



Qualifications and Internal Checks versus Independent Proof of Structural Design

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Abstract

Against the background of European standardisation of structural engineering principles, there is intense debate about the extent to which self-regulation and internal inspections can replace independent inspection of calculations relating to static equilibrium, project scheduling and execution of construction work by a third party. There is also discussion about whether the likelihood of errors decreases and, to a certain extent, whether errors would be unlikely or would not have a significant effect on the stability of buildings, as engineers become better qualified. This contribution examines both questions and gives examples from the author's practical experience.

Keywords: independent proof, qualifications, self-check, internal check, human errors, ISO 9001

1 Introduction

Our current safety concept is based on verification in limit states and application of partial safety factors for individual actions and resistances (EN 1990 [1]). It takes into consideration various factors that influence the safety or reliability of the building, such as distribution of actions, including over time, deviations of material characteristics from their target value and distribution of these deviations, deviations of the geometry of the load-bearing structure from planned dimensions and consideration of unfavourable values, as well as inaccuracy of the model for verification and determination of the inner forces. Partial safety factors concerning the various influences were assigned following calibration on the basis of reliability analyses [2], [3]. They can differ completely geographically and from country to country.

The issue of the extent to which this partial safety concept takes into consideration human error, inaccuracies and negligence keeps arising today,

as it always has done in the past. However, the following thesis is also subject to the same amount of discussion: the better the qualification, the lower the probability that errors will be made, or rather, one suspects that it would be possible to consider their effects by factors dependant on the qualification.

To get to the root of this issue, the buildings that are being planned and erected should first be characterised and then the human errors and weaknesses specified. Their causes are also of interest.

2 Construction works and their planning and execution

Every construction work is in comparison with industrial products an unique specimen which is marked by the following characteristics (cf. [5], pp. 38 f):

- The erection at the place of the utilization connected with special climatic and soil conditions