SHOCK WAVE PROPAGATION IN A STRAIGHT STREET

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This study is motivated by the concern for the safety of goods and people and the ability to provide people with the means of prevention and protection against accidental risks and terrorist threats of any kind. The research is a task in the ANR research project URB(EX)[3] (grant #ANR-21-CE39-0016), which aims at developing a fast-running, breakthrough model for blast consequences in urban configurations. The objective is to characterize the propagation of a shock wave along a straight street using experimental and numerical approaches. The shock wave results from the detonation of a gaseous explosive charge.

The experiments were carried out on a laboratory scale by applying the laws of similarity. The shock waves were analyzed by the pressure profiles recorded by means of regularly distributed pressure sensors. Visualization was also carried out in order to show the different interactions of shock waves between the two walls. The simulation was conducted with the Viper::Blast software (https://www.viper.as/).

The explosive charge is placed on the central axis of a street materialized by two parallel walls. The propagation of the shock wave is analysed in terms of street width and street height.

The shock wave changes its propagation mode from 3D to 2D, as demonstrated in the literature. The transition zone was determined for each configuration and an empirical law was deduced from the different experimental results obtained. The law takes into account three parameters, namely the diameter of the explosive charge and the dimensions of the street (height and width).

229 mots ou peut aller jusqu'à 400