

Appendix G
MSD Calculation Sheets

Minimum Separation Distances

Ft. Ord

75mm M48

27 July 2004

REQUESTED BY: Tom Knapp

PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) EM 1110-1-4009, the minimum separation distance for unintentional detonations shall be the largest of the maximum fragment range, the K50 ($50W^{1/3}$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft. In accordance with (IAW) EM 1110-1-4009, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for unintentional detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

IAW EM 1110-1-4009, the minimum separation distance for intentional detonations shall be the largest of the maximum fragment range, the K328 ($328W^{1/3}$ where W is the total net explosive weight for the detonation) overpressure distance or 200 ft. The 200 ft is a default distance applied by USACE OE Safety and may be reduced by the appropriate approval authority (contact the MMRP-CX for instructions).

CALCULATED FRAGMENT DISTANCES

Maximum Fragment Range = 1701 ft

Range to No More Than 1 Hazardous Fragment/600 sq ft = 234 ft

CALCULATED OVERPRESSURE DISTANCES BASED ON OE ITEM'S EXPLOSIVE WEIGHT ONLY (i.e. NO DONOR CHARGE)

Range to 0.9 psi Overpressure (K50) = 60 ft

K328 Overpressure Range = 396 ft (based on munition NEW only, no donor)

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW DDESB Technical Paper 16. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW DDESB Technical Paper 16.

NOTE THAT ALL MITIGATION METHODS FOR INTENTIONAL DETONATIONS ARE BASED ON THE USE OF COMMERCIAL SHAPED CHARGES FOR INITIATION. IF ANY OTHER DONOR CHARGE IS TO BE

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USED THIS INFORMATION MUST BE PROVIDED TO CEHNC WITH A REQUEST FOR NEW CALCULATIONS!

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 24 in. with 6" standoff between munition and sandbags

Sandbag Throw Distance = 125 ft

Minimum Separation Distance = 200 ft

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site.

WATER MITIGATION FOR INTENTIONAL DETONATIONS

Water Containment System (see HNC-ED-CS-S-00-3)	Minimum Separation Distance (ft)
1100 gallon tank	200

The water containment system and the minimum separation distance were determined IAW HNC-ED-CS-S-00-3. A copy of HNC-ED-CS-S-00-3, "Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site

MINIMUM SEPARATION DISTANCES WHILE USING MOFB DURING INTRUSIVE ACTIVITIES

Design of the Miniature Open Front Barricade (MOFB) is in accordance with HNC-ED-CS-S-98-8, "Miniature Open Front Barricade". A copy of this report must be available on site. DDESB has placed certain restrictions on the approved usage of the MOFB. These are listed in the approval letter in the front of the report.

Thickness of Aluminum Required to Prevent Perforation = 1.45 in

The MOFB is designed to defeat fragments to the rear and sides of the MOFB in the case of an accidental/unintentional detonation during intrusive activities. The fragment distances to the front of the MOFB are the same as the fragment distances without the MOFB (see figure). The MOFB is not designed to reduce the effects of blast overpressure. The MOFB may not be used for intentional

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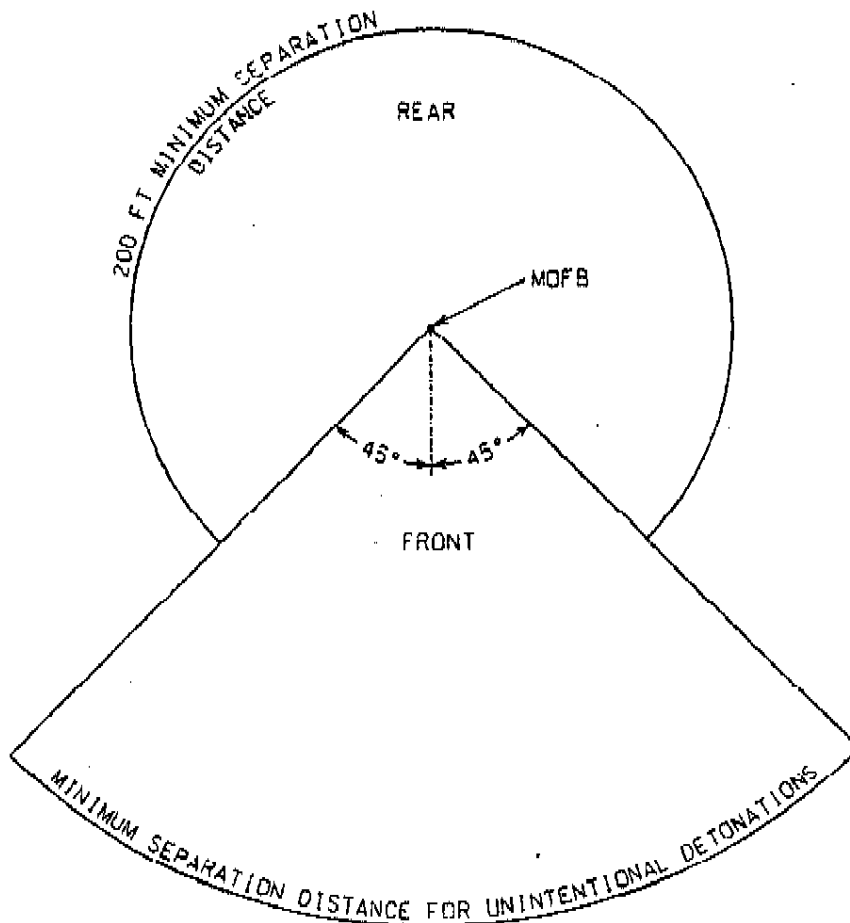
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detonations. The minimum separation distances to the rear and sides of the MOFB must be maintained based on the expected throw distance of the MOFB itself.

Minimum Separation Distance to sides and rear = 200 ft

Minimum Separation Distance to front = 170 ft

K50 distance = 60 ft



MINIMUM SEPARATION DISTANCE FOR UNINTENTIONAL DETONATIONS
USING MINIATURE OPEN FRONT BARRICADE DURING INTRUSIVE ACTIVITIES

SIGNATURES:

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7/27/04
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