

## **SIMULATION OF AIRBLAST PROPAGATION IN AN UNDERGROUND MAGAZINE, COMPARISON OF 3D HYDROCODE AND SMALL-SCALE MODEL RESULTS**

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A series of small-scale model tests (approximately 1:30 scale) has been conducted at the U. S. Army Engineer Waterways Experiment Station (WES) to investigate blast effects from accidental explosions in underground magazines. One model configuration studied consists of a steel detonation chamber connected by a length of pipe to an expansion chamber, which is vented to the atmosphere through two short lengths of pipe (two vents). This arrangement represents a storage chamber, a loading/unloading chamber, and connecting tunnels in a prototype magazine.

This paper presents and discusses the results of a 3-D numerical simulation of a detonation in the model storage chamber. The results are compared to measured airblast pressures in the physical model. A 3-D version of SHARC (a second-order, finite-differencing hydrocode) was used for the numerical simulation. Data obtained from the physical model included gas and shock pressure and thermal flux. Overpressures and stagnation pressures were measured within the tunnel system, expansion chamber, and in the free-field to establish the tunnel exit pressure and airblast hazard distance for inhabited buildings.