

## Challenges when enhancing the infrastructure – case studies

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### Abstract

The fundamental rationale of the German way to ensure structural safety and to prevent the society from undue harm is independent design review and execution supervision. This paper will explain both regarding the way in which review and supervision are performed, as well as the qualification needed for the design and supervision review engineer, who acts as a trustee of the public administration. The development of the review and supervision regime and of the underlying set of technical rules and regulations will be addressed by discussing actual and historic case studies. Special emphasis will be put on the interface-problems when different parties are involved and on the necessity of good and reliable coordination mechanisms between the involved parties. As a consequence of the increasing fragmentation of the design process in combination with the use of complex software tools and inevitable time pressure often the integrated design review process is the last line of defence to avoid incidents due to minor lapses or serious misjudgements.

**Keywords:** design review, human error, structural safety, case study

### 1 Introduction

The methods chosen to ensure and to improve structural safety in Germany, which is one of the basic obligations of the state, are closely linked to the lessons learnt from case studies of structural failures and near misses during the last century. The fundamental lesson derived from the study of the root causes of these incidents was that the

most efficient way to prevent the society from undue harm is the establishment of a pre-emptive design review and execution supervision system. To avoid economic dependencies between the client/contractor and the review/supervision body, it is crucial that the design review as well as the execution supervision are performed by a technical and economical independent entity. Consequently, these tasks can only be performed, without any