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DESIGN OF FLEXURAL MEMBRANES FOR BLAST MITIGATION

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The use of flexural membranes for blast mitigation has been considered using a fast running analytical model, (Scherbatiuk [1]). This model allows the deformation, transmitted peak overpressure and positive impulse to be calculated for various flexural membranes with the assumption that the material does not fail. In this paper a simple failure criteria is incorporated into the analytical code. The code is then validated with a series of experimental trials involving the blast loading of various membrane materials and hydrocode simulations performed using LS-DYNA.

The design of a low mass system for blast mitigation is then considered analytically. The selected free field loading is chosen to significantly exceed the lung threshold of damage survival pressure-impulse curve, (TM5-1300 [2]). Various materials and membrane geometries are investigated.

[1] Scherbatiuk, K., "Effect of a Flexural Membrane on Blast Transmission and Mitigation", *Proceedings of Extreme Loading 2003*.

[2] Department of the Army Technical Manual (1988). *TM5-1300 Structures to Resist the Effects of Accidental Explosions*. U.S. Army, United States of America.