Level | **RA**

Adhesively-bonded GFRP-glass sandwich structures

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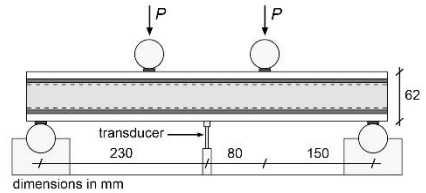
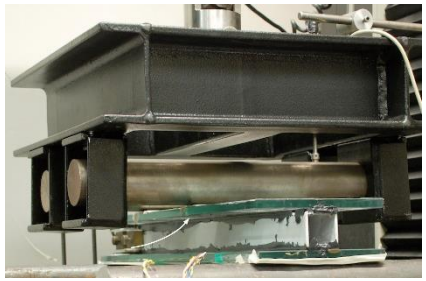
Adhesively-bonded GFRP-glass sandwich panel.



Schematic view of four-point bending experiment performed on GFRP-glass sandwich panel.



Four-point bending experiment performed on GFRP-glass sandwich panel.

Overview | Glass is an ubiquitous material in building envelopes where it is frequently used in curtain wall systems (metallic frames supporting infill glass panes). However these systems have complex connections between frame and glass components and have also low robustness and relatively low thermal performance. To simplify connections and increase robustness and thermal performance, novel adhesively-bonded GFRP-glass sandwich structures are investigated for building envelopes. In this sandwich configuration two structural (tempered) glass face sheets are bonded with stiff adhesives to high-strength, lightweight and thermal performant GFRP pultruded core profiles.

Outcomes and Impact | The aim of the project is to develop a novel GFRP-glass sandwich structural concept for transparent building envelopes. This concept constitutes a radical shift in the use of glass in buildings – from its current use as infill panel supported by thermally inefficient metallic profiles to a load-bearing component integrated in a thermally efficient unit. This new concept offers potential for reducing weight and depth and for increasing transparency and thermal performance of building envelopes compared to actual glass façade systems.

Work Involved | The project will focus on the following stages:

- Evaluation of the structural performance of adhesives and of novel sandwich panels.
- Evaluation of thermal performance of novel sandwich panels.
- Investigation of form-adapted load-bearing glass and GFRP components.
- Feasibility study of integrating solar energy production and active façade systems.

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