JET-FLOW FROM A SIMULATED EXPLOSIVE STORAGE MAGAZINE USING A SHOCK TUBE

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Side-on stagnation pressure have been measured and shadowgraphs taken for jet flow beyond the exit of a 2.54 cm diameter shock tube. The shock tube is sized to simulate a 1/200 scale explosives storage magazine. An apparent lack of stagnation pressure data and other details of the jet flow have been noted in the external region beyond the tunnel exit. Such data could have relevance for the distances for the siting of inhabited buildings were the magazine gases and debris to contribute significantly to the loading experienced by the structure. Present guidelines for building siting are based only on the side-on pressure at the location.

Three parallel blast lines were used to determine the width and magnitude of the flow. One blast line was along the zero radial in front of the tunnel. The second blast line was off-set 1.5 diameters and the third line was off-set 3 diameters. The blast lines recorded both side-on and stagnation pressure versus time. Small displacement cubes were also used at greater off-set distances to define the flow in terms of stagnation pressure impulse.

Helium gas was used for the shock tubes driver to more nearly simulate the density of the explosive gases. At the 200 mbar side-on pressure contour we found a significant increase in the stagnation pressure due to the arrival of the tunnel gases. Beyond the 50 mbar contour, the stagnation pressure measured is nit much greater than that due to the shocked flow but the impulse delivered to the structure is extended. The results found from the pressure measurements and shadowgraphs of the jet flow will be reported in this paper.