

عنوان مقاله:

Ballistic Performance of Hybrid Armor with Ceramic Inserts and Polymeric Matrix for Different Threat Levels

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خلاصه مقاله:

Ceramic materials due to their high compressive strength and hardness have been one of prime candidates in armor design in particular when high level threats (impact velocity above 600 m/s) are involved. The aim of this work is to investigate ballistic impact performance for a target plate containing novel ceramic inserts and compare it to ceramic tiles embedded in polyurethane based matrix. Two size 98% alumina (Al_2O_3) base ceramic inserts with 10 mm diameter and 6 and 10mm in length were used in the specimen's preparation. In addition, 6 and 10mm thick ceramic tiles were used to compare the ballistic performance. Smooth bore gas gun was used to carry out high velocity ballistic impact tests in velocity range of 530- 830m/s on both target plates. Results showed outstanding ballistic performance by the target plate with ceramic inserts in term of lower residual velocity for the specimens which experienced perforation and lower damage area compared to totally disintegrated plates containing ceramic tiles. Specimens containing ceramic inserts also showed good ballistic resistance in case of multiple impacts whereas the specimens with ceramic tiles almost totally lost its ballistic potentials. Ability to repair on site (debris removal and new ceramic insert replacement) is among unique advantages of this novel design in the armor application.

کلمات کلیدی:

Ballistic Impact, Ceramic Inserts, Damage Extension, Multiple Impacts

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