

# **BLAST WALLS REVIEWED**

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Blast walls are applied throughout the world to protect people and structures from accidental or terrorist explosions. Blast waves diffract around corners and walls, into streets and tunnels, therefore the protection given by a wall is relatively small. The main purpose of a wall is usually to protect against fragments. Nevertheless blast walls have proved to reduce the blast load, especially close to the wall.

The British Force Protection Engineering manual JDP 3-64.1 claims a ‘shadow’ of reduced pressure of 5-7 times the height of the wall. However, it does not quantify the reduction, neither does it describe which parameter influences the reduction and to what extent.

The reduction of blast pressure has been reported by several researchers, based on both measurements and simulations. The various blast wave phenomena like diffraction of the blast around a wall, reflection on the ground and subsequent Mach stem formation have been described. Several design formulas and graphs have been proposed. This paper will review previous work and add a comprehensive summary of the effect of several parameters on the reduction of the blast behind a wall.

A large number of AUTODYN simulations has been performed, both in 2D and 3D. Parameters such as the detonating weight, the height of burst, the distance of the explosion to the wall and the height of the wall were analyzed. Also the shape of the wall is taken into consideration. The results of the simulations are verified with several experimental results and other numerical results from literature.

The results of this extensive parameter study are plotted in scaled graphs, which can be used to deduce the optimal design parameters of a blast wall for any specific scenario. Most importantly, based on the results in this work, it is suggested to reduce the size of the claimed ‘shadow’ of reduced pressures.