Univ.-Prof. Dr.-Ing. Frank U. Vogdt

Summary of the research report on the "Determination of the partial safety factors on the resistance side for verification of the structural safety of bonded thermal insulation composite systems"

The applicability of a thermal insulation composite system has to be verified through a *General construction technique permit (allgemeine Bauartgenehmigung) (aBG)* or with a *European technical assessment (ETA)* under consideration of the requirements in accordance with the *Model Administrative Provisions – Technical Building Rules (Musterverwaltungsvorschrift Technische Baubestimmungen) (MVV TB).* The conservative approach of global safety factors has been used up to now to evaluate the analyses of structural safety and durability required in this regard, with the assumption of simplified load-bearing models. However, partial safety factors for the resistance now have to be determined for adaptation to the semiprobalistic verification procedure common in the building trade.

A cohesive theoretical model to analyse the behaviour of bonded thermal insulation composite systems on mineral substrates was to be initially developed in this research project as the basis for the qualitative and quantitative establishment of the partial safety factors. It was however found that the existing available data is insufficient (and in part also contradictory), so that a model cannot be devised on this basis that would permit the realistic simulation of the load-bearing behaviour and allow the structural safety and durability to be precisely (and accurately) predicted.

Although an exact derivation based on an accurate simulation/forecast model is currently not possible, approaches to establish the partial safety factors can be devised based on the analyses that were performed. As a further development of the existing approaches, these must be viewed as recommendations for discussion by the *Deutsche Institut für Bautechnik (DIBt)* and the consulting experts in this matter. The following is defined to this effect:

- $\gamma_{M,1}$ for the variance of the strength
- $\gamma_{M,2}$ for the decrease in strength due to "ageing" resulting from climate effects
- $\gamma_{M,3}$ for the direct decrease in strength due to climate effects
- $\gamma_{M,4}$ for the decrease in strength due to permanent load effects
- $\gamma_{M,5}$ for possible inaccuracies in the execution on site
- $\gamma_{M,6}$ for possible inaccuracies in the theoretical modelling

However, performing supplementary (basic) analyses of the components and the thermal insulation composite system is indispensable for reaching a conclusion.

Univ.-Prof. Dr.-Ing. Frank U. Vogdt
Karl - Marx - Str. 63
14532 Kleinmachnow