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Numerical Investigation of the Effect of Blast Pressure on Discrete Model in Shock Tube

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Abstract : Blast waves are generated due to the explosions of high energy materials. An explosion yielding a blast wave has the potential to cause severe damage to buildings and its personnel. In order to understand the physics of effects of blast pressure on buildings, studies in the shock tube on generic configurations are carried out at various pressures on discrete models. The strength of shock wave is systematically varied by using different driver gases and diaphragm thickness. The basic material of the diaphragm is Aluminum. To simulate the effect of shock waves on discrete models a shock tube was used. Generic models selected for this study are suitably scaled cylinder, cone and cubical blocks. The experiments were carried out with 2mm diaphragm with burst pressure ranging from 28 to 31 bar. Numerical analysis was carried out over these discrete models. A 3D model of shock-tube with different discrete models inside the tube was used for CFD computation. It was found that cone has dissipated most of the shock pressure compared to cylinder and cubical block. The robustness and the accuracy of the numerical model were validation with the analytical and experimental data.

Keywords : shock wave, blast wave, discrete models, shock tube
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