

Future Construction

SHORT REPORT

Title

Improvement of the practical application of construction standards –
Project part 2: Concrete construction

Reason/ Initial situation

The purpose of the research project was the pre-normative research in preparation of the practice-oriented updates and further development of Eurocode 2 for the design of concrete structures (EN 1992-1-1).

The research followed the strategy that first of all vulnerabilities and excessive regulations of Eurocode 2 were assembled as part of an anamnesis. Then, as part of a diagnosis phase it was reviewed, in how far these deficits have relevance in practice. Subsequently improvements and simplifications were developed as a remedy to the issues and partly validated using comparative analysis. The effects of the proposals to Eurocode 2 have been investigated with real members and were compared with design results of the current code if required. The results of this research should be implemented in the German and European standard committees.

Object of the research project

From the point of view of German users there are some key topics in Eurocode 2 which have been identified as in need of improvement. These are the shear and punching design, the rules for crack control and for simplified deformation control as well as parts of the reinforcement and detailing rules.

The identified remedial proposals and simplifications to most of the chapters of Eurocode 2 have been checked by comparative analysis or validated by statistical evaluation of databases if required.

The most extensive interventions and changes have been implemented in the design format for punching. The verification for slabs and foundations both without and with shear reinforcement has been successfully combined using a smaller control perimeter in a common format. In this context calibrated adjustment factors for concrete and steel resistance parts have been established for different member types. Therefore the current elaborated iteration for (compact) foundation can be cancelled. Thus also a lot of special rules and national NCI additions can be deleted.

An essential target of revising the topics was the further harmonisation of Eurocode 2 by reduction of NDP and especially of the German additional rules. Starting point was an extensive analysis of the National Annexes to EN 1992-1-1 of 28 European countries, thus allowing to quantify and qualify accordances and differences in Europe. On that basis many cancellations or simplifications of NDP and NCI have been proposed.

Conclusion

In the research project pre-normative proposals for improvement and simplification for most chapters of Eurocode have been identified in the sense of a remedy. The focus was on improvement of ease of use based on the previous experiences in Germany and based on analysis of specialist literature. In all revised topics a reduction of the number of NDP and of German additional rules has been achieved. The remedial proposals led to updated and practice-oriented drafts of code texts for Eurocode 2 and for the related National Annex.

Within the scope of the ongoing evaluation of the European collated comments after the systematic review and during the rework of Eurocode 2 up to the next official code draft (expected end of 2016) future proposals for change and improvement of other countries have to be discussed. Thereby it is necessary to assess these proposals from the point of view of ease of use, safety and economy (e. g. by comparative analysis) and to compare with the German proposals. During this process further rework and optimisation of the proposals are expected. Eventually new research topics will be established which have not been identified as key topics so far.

Project data

Short title: Improvement of the practical application of Eurocode 2

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