NUMERICAL SIMULATION OF A BLAST WITHIN A MULTI-ROOM SHELTER

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This paper describes tile application of a recently developed three-dimensional adaptive finite element shock capturing scheme on unstructured tetrahedral grids, to the simulation of a blast within a multi-room shelter resulting from the penetration and detonation of an artillery shell.

The geometry of the multi-room shelter was defined using a new CAD-like user-friendly solid-body generator (FECAD). The advancing front methodology (FRGEN3D) was then used to generate the surface and volume grids. The shock diffraction simulation was initiated by imposing the results of a 1-D simulation. The resolution and fidelity of the simulated shock wave diffraction phenomena, performed via a solution of the transient compressible Euler equations, were enhanced by the application of the classic H-enrichment/coarsening grid adaptation scheme, with density as the critical adaptation parameter. Fast post-processing was performed rising dumps that include the flow variables only on the surface and on pre-defined planes rather than on the complete computational volume.