

## Future development of Eurocode 7

Andrew Bond  
Chairman TC250/SC7



BGA Symposium - Eurocode 7 Today and Tomorrow, Cambridge, England, March 2011

## Each Eurocode costs 1 million euro

*'CEN estimates that the development of each standard costs approximately 1 million €, which is mainly covered by industry'*

Minutes of CEN TC250 meeting, Ispra, Sept 2009



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## Outline of the talk

The future of the Eurocodes  
Questionnaire on the evolution of Eurocode 7  
Response from  
    the British geotechnical community  
    European National Standards Bodies  
Proposal for evolution of EN 1997  
Key findings



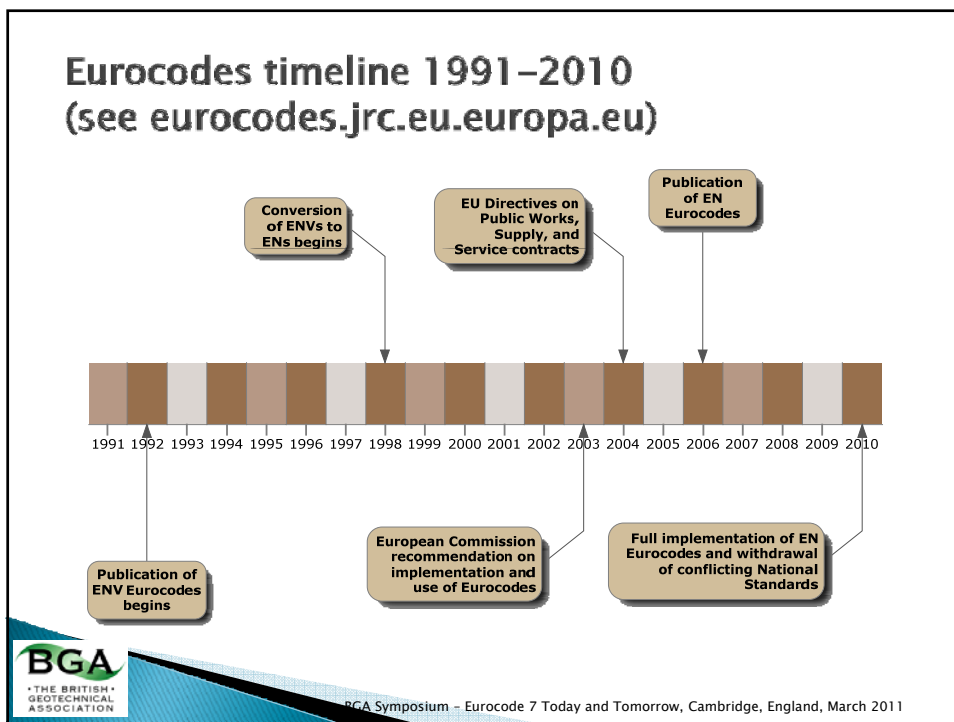
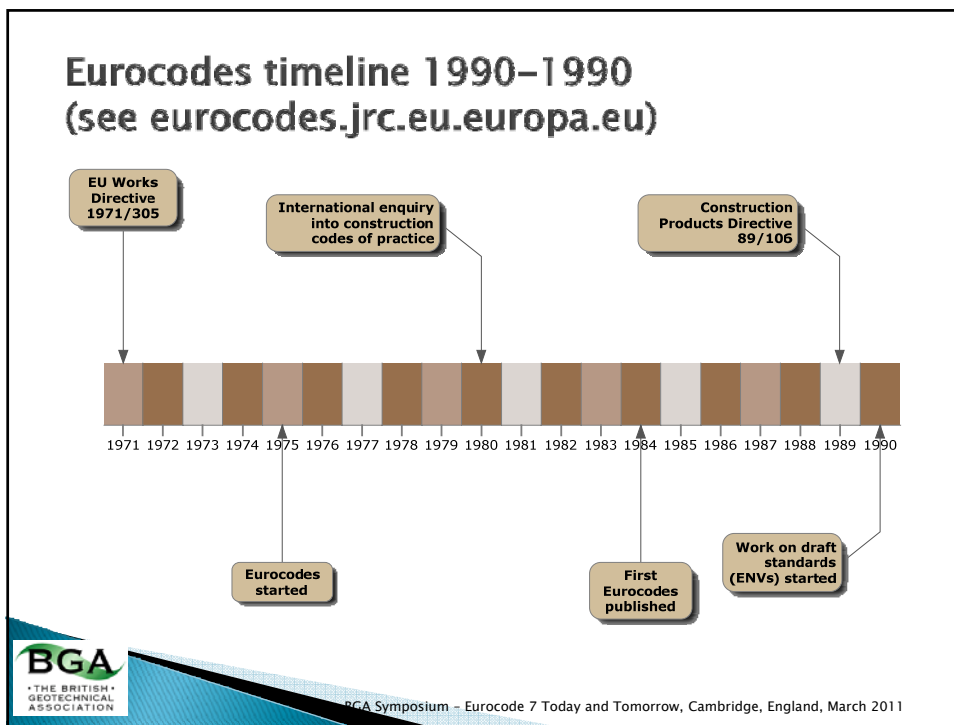
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## The future of the Eurocodes

Future development of Eurocode 7



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## European Commission Mandate M/466 EN issued 19th May 2010

Objective to 'initiate the process of further evolution of the Eurocodes'

1. New Eurocodes or Eurocode parts
  - a) Extension of existing rules for the assessment of existing buildings and structures and their strengthening
  - b) Design of structures that include structural glass members
  - c) Design of structures that include structural members made of fibre reinforced polymers
  - d) Design of membrane structures
  - e) Extension of existing rules for robustness
2. Further development of the existing Eurocodes ENs 1990–1999



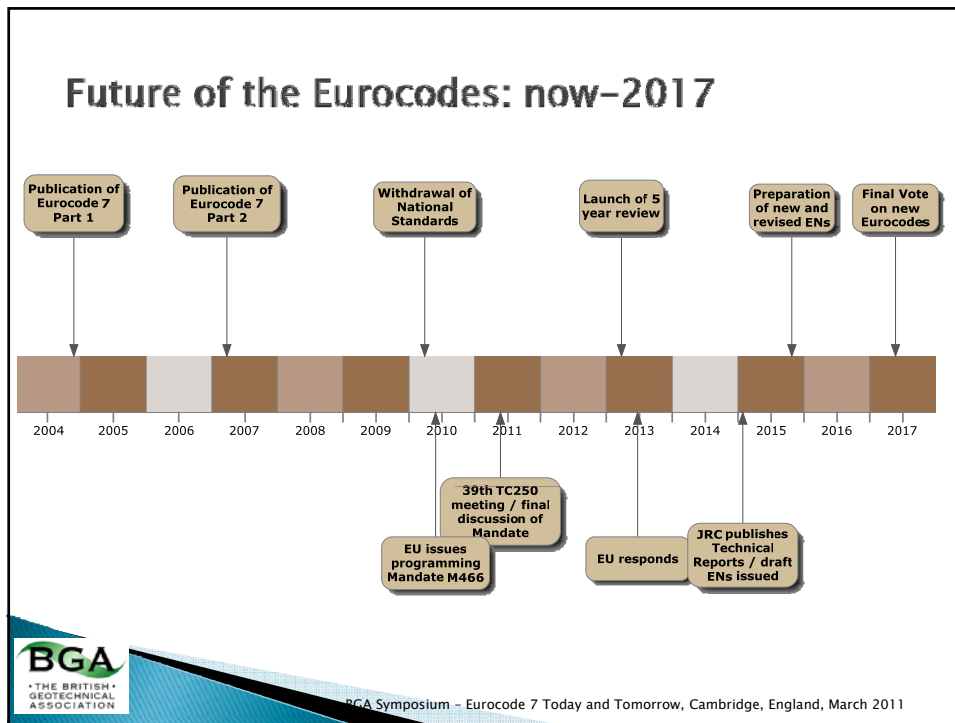
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## European Commission's targets for further development of existing Eurocodes

- a) Assess existing Eurocodes to reduce the number of Nationally Determined Parameters (NDPs)
- b) Incorporate recent research on innovation, e.g. performance-based and sustainability concepts
- c) Incorporate recent research on sustainability
- d) Adopt ISO standards to supplement the Eurocode family, e.g. atmospheric icing of structures and actions from waves and currents on coastal structures
- e) Simplify rules, where relevant, for limited and well identified fields of application
- f) Facilitate feedback from stakeholders and practical local implementation
- g) Consider on going work and results of Mandate 420, CEN/CENELEC Guide 6 and ISO/DIS 21542



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### What lessons can be learned from implementing the Eurocodes? (after Steinar Leivestad, Norway)

- Simplify only to the extent that it can be technically justified
- Say things only once, correct and in the appropriate place
- Apply general principles
- Use shall where we mean shall, following normal ISO/CEN rules (shall/should/may/can)
- Avoid trivial and disputable rules
- Avoid rules of little/no practical use in design
- Let standards for application be down to earth practical
- Reduce number of pages and books [designers have to use]
- Avoid publication of unauthorised 'simplifying standards' that would undermine the Eurocodes

## 'PraxisRegelnBau' initiative: practical rules for construction

Interest groups in Germany want more practical codes

*'We want [this initiative] to be an engine for preparing practical regulations in the building profession. ... The current generation of Eurocodes is a good first step ... However, there is a second step, [to improve and] to simplify. Only if this second step is done, will the Eurocodes be a success.'*

Professor Nußbaumer (Chairman)

Founding members include:

Federal Chamber of Engineers eV, Confederation of German Construction Industry, National Federation of Building Trade, and many others

Members admit they did not engage in the process of code development in the past



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## Questionnaire on the future work of TC250/SC7

Future development of Eurocode 7



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## Questionnaire circulated through Geocentrix training courses/talks and Ground Engineering


**UK questionnaire on the future work of TC250/SC7 on geotechnical design (rev C)**

As a joint initiative with the British Geotechnical Association (BGA) and Ground Engineering magazine, I am circulating this questionnaire to UK geotechnical professionals to obtain your opinions about what subjects should be featured further in the next version of Eurocode 7. I would be most grateful for your views on the priority of each topic. Please return the questionnaire to the address below or via email to [geocentrix@geocentrix.com](mailto:geocentrix@geocentrix.com).

The questionnaire is available for Eurocode 7 (EN 1997-1) and Eurocode 7 (EN 1997-2) (see below) for information and needs to be returned to the address below or via email to [geocentrix@geocentrix.com](mailto:geocentrix@geocentrix.com) or via the website [www.geocentrix.com](http://www.geocentrix.com).

Thank you for your help in formulating views for the future development of Eurocode 7.

Yours faithfully,  
 Andrew Burt  
 Chairman TC250/SC7



**BGA**  
 THE BRITISH  
 GEOTECHNICAL  
 ASSOCIATION

Please return the questionnaire to the address below, or email to [geocentrix@geocentrix.com](mailto:geocentrix@geocentrix.com). Alternatively, you can complete the online version of the questionnaire by visiting [www.geocentrix.com/uk](http://www.geocentrix.com/uk).

Geocentrix is a limited liability company.

Topic	1	2	3	4	5	6	7	8	9	10
1. Address the need for Eurocode 7, including what is currently covered by other standards.										
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## Instructions for completing questionnaire

Please rank the topics overleaf in order of priority, by placing a cross (X) in the appropriate boxes

10 = highest priority; 9 = second highest; etc.

Please enter a maximum of ten crosses, one for each rank



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## Over half of respondents failed to follow the instructions!

#	Topic	1	2	3	4	5	6	7	8	9	10	
0	Amendment of Section 8 Anchorages	Possible additions to Eurocode 7										
1	Add new Part to Eurocode 7 covering rock mechanics											
2	Add new Part to Eurocode 7 covering tunnelling											
3	Add new Part to Eurocode 7 covering reinforced soil											
4	Add new Parts to Eurocode 7 covering detailed design (e.g. of footings, walls, piles, and slopes)											
5	Add normative calculation models (i.e. to main text)											
6	Add informative calculation models (i.e. in Annex)											
7	Add partial factors for transient/accidental design situations											
8	Add partial factors for joint SLS/ULS verifications (e.g. using simplified procedures)											
9	Add partial factors for different consequence/reliability classes											
10	Add guidance on use of numerical models (e.g. finite element, finite difference, boundary element methods)											
11	Add guidance on design of structures in Geotechnical Category 1, for use by non-geotechnical specialists (e.g. structural engineers)											
12	Add discussion of reliability based design											
Possible improvements to existing text												
13	Improve guidance on selection of water pressures											
14	Improve general guidance on selecting characteristic soil parameters											
15	Improve guidance on interpretation of field tests for selection of characteristic values (Eurocode 7 Part 2)											
16	Improve guidance on limit state EC0											
17	Improve treatment of Equations 6.31a and b from EN 1990											
18	Improve guidance on buoyancy and hydraulic failure											
19	Improve											
20	Improve											
21	Improve											
22	Improve											
23	Improve											
Possible improvements to existing text												
24	Revise/harmonize NDBs following review of different countries' National Annexes											
25	Simplify/reduce number of Design Approaches											
26	Revise correlation factors for pile design											
27	Revise Eurocode 7 Part 2 to remove material readily found in text books											
28	Revise/simplify text of Eurocode 7 Part 1 to make it more readable; replace Section 3 with references to Eurocode 7 Part 2											
29	Revise/remove text in Eurocode 7 Part 1 that is duplicated in Eurocode 7 Part 2											

10 crosses = 55 votes

27 crosses = 119 votes



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## Responses received to date

### European responses

18 National Standards Bodies

### Academic response

12 Meeting of Teachers of Geotechnical Subjects

### UK industry response

69 via Geocentrix training courses

64 from BGA Symposium flyer in Ground Engineering

133 in total

40 % of today's delegates submitted a response



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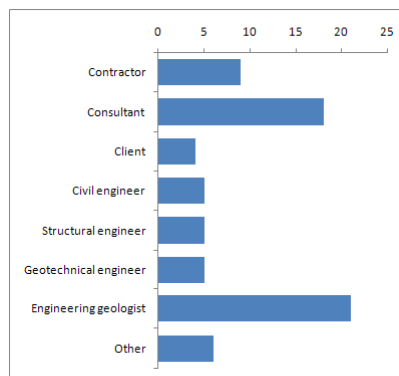
# Response from the British geotechnical community

## Future development of Eurocode 7



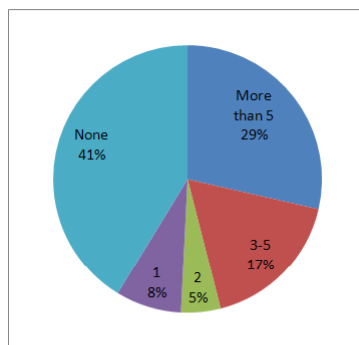
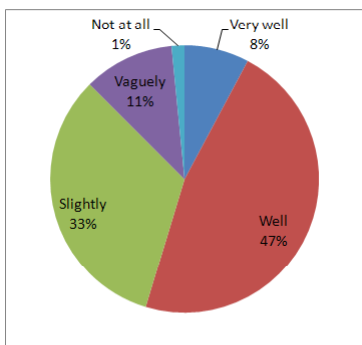
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### How would you describe yourself?



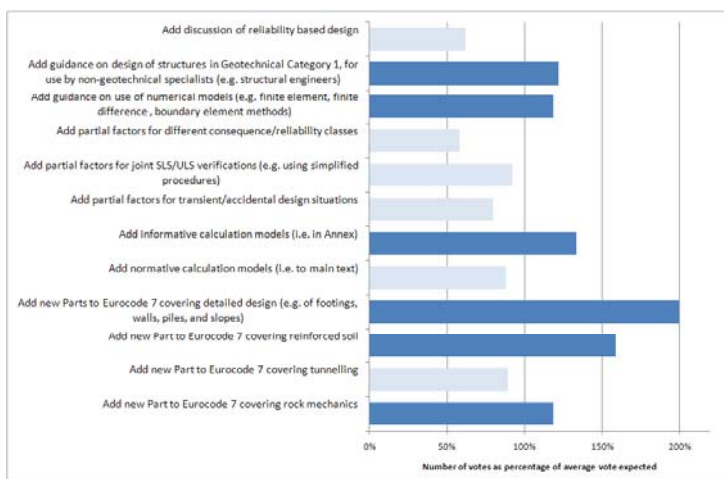
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## How well do you know Eurocode 7? How many designs done using Eurocode 7?



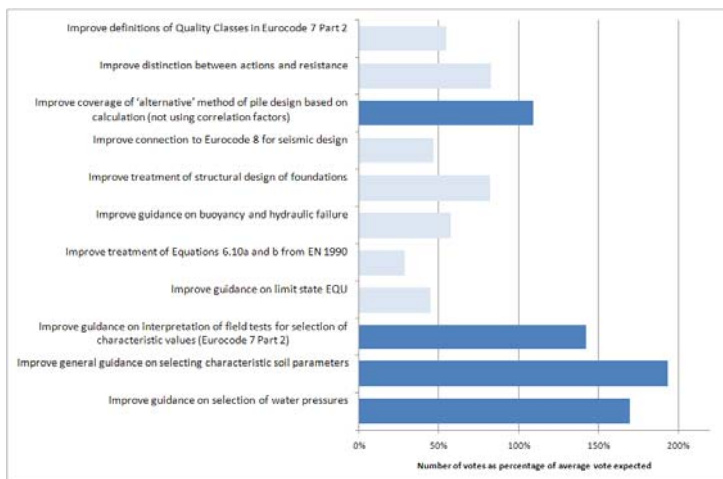
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## Popularity of ‘adding’ to Eurocode 7



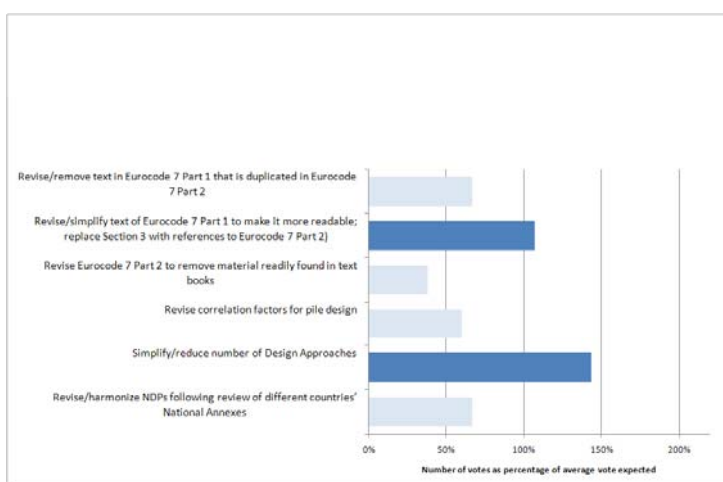
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## Popularity of 'improving' Eurocode 7



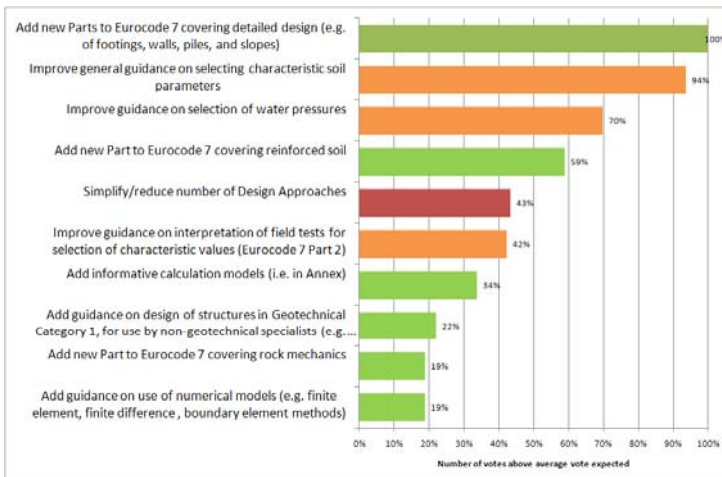
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## Popularity of 'revising' Eurocode 7



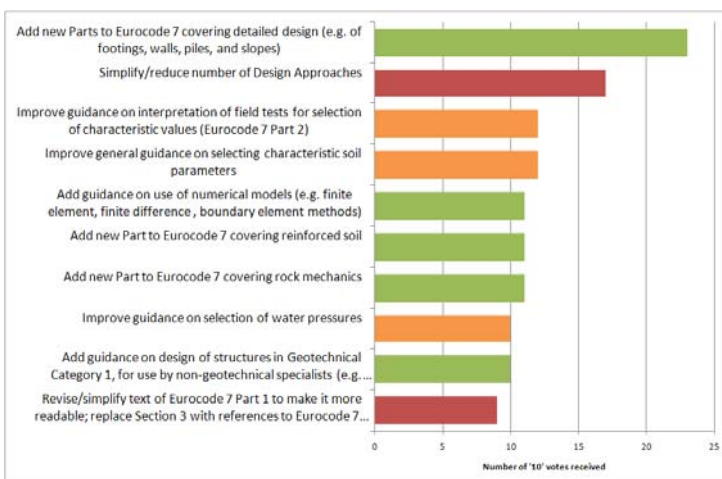
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## Top 10 topics as voted by UK engineers



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## Topics getting '10' vote from UK engineers



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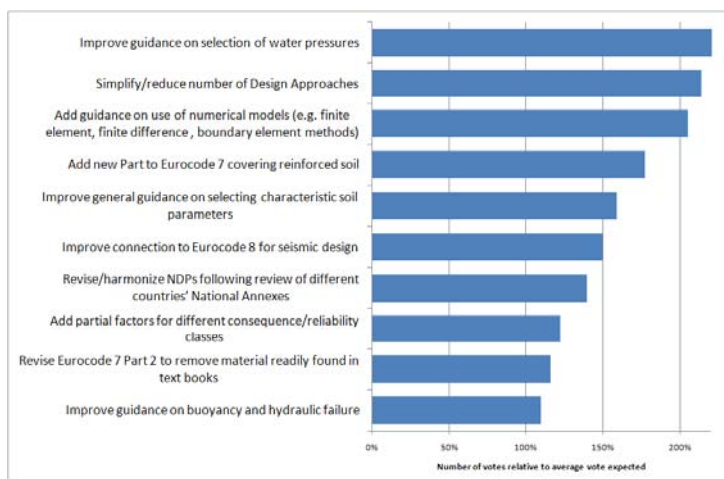
## Response from European National Standards Bodies

Future development of Eurocode 7



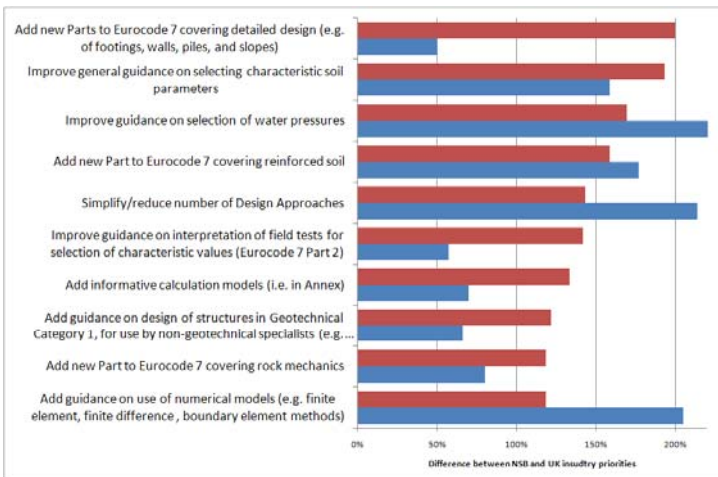
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## Top 10 topics as voted by National Standards Bodies



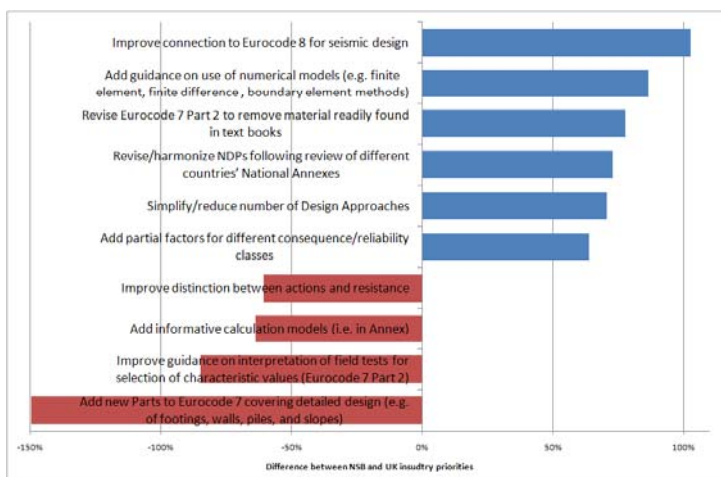
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## UK's top 10 topics as voted by National Standards Bodies



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## NSB and UK industry priorities compared



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# Proposal for evolution of EN 1997


## Future development of Eurocode 7



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## SC7's highest priorities for development in next revision of EN 1997

1. Harmonization (see next slide)
2. Incorporation of recent research results and technical studies
  - Add/improve guidance on ground water pressures; numerical models; selection of characteristic parameters; use of EN 1997 with EN 1998 for seismic design
3. Sustainability
  - Remove conservatism from connection with structural Eurocodes; provide better treatment of consequence/ reliability classes
4. New parts to Eurocode 7
  - Covering reinforced soil, rock mechanics, and tunnelling
5. Simplification of rules
  - Revise EN 1997-2 to remove material readily found elsewhere; revise/remove text duplicated across ENs 1997-1 and -2



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## SC7's hopes for harmonization

### 1.1. Simplify/reduce number of Design Approaches

Eurocode 7 currently permits designs to be performed using one (or more) of three design approaches (DAs) ... These will be simplified and (potentially) reduced based on recent experience of using Eurocode 7.

### 1.2 Revise/harmonize NDPs following review of countries' National Annexes

Eurocode 7 Part 1 currently includes over 120 NDPs, many of which have had their values adjusted in National Annexes. The project would study all NDPs and reduce their number to an acceptable minimum.



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## Summary of key points

Future development of Eurocode 7



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## Summary of key points

Awareness and use of Eurocode 7 is growing  
European Commission has issued a Mandate for the  
'evolution of the Eurocodes' – response is needed  
imminently

### National Standards Bodies want:

- greater harmonization
- fewer Design Approaches
- better coverage of numerical methods

### UK engineers want:

- more detailed guidance on routine calculations
- better guidance on soil characterization
- better guidance on water pressures



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## What can you do?

*'And so, my fellow Europeans: ask not what Eurocode  
7 can do for you – ask what you can do for  
Eurocode 7'*

With apologies to John F Kennedy



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