PREDICTION OF ROOM FILL PRESSURES CAUSED BY BLAST PROPAGATION OF INTERNAL EXPLOSIONS THROUGH FAILING WALLS

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ABSTRACT

Internal explosions cause a shock wave and an overall quasistatic, or fill pressure in the explosion room. The shock wave and fill pressure will propagate outside the explosion room through any openings or failing walls. There has been very limited development of fast-running codes that integrate blast load propagation and structural response to calculate blast propagation outside the explosion room through failing walls and doors. Recently, the Defense Threat Reduction Agency (DTRA) and the Air Force Research Laboratory (AFRL) in the U.S. and the German government have sponsored test programs to investigate internal blast propagation through failing walls. Also, DTRA has sponsored development of FRIDAM (Fast-Running Internal Damage Assessment Methodology) to predict blast pressures, building damage, and occupant injuries in buildings from internal explosions. FRIDAM calculates the propagation of fill pressure and shock pressure outside the explosion room with separate methods and then adds them together in each room to get the total blast pressures in the building from an internal detonation. This paper focuses on how the FRIDAM code calculates fill pressure propagation. The paper will shows comparisons of the predicted and measured blast pressures in rooms outside the explosion room from the internal detonation tests.