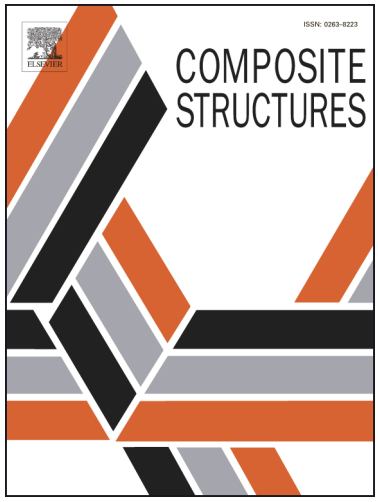

Dynamic response and research of 3D braided Carbon Fiber Reinforced Plastics subjected to ballistic impact loading

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***Highlighted Revision**

Dynamic response and research of 3D braided Carbon Fiber Reinforced Plastics subjected to ballistic impact loading

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Abstract: The damage mechanism of braided composites under ballistic impact condition is of paramount importance. In the present work, an experimental study was carried out to analyze the deformation failure mechanisms of 3D braided Carbon Fiber Reinforced Plastics (CFRPs) subjected to ballistic impact loading. A two camera system was adapted to study the damage initiation and propagation of 3D braided CFRPs under ballistic impact simultaneously, as well as the whole-field displacement field and strain field. Moreover, the energy absorption mechanism of 3D braided CFRPs was studied. Finally both C-Scan and digital microscope technique were used to observe different failure patterns on the surface of 3D braided CFRPs under ballistic impact. The typical deflection curves and damage modes were obtained. The results show that the absorbed energy and the incident velocity have a liner relationship approximately.

Key words: 3D braided composites, three-dimensional digital image correlation, damage mechanism, energy absorption mechanism.

1. Introduction

Three-dimensional braided composites are widely used in aviation, aerospace,