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Measurement of Ballistic Impact Performance of Fiber Reinforced Polybenzoxazine/Polyurethane Composites

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Abstract

The objective of this study is to measure impact performance of the composite based on glass and aramid fiber reinforced polybenzoxazine/polyurethane composites. Experimental panels were manufactured from E and S glass fiber reinforced polybenzoxazine backed by aramid fiber reinforced 80/20 polybenzoxazine/polyurethane and subjected to 7.62×51 mm at a velocity of 847±9.1 m/s. Bases on test results the specimens did not have any perforation. Comparing the same number of ply, cone deformation on the last panel of S glass composite was significantly lower than that of specimen manufactured using E-glass composite. Such panels were tested for their resistance and the specimens completely resisted the penetration of projectiles for six shots. The numerical study of ballistic impact was undertaken to predict the ballistic limit velocity of the samples in which the value was measured to be 930 m/s. Results determined in this work indicated that such panels have an excellent ballistic characteristics to be used as raw material to manufacture body armor.

Keywords: polybenzoxazine, ballistic impact performance, polymer composite, finite element