



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Vehicle Improvement Studies

Investigating Welding Techniques to Mitigate the Effects of Underbody Blast

Program Managers at Armored Fighting Vehicles, part of the Program Executive Office Ground Combat Systems (PEO GCS) (Warren, Michigan), has challenged its Science and Technology contractors to design for mitigation of injuries on increasingly larger blasts. General Dynamics Land Systems (Sterling Heights, Michigan) responded to the challenge by investigating the use of explosively bonded strips to join a steel lower hull to the aluminum upper hull of a Bradley Fighting Vehicle. Researchers then blasted the hull in various locations to test the explosively bonded joint. The asset suffered extensive damage after a blast was centered on the crew area, and a second blast targeted on the engine bulkhead, the asset suffered extensive damage. Visual inspections revealed that almost every weld on both the upper and lower hulls had cracks; however, at no point did the explosively bonded strip show any signs of separating. Hull structural integrity is a key component in minimizing or preventing blast injuries. These test results indicate that the explosively bonded strip was the strongest joint on both the aluminum and steel halves, and a viable method for joining dissimilar metals for combat vehicle applications.

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