

BLAST RESISTANT COMPOSITE PANELS AND FULL SCALE VALIDATION

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Compared to steel panels the blast resistance of regular composite panels is a major problem, particularly for internal blast. The most important drawback for composites is the difficulty to design an affordable and proper connection / joint to adjacent structures with sufficient continuous strength, due to the absence of the possibility of welding the fibres.

Sandwich structures are not sufficient to withstand large blast loads but a mass effective way to resist these loads is via the membrane mechanism as proven by welded steel panels. Particularly for composite membrane structures the design of realistic joints is a challenge as they have to transfer very large membrane forces.

Potential joints were generated by the international Convince and Compare community. Most of the concepts are based on the idea to have continuity of the fibres across the joining elements.

To test composite panels for large internal blast loads is another major design challenge due to the enormous reaction forces resulting from membrane structures. A new and efficient set-up was designed that proved to work well during full scale tests on the composite panels.

The dynamic response of the panels will be compared with FEM simulations and the failure modes described.