

بيانات عن البحث الثامن المقدم للترقية

٨				رقم البحث في القائمة المعتمدة
Experimental investigation of the crashworthiness performance of fiber and fiber steel-reinforced composites tubes				عنوان البحث باللغة الانجليزية
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ملخص البحث باللغة الإنجليزية:

Crashworthiness plays a key role in energy absorption and hence in vehicle accidents. The energy absorption capacity of laminated composite materials is heavily investigated in the industry due to their low cost, corrosion resistance, and high strength to weight ratio. Thus, this paper experimentally investigates the effect of the addition of woven fiber laminates and fiber steel sandwich laminates on the strength and energy absorption capacity of PVC polymer tubes. The sandwich-structured composite is formed from two glass-fiber composite layers with a steel layer in between. Four normal and hybrid reinforcement configurations are proposed, evaluated, and compared to the benchmark unreinforced tube. The crashworthiness characteristics of the reinforced composite tubes were identified using quasi-static axial compression tests. The crushing parameters, in terms of load-displacement response, load-carrying capacity, Specific Energy (SE) absorption capability, and Crush Force Efficiency (CFE) were determined for each sample. Moreover, Scanning Electron Microscope (SEM) analysis was carried out to investigate the microstructures, which clearly indicate the fractured surfaces. The results show that the tube reinforced with a 1 mm steel layer sandwiched between 2 layers and 4 layers of woven glass-fiber has the highest SE and CFE of 14 J/g and 0.91, respectively, while the tube reinforced with 7 layers of glass fiber layers only has the highest Initial Peak Load (IPF) of 139.36 kN.