National Standards Authority of Ireland

STANDARD

ENV 1993-5:1998

ICS 91.010.30

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EUROCODE 3 : DESIGN OF STEEL STRUCTURES - PART 5 : PILING

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EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
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Descriptors: civil engineering, steel construction, structural steels, foundation piles, design, building codes, computation

English version

Eurocode 3: Design of steel structures - Part 5: Piling

Eurocode 3: Calcul des structures en acier - Partie 5: Pieux et palplanches

Eurocode 3: Bemessung und Konstruktion von Stahlbauten - Teil 5: Pfähle und Spundwände

This European Prestandard (ENV) was approved by CEN on 30 June 1997 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 a European Standard.

CEN members are required to announce the existence 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.

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

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

Ref. No. ENV 1993-5:1998 E

Contents

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 is necessary to indicate the quality of the construction products, and the standard of the workmanship, needed to comply with the assumptions of the design rules.

(3) Until the necessary set of harmonised technical specifications for products and for methods of testing their performance is 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 harmonized technical rules for the design of building works and civil engineering works which would initially serve as an alternative to the different 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 Structural 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 of ENV 1993 has been finalised in accordance with a mandate issued by CEC and is being published as an European Prestandard 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 on this Prestandard to be taken into account in determining future action.

(12) Meanwhile feedback and comments on this Prestandard should be sent to the Secretariat of Sub-committee CEN/TC 250/SC 3 at the following address:

BSI Standards
British Standards House
389 Chiswick High Road
London W4 4AL
England

or to your national standards organisation.

National Application Documents (NADs)

(13) In view of the responsibilities of the 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 by ☐ or [ ] ("boxed values"). The authorities in each member country 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 necessary supporting European or International Standards might 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 country or its Standards Organization.

(15) It is intended that this Prestandard is used in conjunction with the NAD valid in the country in which the building or civil engineering works is located.

Matters specific to this Prestandard

(16) The list of parts of ENV 1993 which are currently envisaged is:

ENV 1993-1-1	General rules and rules for buildings
ENV 1993-1-2	Supplementary rules for structural fire design
ENV 1993-1-3	Supplementary rules for cold formed thin gauge members and sheeting
ENV 1993-1-4	Supplementary rules for stainless steels
ENV 1993-1-5	Supplementary rules for the strength and stability of planar plated structures without transverse loads
ENV 1993-2	Steel bridges
ENV 1993-3	Towers, masts and chimneys
ENV 1993-4	Silos, tanks and pipelines
ENV 1993-5	Piling
ENV 1993-6	Crane supporting structures
ENV 1993-7	Marine and maritime structures
ENV 1993-8	Agricultural structures

(17) This Prestandard has been established with two main objectives:

- to be sufficiently precise and comprehensive for contractual use;

- to be sufficiently flexible to allow the clients, the designers and the contractors fully to exert their technical responsibilities.

(18) Wherever this Prestandard mentions "unless otherwise specified", it is intended that complementary and/or modifying requirements may be given in the project specification.

(19) The limits of validity of the contents of this prestandard are defined in 1.1. Beyond these limits, rules should be given by NAD or specifically for particular projects.

(20) Certain reduction factors concerning possible slip in the interlocks of U-shaped sheet piles have been left open and can be supplied in NADs at the discretion of national competent authorities.

1 General

1.1 Scope

(1)P This Part 5 of ENV 1993 provides principles and application rules for the structural design of bearing piles and sheet piles made of steel.

(2) It also provides examples of detailing for foundation and retaining wall structures.

(3)P The field of application includes:

- steel piled foundations of civil engineering works on land and over water;
- temporary or permanent structures necessary for the execution of steel piling;
- temporary or permanent retaining structures composed of steel sheet piles, including all kinds of combined walls.

(4)P The field of application excludes:

- offshore platforms;
- dolphins.

(5) This Part 5 of ENV 1993 also includes application rules for steel piles filled with concrete.

NOTE: These provisions might be transferred to ENV 1994 in a later stage.

(6) Special requirements for seismic design are not covered. Where relevant, the effects of ground movements caused by earthquakes should be taken into account according to ENV 1998.

(7) Design provisions are also given for waling, bracing and anchoring, see section 6.

(8) The design of steel sheet piling using class 1, 2 and 3 cross-sections is covered in sections 4 and 5, whereas the design of class 4 cross-sections is covered in annex A.

(9) The design procedure for crimped U-piles and straight web steel sheet piles utilises design resistances obtained by testing. It is expected that in future a separate European Standard will contain appropriate provisions for the testing of crimped points for U-piles and the testing of straight web steel sheet piles.

NOTE: A preliminary approach for harmonized testing procedures is given in annex B.

(10) Geotechnical aspects are not covered in this document. Reference is made to ENV 1997.

NOTE: Annexes C, D and E are provided only to allow a complete design of steel piling including some geotechnical aspects in accordance with ENV 1997. This allows the document to be used in the ENV-stage for trial application. It is expected that after the ENV-stage the location of the content of these annexes will be reconsidered and the annexes will be dropped.