

A VALIDATION OF THE MICRO-NUKES MODEL TEST TECHNIQUE

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At MBAS 10 a micro He-test technique for determining the blast loading characteristics of a nuclear explosion on an above ground structure by the use of very small models, at a scale of 1:100 or smaller, was presented and its feasibility demonstrated. However, the lack of full scale test results for similar structures did not allow validation of these so-called micro-nukes results in terms of scaling effects.

In this paper a first validation of this promising modeling technique will be presented. Full scale blast loading data for a Swedish above ground shelter obtained at the DNA HE-event MINOR SCALE are compared with the 1:100 and 1:400 scale micro-nukes test results.

The structure was placed at a distance corresponding to the 1 bar peak overpressure level of the incident blast from the simulated 8 kT nuclear surface burst. The related HE-charges are 4 kg and 0.0625 kg TNT for 1:100 and 1:400 scale respectively. The time histories of the blast loading were measured on the front wall and on the top surface of the structure.

The results are in excellent agreement with those from the micro-HE tests for this kind of structure geometry. Some differences in time histories may be explained by specific viscous effects and thus reveal the limits of such a micro test technique.

Further investigation of the scaling effects using both diffraction and drag sensitive model geometries (boxes, cylinders, spheres) have also been performed. The final evaluation of these numerous tests will not be completed before the MABS Symposium. However, a summary of the preliminary results will then be presented.

Finally, some practical information and experience gained with the micro-nukes model field test and measuring technique will complete the presentation.