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ABSTRACT

The behavior of foam-filled core composite is vastly superior as a material in terms of its mechanical and physical properties. The present paper describes the performance of polyurethane (PU) foam as an internally-reinforced filler material on pultruded composite square cross-section tubes made of E-glass/polyester resin and subjected to axial and oblique loading. In this research study, foam-filled core composites of three different wall thicknesses and densities were examined experimentally. The capacity of a structure to absorb large amounts of energy during crush regimes is a major concern in the design of crashworthy structures. Various loads were applied to different angle cross-head platens to assess their energy absorption capacity based on quasi-static load-displacement curves. In addition, the interaction properties of the composite and the foam core sheets during the loadings were discussed. Experimental results indicated that the crashworthy structure of the polyurethane (PU) foam-filled specimen enhanced the specific and quasi-static absorbed energies more than the empty composite tubes.