Abstract Submitted for the SHOCK19 Meeting of The American Physical Society

Mach stem: large scale experiment to validate analytical model. NICOLAS LECYSYN, DIDIER CAPDEVILLE, JEAN-YVES VINCONT, CEA DAM, PIERRE SLANGEN, IMT ALES, ALEXANDRE LEFRANCOIS, YVES GRILLON, ANTOINE OSMONT, CEA DAM, IMT ALES AND CEA GRAMAT COLLABORATION, IMT ALES AND CEA GRAMAT COLLABORATION -Blast overpressure due to detonation is a major concern in terms of homeland security. Immediately after an explosion, an induced shockwave, which is initially spherical, can be reflected to form a bridge wave which is called Mach Stem. This paper deals with a large scale experimental approach to validate Mach stem (Pressure and Triple Point Height) predictions. Two different spherical explosive charges, were set off at different heights and mass above the ground with respect to Sachs' scaling law between both experiments. The choice of Height Of Burst, according with our prediction Model tool, was such as a mach stem reflexion occurs. Overpressure measurements on the ground were carried out. Mach stem, and triple point height were precisely visualized and measured thanks to Edgerton in line shadowgraphy. Among lot of visualization techniques, shadowgraphy gives the best resolved images with less difficulty of implementation at large scale. An analytical model for pressure and triple point height dedicated to nuclear explosions has been modified in order to be used for chemical explosive. There is a good agreement between analytical model and experimental measurement for height of triple point and also for pressure measurement.

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Date submitted: 02 Mar 2019

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