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SandSet - Sandwich panels as self supporting structural members

The objective of the project was to research the applicability of sandwich panels as self supporting structural members without substructure together with their connections.

Traditionally sandwich panels are structural components for wall cladding and roof covering of a building. They are mounted on a load bearing substructure consisting of steel, aluminium, reinforced concrete or wood. The sandwich elements themselves are made of two thin metal sheets with an insulating core between the faces. Typically the core material comprises Polyurethane (PU) or Mineral wool (MW). Cross-section geometry and material of both the faces and the core material between them may vary according to the building requirements that depend on the later utilisation. Thus, building with sandwich elements is highly flexible and cost-effective. In the course of the SandSet research project the application of sandwich panels as self bearing structural members (without substructure) was investigated. With a substructure sandwich elements act as simply supported beams. When the conventional bearing substructures are missing the panels serve as planar load-bearing elements. In this application both axial and in-plane forces have to be carried by the panels itself. Some basic information in order to verify the bearing capacity and the fitness for purpose under the load conditions mentioned above was provided. Furthermore, the long-term behaviour under this kind of load was investigated. The results from the experiments were incorporated into a complete and sound design concept that enables the user to apply sandwich elements without substructure in practise. To abandon the substructure means a considerable advantage regarding reduction of costs and mounting time.