SCALED BLAST LOADING SIMULATIONS ON DIFFERENT VEHICLE BOTTOM GEOMETRIES

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ABSTRACT

The development of new bottom concepts for military vehicles against mine blast threats involves the consideration of two main aspects: the bottom geometry and the material used. In order to reduce costs, experimental testing of new vehicle bottom concepts often requires small-scale setups together with numerical simulations to assist the design and development process. This study first presents the validation of a numerical blast model for bare charges using experimental freefield blast data. An investigation of the reflected pressure on a flat plate shows the importance of considering the dynamic flow for close-in blast loading since the density of the detonation products is still relatively large. The numerical blast model is applied for different vehicle bottom geometries such as a flat plate, a V-shape plate and a gull wing plate. It is shown that the gull wing provides lower load transfer closest to the charge (near the centreline), although the total impulse transfer is lowest using the V-shape.