

Effect of hexagonal on the in-plane crushing behaviour of plain weave composite hexagonal quadruple ring system

ABSTRACT

In this study, an experimental investigation into the crushing behaviour of one dimensional composite hexagonal cellular structure between two plates has been carried out. The materials have been used to accomplish the studies are the plain weave E-glass fabric and the epoxy resin. The tested cellular structures are composed of 4×1 hexagonal cells with angles varied between 35° and 60° . Various crashworthiness parameters of the tested cellular structures such as crushing load capacity, energy absorption capability and force efficiency were computed and discussed. The crush failure modes of the tested rings were identified and analysed. Results showed that the hexagonal ring angle has a significant effect on the crush failure loads and energy absorption capability. Increasing the cell angle showed a decrease in energy absorption capability and load carrying capacity. Additionally, the cell angle has a remarkable effect on the failure sequence of the ring cells.

Keyword: Plain weave glass fiber; Hexagonal cellular structure; Cell-wall angle; Crushing behaviour