PROPAGATION OF BLAST WAVE IN PRESENCE OF BLAST WALL

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Nowadays, the blast walls are placed to effectively reduce the overpressure effects produced by either accidental or intentional detonation of explosive in public or private place. The prediction of blast effects behind the blast walls requires a good understanding of the interaction of blast waves with a barrier of safety (reflection, rarefaction ...) and depends on its dimensions (mass of charge, height and thickness of the wall, angle of inclination for front and back side, distance between the centre of the charge and the blast wall).

Our research works study the interaction of blast wave with the blast wall as a function of its dimensions. The barriers of safety studied possess an angle of inclination from 45° to 90° with a non-null thickness atop its. This study is based on the experimental and simulation investigations for explosion of a gaseous hemispherical charge (a stoichiometric propane-oxygen mixture) at small scales (Hopkinson's scaling law).
The experimental blast walls were simulated with HERA hydrodynamic code and we compare the simulation results with the experimental and academic data (Brode (1968), TM5-1300 (2008), Trélat (2006)). HERA is a multi-physics software from multi-temperature hydrodynamics to detonics and allows to detonate any explosive (CHON explosive, gaseous explosive). It is an Eulerian hydrocode with Godunov's scheme and one of its specificities is to use Adaptive Mesh Refinement (AMR).

This study analyzes the phenomena combination during the interaction of blast waves with a barrier of safety as a function of its dimension: reflection, rarefaction, recombination of blast waves...