AIR BLAST SIMULATION USING THE PETRA HYDROCODE

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PETRA a general purpose 2D eulerian code, having explosion burn and material strength options. The code has been used in this study to consider the development of simulated shock waves.
Initially the code was used to simulate a small ¼ g PETN explosive charge detonated above a flat surface. The simulation produced density and pressure contour plots and velocity vector plots. From these the reflected shock waves and Mach stem formation were observed. This information was compared with experimental results in particular with the schlieren photographs of the shock waves.

The effect of bursting a small pocket of air of equivalent energy to the ¼ gram charge was also simulated. The results were compared with those from the quarter gram high explosive detonation. It has been demonstrated that the energy transference from the hot air pocket to the surrounding ambient air is faster than the transference from the HE charge to the air. Times of arrival of the shock front were also compared.

Micro scale simulations of larger air bursts were also undertaken. These had to be on the microscale because of limitations in the code and graphics. A check on scaling had already been undertaken.

Comparisons of arrival times of the shock front were made in all cases by scaling up or down to 1 kT.
A demonstration of how these simulations can be used to study the effect of shock waves on structures is also considered.