

215-006

MULTILAYERED BALLISTIC ARMOR IN USED POLYESTER MATRIX COMPOSITES REINFORCED WITH JUTE FABRIC AS INTERMEDIATE LAYER

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This paper evaluates the impact resistance of multilayered armor system that was used as intermediate layer the polyester matrix composite reinforced with jute fabric. The Multilayered armor system provides a lightweight personal protection, effective and the objective is to absorb the energy of projectile. Usually, this system is composed of three layers: the frontal layer is ceramic material, intermediate layer is aramid fabric and the third layer is a metallic material. The ceramic material is as function to dissipate the most energy of impact through of deformation and fragmentation of projectile, the objective of the aramid is to dissipate the energy of impact through of absorption of kinetic energy of fragments generated by impact of projectile, and the objective of metallic material is to absorb residual energy of fragments through of plastic deformation. In this present study was used as intermediate layer, in place of aramid fabric, the polyester matrix composites reinforced with jute fabric with different volumetric fraction (10% up to 30%). In these ballistic tests were used ammunitions with caliber 7.62 and the projectile penetration was analyzed by indentation in clay witness. The multilayered armors systems attended the specifications of NIJ 0101.06 (2008) that determines that the value of indentation depth is less 44 mm. Micrographs obtained by scanning electron show brittle fracture of polyester matrix, interaction of jute fibers with fragments of ceramic layer. These mechanisms contributed to dissipate the impact energy of projectile. Moreover the replacement of aramid fabric for polyester composites reinforced with jute fabric provides weight reduction of the shield (4.9%) and the cost reduction (39%).