



GFRP-Glass Composite Structures

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Overview | *The standard metal-glass unitised curtain wall system commonly used in contemporary facades has two major weaknesses; the system is structurally inefficient as it fails to exploit composite behaviour with the glass and the system is thermally inefficient, with thermal bridging occurring at joints. This project aims to address these weaknesses by means of GFRP-glass composite action. The thermal conductivity of GFRP is lower than metals and the exploitation of composite action can greatly increase the structural efficiency of the system. The project explored the composite action which could be achieved between GFRP and glass by high strength adhesive bonds. Single-lap shear tests were used to determine the most suitable adhesives and a combination of 4-point bending tests and an analytical model was used to quantify the degree of composite action achieved for the chosen adhesives.*

Main Outcomes | *It was found that the composite behaviour achieved by the high-strength adhesives greatly improved the performance of GFRP-glass beams, increasing both the strength and the stiffness. The most promising adhesive achieved 69% of composite action when an altered composition of 13:10 hardener to resin was used. The analytical model developed provided a good prediction of the response of composite specimen prior to failure.*

Future Work | *Further experimental testing of materials, will be used to validate and refine the analytical model. The feasibility of a curtain wall system of this type should be explored further by investigating the long term performance of the adhesives. Before GFRP-glass composite structures could be viable for use in curtain wall systems, larger scale tests with larger panels of glass should first be tested.*

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