APPLICATION OF SCALING TO EXPLOSIONS IN A MODEL CITY

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In 2006 the Lee-Giltrud (1995) scaling rule was used to develop an accurate fast-running tool for the prediction of pressure and impulse loads on a wall for near contact explosions. The tool was named ABNC for Air Blast Near Contact. In this paper we will show the same scaling rule can be applied to accurately predict the pressure and impulse loads in a city block, thus opening the possibility of a fast-running tool for cities under the threat of large scale terrorist bombing. The physical model is a 1/5-scale hypothetical city with 17 square blocks at various heights. The validated MAZ hydrocode is used to calculate the blast environment in this model city for three different yields, namely, 40-lb, 80-lb and 160-lb at two charge locations. For each charge location the numerical solution from MAZ for the 40-lb case is scaled up to 80-lb and the resulting scaled solution is compared to the MAZ solution for the 80-lb explosion. Similarly, the 160-lb case is scaled down to 80 lbs and the resulting scaled solution compared to the MAZ solution for the 80-lb case. It is shown that the scaled solutions agree well with the MAZ solutions for both charge locations.