

Accepted Manuscript

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PII: S0266-3538(17)32521-6

DOI: [10.1016/j.compscitech.2018.01.015](https://doi.org/10.1016/j.compscitech.2018.01.015)

Reference: CSTE 7041

To appear in: *Composites Science and Technology*

Received Date: 15 October 2017

Revised Date: 5 January 2018

Accepted Date: 7 January 2018

Please cite this article as: Xu G-d, Wang Z-h, Zeng T, Cheng S, Fang D-n, Mechanical response of carbon/epoxy composite sandwich structures with three-dimensional corrugated cores, *Composites Science and Technology* (2018), doi: 10.1016/j.compscitech.2018.01.015.

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Mechanical response of carbon/epoxy composite sandwich structures with three-dimensional corrugated cores

Guo-dong Xu ^a, Zhi-hai Wang ^a, Tao Zeng ^{a,*}, Su Cheng ^a, Dai-ning Fang ^b

^a Department of Engineering Mechanics, Harbin University of Science and Technology, Harbin
150080, P.R. China

^b School of Aerospace Engineering, Beijing Institute of Technology, 100081, Beijing, P.R.China

Abstract

A novel three-dimensional (3D) corrugated core sandwich structure was designed and fabricated by auto-cutting process. Mechanical behaviors and failure mechanism of 3D corrugated core sandwich structures were investigated. Analytical models were developed to estimate the strength, stiffness and dominant failure modes. In order to demonstrate sensitivity of the graded parameters on mechanical behaviors of 3D corrugated core sandwich structures, the specimens with different graded parameters were fabricated and tested under compression and bending loads. Results showed that the graded parameters have obviously influences on the mechanical properties and failure modes of 3D corrugated core sandwich structures. The predictions were also compared with the experiments and the results showed good agreements. Failure maps were constructed to illustrate the controlling failure mechanisms in various regions with different parameters.

Keywords: Composites; Sandwich structures; Mechanical properties; Corrugated cores.

1. Introduction

Sandwich structures consisted of solid face sheets and low-density core are widely

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