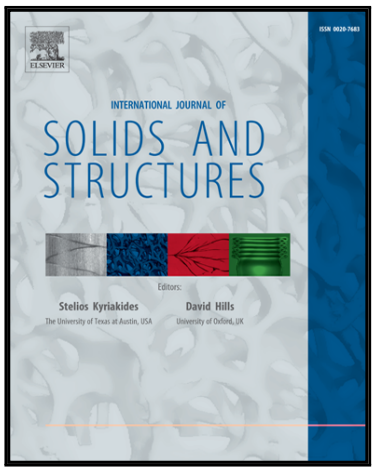

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Experimental and Finite Element Analysis of cellular materials under large compaction levels

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Abstract

This work aims at investigating the experimental characterisation and the modelling of the mechanical behaviour of cellular sandwich structures for large compaction levels, especially focusing on the collapse mechanisms of their constitutive cells and the role of the contacts created between neighbour cells. For that purpose, brazed cellular sandwich structures made of tube stackings have been considered as model architectures. The experimental characterisation of stackings consisting of either a square pattern or a hexagonal one has highlighted that the collapse mechanism was very reproducible in the case of the square stacking. On the contrary, the one observed for the hexagonal stacking showed an important sensitivity to the architectural defects such as missing braze joints or tube misalignment. Internal self-contacts created played also an important role regarding the densification plateau. In parallel, these compression tests have been simulated through the finite-element method; two different codes have been considered, one implicit (*Z-set*) and one explicit (*Europlexus*). The predictions of both

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