VENTING FROM BLAST IN A RESPONDING CHAMBER

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A simple PC-based model named MATVENT for the calculation of venting from a responding chamber is described. The source for the venting is assumed to be blast-fluidized material inside the chamber- Approximate treatments of mechanical and/or thermal response of the chamber walls and materials to the internal blast are incorporated into a quasi-steady treatment of fluid mechanics in the chamber. The model is coded in the MATLAB language and allows rapid tradeoff studies for experiment design. Parametric calculations with MATVENT produce time histories of all the fluid mechanical variables of interest in the chamber as well as histories of the mass flow rate, total vented mass, and where needed, the relative volume change of the chamber and/or the relative heat loss to the chamber walls. A recent experiment is modeled in a set of parametric calculations with MATVENT and the results are presented. The results indicate that in small-scale experiments with low blast yields, the selection of the chamber material and the thermal characteristics of the chamber wall surfaces can significantly affect the amount of vented mass. The model can be extended to simulate venting from multiple interconnected chambers in one of which an explosion might be set off, and to accommodate more sophisticated mechanical response models for the chamber(s).