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# Ballistic performance of ceramic-metal composite structures

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## ABSTRACT

In this study, a numerical analysis of the ballistic performance of ceramic-metal composite structures was investigated. In the analysis, the two composites consist of distinct ceramics namely alumina and boron carbide tiles supported by the aluminum plate were tested for numerical analysis. In both the structures, the size of the circular ceramic plates were 101 mm diameter and 25 mm thickness composed at the center of backed aluminum metal plates having a thickness of 25 mm and an outer diameter of 152 mm. A cylindrical tungsten projectile (76.2 mm long and 7.62 mm diameter) was impacted with 1550 m/s velocity at the center of both the composites and the behavior of the impacted ceramic-metal composites were studied through LS-DYNA solver and validated through experimental results available in the literature.

For studying the ballistic performance of the composite, different parameters were considered, namely the residual velocity of the projectile, depth of penetration, cost of composite, ballistic limit, areal density and erode length of the projectile. The performance of ceramic immensely depends upon the yield strength of backing and front ceramic material. The numerical results have shown that the Boron Carbide-Aluminum composite had better ballistic resistance whereas the Alumina-Aluminum composite was cost-effective.

*Keywords: Ballistics; Ceramics; Ceramic-Metal Composite; Depth of penetration.*