

Zeitschrift: IABSE reports = Rapports AIPC = IVBH Berichte
Band: 74 (1996)

Artikel: Revision of IS 2394: general principles on reliability for structures
Autor: Vrouwenvelder, Ton
DOI: <https://doi.org/10.5169/seals-56062>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 28.08.2025

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Revision of IS 2394 General Principles on Reliability for Structures

Ton VROUWENVELDER
Delft University of Technology
TNO BOUW
The Netherlands

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 (γ factors) or load reduction factors (ψ 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

0	INTRODUCTION
1.	GENERAL
1.1	Scope and field of application
1.2	Definitions
1.3	Notations
2.	REQUIREMENTS AND CONCEPTS
2.1	Fundamental requirements
2.2	Reliability differentiation
2.3	Structural Design
2.4	Conformity
2.5	Durability and maintenance
3.	PRINCIPLES OF LIMIT STATES DESIGN
3.1	Limit states
3.2	Design
4.	BASIC VARIABLES
4.1	General
4.2	Actions
4.3	Environmental influences
4.4	Properties of materials and soils
4.5	Geometrical quantities
5.	MODELS
5.1	General
5.2	Types of models
5.3	Model uncertainties
5.4	Design based on experimental models
6.	PRINCIPLES OF PROBABILITY BASED DESIGN
6.1	Introduction
6.2	Systems versus element reliability
6.3	Specified degrees of required reliability
6.4	Calculation of failure probabilities
6.5	Implementation of probability based design
7.	THE PARTIAL FACTORS FORMAT
7.1	Design conditions and design values
7.2	Representative values of actions
7.3	Characteristic values of properties of materials and soils
7.4	Characteristic values of geometrical quantities
7.5	Load cases and load combinations
7.6	Action effects and resistance's
7.7	Verification for fatigue
7.8	Calibration
8.	ASSESSMENT OF EXISTING STRUCTURES
8.1	Relevant cases
8.2	Principles of assessment
8.3	Basic variables
8.4	Investigation
8.5	Assessment in the case of damage

Annex A: Quality management and quality assurance

Annex B: Examples of permanent, variable and accidental actions

Annex C: Models for fatigue

Annex D: Design based on experimental models

Annex E: Principles of reliability based design

Annex F: Combination of actions and estimation of action values