Abstract

This study presents an experimental study of the quasi-static axial compression and compression–compression fatigue behavior of a three-dimensional braided carbon/epoxy composite tube. Three kinds of tubes with different braiding angles, i.e. 25º, 35º, and 45º were used to examine the dependence of fatigue behavior on the braiding parameters. Quasi-static compression and compression–compression cyclic loadings were carried out on the braided composite samples. The S–N [stress and number of cycles to failure] curves, strain–N (number) curves, and damage observation were used to evaluate the behavior of the braided tubes under fatigue loading. The test results showed that braiding angle had significant effect on the ultimate compression strength (UCS) and the number of cycles per stress level that the sample could withstand. The tube with 25º braiding angle had the highest UCS while the tube with 45º braiding angle accumulates high number of cycles for the same stress level as compared to other samples. Damage occurred along the braid angle for 25º tubes while matrix crack plus bulging occurred in the tubes with 35º and 45º braiding angles.