

SUMMARY

Title

Ease of Use of Structural Design Codes – Partial Application 1: Safety Concept and Load Actions (Verbesserung der Praxistauglichkeit der Baunormen – Teil Antrag 1: Sicherheitskonzept und Einwirkungen)

Motivation

Since their introduction, the Eurocodes were met with only limited acceptance among practitioners. The main reason for this is the lack of ease of use which led to a negative perspective on the Eurocodes by the practitioners. The lack of ease of use stems from textual, editorial and technical complexity.

Thus, the main goal of this research project is the development of codes with substantial ease of use. This shall be achieved by pre-standardization research previous to the review and development of an enhanced version of Eurocode 0 (Basis of Design) and the 10 parts of Eurocode 1 (Actions on Structures).

Procedure

The methodology was divided into three chapters: First, an „anamnesis“ was conducted in which the shortcomings and overregulations of the Eurocode chapters were identified and gathered. Subsequently, a „diagnosis“ was derived to determine the relevance of the identified issues with regard to practical applications. Finally, enhancements and simplifications were developed to work as a „therapy“. For the parts concerning actions on structures, the focus was set on editing due to their strong descriptive character.

Lastly, the consequences of the proposed changes were evaluated on real projects. The results of the research project are supposed to be introduced into the corresponding German and European standardization process.

Results

According to German practitioners, the general load combination rules in Eurocode 0 as well as the design approaches to wind and snow loads have been identified as main issues.

Extensive studies were performed concerning a simplified rule for load combination with respect to the valid target level of reliability in Germany. It could be verified that the target level is still maintained by the proposed simplified load combination. Additionally, extensive changes were proposed for DIN EN 1991-1-4 (wind loads), e.g. the separation of the pressure coefficients for the main structural system from the pressure coefficients for the secondary structural system.

Besides the aforementioned subjects, the harmonization of the Eurocode parts was a further target. The most significant differences among NDPs from several National Annexes were determined and compared. This can form a basis for further analysis of the differences, especially in the parts of the Eurocode concerning load actions, and for the derivation of further proposals for change with respect to harmonization.

Conclusion

Proposals for change and enhancement have been made for most chapters of the Eurocode 0 and the 10 parts of Eurocode 1. The focus was set on the ease of use with respect to previous experiences in Germany. Within every subject, a reduction of the number of NDPs was a target and comparisons of the NDPs were provided. The work on the proposals is still in progress and will be incorporated into practice-relevant drafts for both parts of the Eurocode (EC0 and EC1).

With the ongoing evaluation of European comments derived from the systematic review of Eurocode 0 and Eurocode 1 and the corresponding proposals for modification and change have to be discussed before the new draft versions are completed (not before end of 2016).

It will be important to evaluate these proposals regarding ease of use, safety and efficiency (e.g. by performing comparative calculations) and compare these to the German proposals. Within this process, further review and optimization of the proposals will arise and thus, will lead to new subjects for research, which have yet to be focussed on.

Facts

Short title: Ease of Use of Structural Design Codes – Partial Application 1: Safety Concept and Load Actions (Verbesserung der Praxistauglichkeit der Baunormen – Teil Antrag 1: Sicherheitskonzept und Einwirkungen)

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