

SIMULATION OF NON-IDEAL BLAST WAVES PRODUCED BY THE THERMAL PRECURSOR IN NUCLEAR EXPLOSIONS

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For 15 years, France is using a large blast simulator (SSGG) located at the Centre d'Etudes de Gramat. This facility is able to faithfully simulate the effects of ideal blast waves from 1 kT to 1 MT yield nuclear weapons.

Non ideal blast waves generated by the thermal precursor are placed in a prominent position. This phenomenon appears until long distances from explosion above desert or thick low vegetation surfaces. So CEG attempted to improve the SSGG working in order to simulate this phenomenon and to perform experiments on military equipments.

In a first time, a theoretical study shows the possibility to strongly increase the amplitude and the impulse of dynamic pressure generated into the simulator without sensible deterioration of the static overpressure history. Then, experimental works were performed in SSGG. The modularity of the drivers and the adaptability of the active rarefaction wave eliminator allow to reproduce, in the test section of the simulator, dynamic effects representative of the non-ideal blast wave.

In a second time, SSGG has been calibrated to simulate real nuclear explosion conditions. In this way, some tests were performed with armored vehicles exposed first to the ideal blast wave and secondly to a corresponding simulated non-ideal blast wave. Very significant results, displayed on a video film, confirm the great interest in investigating the behavior of equipments exposed to the non-ideal blast waves effects.

The first experiments with the CEG large blast simulator prove the ability of this facility to simulate such effects and, as a result, to experiment military equipments whatever the battlefield environment may be.