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DECREASED SEPARATION DISTANCES FOR MAXIMAL AMMUNITION STORAGE USING REAR EARTH BERMED POLYGONAL WALLS

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A new safe storage method for large quantities of ammunition in cases where it is located very close to inhabited buildings, workers, or sensitive facilities and infrastructures like runways, is suggested. The ammunition includes robust air bombs (sensitivity group 1, SG 1), which belong to hazard division of mass explosion with blast & fragments hazards (HD 1.1), and compatibility group D (CG D). The ammunition may be stored in rows of open modules while the exposed site with sensitive objects like inhabited buildings is located at their rear side. The US DoD manual 6055.09-M minimal inhabited building distance (IBD) for any ammunition quantity equivalent to TNT is 1200' (381m) and the NATO AASTP 1 ammunition storage standard defines a minimal IBD of 400m, while the new method provides a safe storage for these restricted zones where no other similar solution exists.

It comprises a rear earth bermed polygonal (reinforced concrete) wall- REBPW together with earth-filled steel bin-type (EFSB) barricades as substantial dividing walls (SDWs) for outside storage, also known as ARMCO Inc. revetments. The REBPW prevents fragments and debris from flying towards the inhabited buildings. Blast and fragments loading could shear off the REBPW and throw it backward only to a limited distance. The rear peak overpressure at the new IBD is equal or less the levels required by the US DoD. It enables ammunition storage at each module's cell ranging between 1.9 and 12.9 tons of TNT equivalent at reduced IBDs of 200m and 381m accordingly. The ARMCO EFSB barricades enable the safe storage of up to 13.6 ton of TNT equivalent at each cell in an open module.

The risk management model uses multi-criteria objective function that combines between: maximization of the storage quantities, minimization of the risk and the total cost.