

Crushing behavior of kenaf fiber/wooden stick reinforced epoxy hybrid “green” composite elliptical tubes

ABSTRACT

In this paper, an investigation on crushing behavior of kenaf fiber/wooden stick reinforced epoxy hybrid composite elliptical tubes is presented. Kenaf fiber reinforced epoxy elliptical composite tubes, unsupported and supported by wooden sticks (4, 6 and 8), were fabricated using hand lay-up process. The crushing tests were performed at a constant speed of 20 mm/s to explore the potential effect of wooden sticks on the specific energy and mechanical behavior of kenaf fiber reinforced epoxy composite elliptical tubes. As a result of the study, it was found that the load carrying capacities of kenaf fiber reinforced epoxy composite tubes were gradually increased with the number of wooden sticks. Generally, the investigation showed that kenaf fiber reinforced epoxy composite elliptical tubes supported by wooden sticks demonstrated superior specific energy absorption and crashworthiness compared to the composite tubes unsupported. Further, the results also revealed that all specimens have failed in longitudinal failure modes. In this regard, an elliptical composite tube supported by 8 wooden sticks exhibited the best energy absorption capability.

Keyword: Kenaf fiber mat; Biocomposites; Specific energy absorption; Epoxides; Crushing behaviour; Wooden sticks