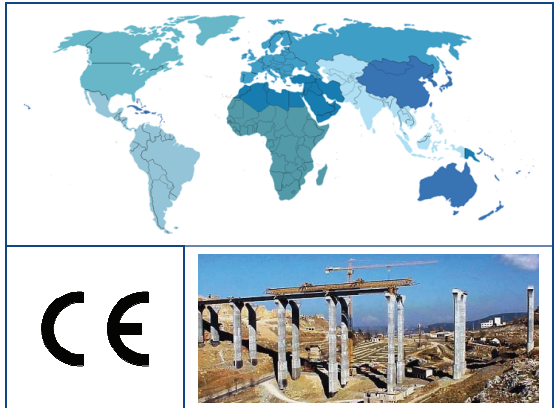


B5 THE EUROCODES: USE OUTSIDE EU



DG Enterprise and Industry
Joint Research Centre

Eurocodes ▶
Building the future

This booklet was produced by the JRC in the framework of
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between
the Enterprise and Industry Directorate General (DG ENTR)
and
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regarding support to the implementation, harmonization and further development
of the Eurocodes

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Eurocodes – Building the future	http://eurocodes.jrc.ec.europa.eu
DG ENTR, Construction Sector	http://ec.europa.eu/enterprise/construction/index_en.htm
CEN	http://www.cen.eu
EOTA	http://www.eota.eu

1. THE EUROCODES

1.1. What are the Eurocodes?

The Eurocodes are a set of European Standards (EN) for the design of buildings and other civil engineering works and construction products, produced by the Comité Européen de Normalisation (CEN). They embody National experience and research output together with the expertise of CEN Technical Committee 250 (CEN/TC250) and of International Technical and Scientific Organisations and represent a world-class standard for structural design.

The Eurocodes suite is made up by 10 European Standards for structural design. Each Eurocode consists of a number of parts that cover particular technical aspects, e.g. fire, bridge design, etc.

EN 1990	Eurocode: Basis of structural 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

The EN Eurocodes

The Eurocodes cover in a comprehensive manner all principal construction materials (concrete, steel, timber, masonry and aluminium), all major fields of structural engineering (basis of structural design, loading, fire, geotechnics, earthquake, etc) and a wide range of types of structures and products (buildings, bridges, towers and masts, silos, etc).

Publication of the Eurocodes was completed in May 2007. Following CEN rules, the Eurocodes can be used in parallel with National Standards until mid 2010, when all conflicting National Standards will be withdrawn.

A European Standard (EN) is published by one of the European Standards Organisations, i.e. CEN, CENELEC and ETSI, and must be adopted as an identical National standard by the National Standards Bodies.

1.2. Innovation – The role of EN 1990

EN 1990 establishes for all the Eurocodes the Principles and Requirements for safety, serviceability and durability of structures.

The Eurocodes provide common structural design rules for everyday use for the design of whole structures and component products of both a traditional and an innovative nature.

The verification procedure is based on the limit state concept used in conjunction with partial safety factors. The Eurocodes allow also for design based on probabilistic methods as well as for design assisted by testing, and provide guidance for the use of these methods.

Innovation contributes to more and better employment opportunities by increasing the competitiveness of the construction industry in the world market.

The Eurocodes are written in a style encouraging innovation and form a common basis for R&D in civil engineering.

1.3. Flexibility – Nationally Determined Parameters

The determination of the levels of safety of buildings and other civil engineering works and parts thereof, including aspects of durability and economy, remains within the competence of the State implementing the Eurocodes.

The Eurocodes *“recognise the responsibility of regulatory authorities in each Member State and have safeguarded their right to determine values related to safety matters at national level where these continue to vary from State to State”*.

National choice is provided by the Eurocodes with sets of recommended values which may be replaced by Nationally Determined Parameters. These refer to classes, symbols and alternative methods.

The Nationally Determined Parameters account for possible differences in geographical or climatic conditions (e.g. wind or snow), or in ways of life, as well as different levels of protection that may prevail at national, regional or local level.



2. BENEFITS AND OPPORTUNITIES OF USING THE EUROCODES

2.1. Present situation in countries outside the EU

In several countries the Eurocodes are already used for the revision of existing and for the creation of new national codes.

Several countries are planning the direct implementation of the Eurocodes.

A number of structural designers of companies that participate in international projects are using the Eurocodes.

There are universities outside Europe who are offering courses on Eurocodes.

External Assistance is a core activity of the European Union. The Eurocodes relate to actions including product safety, sustainable transport and infrastructure, trade development and integration and regional cooperation.

2.2. Why the Eurocodes?

The Eurocodes may be used also outside EU in the context described above, because they are:

- a **complete set of design standards** that cover all principal construction materials, all major fields of structural engineering and a wide range of types of structures and products;
- the most **up-to-date** codes of practice;
- **flexible**, offering the possibility for each country to choose the levels of safety through the Nationally Determined Parameters.

Furthermore, the Eurocodes:

- are a major tool for the successful removal of trade barriers for construction products and services;
- contribute to the safety and protection of the people in the built environment, on the basis of the best possible scientific advice;
- are a common basis for technical and scientific collaboration.



2.3. Benefits and opportunities

Removal of trade barriers

The European Union is a major power in world trade with strong interest in open markets and clear regulatory frameworks. The External Trade policy is to remove barriers in order to make trading with partners significantly easier, thus benefiting both sides. Transparent, effective and respected common rules are essential to achieve this objective.

The harmonisation of the legislative framework in areas such as standards, conformity assessment, technical and environment regulations and competition laws is of central importance to facilitate access to the enlarged European market of 27 countries with 500 million potential customers.

Within the European standardisation and conformity assessment system, the Eurocodes are the reference documents for construction products. They will:

- enable manufacturers to comply with European legislation;
- provide a common and transparent basis for fair competition in the construction market;
- facilitate the exchange of construction and engineering services;
- facilitate the free movement of structural materials, products, components and kits;
- reduce border bureaucracy and the cost of multiple testing and certification.

Safety of citizens

The Eurocodes suite is the principle contributor to the safety of citizens in the built environment, on the basis of the best possible scientific advice. They help to protect citizens from sub-standard products and are a tool for the cross-border harmonisation of safety levels in construction.

Scientific, industrial and technical cooperation

The intended benefits and opportunities arising from the implementation and use of the Eurocodes are to:

- provide common design criteria and methods to fulfil the specified requirements for mechanical resistance, stability and resistance to fire, including aspects of durability and economy;
- provide a common understanding between owners, operators and users, designers, contractors and manufacturers;
- allow the preparation of common design aids and software;
- provide a common basis for research and development;
- encourage innovation in construction products and works.



3. EUROPEAN LEGISLATION FOR CONSTRUCTION WORKS AND PRODUCTS

3.1. The Eurocodes and EU Legislation

The Eurocodes serve as reference documents recognised by authorities of the Member States of the EU and the European Free Trade Association for the following purposes:

- as a means to prove compliance of buildings and civil engineering works with the Essential Requirements of the Construction Products Directive (Council Directive 89/106/EEC), particularly Essential Requirement 1: Mechanical resistance and stability and part of Essential Requirement 2: Safety in case of fire.
- as a basis for specifying contracts for public construction works and related engineering services. This relates to the Directive on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts (Directive 2004/18/EC of the European Parliament and of the Council).
- as a framework for drawing up harmonised technical specifications for construction products (hENs and ETAs).

3.2. The Construction Products Directive

Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (the Construction Products Directive) aims to breakdown artificial barriers to trade throughout the European Union and is intended for products placed on the market.

According to the Construction Products Directive, construction products suitable for construction works need to satisfy the following six Essential Requirements as appropriate:

- mechanical resistance and stability;
- safety in case of fire;
- hygiene, health and the environment;
- safety in use;
- protection against noise;
- energy economy and heat retention.

The first two, and in exceptional cases the fourth, are applicable to the Eurocodes.

The European Free Trade Association (EFTA) is an intergovernmental organisation for the promotion of free trade and economic integration to benefit its four Member States: Iceland, Liechtenstein, Norway and Switzerland.

3.3. The European system for standardisation and attestation in construction

The Construction Products Directive is based on four elements:

1. A harmonised system of technical specifications which are European Standards and European Technical Approvals (ETAs).

Design Standards: the Eurocodes	
Construction Product Standards: steel, concrete, structural bearings, barriers, parapets, etc.	European Technical Approvals: expansion joints, prestressing tendons, etc.
Execution standards: execution of concrete and steel structures, etc.	
Test standards: testing of concrete, masonry units, fire tests, etc.	

European standards family

European Standards related to construction comprise the Eurocodes for design and standards for construction products, including execution and testing standards.

For innovative products that are too early in their life to be covered by a standard, an ETA may be issued. An ETA is a favourable technical assessment of the fitness of a product for an intended use.

2. The European Organisation for Technical Approvals (EOTA), which coordinates all activities relating to ETAs. There are two possibilities for ETAs to be based on:
 - o European Technical Approval Guidelines (ETAGs) relate to a number of separate manufacturers in several countries of the EU;
 - o Common Understanding of Assessment Procedures (CUAPs) relate to a single manufacturer.
3. An agreed system of attestation of conformity for each product family which involves, dependent on the system of attestation of conformity provided, a third party (an approved nominated body) to assess conformity. The choice of the system of attestation depends upon the consequences of failure of the product and the product characteristics.
4. CE marking of construction products, based on the provisions of the technical specifications for a product. CE marking is mandatory for products covered by a Directive and allows them to freely circulate within the European Economic Area. CE marking follows the successful approval of a product and symbolises the conformity of the product with the Directive.

The use of Eurocodes raises a presumption of conformity with the Essential Requirements of the Construction Products Directive.

Construction products may be structural materials and constituent products as well as prefabricated structural components and kits consisting of structural components.



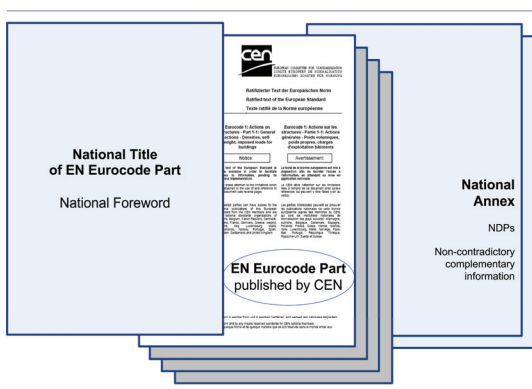
The European Economic Area unites the EU Member States, Iceland, Liechtenstein and Norway into an Internal Market, where goods, services, capital and persons move freely.

4. NATIONAL IMPLEMENTATION OF THE EUROCODES

4.1. National Standards

The National Standard transposing the EN Eurocode Part, when published by a National Standards Body, will be composed of the EN Eurocode text preceded by the National Title page and by the National Foreword and generally followed by the National Annex.

The National Annex may contain directly, or by reference to specific provisions, information on the Nationally Determined Parameters to be used for the design of buildings and other civil engineering works to be constructed in the country concerned. It may also contain decisions on the application of informative annexes and references to non-contradictory complementary information.



National publication of EN Eurocode Part

4.2. Training

In order to achieve an adequate application of the Eurocodes, National Authorities, National Standards Bodies, the construction industry and all civil engineering professionals must be ready to use them.

Guidance material on the existing “best practice” that overcomes any barriers to the practical implementation and use of Eurocodes is available through:

- education, both by means of continuing training and within universities;
- websites;
- published information on the implementation procedures;
- designer handbooks, manuals and design aids;
- training and design software.

The website <http://eurocodes.jrc.ec.europa.eu> serves as a platform for the dissemination of training and informative material, along with information on training events both at National and European/international level.

Non-contradictory complementary information aims to assist the user to apply the Eurocode, e.g. by explanation of a clause, perhaps in comparison with existing national rules.

The European Commission, in cooperation with CEN/TC250, National Authorities and interested industrial partners, is promoting actions that will assure consistency between Member States and will facilitate transfer of knowledge.

5. TOWARDS OFFICIAL COOPERATION IN STANDARDISATION

5.1. CEN guidelines for the dissemination of EN standards

CEN and its members own the copyright exploitation rights in all CEN deliverables. A clear distinction is made within the CEN rules between two types of use:

- adoption of ENs as National Standards of the country concerned (and the withdrawal of any other National Standards that conflict with them);
- mere promotion of the ENs as guidance documents with no specific national status.

CEN supports any actions aimed at disseminating the results of its work and encourages the adoption of European Standards as National Standards in countries outside the CEN area. All use of European Standards is subject to an agreement signed by CEN and the country that wishes to use the standards.

5.2. Contact details

Interested parties (National Standards Bodies, ...) should address CEN:

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CEN is a technical organisation composed of the National Standards Bodies of 30 European countries.

The mission of the Construction Unit of DG Enterprise includes support to the production of Standards and ETAs and assistance to new Member States and candidate countries in setting up the necessary legal and technical instruments.

6. THE FUTURE

6.1. Maintenance of the Eurocodes

CEN is responsible for maintenance of the Eurocodes and has developed an appropriate strategy for revision and updating. Maintenance activities will deal with:

- processing comments from the users;
- correction of errors;
- technical amendments;
- editorial improvements;
- resolution of questions of interpretation;
- elimination of inconsistencies and misleading statements.

In response to the needs of Industry and the users, a period of stability is foreseen.

6.2. Research and development

Future editions of the EN Eurocodes, in terms of new annexes or parts and eventually new Eurocodes will be needed to include guidance reflecting new European Union policies, innovative design methods, construction techniques, new materials and products.

The need for updating and completion is strongly recognised so that an improved second generation of the Eurocodes can evolve, ensuring that the most up-to-date information, in terms of recent proven innovations and improvements in construction technology, is incorporated in the Eurocodes.

The Eurocodes will continue to develop according to the needs of the market and the progress of scientific knowledge and methods. The pressures from the market are generated by:

- new materials and new products;
- new ways for procurement and execution of works;
- needs for economy whilst maintaining acceptable levels of safety.

The progress of scientific knowledge and methods is generated by:

- the need to avoid disasters in the area of safety (e.g. earthquakes, fire, explosions, impacts) and defence against malicious damage;
- the answer to new economic or social needs (e.g. sustainable development, high-speed railways, nuclear power plants);
- knowledge of phenomena acquired in other domains (e.g. aeronautics for wind action);
- the availability of powerful and widely-distributed tools for calculation (computers and software).



"Member States should undertake research to facilitate the integration into the Eurocodes of the latest developments in scientific and technological knowledge [...] thus ensuring an ongoing increased level of protection of buildings and other civil works, specifically as regards the resistance of structures to earthquakes and fire."
(Commission Recommendation of 11 December 2003).

The mission of the Joint Research Centre is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

In this series:

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- B3: The Eurocodes and construction products
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