Abridged version

Elaboration of an instruction manual for the assessment of the fall protection of windows in the building envelope and their installation as well as an explanation of the application of the ETB guideline.

Components of the building envelope with safety barrier properties must be verified against static and impact loads with regard to the sufficient load-bearing capacity of the component including the anchoring in the load-bearing substrate. The regulations to be applied were developed and published at significantly different times. In particular, the ETB Directive dates back to 1985 and no longer corresponds to today's safety concepts. Therefore, the aim of the project applied for was to develop a guideline which clearly defines the necessary verification for safety barrier windows as well as the possible ways of verification. Furthermore, it was to be analysed how and under which boundary conditions the static equivalent load for the impact can be distributed to several fixing points when verifying the window fixing.

In order to achieve the research objective, the current requirements regarding the verification paths and verification methods for safety barrier windows were analysed and checked for consistency with regard to the different regulations to be used. An analysis of the definition gaps in the regulations as well as requirements that are interpreted and applied differently by the possible participants (e.g. structural engineers, building authorities, testing institutes) was also carried out. Based on this analysis, appropriate proposals were developed as to how the open points should be dealt with in future.

An essential part of the investigations dealt with the mathematical proof of the soft impact, in particular with the question of load transfer of the local impact to adjacent fixing points. In order to answer this question, the essential parameters which influence the load transfer were varied in FEM calculations. The calculation model was previously validated by experimental investigations. From the parameter study, a proposal was worked out under which constructive boundary conditions a load transfer to adjacent fixing points can be applied and thus the load at the directly stressed fixing point can be reduced.
In addition to the previous approach of proving the impact by means of a static equivalent load, a proposal for a design method was developed in which the absorption of the impact energy in the fasteners is proven.

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