CALCULATIONS OF NON-IDEAL AIR BLAST LOADS ON A T-72 TANK

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Three-dimensional ARA Second-order Hydrodynamic Automatic Mesh Refinement Code (SHAMRC) calculations were performed to predict the loads on a full scale T-72 tank. The results of exit jet calculations performed earlier were used as initial conditions and boundary conditions for the loads calculations. A detailed CAD model of the T-72 was placed in the ARA SHAMRC computational grid using a method of ray intercepts developed at ARA. The tank was resolved to 3 cm in each direction.

Two different Large Blast and Thermal Simulator (LB/TS) driver pressures were used to provide a simulated non-ideal nuclear blast environment within the exit jet. The boundaries were initially placed 10 m upstream of the test article. When questions arose about possible contamination of the boundary conditions by reflected shocks, the input boundary was moved to 40 m upstream of the target.

Pressure vs. time histories were recorded at over 1000 points on the surface of the vehicle. Measured data from the 5 or 6 gauges placed on the vehicle could be directly compared for verification of the calculation. The calculation was used to calculate total forces and torques acting on the vehicle as a function of time. These forces were translated to motion of the solid body using a very simple 6 degree of freedom response model. Comparisons of the results of two tests at different impulse levels are compared to the predictions.