INVESTIGATION ON THE JET FORMATION DURING THE DISPERSION OF A CLUSTER OF SOLID PARTICLES SUBMITTED TO A SHOCK WAVE

V. Rodriguez[1], G. Jourdan[1], C. Mariani[1], L. Houas[1], R. Saurel[1]
E. Lapébie[2], L. Munier[2], A. Osmont[2]

[1]*Aix-Marseille Université, IUSTI - UMR CNRS 6595*
Technopôle de Château Gombert,5 rue Enrico Fermi, 13453 Marseille Cedex 13, France.

[2] *CEA, DAM, GRAMAT, F-46500 Gramat, France*

Key words: Experimental investigation – Explosive event simulation - Granular medium Solid particles dispersion - Jet formation

Experimental studies show that when solid particles are submitted to a shock wave, they are dispersed, often developing a uniform spatial distribution. This may take the form of clusters of particles or coherent jets-like particle structures which may persist for some distance during the dispersal process.
The aim of this experiment is to study the phenomenon in 2D geometry in order to analyze accurately the results. Indeed, all the experiments conducted so far have been made only in 3D geometry [1].
The shock wave is generated by a small shock tube with a 32 mm circular diameter. The granular medium is located at the outlet of the shock tube, inside a Hele-Shaw cell. From ultra-rapid visualizations and pressure measurements at different stations of the device, we extract the characteristic quantities at the origin of the jet formation during the dispersion of solid particles impulsively accelerated.
Parameters such the particles diameter, the density of the granular medium, the intensity of the shock wave and the initial geometry of the cluster of particles are modified in order to determine what parameters can control this type of instability.
The present experimental setup allows to observe additional things which cannot be seen in the 3D geometry. During the symposium we hope to present the first results issued from this investigation.

References:
[1] D.L. Frost, S. Goroshin; F. Zhang. Jet formation during explosive particle dispersal. MABS, October 2010, Jerusalem.