A Novel Approach For Improving Multi-Hit Armor Solutions Based On Reaction Bonded Ceramic Matrix Composites

Abstract: It is very difficult to develop a consistent multi-hit armor design by using conventional monolithic ceramics even with high end ceramics such as Boron Carbide or Silicon Carbide. It becomes even more difficult with threats such as 7.62x 63 mm AP, which is nowadays required in personal protection standards. On the other hand, an armor solution based on many ceramic pieces are not preferred due to multicurve geometry requirements and reliability of ballistic performance at interfaces between ceramic parts. A novel approach is suggested for overcoming this problem by encapsulating ceramic pieces (B4C or SiC based) with coated carbon fiber fabrics and combining these via silicon infiltration into a single multiphase ceramic matrix composite.