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OBLIQUE CLEARING: BLAST LOADS ON BUILDINGS AT NON-ZERO ANGLES OF INCIDENCE

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The blast load experienced at a distance from a spherical air burst or hemispherical surface burst is described as a free-air or side-on load and gives rise to side-on blast parameters such as overpressure and impulse.

The enhancement in pressure experienced on an infinitely large reflecting surface produces face-on or reflected blast waves, and at locations away from the point at which the wave first impinges oblique reflections occur. Blast wave parameters for both perpendicular and oblique reflections are provided in the literature, and many examples of practical importance can be treated adequately using such information.

Finite buildings, aligned such that they have one face perpendicular to the direction of propagation of the blast, can be treated by techniques which have been developed to enable blast impulses lower than reflected values on infinitely large surfaces to be calculated. These techniques make use of the dimensions of the building and the local sound speed of the wave to calculate the arrival time of expansion waves from its edges and reduce the reflected pressures to side-on values at an appropriate clearing time.

In many practical situations, however, it is common for every surface of a finite building to be aligned obliquely to the direction of the incoming blast wave. In this situation there is little useful guidance provided in the literature. This situation is an example of oblique clearing, and a brief study of the problem, based on calculations using the Air3d CFD code and validated by full-scale experiments, is the subject of this paper.