

Zukunft Bau

KURZBERICHT

Titel

Improvement of the ease of use of building codes by pre-standardization research – Part 3: Steel structures

Reason / Initial situation

Eurocode 3 (design of steel structures) consists of 20 parts with a total volume of 1500 pages. This massive amount of design rules has been met with criticism by practitioners. Besides the total volume, the unsatisfying comprehensiveness and consistency, leading to poor ease of use, were criticized.

The goal of this project was the improvement of the ease of use through pre-standardization research in the preparation of the review and development of Eurocode 3.

Object of the research project

In the course of the project, the six parts with the highest relevance for design and execution from the total set of 20 parts of Eurocode 3 were chosen and analysed. These six parts were also identified to provide the largest potential for improvement. In particular, these chosen parts were 1-1 (Design of steel structures – General rules and rules for buildings), 1-8 (Design of joints), 1-5 (Plated structural elements), 1-9 (Fatigue), 1-2 (General rules – Structural fire design) and 6 (Crane supporting structures). Due to the close relation of DIN EN 1090-2 (Execution of steel structures and aluminium structures) and DIN EN 10025 (Hot-rolled products of structural steels) to Eurocode 3, these were also assessed in terms of ease of use.

Besides the review of the six previously mentioned parts of Eurocode 3, the nationally determined parameters (NDP) from six national annexes (NA to EN 1993-1-1, -1-5, and -1-8) were analysed and evaluated to achieve further harmonization. This is fundamental for the submittal of proposals aiming at a reduction of the number of NDP to the European standardization committees.

In accordance with the research proposal, in the first step an “anamnesis” of the shortcomings and overregulations of Eurocode 3 was conducted. The results were checked in terms of relevance to practitioners in a second step, “diagnosis”, focusing on ease of use and inconsistencies between the different parts. The results of the diagnosis and inconsistencies in the text were presented in separate synopses. In the final report, anamnesis and diagnosis for each part of Eurocode 3 were merged in one section under the headline “status analysis” (Bestandsanalyse).

In the third step (referred to as “therapy”), improvements and simplifications in terms of ease of use were developed. The consequences of these changes were assessed on realistic members by comparative calculations and comparison to the results according to Eurocode 3.

In the final report, the results of the therapy are presented in the chapter “proposals for solutions” (Lösungsvorschläge). The proposals lead to improved drafts of the text body of Eurocode 3. The drafts are provided in separate reports and are not included in the final report.

The results of the research project are supposed to be or already have been communicated within the German and European standardization committees, respectively.

Conclusion

The investigations showed, that most of the text bodies of the investigated parts of Eurocode 3 can be shortened without loss of information. Restructuring can enhance comprehensiveness and ease of use, especially in part 1-1, sections 6.2 and 6.3 as well as part 1-2.

In the amendment of the Eurocode, the order of the calculation and design methods should be changed in such a way, that the simplified methods are followed by the exact and extensive ones for better ease of use. Further, the order of annexes to every Eurocode should be changed so that the informative annexes follow the normative ones. This makes it more clearly for the practitioner to identify negligible annexes.

A large number of misleading formulations of the German version of Eurocode 3 are based on the technically incorrect translation of the originally English document.

Within the evaluation of the European comments from the systematic review and the further development of Eurocode 3 until completion of the new generation of drafts, proposed changes from other countries have to be discussed. In this discussion, the proposals have to be assessed focusing on ease of use, safety and efficiency; this is possible by conducting comparative calculations and counterchecking with the proposals of PRB. This will automatically lead to further development and optimization of the current proposals and result in new research subjects.

Project data

Short title:	Verbesserung der Praxistauglichkeit von Eurocode 3
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