

SandFlat – Development and investigation of sandwich elements for flat roof coverings

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The aim of the SandFlat project was to find an alternative solution to traditional flat roofs with thermal insulation on the external side as used for flat roofs in industrial buildings. Special flat sandwich panels can be the alternative. In this connection it is especially important that the new sandwich elements feature flat upper sides. The sandwich panels which are currently used for roof applications possess trapezoidal upper sides. In the past trapezoidal upper sheets often proved to be disadvantageous for this application. Sandwich panels could increase their share in the market of roof coverings considerably. This will be shown in this report. The implementation of such a novel building product could mainly help the small and medium-sized enterprises to ensure their actual market position and to expand this position compared to other European business competitors. This is important both for the producers of sandwich panels and for the producers and developers of sealings and for assembling companies.

There are three important technical problems for the application of roof sandwich panels with external flat facings that should be solved within the SandFlat project. These are: a detailed investigation of the long-term behaviour of flat roof elements, the development of sufficient sealings for flat roof elements and the design of new appropriate fixings for flat roof elements. The investigations of the long-term behaviour of sandwich panels concentrated on the consideration of the interaction of deformations due to load collectives. The core material creeps in winter and relaxes in summer. Tests and investigations within the SandFlat project proved that the deformation due to snow loads in the winter period relaxes in the next summer period due to loads of high temperature.

One important aspect of the investigation of the long-term behaviour of core materials with high creep deformation is that the stiffness of the joint geometry alone (e.g. of hidden fixings) sufficiently reduces the deflection due to dead load. In the area of sealings numerous different types of geometry of the joints and strips for sealings were developed and analysed in detail. Some of these developed types can be used directly for roof application. Together with the developed sealing strips it is even possible to use sandwich panels that are intended for wall elements. Further development of these solutions can be done after finishing the research project. This can be realized in cooperation between the producers of sandwich elements and the producers of sealing strips.

There were several special types of fixings for flat roof elements developed and tested extensively. The tests show that these fixing solutions are sufficient in reference to the mechanical requirements for practical applications.