Effects volume of carbon nanotubes on the angled ballistic impact for Carbon Kevlar Hybrid fabrics

ABSTRACT

Investigations of the angled ballistic impact behavior on Carbon Kevlar® Hybrid fabrics with assorted volumes of carbon nanotubes (CNTs) into epoxy are presented. The ballistic impact behavior of the epoxy composites with/without CNTs is compared. Individual impact studies are conducted on the composite plate made-up of Carbon Kevlar Hybrid fabrics with diverse volumes of CNTs. The plate was fabricated with eight layers of equal thickness arranged in different percentages of CNTs. A conical steel projectile is considered for a high velocity impact. The projectile is placed very close to the plate, at the centre and impacted with sundry speeds. The variation of the kinetic energy, the increase in the internal energy of the laminate and the decrease in the velocity of the projectile with disparate angles are also studied. Based on the results, the percentage of CNTs for the ballistic impact of each angle is suggested. The solution is based on the target material properties at high ballistic impact resistance, the inclined impact and the CNT volumes. Using the ballistic limit velocity, contact duration at ballistic limit, surface thickness of target and the size of the damaged zone are predicted for fabric composites.

Keyword: Carbon nanotubes; Oblique impact; Ballistic impact; Kevlar fiber; Carbon fiber