

A SIMPLIFIED APPROACH USING THE CONWEP SOFTWARE THAT SIMULATES THE EFFECT OF SHOCK WAVE REFLEXIONS

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CEA Gramat is the French research centre for the evaluation of the conventional weapons effects. It is also involved in global security research and develops tools and methodologies to determine the vulnerability of military or civilian structures against accidental events and criminal activities. There is a need to protect building against the explosion effects. Numerical simulations are required to simulate the behaviour of complex structures submitted to blast loads. The Conwep software is an effective tool able to simulate the loading when an explosive charge detonates. Free field conditions are considered in the Conwep module. This paper describes a methodology that takes into account shock wave reflexion using Conwep. Typically the problem considered here is the detonation of a TNT charge located above the ground near a vertical wall. An additional mirror charge is introduced to simulate the reflected wave coming from the ground and acting on the wall. Its weight is established in order to get a theoretical value of the reflected wave at the corner point (intersection between three orthogonal planes, the wall plane, the ground plane and the vertical plane that includes the charge centre). The theoretical value is obtained considering Mach reflection conditions or regular reflexion conditions depending on the charge position. This methodology is extended to the case of an explosion inside a closed box. The computed pressure profiles are compared to experimental data and also to numerical results obtained from high fidelity fluid dynamic simulations. Satisfactory results are obtained with the presented methodology.