

The effects of multi-walled CNT in bamboo/glass fibre hybrid composites: tensile and flexural properties

ABSTRACT

Recently, polymer nanocomposites have been fabricated using carbon nanotubes (CNTs) as reinforcement nanofillers. However, the effect of incorporating CNT/polymer into hybrid composites with natural fibre is not clear. This study investigated the effect of using multiwalled carbon nanotube material (MWCNT) as the nanofiller on the tensile and flexural properties of bamboo/glass fibre hybrid composites. Composites containing various weight fractions of CNTs (0.1 wt.%, 0.3 wt.%, 0.5 wt.%, and 1.0 wt.%) were compared with the control hybrid composites. The hybrid composites were prepared with epoxy resin. The experimental results revealed an increase in the tensile strength of the composites with the addition of up to 0.5 wt.% CNTs (+7.7% over the control hybrid). However, beyond this value, i.e., with 1.0 wt.% CNT additives, the composite strength showed a remarkable decrease (- 36.8% compared with the control hybrid). Moreover, introducing CNTs into hybrid composites resulted reduced the flexural properties with increasing weight fractions as low as 8.45% compared with the controls. In sum, the tensile properties increased with the addition of up to 0.5 wt.% CNTs, but there was a decrease in the flexural properties.

Keyword: Bamboo; Tensile; Flexural; Hybrid; CNT; Nanofillers