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**The effect of carbon nanotube dispersion on the dynamic characteristics of
unidirectional hybrid composites: An experimental approach**

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Abstract

An experimental study on the natural frequencies and damping properties of hybrid composite beams and plates are presented in this paper. Hybrid composites consist of a matrix material along with both nano-fillers and micro fibers. In this research, carbon nanotube (CNT) is used as nano-filler. Epoxy, CNT/epoxy, glass/epoxy, CNT/glass/epoxy, carbon/epoxy and CNT/carbon/epoxy beam-shaped specimens are fabricated. Free vibration analysis of cantilever beams is examined in order to characterize the dynamic behavior of the specimens. 9.4% increase in the fundamental frequency and 12.3% decrease in the damping ratio of the CNT/glass/epoxy beam are observed with respect to those of the glass/epoxy beam specimen. Further, it is observed that CNT/carbon/epoxy beam has degraded fundamental frequency (13.9%) and enhanced damping ratio (31.5%) in comparison with those of carbon/epoxy beam specimen. Moreover, the first bending natural frequencies of the glass/epoxy, CNT/glass/epoxy, carbon/epoxy and CNT/carbon/epoxy plates are obtained experimentally. Plates with all free edges (FFFF) and plates with one edge clamped (CFFF) are investigated. Finite element models confirm the results obtained.

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