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## Revision of IS 2394

### General Principles on Reliability for Structures

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Ton Vrouwenvelder was born in 1947 in The Netherlands and graduated as a Civil Engineer from Delft University of Technology. He has become a specialist in the fields of Structural Mechanics and Structural Reliability. In his present position he is deputy head of the Structural Division of TNO Bouw and part-time professor at Delft University, Department of Civil Engineering

#### **Synopsis**

The present IS 2394 which dates from 1986, has recently been rewritten and is ready for voting. A Table of Contents is presented here in Annex 1 of this paper.

It is of course interesting to compare this ISO-Draft with Eurocode 1, Basis of Design. Both documents have been written in the same period and, as far as Europe is concerned, partly by the same people (Gulvanessian, Leray, Ostlund and Vrouwenvelder were in both drafting panels).

The advantage of this panel overlap was that unnecessary and disturbing small differences between the two documents could be avoided. Some paragraphs even are completely identical.

Nevertheless there is also a fundamental difference between the two documents. The main difference is that the ISO code is primarily of a conceptual nature where the Eurocode is more operational. As an example: the ISO code does not specify numbers for partial factors ( $\gamma$  factors) or load reduction factors ( $\psi$  factors).

A second typical distinction between the two documents is the explicit attention for probabilistic concepts in ISO. In this respect the new draft also differs from the 1986 version. In principle, all uncertainties and scatters encountered in the design process are basically considered from the probabilistic point of view. Topics like inherent versus statistical and model uncertainties and reliability targets are extensively discussed. In order to fulfil the reliability requirements two in principle equivalent design formats are presented:

- the probabilistic format, as discussed in chapter 6
- the partial factor format, as discussed in chapter 7

In the Eurocode only the partial factor method is presented. Only in the informative annex A the possibility of probabilistic methods as design method and as background for the partial factor method is mentioned.



One of the shortcomings of the ISO document, as mentioned before, is the lack of standardised data to help the designer to use the theoretical procedures. In this respect one might say that the present draft could not "replace" the present Eurocode 1, Basis of Design. However, this might only be a matter of time. The Joint Committee on Structural Safety is working on an operational Probabilistic Model Code, which exactly provides the missing information. In order to be prepared, it would be helpful if Eurocode 1 Basis of Design, would move already as far as possible into the direction of the new draft of IS 2394

#### Annex 1 Table of Contents of IS 3294

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- Annex A: Quality management and quality assurance
- Annex B: Examples of permanent, variable and accidental actions
- Annex C: Models for fatigue
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- Annex F: Combination of actions and estimation of action values