

BLAST WAVES: SCALE MODEL AND NUMERICAL SIMULATIONS

NAZ,P.;PARMENTIER,G.

AN explosion in the atmosphere produces a blast wave which can cover a large range and can create great damages. Considering the quantity used in this kind of application, and the volume swept by the blast wave, the full scale experiments are difficult. In this case the scale models and the numerical simulations can be useful.

First we present a comparison of pressure signatures corresponding to different points of a test site measured on a scale model and measured on the real site. According to the similarity law, the same values are obtained in both experiments for the curve of pressure versus time, in particular for the overpressure peak and for the overpressure duration.

Secondly we present some results of numerical simulations done with the hydrocode HULL, showing the generation, the propagation and the successive reflections of the pressure wave. In this application the explosive charge is placed inside a chamber with some apertures.

Thirdly the finite element code DYNA3D is used to calculate the effects of the blast wave on a structure. In the presented case the deformations of a tympanic membrane are calculated.

Scale models and numerical simulations are useful to quantify the pressure level in complex geometrical configurations where multiple reflections occur which are not easy to study with simple methods or abacuses.