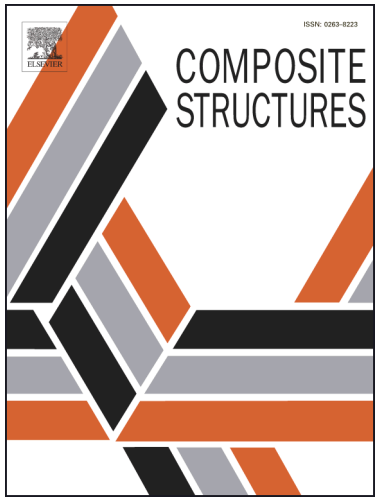

Compressive deformation and energy-absorption capability of aluminium honeycomb core

Ines Ivañez, Lorena M. Fernandez-Cañadas, Sonia Sanchez-Saez

PII: S0263-8223(17)30472-5
DOI: http://dx.doi.org/10.1016/j.compstruct.2017.04.056
Reference: COST 8487

To appear in: *Composite Structures*

Received Date: 9 February 2017
Revised Date: 22 March 2017
Accepted Date: 13 April 2017

Please cite this article as: Ivañez, I., Fernandez-Cañadas, L.M., Sanchez-Saez, S., Compressive deformation and energy-absorption capability of aluminium honeycomb core, *Composite Structures* (2017), doi: http://dx.doi.org/10.1016/j.compstruct.2017.04.056

Compressive deformation and energy-absorption capability of aluminium honeycomb core

Ines Ivañez*, Lorena M. Fernandez-Cañadas, Sonia Sanchez-Saez

Department of Continuum Mechanics and Structural Analysis

University Carlos III of Madrid

Avda. de la Universidad 30, 28911 Leganés, Madrid, Spain

* Corresponding author. Email address: idel@ing.uc3m.es

Abstract

In this study, the crush behaviour and the energy absorption capability of an aluminium honeycomb core is discussed. A three-dimensional finite-element model of a honeycomb-core structure was developed using the commercial code Abaqus. Flatwise and edgewise experimental compressive tests were made to validate the numerical model and good agreement was found between the experimental data and the numerical results. Virtual compressive tests varying the cell size, cell-wall thickness, and material properties were performed. The deformation mode, compressive core behaviour and its energy-absorption capacity were examined. The crushing parameters at in-plane directions were more affected by the variations of the characteristic core parameters; although, in general, increasing the cell-wall thickness and the yield stress of the aluminium alloy give higher crush loads, and therefore the absorbed energy increases. However, if the cell size increases, the energy-absorption capacity decreases.

Keywords: Honeycomb core, crushing behaviour, sandwich structure, modelling, crushing parameters.