

BLAST SIMULATION EXPERIMENTS OF A STRUCTURALLY ENHANCED INTERMEDIATE HARDENED SHELTER

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Harry Diamond Laboratories (HDL), working in conjunction with Natick Research, Development, and Engineering Center (NATICK) developed and tested a new conceptual design for structural enhancement of the Intermediate Hardened Shelter (I-Shelter). An easily installable/removable, low cost, low weight set of structural enhancement devices (SEDs) were utilized to upgrade the basic I-Shelter into a performance enhanced version, the ISE.

A successful series of ISE experiments with various configurations of equipment racks and shock mitigation systems was performed in 1990 at the Centre d'Etudes de Gramat (CEG) Large Blast Simulator (LBS).

Pre-test validation of the design concept was effected by performing non-linear dynamic structural analysis using a 3-D ADINA finite element code.

Extensive modeling of the ISE and SEDs was performed to include predicted accelerations, stresses and strains. Distinct finite element models were constructed for the side and end-wall shock encounters. The analytical results predicted the successful ISE performance which was observed at CEG.

Focusing on the blast simulation experiments performed at CEG, this paper will describe the SED design, analysis, implementation, and tests. The various experiment configurations, including results and comparisons between the predictions and actual structural response, will be discussed.