MEASUREMENT AND SIMULATION OF AIR BLAST HAZARDS ASSOCIATED WITH DOOR BREACHING OPERATIONSP

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We report experimental results and numerical simulations of overpressure levels from experimental breaching charges. Two types of charge were tested, a "snib charge", and a larger "frame charge", designed to breach an access hole through a solid door. Four pressure transducers were used to record pressure-time records, and the charges were evaluated with the door fixed in two positions within the wall opening; either flush with the wall, or recessed by 15 cm.

Experimental records for the snib charge showed that peak pressure decreased rapidly with increasing distance from the charge for both flush and recessed door configurations, and peak pressures for the recessed charge were always lower than those for charges on the flush door. The mean positive phase impulse was also always lower for the recessed door configuration. Results for the frame charge were more complicated. Close to the charge the peak pressures for the recessed door were always lower than those on the flush door, but once the distance exceeded two metres the peak pressures were higher for the charge on the recessed door. Also, the mean positive phase impulse was always higher for the charge on the recessed door.

We have performed numerical simulations for each of the charge/door configurations using a 3D hydrocode based on the Flux-Corrected Transport algorithm. Simulated pressure-time records and impulse are in excellent agreement with experiment. Our simulations show that the higher pressure for the frame charge on the recessed door is caused by pressure enhancement resulting from the coalescence of the weakened primary shock from the distributed frame charge and its ground reflection. The effect is not seen for the snib charge because the charge design produces a very weak ground reflection which arrives well behind the primary wave for both flush and recessed geometries.