

# **BURIED EXPLOSION MODULE (BEM)**

## **Proven Technology**

### **Providing Current Benefits**

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**U.S. ARMY**



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# DISCUSSION TOPICS

- Engineering Control
- Use at Camp Edwards MA
- BEM vs BIP
- Construction of BEM
- Shot Preparation and Demolition
- BEM Post Demolition
- Unacceptable to Move Items



# Buried Explosion Module



- An authorized DoD Engineering Control to prevent fragmentation from traveling great distances and can be used to significantly reduce the exclusion zone.
- Reduces the energy release from rapidly venting into the atmosphere to limit the spread of residual explosives contamination.
- Reduces noise of detonation.



# Joint Base Cape Cod (JBCC) Camp Edwards, MA

## Location:

- Western Cape Cod, MA
- Sits over the top of a sole source aquifer

## Brief History:

- Military training on Cape Cod began around 1911
- Training on JBCC began at the start of WWII
- Most active during WWII – training continues to present day
- Certain range firing activities in the Central Impact Area (CIA) suspended by EPA Administrative Order under the Safe Drinking Water Act (SDWA)  
Firing of all military munitions into CIA discontinued in 1997 (Firing of high explosive artillery had been discontinued by the Guard in 1989)
- Investigation and cleanup of the CIA source area started in 1997 and continues today.



# BEM vs BIP

- Blow in Place (BIP)/Open Detonation
  - ▶ Exclusion Area is dependent on the munition with the greatest fragmentation distance (MGFD). Approximately 2900 ft Maximum Fragmentation Distance (MFD) for intentional detonation of a 155mm high explosive round
- BEM
  - ▶ Exclusion Area based on depth of cover material. 200-500 feet is typically used for general safety purposes



# BEM



## Comparing Disposal Methods

- BIP/Open Detonation
  - Exclusion Area approximately 2900 ft MFD for 155mm
  - Crater 5ft x 15ft
  - Dispersion of residual explosives up to 200 ft radius
  - Crater soil removed for disposal and back filled with clean soil
  - Costly sampling requirements



# BEM

## Comparing Disposal Methods

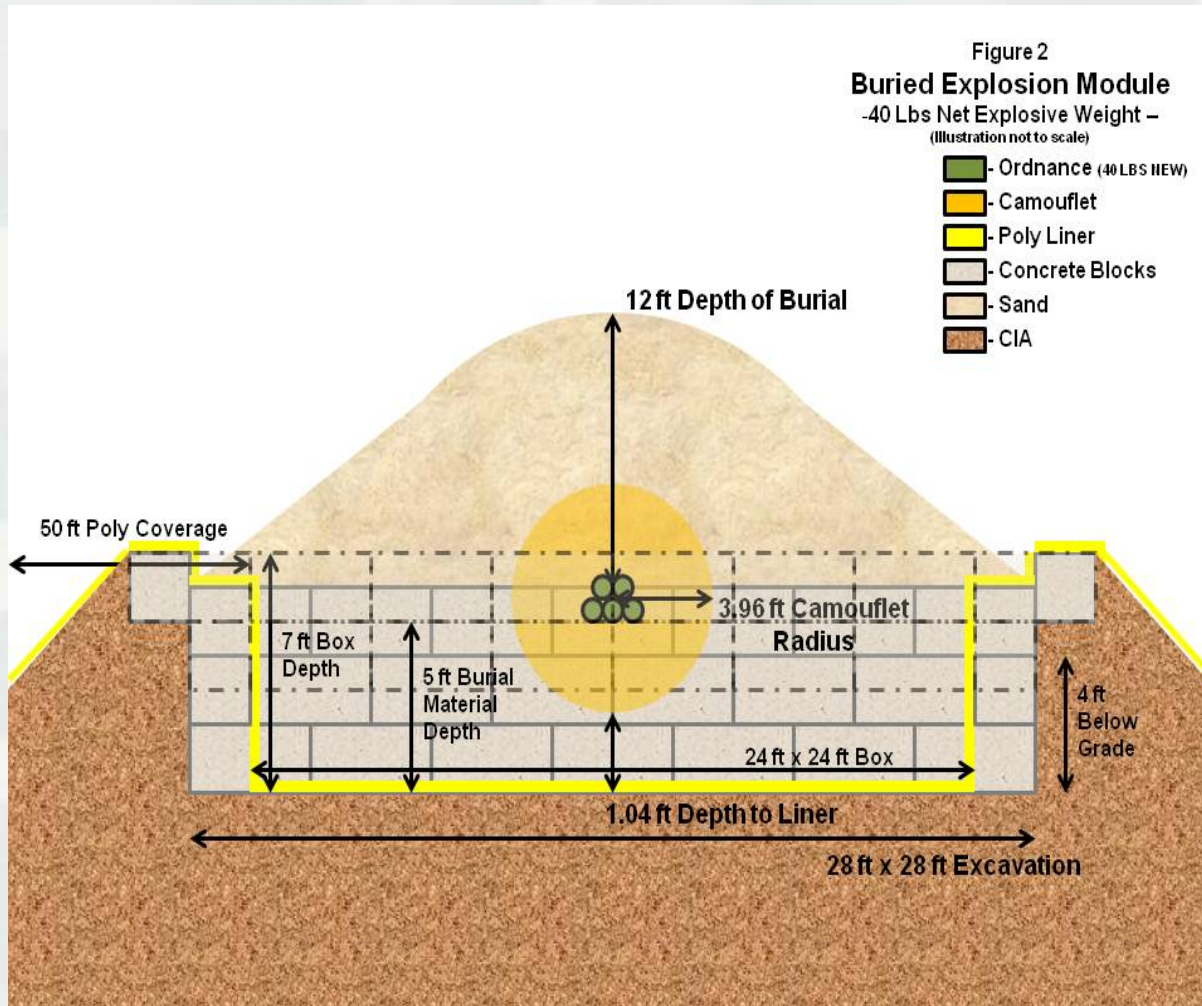


- Buried Explosion Module

- Exclusion Area 200-500 ft is typically used for safety
- Crater 3ft x 10ft
- Dispersion of residual explosives 3 ft radius (99% reduction from open detonation)
- Burial material remains on poly liner for reuse



# BEM Construction



## Design Concept

- Capabilities

- Can be permanent
- Designed for 40 lbs max Net Explosive Weight
- Reduce dispersion of secondary explosive residue
- Reusable burial material (sand)
- Poly Lined to prevent contamination of clean soil underneath and around site





# BEM Construction



# BEM Construction



# BEM Construction



# BEM Construction



# BEM Construction



# BEM Construction



# BEM Construction



# BEM Shot Prep





# BEM Shot Prep



# BEM Shot Prep



# BIP Demolition



# BEM Demolition



# BEM Demolition



# BEM Post Demo



# BEM Post Demo



# Unacceptable to Move Item BEM

- Procedure can be scaled down and applied to UXO that are “unacceptable to move” items
- 6 to 8 feet of sand placed over item
- Item detonated.
- Sand removed and underlying soil excavated in a 5 x 5 foot area 1 foot deep.
- Sampling indicates soil cleanup goals met.





# QUESTIONS



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