

Calculating Blast-Effects Distances in Urban Environments

by

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Introduction

EBlast^{®1} (Emergency Blast), an expert system to assist emergency measures personnel determine appropriate evacuation distances from explosive devices in urban environments, was described and demonstrated at MABS15 (Dewey et al, 1997) and MABS16 (Dewey and McMillin, 2000). The ***EBlast*** user is able to select from a wide range of explosive devices, such as vehicle, package and pipe bombs of different sizes, and military munitions, and to define an urban environment in which the device is located. The expert system then provides the limiting distances at which various blast effects are likely to occur. The blast effects include such features as: percentage probability of lethality; damage to concrete or brick structures; eardrum injury, and damage to various types of window glass. The limiting distances of these effects are displayed numerically and graphically on a bar chart, or superposed as circular contours on a city map stored as a geographical information system (GIS). The Alcohol, Tobacco and Firearm Bureau's (ATF) recommended evacuation distance for the selected explosive device, is also displayed.

Users, and potential users, of ***EBlast*** have asked how the blast-effects distances are calculated. Also, why the distances for the various effects do not always occur in the same order if the size of the explosive device or the nature of the urban environment are changed. The objective of this paper is to answer these questions.
