THE EFFECT OF GROUND SURFACE AND CHARGE SIZE ON THE MACH REFLECTION OF SPHERICAL BLAST WAVES

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Regular and Mach reflection of spherical blast waves at real and ideal surfaces have been study using two high speed photogrammetrical techniques. A series of experiments was carried out using two identical simultaneously detonated charges, suspended one vertically above the other so that the distance between the charges was equal to the height of the lower charge above the ground surface. Measurements were made of the reflection of the blast wave from the lower charge at the ground surface, and of the interaction of the two identical blast waves along the horizontal plane of symmetry between the charges. Since no energy was lost in the two wave interaction this could be considered as an ideal reflection. Pairs of 500 kg and 1000 kg charges were used in conjunction with smooth and rough ground surfaces. The shock fronts were photographed at 4000 pps against a 15 m high striped background. The velocities of the primary and Mach stem shocks could be determined to give the variations of shock strength with distance.

In addition, an array of 300 smoke puffs, acting as airflow tracers, at 1.5 m spacing in a rectangular grid 40 m long by 20 m high was photographs at 5000 pps to give the particle velocity and density throughout the blast waves. Results will be presented which show the effects of the different ground surfaces and of the different charge sizes, after allowing for cube root scaling, on the Mach stem shock strengths and the
triple point trajectories.