

EXPERIMENTAL SMALL - SCALE STUDY OF BLAST LOADS ON AMMUNITION MAGAZINES

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ABSTRACT

Most Earth Covered Ammunition Magazines (ECMs) are based on a standard design - “igloo type” magazine. This design was investigated thoroughly, its safety criteria are well defined and it is used in many places around the world.

The present research focuses on a different type of ECM: a rectangular, box shaped structure. This type of ECM has a long exposed facade, in which there are two entrances. In order to define the safety criteria for this unique ECM, it is necessary to evaluate the blast loads applied on adjacent “acceptor” ECMs while a “donor” ECM explodes accidentally. The paper describes a series of explosion tests conducted on a small scale replica model ECMs arranged in a scaled down pattern.

The donor ECM was made of plywood (“no strength” model). The acceptor ECMs adjacent to the donor were made of steel (resembling “infinite rigidity” model), and were instrumented with pressure gauges inside and outside (floor, walls and roof). Several tests were conducted in which two scaled amounts of explosive placed in the donor ECM were detonated. Due to the arrangement of the ECMs in the field, when one explodes accidentally, there are three modes of loading on the adjacent ECMs: front to back; side to side and back to front. The measured results show conclusively that the back to front loading is significantly worse than the other modes. The isobars around the donor seem to be circular; differing from the ellipsoid shape fronts measured an explosion in an igloo type ECM donor. Free field pressure measurement gauges placed on a straight line at three distances from the donor ECM enable the definition of the safety distances in case of such an accidental explosion.