

**Comparative study of impact response of GFRP and CFRP composite plates
against blunt nosed projectile.**

Neel Gharde

Visvesvaraya National Institute of Technology, Nagpur, India
neelgharde18@gmail.com

S. Shrivastava¹, G. Tiwari²

^{1, 2} Visvesvaraya National Institute of Technology, Nagpur, India

ABSTRACT

Three dimensional finite element simulations were carried out to explore the perforation behavior of the GFRP and CFRP plates against blunt nosed projectile within sub-ordnance velocity regime. The ballistic performance of both the composite plates of 140 x 140 x 3.3 mm comprising of four layers of each thickness 0.825 mm having unidirectional glass fiber with orientation (0/90/90/0) was evaluated. The mass, diameter and length of projectile was kept constant as 52.5 gm, 19 mm and 50.8 mm respectively. To carry out the numerical simulations, commercial finite element code Ansys/Ls-Dyna was employed. To simulate the high strain rate behavior of GFRP composite material, enhanced composite damage material model was considered whereas for CFRP, Composite failure material model offered better results. The performances of both the plates were evaluated based on residual velocity, ballistic limit and energy absorption. The numerical results were found to be close enough with the experimental results available in the literature. It was found that GFRP underperformed than that of CFRP.

Keywords: GFRP; CFRP; Ballistic Limit; Energy absorption.