

Instrumentation of outer walls for testing of sustainable building envelope solutions

Extending the possibilities of a joint test facility for building research and industry

A full-scale (7 x 22 m) moisture test building, which was formerly used by Aalborg University, Dept. of the Built Environment (AAU/BUILD), has been relocated to the Kgs. Lyngby campus of the Technical University of Denmark, DTU. Here it will be used as a joint facility for AAU/BUILD and DTU together with stakeholders from the building industry to test sustainable solutions for exterior building constructions.

The background is that new requirements in the Danish building code on minimizing the environmental impact of buildings will probably lead to more use of bio-based materials in future structures. It should be tested how these materials perform when they are used in exterior constructions, as they may be susceptible to moisture-induced degradation. Full-scale testing under conditions that combine controlled indoor exposure with natural outdoor exposure is a good way to do such testing. The moisture test building facilitates testing and documentation of the conditions for the green building systems of the future to have good performance and be durable.

The building has three rooms where exposure according to different indoor humidity levels can be tested. So far, the building has been used only for attics where different ceiling constructions have been tested with regards to insulation type and thicknesses, with or without vapour barrier and different types of ventilation.

With this project, it will be possible to carry out similar tests also in the exterior façades of the building. The wall elements can be tested in two orientations, facing north or south. Up to six different wall types can be tested in parallel in two orientations and three humidity classes, making up a total of 36 variations.

The project involves planning and construction of frames for wall elements preparing them for flexible testing of different wall constructions. Furthermore, sensors for measuring temperature and relative humidity inside the wall elements, and data collection will be facilitated due to this project.

The facility shall be used in the coming years as a platform for testing and documenting green building solutions that have good heat and moisture performance and are durable.