**IMPROVING THE explosive blast resistance of fibre-polymer composites**

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**Abstract**

An overview of experimental research into improvements to the explosive blast resistance of fibre reinforced polymer composite materials used in military and civil structures is presented. Fibreglass and carbon fibre composite targets were impulsively loaded by shock waves of increasing intensity generated by plastic explosive charges. The dynamic deformation behaviour, internal damage, and post-blast mechanical properties of the composites were determined. Damage within composite materials initiates with matrix cracking and fibre-matrix interfacial debonding, and then develops into delamination cracks and broken fibres with increasing shock wave impulse until eventually the entire target ruptures. With the initiation and spread of delamination cracking and broken fibres there is a corresponding reduction to the post-blast mechanical properties of composites. Experimental testing reveals that the explosive blast damage resistant of composite materials is dependent on a multitude of factors, including the type of fibre reinforcement, fibre architecture, type of polymer matrix, and the interfacial bond strength between the fibre reinforcement and matrix. This information can be used in materials selection to create composites with enhanced explosive blast damage resistance and improved post-blast properties.

**Bio**

Professor Mouritz performs research into fibre reinforced polymer composites and other engineering materials used in aircraft. Professor Mouritz has performed research which has led to significant discoveries on various topics associated with composite materials, including their mechanical, fracture and fatigue properties; impact and explosive blast properties; fire structural properties; non-destructive inspection and smart health monitoring; and damage tolerance using through-thickness reinforcement (orthogonal weaving, stitching, pinning).He has published nearly 200 research articles on composites; which include 3 books, 3 edited books, 15 book chapters, and over 120 journal papers.Professor Mouritz has received over $5 million in research funds over the past 10 years from various sources, including the Australian Research Council, United States Office of Naval Research and the Composites CRC. 