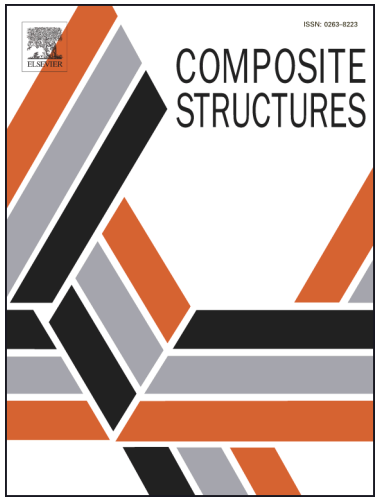

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PII: S0263-8223(16)32623-X
DOI: http://dx.doi.org/10.1016/j.compstruct.2016.11.066
Reference: COST 8027

To appear in: *Composite Structures*

Received Date: 26 March 2016
Revised Date: 17 November 2016
Accepted Date: 23 November 2016

Please cite this article as: Ahmed, S., Galal, K., Effectiveness of FRP Sandwich Panels for Blast Resistance, *Composite Structures* (2016), doi: http://dx.doi.org/10.1016/j.compstruct.2016.11.066

Effectiveness of FRP Sandwich Panels for Blast Resistance

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Abstract

Nowadays, sandwich panels are recognized for their importance in various technical fields especially in aeronautics, automotive, and structural engineering. Light-weight composite material can be used in sandwich panels due to having high stiffness-to-weight ratio. In this study, a numerical model has been conducted to study the effectiveness of fiber reinforced polymer (FRP) sandwich panels under blast effect. Results of numerical model are validated with experimental field tests in the literature. A new inner core configuration is proposed. In the experimental field test, inner core configurations were honeycomb shaped and sand was used as filling material. Newly proposed core configuration is formed of a combination of woven and honeycomb shapes and sand is used as a filling material. The two performance parameters considered in this study are the amount of energy absorbed by panels and their peak deformation. In order to track the enhancement of the panels' performance, a parametric study has been conducted. Moreover, the effect of changing the filling materials has been investigated. A good agreement between the numerical results and the experimental measurements has been realized. Finally, the analyses have revealed that using the new core configuration noticeably enhances FRP panels' behavior under blast loads.

Keywords: Blast Load, Fiber Reinforced Polymers, Finite Element Modeling, Sandwich Panels, Polyurethane Foam.