NUMERICAL MODELLING OF SHOCK WAVE INTERACTION WITH CONICAL BLAST SHIELDS

BAUM,J.D.;BOOK,D.L.

The FAST3D leapfrog FCT code has been applied to the problem of hypersonic shock waves diffracting around a blast shield covering a cilo. The shield is taken to have the form of a right circular cone with a vertex angle of about 160 degree, or a frustum of such a cone, in both cases with a height of 3 feet and with a maximum diameter of 30 and 60 feet, respectively. The peak pressures, total load and impulses are found, as well as flow fields in the midplane and in planes parallel to it, assuming incident shock waves delivering overpressures of 50 kpsi. Effects of pressure variation associated with the rarefaction behind the blast front and with radial decay are also modeled. Correlations with and extensions of 2D shock-on-wedge problems are discussed. The experimental data of Ben-Dor and Glass as well as previous 2D numerical simulations illustrate the difference between the 2 problems. Results are displayed in the form of contour plots and a color movie.