Eurocodes evolution - what will it mean to you?
Evolution of the Structural Eurocodes - Aims, timing, process


Steve Denton
Head of Bridges and Ground Engineering
Visiting Professor at the University of Bath
Chairman of CEN/TC 250 - Eurocodes
500,000 Engineers
€65 Billion
10-58
5000 Pages
1055 NDPs

33 Countries
97 SCs/WGs/TGs
€4.3 Million
€11 Million
49/50

75+ Project Teams
25 Phase 1 PTs
170+ Phase 1 Contracts
Dec 2016
2021
Agenda

- Aims
- Process
- Timing
Aims

- ✔ Enhanced Ease of Use
- ✔ Positive Votes from CEN Members
CEN/TC 250’s vision for the second generation of the Structural Eurocodes:

Whilst respecting the achievements of the past, our vision for the second generation of Structural Eurocodes is to create a more user-orientated suite of design standards that are recognised as the most trusted and preferred in the world.
CEN/TC 250 Position on Enhancing Ease of Use

Five pillars to enhance ease of use of the Eurocodes

1. Statements of intent to meet users’ needs
2. Principles and related priorities
3. Examples
4. Strategic performance measures
5. Management, governance and support
CEN/TC 250 Position on Enhancing Ease of Use

Recommendation 1: Statements of intent to meet users’ needs

<table>
<thead>
<tr>
<th>PRIMARY TARGET AUDIENCE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practitioners – Competent engineers</td>
<td>Competent civil, structural and geotechnical engineers, typically qualified professionals able to work independently in relevant fields</td>
</tr>
</tbody>
</table>
# CEN/TC 250 Position on Enhancing Ease of Use

## Recommendation 1: Statements of intent to meet users’ needs

<table>
<thead>
<tr>
<th>CATEGORIES OF EUROCODES’ USERS</th>
<th>CEN/TC 250 STATEMENTS OF INTENT</th>
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<tbody>
<tr>
<td>Practitioners – Competent engineers [Primary target audience]</td>
<td>We will aim to produce Standards that are suitable and clear for all common design cases without demanding disproportionate levels of effort to apply them</td>
</tr>
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<td>Practioners – Graduates</td>
<td>We will aim to produce Eurocodes that can be used by Graduates where necessary supplemented by suitable guidance documents and textbooks and under the supervision of an experienced practitioner when appropriate</td>
</tr>
<tr>
<td>Expert specialists</td>
<td>We will aim not to restrict innovation by providing freedom to experts to apply their specialist knowledge and expertise</td>
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<tr>
<td>Product Manufacturers</td>
<td>Working with other CEN/TCs we will aim to eliminate incompatibilities or ambiguities between the Eurocodes and Product Standards</td>
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<td>Software developers</td>
<td>We will aim to provide unambiguous and complete design procedures. Accompanying formulae will be provided for charts and tables where possible</td>
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<td>Educators</td>
<td>We will aim to use consistent underlying technical principles irrespective of the intended use of a structure (e.g. bridge, building, etc.) and that facilitate the linkage between physical behaviour and design rules</td>
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<tr>
<td>National regulator</td>
<td>We will endeavour to produce standards that can be referenced or quoted by National Regulations</td>
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<tr>
<td>Private sectors businesses</td>
<td>We will continue to promote technical harmonization across European markets in order to reduce barriers to trade</td>
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<tr>
<td>Clients</td>
<td>We will produce Eurocodes that enable the design of safe, serviceable, robust and durable structures, aiming to promoting cost effectiveness throughout their whole life cycle, including design, construction and maintenance</td>
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<tr>
<td>Other CEN/TCs</td>
<td>We will engage proactively to promote effective collaboration with those other CEN/TCs that have shared interests</td>
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# EoU - Statements of intent to meet users’ needs

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# Recommendation 2: Principles and related priorities

**General principles (primary)**

1. Improving clarity and understandability of technical provisions of the Eurocodes
2. Improving accessibility to technical provisions and ease of navigation between them
3. Improving consistency within and between the Eurocodes
4. Including state-of-the-art material the use of which is based on commonly accepted results of research and has been validated through sufficient practical experience
5. Considering the second generation of the Eurocodes as an “evolution” avoiding fundamental changes to the approach to design and to the structure of the Eurocodes unless adequately justified

**Specific principles (secondary)**

6. Providing clear guidance for all common design cases encountered by typical competent practitioners in the relevant field
7. Omitting or providing only general and basic technical provisions for special cases that will be very rarely encountered by typical competent practitioners in the relevant field
8. Not inhibiting the freedom of experts to work from first principles and providing adequate freedom for innovation
9. Limiting the inclusion of alternative application rules
10. Including simplified methods only where they are of general application, address commonly encountered situations, are technically justified and give more conservative results than the rigorous methods they are intended to simplify
11. Improving consistency with product standards and standards for execution
12. Providing technical provisions that are not excessive sensitive to execution tolerances beyond what can be practically achieved on site
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<tr>
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## EoU - Principles and related priorities

### General principles (primary)

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2. Improving accessibility to technical provisions and ease of navigation between them
3. Improving consistency within and between the Eurocodes
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### Specific principles (secondary)

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<td>Omitting or providing only general and basic technical provisions for special cases that will be very rarely encountered by typical competent practitioners in the relevant field</td>
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Agenda

→ Aims

→ Process

→ Timing
MANDATE FOR AMENDING EXISTING EUROCODES AND EXTENDING THE SCOPE OF STRUCTURAL EUROCODES
CEN/TC 250 Technical response

- 138 pages
- Over 1000 experts from across Europe involved
- Structure of tasks and sub-tasks
- Phased programme
CEN/TC 250 Work Programme Structure
## CEN/TC 250 Detailed Task Plans

### TCEN1990

#### Response to Mandate M/515 EN: Structural Eurocodes

<table>
<thead>
<tr>
<th>Task Ref.</th>
<th>TCEN1990.T1</th>
<th>Task Name:</th>
<th>Evolution of EN1990 - General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Task Phase: PI</td>
<td>Deliverable:</td>
<td></td>
<td>A new version of EN 1990 with an increased scope reflecting needs identified by National Standard Bodies and the other Eurocodes, together with background information for all changes and new material, excluding new version of Annex A2 for F&amp;F and new Annex E2 relating to loadings and expressions.</td>
</tr>
<tr>
<td>Outline Task Scope:</td>
<td>Revision of EN 1990 to incorporate comments from the EN 1990.1 year review and requirements from other Eurocodes for principal guidance on fatigue, non-linear analyses with the Specific Mandate Section 9 from Standard for amending existing Eurocodes and extending the scope of structural Eurocodes and extending the scope of structural Eurocodes. (Document EN303/2007 - EN - Brussels - 17th July 2007). Scope does not include specific work relating to Bridges which is included in Task TCEN1990.T2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting documents:</td>
<td>EN 1990 Basic of Structural Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Justification for inclusion in Phase 1:</td>
<td>EN 1990 is the Head Eurocode, setting the rules for achieving safety, serviceability, robustness and durability as well as Reliability and Quality Management for the other 5 parts of the Structural Eurocode suite and CEN structural product standards. It is the cornerstone for all other Structural Eurocodes and serves as a template for the development of new parts as well as revision of existing standards. The item identified by the CEN/TC250 Secretariat Group for the revision of EN 1990 described in this proposal has been developed collaboratively with a representative cross-section of stakeholders and need to be given priority. The selected tasks will further support and strengthen harmonisation, the development of an EU Internal Market in the design and construction sector. The work takes into account market and research developments in materials, products, construction techniques and design methods in the sector. It also affects new societal needs and demands as linked to structural design of buildings and other construction works. Therefore EN 1990 as the head code needs to be updated at the earliest convenience so as to form a basis for the work of the other sub-committees. As full a draft as possible must be made available at end of Phase 1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-task Ref.</td>
<td>Sub-task name</td>
<td>Brief description, background and reasons for the work (including any additional comments / notes)</td>
<td>Interdependencies</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>-------------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>1</td>
<td>Reduction in number of National Choices (NCPs)</td>
<td>Reduce the number of National Amisses and supporting documents, where this does not reflect enforcements needed to implement the Eurocodes.</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Enhanced ease of use</td>
<td>Enhance ease of use by improving clarity, outlining routes through the Eurocodes avoiding or removing use of this position on use and avoiding additional and/or implied rules for particular structural or construction types, all to the extent that it can be technically justified whilst safeguarding the core of essential technical requirements.</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Evolution of management of reliability of construction works (Review)</td>
<td>Adopt EN 1990 by establishing and implementing control procedures for design and construction with the principles of the standard, a national level, recognising differences between the various countries. Making Annex A of EN 1990 more comprehensive by increasing its scope to construction works with higher consequences of failure / Consequence Class 3 and reflecting complexing of design, implementing alignment with Execution Standards (EN 1990 and EN 1997-1) and the appropriate material Eurocodes.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Robustness</td>
<td>Review and update the requirements for Robustness in Section 2 of EN 1990. A light of recent published code action (COST Action TU0701, 2011) report, it is expected that work will also investigate the information from EN 1990.1 to EN 1990 and further develop these tasks. This will be in liaison with WO. Robustness.</td>
<td>In liaison with WO. Robustness</td>
</tr>
<tr>
<td>6</td>
<td>Sustainability</td>
<td>Update EN 1990 to include assessments of sustainability relevant to the scope of the Eurocodes, responding to the relevant requirements for Sustainability developed by e.g. TC 350. At the present time any amendment will be Section 2 Requirements.</td>
<td></td>
</tr>
</tbody>
</table>

File name: EN1990 Template 3 draft 4.0 Draft/Final version of: 29/04/2013 TC EN 1990 – page: 1 of 3

File name: EN1990 Template 3 draft 4.0 Draft/Final version of: 29/04/2013 TC EN 1990 – page: 2 of 3

File name: EN1990 Template 3 draft 4.0 Draft/Final version of: 29/04/2013 TC EN 1990 – page: 3 of 3
CEN/TC 250 Phased Programme
CEN/TC 250 Work Programme Structure
CEN/TC 250 Evolution Overview

EN 1990
EN 1991
EN 1992
EN 1993
EN 1994
EN 1995
EN 1996
EN 1997
EN 1998
EN 1999

Glass
FRP
Membrane

Robustness
Assessment
Climate change
Ease of use
Systematic Review Comments

Mandate M515 Work Programme

Eurocode Systematic Review Comments

Evolution of Eurocodes
Eurocode Evolution Process

→ Follow CEN Internal Regulations

→ Specific information available in CEN/TC 250 document N1250 [CEN, Eurocodes]

→ Further details available in Phase 1 call for experts specification (Vol 3) [NEN, Eurocodes 2020]
Eurocode Evolution Process

→ Follow CEN Internal Regulations

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Call for tender - Evolution of Structural Eurocodes

Call for Tender for experts for the development of the second generation of Structural Eurocodes.

- Updated 20th of May 2015 -

The Eurocodes (EN 1990 – EN 1999) enable the design of building and civil engineering works, and comprises of 10 European Standards in 58 parts. The first generation of EN Eurocodes were the most comprehensive and technically advanced suite of standards for structural and geotechnical design in the world. Their development was a tremendous achievement and represented the culmination of over 30 years collaborative effort. Their impact has been considerable. It has been estimated that they affecting the work of around 500,000 professional.

Volume 1: Instructions to Tenderers – This volume provides full instructions on how the Tender Process shall be organized and how and when Tenderers should submit their responses to the questions contained within and to the award criteria;

Volume 2: Contract terms and Conditions - This Volume contains the documentation for Contracts and general terms and conditions;

Volume 3: The Specification – This volume contains the scope/brief, outlining the requirements;

Volume 1 Annex 2: Template for quality submission – This word document provides the template for the quality submission;

Volume 1 Annex 3: Template for financial submission – This excel document provides the template for the financial submission.
Agenda

- Aims
- Process

Timing
The Structural Eurocodes

Timeline - Historic

- 1975: Eurocodes started
- 1990: ENVs started
- 1992: Publication of ENVs
- 1998: Conversion of ENV to EN
- 2007: Publication 1st generation of the Eurocodes
- 2010: Programming Mandate
- 2011: Response to Programming Mandate
- 2012: Specific Mandate
The Structural Eurocodes

Timeline – Latest status

2007
Publication 1st generation of the Eurocodes

2010
Programming Mandate

2011
Response to Programming Mandate

2012
Specific Mandate

2013
Technical Response to Specific Mandate

2014
Phase 1 Quotation Submitted

2015
Phase 1 Funding Granted; Call for Experts; P1 PTs formed

2016
Phase 2 Quotation submitted; Funding awaited
# Phase 1 – Project Team Programme

<table>
<thead>
<tr>
<th>Task specifics (the schedule represents the deadlines for these tasks)</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> Start of the Project Team</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation of First Draft by PT</td>
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<td>Preparation of background document(s) by PT</td>
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<td>Delivery of first Draft by PT to NEN</td>
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<tr>
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See Call for Experts, Specification, Annex C
Community participation - Why your involvement is vital, how it can be achieved
Why Design Standards Matter?
Impact
International trade
Verification of adequacy
Feedback
New societal demands
Research to application
Development Cycles
Comparing infrastructure and digital technology

- Bridge design life, 120 years
- Building design life, 50 years
- Crossrail construction, 9 years
- Shard construction, 5 years
- Autodesk product support, 3 years
- Autodesk major release, 1 year
- App Store avg update, 30 days
Historical evolution (*)

If a designer-builder has designed-built a home for a man and his work is not good, and if the house he has designed-built falls in and kills the householder, that designer-builder shall be slain.

*Rule 229, Code of Hammurabi*

(*) The graph is indicative
Who develops design Standards?
Concerns for the UK


Steve Denton
Head of Bridges and Ground Engineering
Visiting Professor at the University of Bath
Chairman of CEN/TC 250 - Eurocodes
The Structural Eurocodes

- European Product Standards
- European Execution Standards

Non-contradictory complementary information

Client implementation and requirements

Support to the profession
Concerns …

→ Thank you for written submissions

→ Opportunity to raise specific concerns
  - Will be recorded by BSI and discussed by B525
What happens next


Steve Denton
Head of Bridges and Ground Engineering
Visiting Professor at the University of Bath
Chairman of CEN/TC 250 - Eurocodes
Some key dates …

→ December 2016 – Call for Experts for Phase 2
→ April 2017 – 2\textsuperscript{nd} draft deliverables from Phase 1 PTs
→ Sept 2017 – (informal) enquiry on Phase 1 PT deliverables