt capacity

Note: A method for calculating the effective number of dowel-type fasteners is given in annex C

(3)P For concrete components and reinforcing bars, the provisions of ENV 1992-1-1 and ENV 1992-2 apply

(4)P For steel components, the provisions of Eurocode 3, especially ENV 1993-1-1 and ENV 1993-2 apply

(5)P For the basis of design, see section 2

(6) When using this Part 2, reference should be made, where relevant, to the following European Prestandards

- ENV 1991-1-1 Eurocode 1 Part 1-1 Basis of design
- ENV 1991-2-1 Eurocode 1 Part 2-1 Densities, self-weight and imposed loads