STUFF THAT DOESN’T BLOW

Panelists:

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UXO

Types
• Landmines and cluster munitions in former and current war zones
• Military bases and training grounds
• Ordnance Stockpiled in Magazines

Location
• Ordnance stockpiled in magazines both CONUS and OCONUS
• Africa, Asia, and South America

Actions
• Locating UXO
• Methods used for the destruction of munition and ordnance
• Response procedures for UXO
• Hazards related to UXO and DMM for personnel, assets, and infrastructure
Landmine Stockpiles by Country, 2018

Sources
- Landmine and Cluster Munition Monitor and ongoing public updates

Key:
- No stockpiles
- Destroyed
- Has stockpiles

Cluster Munition Stockpiles by Country, 2018

Sources
Landmine and Cluster Munition Monitor and ongoing public updates

Key:
- no stockpiles
- destroyed
- has stockpiles

Landmine Contamination by Country, 2018

Sources
Landmine and Cluster Munition Monitor and ongoing public updates

Key:
- not affected
- complete
- unclear
- light <5km²
- medium 5-10km²
- heavy
- massive

www.same.org
Cluster Munition Contamination by Country, 2018

Sources
Landmine and Cluster Munition Monitor and ongoing public updates

Key:
- not affected
- complete
- unclear
- light ≤5km²
- medium 5-99km²
- heavy 100-999km²
- massive >1000km²
UXO / EWR Contamination Causes Repercussions

Post conflict issues

- Death
- Long term injuries
- Limits accessibility
  - Education
  - Medical care
  - Humanitarian aid
- Inhibits freedom of movement
UXO Landmine Impacts

- Impacts civilians at a higher rate compared to military personnel
- The Landmine Cluster Munition Monitor reports approximately 112,646 causalities from landmines and explosive remnants of war between 1999 and 2016.

Military Munitions Responses Mitigation

- **Wide Area Assessments (WAA)**
  - LiDAR and Orthophotography
  - Helicopter Magnetics (HeliMag)
  - Ground Based Geophysical Assessments
  - Marine Assessments

- **Munitions Cleanup**
  - Site Investigation
  - Removal Action
  - Time Critical Removal Action
  - Conceptual Site Model
Mine Ban Treaty / Ottawa Treaty

- Mine Ban Treaty was adopted on 18 September 1997 and entered into Force on 1 March 1999.
- Over 80% of the world's countries are States Parties to the treaty.
- Currently 164 State parties, and only 32 States remain outside the treaty.
- Most countries not part of the treaty do not produce or use landmines.
FUDS (Formerly Used Defense Sites)

5,144 FUDS as of 30 September 2015

Other Sites Not Displayed on Map:
- Northern Mariana Islands - 25
- Puerto Rico – 48
- US Virgin Islands – 5
- American Samoa – 9
- Guam – 17

https://www.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/
UXO - Stockpiles of old munitions and ordnance

• What happens when host nations require the disposal of old munitions in order to utilize magazine and storage space?
UXO Destruction CONUS

Pueblo Chemical Agent Destruction Pilot Program (PCAPP)

- The plant opened in 2016 is destroying the chemical weapons stockpile at the U.S. Army Pueblo Chemical Depot, in southeastern Colorado. Since the 1950s, the depot has stored munitions containing 2,613 tons of mustard agent that are part of the U.S. chemical weapons stockpile.

- The destruction of the chemical weapons should be completed in 2023.

- A second facility The Blue Grass Army Depot is currently under construction in Kentucky and will open in 2019. The plant currently stores 523 tons of both nerve and blister agents in rockets and projectiles. It is anticipated that the mission will be completed in 2023.
Initial Response to UXO/DMM scenarios

• Before the scenario – Educate!
  
  Recognize - when you may have encountered a munition and that munitions are dangerous.

  Retreat - do not approach, touch, move or disturb it, but carefully leave the area.

  Report - call 911 and advise the police of what you saw and where you saw it.

• When encountering UXO/DMM
  – Do not approach
  – Call the proper authorities with UXO expertise
Available Education Resources

- Most available material is geared to a CONUS scenario
- However, much of the educational material is universal
- DENIX website (www.denix.osd.mil/UXO)
- DoDM 4715.20 March 2012 – US only
WHAT are munitions (ammo)? Military munitions (ammo) are projectiles, bombs, hand grenades, and other types of ammo that the military use in training and combat. Ammo that did not work as it was supposed to work is called UXO or unexploded ordnance.

WHO can encounter ammo, including UXO? Anyone! Learn about Explosives Safety below.
Munitions Are Dangerous

Follow the 3Rs of Explosives

- Recognize - when you may have encountered a hazardous material
- Retreat - do not approach, touch, move
- Report - call 911 and advise the police

Munitions Vary in Appearance

Munitions are dangerous regardless of appearance:
- Munition type, shape, size, age, or condition don’t matter.
- Flares, simulators, and time fuses and time caps are all dangerous.
- War souvenirs can be dangerous.

Examples of Warning Signs

Trespassing on areas with warning signs or gates:

- is hazardous and prohibited by law.
- may result in substantial fines.
- may result in injury or death.

www.denix.osd.mil/UXO
Available Education Resources

- DENIX website
  (www.denix.osd.mil/UXO)
ABOUT PARAMOUNT

Over **30 years** experience with explosive cargo

Move over **13,000 metric tons** of explosives annually

Operates Defense Logistics Depot in USA with explosive storage capacity up to **4 million pounds**

Specialize in intermodal/multimodal transportation and storage of:
- **Explosives**
- **Weapons** for military and government customers
DEFENSE LOGISTICS CENTER - USA
Vessel & Trucking Operations
DEMILITARIZATION LOGISTICS

An example solution demonstrating key steps in the process

Ground Operations
- Prep for transit
- Pack / repack
- Load / block / brace

Inventory Management
- Aggregate
- Warehouse
- Track

Shipping
- Coordination of transit & schedules
- Delivery to demil facility

Demilitarization
- Unit destruction
- Certificates of Destruction upon completion
GROUND OPERATIONS

Key considerations when preparing explosives for transport

- **Safety first!**
  - Ensure handlers have appropriate training & experience

- **Assessment of Packaging**
  - Is there any packaging? What is condition?
  - Determine whether to re-package

- **Load / Block / Brace**
  - When transporting via shipping containers
Inventory Management

- Maintaining positive control

- Unit level accountability
  - Ex: Single cluster bomb has 200+ bomblets within
Methods of Transportation

What is the right option? Factors to consider include:

- Regulation (Hazard Class, Compatibility)
- Speed of Transit
- Cost
- Location / Accessibility
DEMILITARIZATION FACILITIES

- Facilities around the world
  - USA, Europe, Asia, Africa

- Reputation / Credibility / Location
  - Facilities specialized in ordnance, munitions, and UXOs
  - Past performance & experience
  - Location in proximity to site / transit avenues
Disposal Methods

- **Closed Incineration vs Open Burn / Open Detonation**
  - Environmental impacts
  - Regulation

- **Automated vs Manual Extraction Processes**
  - Manual disassembly of parts
  - Robotic / automated
• Recycling of Materials
  – Some energetic material can be extracted and recycled for reuse in commercial applications
  – Metal & Wood packaging
  – Metal components of ordnance as scrap

• Environmental considerations
  – Contaminates exposed to the air / environment (soil, water, etc)
  – Closed incineration is best way to contain environmental impact
IN REVIEW
Here are key takeaways when considering transit and disposal of explosives

1. Put safety first
2. Determine transportation methods based on cargo and specific requirements
3. Weigh reputation & environmental impact when evaluating facilities & methods
ABOUT APT

Explosives safety small business founded in 1990

Specializing in
- Explosives safety hazards analysis
- Site planning (including NATO and host nation criteria)
- Hazard classification of munitions
- Explosives testing and flight/range safety
- Training and standards development
Response for UXO/DMM Scenarios

- UXO response should only be performed by trained professionals
- This material is not intended as training

- Several risk analysis tools are available for planning for potential UXO/DMM scenarios
- These tools can be used to assess the level of risk for varying potential munition items
DoD Policy Documents for UXO/DMM Scenarios

- **DoD Military Munitions Response Program (MMRP)**
  - For CONUS scenarios
  - [https://www.asaie.army.mil/Public/ESOH/mmrp.html](https://www.asaie.army.mil/Public/ESOH/mmrp.html)
  - Developed in 2001 in conjunction with the Environmental Protection Agency (EPA)

- **DoDM 4715.20 March 2012** – US only
  - Additional documentation for DoD EPA interaction
  - Policies apply to CONUS sites, but the material is useful everywhere

- **Munitions and Explosives of Concern Hazard Assessment (MEC HA)**
  - Not clear if this tool is still available
Analysis Tools for UXO/DMM Scenarios

- Risk assessment of current or future UXO/DMM scenarios seek to:
  - Identify the hazards
  - Estimate the potential consequences of those hazards to personnel and assets

- Risks can be assessed in two ways

**Qualitative**
Risk assessments are often subjective and based on judgments

**Quantitative**
Risk assessments are based on the best available information including accident history, physical science, test results, expert judgment, and statistics.

1x10^-6 P_f (annual)
UXO/DMM Hazards

- **Fragments**
  - Primary hazard for UXO/DMM
  - Even small items (<1kg TNT) propel deadly fragments hundreds of meters

- **Overpressure**
  - Hazard increases with explosive quantity

- **Thermal/firebrand**
  - Typically a hazard only in the immediate vicinity
Analysis Tools for UXO/DMM - Fragments


• Methodology for calculating primary fragment characteristics
• Estimates fragment size, velocity, range and perforation into targets
• Can be used to estimate evacuation distances
• Limited distribution
Analysis Tools for UXO/DMM – Crater Debris

DDES B TP 16 – Rev 4 – Aug 2012

• Contains a secondary tool for buried explosions
• Can be used to determine if a crater (soil debris hazard) or camouflet (no soil or fragments ejected) will form
• Can be used to determine required soil cover for safe disposal operations
Analysis Tools for UXO/DMM - Overpressure

DDESB TP 17 – Rev 2 – Dec 2016

- DDESB Blast Effects Computer (BEC)
- Used to calculate detailed blast pressure estimates
- Accounts for weapon casing effects and structural attenuation
- Models various types of explosive fill
- Limited distribution
Analysis Tools for UXO/DMM – Overall Risk

DDESB TP 14 – Rev 5 – 2018

- Full quantitative risk assessment
  - Probability of event
  - Hazard analysis
  - Consequences to personnel
- Currently available as SAFER
- Commercial version (IMESAFR) also available
Sources


U.S. Department of State, https://www.state.gov/t/pm/wra/c11735.htm 11 February 2019
Q&A AND FEEDBACK

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