

FIELD TRIAL OF CARES (CRATER AND RELATED EFFECTS SIMULATOR) A 2 KT SIMULATION

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This paper describes the design, construction and performance of a new high fidelity blast simulator. This device has been tested at the 2 KT simulation level. It was designed primarily to simulate the ground motions and crater produced by a surface detonated nuclear charge. The simulator is referred to as CARES „Crater and Related Effects Simulator“ The efforts of many agencies have been involved (DNA being the primary sponsor and BMO (Ballistic missile Office) of the USAF a prime user of the simulator). WES served as Program Manager for construction, instrumentation and execution effort.

This effort was conducted on a remote Air Force Range, 25 m E of Yuma Arizona, which was chosen for various tests by EMO because the earth materials (a desert alluvium) represents an interesting sitting potential.

The CARES simulator consists of 4 basic parts: the subsurface charge (SSC), the fireball wing tank (FBW) the standoff air blast sector (STABS), and the high explosive simulator technique (HEST). For the 2 kt design, the surface diameter is 44 m and requires 59'000 kg (65 tons) of HE. A liquid explosive, nitromethane, is used in the SSC and FBW; a solid cast explosive, pentolite, is used in the STABS; Iremite-60, a blasting slurry, is used in the HEST.

The explosive tankage is assembled thusly: the SSC (a fiberglass hemisphere) placed in an excavated pit; the FBW (plastic lined plywood boxes) on the surface; then the STABS (pentolite slabs) on polystyrene forms; and the HEST (3 cm diameter linear sausages) is laid in concentric rings to form the periphery of the charge. The initiation system (over 500 detonators with delay) is quite complex in that the shock front, at an early time, must resemble that of an expanding nuclear pulse.

Various instrumentation is used for (1) determining the performance of the simulator, (2) measuring amplitudes and attenuation rate of the shock waves, and (3) determining offsite shock environments. Examples of the recorded data will be presented.