A VOLUME APPROACH TO PREDICT AIRBLAST PARAMETERS

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ABSTRACT

Determining the airblast parameters in cases other than spherical or hemispherical often requires the use of design charts, numerical simulations or even worse: (full scale) tests. However, when the geometry is not too complex and the blast parameters need to be estimated globally instead of locally on a structure element, the parameters can be obtained with a new approach based on equivalent volumes. This equivalent volume approach is presented in this paper and applied on four different cases.

The first case is a hemispherical (or surface) detonation. The second case is a line detonation with cylindrical expansion, like detonating cord. The third case is an explosion at the entrance of a tunnel, where the blast partially enters the tunnel and propagates. Finally, the fourth case is an explosion in front of a tunnel, where only a small part of the blast will enter the tunnel. In all cases scaling plays an important role, since the dimensions of the discussed volumes are 1D, 2D as well as 3D.

The results of the equivalent volume approach have been compared with test data, numerical simulations and existing blast models such as LS2000, with focus on the parameters *peak incident pressure*, *impulse*, *positive phase duration* and *time of arrival*. The match in all four cases was very good. A major advantage of this new approach is its simplicity and it can be applied to numerous other cases