2015 Global Demilitarization Symposium

Munitions Cryofracture Demil Facility for the Area Denial Artillery Munition (ADAM) 155MM Projectile

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Briefing Outline

• Project Driver
• ADAM Projectile
• Process Description
• Test Operations
• Future Plans
• Project Team
• Global pressure to ban *anti-personnel* landmines
  – 1997 Ottawa treaty initiated, over 160 countries signed to date (US has not)
  – 2004 US policy eliminated use of *persistent* landmines
  – 2014 US policy eliminated use of *all* landmines, directed to destroy stockpile
• Ongoing inquiry & scrutiny on demil status from the Administration, OSD, & Army G-4
• OPM Demil priority to establish a demil capability
Area Denial Artillery Munition (ADAM)  
155MM Projectile

OVERLAY/KILL MECHANISM (O/KM): Golf ball sized kill mechanism with double walled aluminum overlay.

MINE HOUSING: Parts encased in an epoxy that contains the compound Uranyl Acetylacetonate – 0.0974 grams uranium per mine.
ADAM Mine Energetic Parts

Gas Generator
(UCS. shown in diagram)

Actual Size
Gas Generator
0.515"L x 0.192"D

Actual Size
M100 Electric Detonator
0.25"L x 0.10"D

Actual Size
Lead Cup
0.096"L x 0.113"D

M100 Electric Detonator

Delay Detonator

Booster Cup

Detonating Cord

Overlay

Lead Cup

Kill Mechanism

Propellant Nut
Cryo expands kiln HE capability:
- Unconfined explosives reduce kiln detonations
- Defeats shaped charges
• Manual stations
• Existing Ammunition Peculiar Equipment (APE) and Commercial equipment.
- Individual mines are loaded into trays, then soaked in a liquid nitrogen bath.
Cryofracture Process
Fracture/Separation

- Mines are placed on a press, punched/crushed & separated.
• Crushed OK/Ms are directed into the APE 1236 Rotary Kiln incinerator.
• Crushed mine housings are directed into a drum heater.

ARDEC support testing done to determine deactivation temperature.
Cryofracture Process
Debris Inspection

- Enclosed negative pressure inspection tent to verify “Material Declared as Safe” (MDAS).
- Temporary measure, collecting data to support DDESB “approved means” determination.
• Initial testing and low rate initial production (LRIP) conducted with loose (already downloaded) mines.
• Recent (2015) testing and LRIP demonstrated the download line and cryofracture reliability improvements.

<table>
<thead>
<tr>
<th>Test</th>
<th>Non-Haz Mines</th>
<th>Live Mines</th>
<th>Total Mines</th>
<th>Projectiles Downloaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial testing/LRIP</td>
<td>-</td>
<td>-</td>
<td>122,297</td>
<td>0</td>
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<tr>
<td>2015 testing/LRIP</td>
<td>4,313</td>
<td>67,536</td>
<td>71,849</td>
<td>304 @ TEAD 1,572 @ MCAAP</td>
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<tr>
<td>Total</td>
<td></td>
<td></td>
<td>194,146</td>
<td>1,876</td>
</tr>
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Future Plans

- MCAAP APE 1236 rotary kiln incinerator pollution abatement upgrade project will be conducted Jan 2016 – Jun 2017.
  - Cryofracture transition to production is on hold until this is completed.
- Remaining tasks to transition to production:
  - Conduct training of MCAAP personnel on control room operations and maintenance activities. (MCAAP is already operating the download line, munitions feeding, and debris handling.)
  - Pursue DDESB “approved means” designation to lift inspection requirement.
  - Obtain NRC license.
  - Documentation and transition to production.
**Project Team**

- **Product Manager for Demilitarization**
  - Sponsor & Program Management

- **US Army RDECOM-ARDEC**
  - Project Management
  - Hazard classification & packaging
  - Radiological analysis
  - Lab testing
  - Item engineer

- **Joint Munitions Command**
  - Workload coordination
  - Radiological support
  - Historical download knowledge

- **McAlester Army Ammunition Plant**
  - Site operations, engg, env, safety
  - Ammunition Peculiar Equipment (APE)

- **Tooele Army Depot**
  - APE, test download & cryofracture, kiln support

- **General Atomics**
  - Cryofracture design, installation, test operations

- **IPS Custom Automation**
  - Download line design, installation, start-up

- **Coterie Environmental**
  - Environmental permitting

- **Safety Management Services**
  - Hazard analysis

- **US Army Public Health Command**
  - Radiological monitoring, health risk assessment

- **Corps of Engineers, Huntsville**
  - Safety analysis

- **DoD Explosive Safety Board**
  - Approved means review

- **Defense Ammunition Center**
  - Approved means liaison

*TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.*