

INTERIOR BLAST LOADING IN A SCALED CONCRETE STRUCTURE

NEEDHAM,C.E.; BINGHAM,B.L.

The results of a two-dimensional and a three-dimensional calculation are presented. The two-dimensional calculation defines the detonation process and early airblast formation of a cylindrical charge of C-4. The three-dimensional calculation uses the results of the two-dimensional calculation for initial conditions and propagates the shock wave to the walls of the structure. The results of these calculations provided pressure-time histories at several hundred locations on the structure walls. The calculations were carried out in support of experiments and structure response predictions.

The detonation room in the structure has a square cross section with solid floor and four concrete walls. Two openings in the roof provide venting to the atmosphere through vent pipes to a large plenum chamber. The structure is approximately 1/6th scale and is constructed of reinforced concrete.

The three-dimensional calculation was carried to a time such that several shock reverberations had occurred in the room and the venting had reduced the quasi-static pressure to a few bars. Comparisons of calculated waveforms are made with the experimental airblast gauges located throughout the structure.