TESTING OF THE ARL 1.68 M DIAMETER SHOCK TUBE EXIT JET SPREADER FOR NON-IDEAL BLAST SIMULATION

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In recent research, the U.S. Army Research Laboratory (ARL) has demonstrated the feasibility of using a shock tube's exit jet to simulate non-ideal nuclear blast events on army equipment with the intent of improving its survivability. This research has provided successful performance of scaled versions of shock tubes with incorporated exit j et spreader devices during the testing of targets placed at a distance beyond the exit of these shock tubes. These spreaders were attached to the ends of the shock tubes with the purpose of spreading the exit jet and resulting dynamic pressure impulse more uniformly over a greater area, thus, providing a more accurate simulation capability for testing larger targets.

This paper documents some of the latest efforts and findings in the area of non-ideal nuclear blast simulation by the ARL. A full-scale exit jet spreader has been constructed for use with the ARL 1.68 m diameter shock tube. Exit jet mapping studies have been performed to validate the spreading phenomena. Also, displacement experiments with World War II era army jeeps have been conducted to allow comparisons of vehicle response under shock tube spread jet loading and past nuclear tests in which jeep displacement data was obtained.