Industrial Ammunition Demilitarisation

PREPARED FOR
RASR Meeting
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PRESENTED BY
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Overview

- Munition disposal options
- Importance of Demilitarisation
- Industrial Demil of large caliber ammunition
- *NATO Trust Fund* Projects in the Balkans
- Sustainable Support (by NATO/other organizations)
Explosions at two large Ukrainian military depots this year have caused losses of ammunition so high that they represent the biggest blow to Ukraine's combat capability since the start of the conflict with Russia-backed separatists in 2014, a senior security official said on 28 September 2017 in Kyiv. Source RFE 28 Oct 17.

https://www.rferl.org/a/ukraine-ammunition-depot-blasts-combat-capability/28762247.html
Large scale OD (UK Forces Iraq 2014)
Burning/Detonation
Military munitions are optimised and designed to be efficient. Causing them to function as close to as intended can be efficient destruction.

Open Burning / Open Detonation
Requires approved sites and safety exclusion. Low cost with open ranges. Capability for large demolitions. Potential impact of residual material and EOD. MoD needs to keep some capacity for OB/OD.

Closed Burning / Detonation
Cost of building a contained system. Reduced safety exclusion, reduced throughput, energy consumption for pollution control equipment – where fitted.
Transportation: Cost and CO\textsubscript{2}

400 MLRS pods (42 trucks) (2013)

Total demil cost 2.8MEUR incl tpt. Transport options were:

1. UK Depot to Eastern Germany 1,400 KEUR (multimode) 80 Ton CO\textsubscript{2}
2. Western German Depot to Eastern German facility 90 KEUR (truck only) 60 Ton CO\textsubscript{2}

Transport costs typically one third of total demil cost: CO\textsubscript{2} very significant – NO\textsubscript{x}, noise etc?

- Air cargo - 0.8063 kg of CO\textsubscript{2} per Ton-Mile
- Truck - 0.1693 kg of CO\textsubscript{2} per Ton-Mile
- Train - 0.1048 kg of CO\textsubscript{2} per Ton-Mile
- Sea freight - 0.0403 kg of CO\textsubscript{2} per Ton-Mile

Source: OECD
Logistic disposal in a commercial facility

- Receipt, Inspection, Buffer Storage
- Unpacking
- Disposal/Recycling of Packaging
- Separation of Components
- Opening of Projectile
- Removal of Submunitions
- Separation into Waste Streams
- Recycling of scrap
Typical view of old ammunition production facility now a modern demil facility.

Subject to national and international legislation as a commercial facility – and monitored as such.

Only accept munitions for which it has capacity and approval.

Likely have an Environmental Management System to satisfy the regulatory regime and any specific customer requirements.

Handle multiple munitions and customers.
ISO Cnr based EWI incl pollution control
5 tonnes 5.56mm SAA in 8 hrs
EODSolutions’ Transportable Ammunition Destruction System (TRADS). © EODSolutions/2012

Modular ISO Cnr based units designed for specific process lines
The ammunition disassembly component of JAKUSZ’s Planetarium transportable system, processing a 100 mm UBK8 projectile. © JAKUSZ SZB/2011
## Typical commercial costs in Europe (excluding transport)

<table>
<thead>
<tr>
<th>Munition</th>
<th>Quantity</th>
<th>Unit cost</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>30mm HEI</td>
<td>27,000</td>
<td>2.12</td>
<td>Part of larger consignment</td>
</tr>
<tr>
<td>20mm API</td>
<td>34,000</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>30mm HEI</td>
<td>10,000</td>
<td>1.29</td>
<td></td>
</tr>
<tr>
<td>1000lb MK10 bomb</td>
<td>2,200</td>
<td>346</td>
<td></td>
</tr>
<tr>
<td>540lb bomb</td>
<td>600</td>
<td>225</td>
<td></td>
</tr>
<tr>
<td>105mm Tk HESH</td>
<td>100</td>
<td>8.80</td>
<td>Part of larger consignment</td>
</tr>
<tr>
<td>105mm WP</td>
<td>10,000</td>
<td>12.30</td>
<td></td>
</tr>
</tbody>
</table>
Specific Designs and Demil process

MARK 10

1000 lb H.E., M.C., BOMBS

LEADING PARTICULARS

Length of bomb body with nose plug 135 cm approx
Maximum diameter, less suspension lug housing 42 cm approx
Weight of body, empty 500 lb approx
Weight and nature of charge 396 lb Torpex 4B
Charge/weight ratio 40 per cent, approx

BRIEF DESCRIPTION

The bomb body is of forged steel, and is supplied without a nose exploder and with an exploder adapter in the tail. All screw threads are of the Unified range.

A fuze well at each end, and a charging tube which connects them to a well on the side of the body, are for fitting an electrically initiated fuzing system. Each fuze well can, alternatively, be fitted with an exploder adapter which will accept the standard range of fuzes and pistols. The nose and tail ends are each fitted with a transit plug.
Melt Out Process
Melt-out Building (new and old)
Supporting an MoD through Trust Fund

Albania Large Caliber Line Opened 8 Mar 11
Full Production 22 Mar 11
Recovering and re-using explosives and other valuable materials
A Demil Production Line

March 2011
New Large Calibre Line Established

Capacity:

122 mm - 240 rounds/day
130 mm - 220 rounds/day
152 mm - 200 rounds/day
Cutting heavy caliber

Temporary storage of metallic mine bodies
Melt-out TNT from anti-tank mines
Remote cutting of metallic mine casing
Melt out of warhead

11 October 2018
Balkan PSSM Trust Funds

**PROJECTS**

- Albania I 1.6M A/Pers Mines
- Albania II 8,700 tonnes munitions
- Albania III 11,100 tonnes munitions
- Albania (SALW) 70,000 SALW

- Serbia & Montenegro I 27,500 SALW
- Serbia & Montenegro II 1.4M A/Pers Mines

- Bulgaria (PMWRA Bilat) 900 tonnes
- Serbia IV start 2016 2,000+ tonnes
- Montenegro start Jan 2016 416 tonnes

**COSTS**


*Turkey recognises The Republic of Macedonia with its constitutional name.*
**Albania I - Completed**

| Achievements                                                                 | Destruction of 1,683,860 million anti-personnel landmines; 1,100 tons of ferrous metals recycled; 192 tons of TNT converted to ammonite; 410,000 kms driven by the AAF |
| Projected cost                                                              | US $ 800,000 |
| Lead Nation                                                                 | Canada 🇨🇦 |
| Project duration                                                             | January 2001 - April 2002 |
| Contributors                                                                | 🇦🇱 🇧🇪 🇧🇪 🇨🇦 🇬🇷 🇩🇰 🇨🇭 🇬🇧 |
## Albania II – Completed

<table>
<thead>
<tr>
<th>Aims</th>
<th>Destruction of 8,700 tonnes SALW ammunition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected cost</td>
<td>EUR 6.4 million</td>
</tr>
<tr>
<td>Lead Nation</td>
<td>Canada</td>
</tr>
<tr>
<td>Project duration</td>
<td>December 2002 – October 2007</td>
</tr>
<tr>
<td>Contributors</td>
<td><img src="image" alt="Contributors" /></td>
</tr>
<tr>
<td>Achievements</td>
<td>105 million 7.62, 12.7, 14.5 mm cartridges; 2 million hand grenades; 130,000 mortar rounds destroyed</td>
</tr>
</tbody>
</table>
## Albania III - Completed

<table>
<thead>
<tr>
<th>Aims</th>
<th>Destruction of 24,000 tonnes surplus ammunition. Capability and capacity enhancement (equipment). Infrastructure refurbishment. 70,000 SALW destruction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project cost</td>
<td>MEUR 6.56</td>
</tr>
<tr>
<td>Lead Nation</td>
<td>Albania        USA (PMWRA)</td>
</tr>
<tr>
<td>Project duration</td>
<td>October 2010 – December 2015</td>
</tr>
<tr>
<td>Contributors</td>
<td><img src="" alt="Flag of Albania" />  <img src="" alt="Flag of USA" /></td>
</tr>
<tr>
<td>Achievements</td>
<td>Destruction of 12,231 tonnes ammo and 66,600 SALW. New capability &amp; capacity enhancement</td>
</tr>
</tbody>
</table>

![Images of the project activities and achievements]
<table>
<thead>
<tr>
<th><strong>Achievements</strong></th>
<th>Destruction of 27,500 SALW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Projected cost</strong></td>
<td>EUR 375,000</td>
</tr>
<tr>
<td><strong>Lead Nation</strong></td>
<td>The Netherlands 🇳🇱</td>
</tr>
<tr>
<td><strong>Project duration</strong></td>
<td>September 2003 - December 2003 (South Eastern Europe Initiative (SEEI) Trust Fund Project)</td>
</tr>
<tr>
<td><strong>Contributors</strong></td>
<td>🇨🇦 🇬🇷 🇮🇹 🇺🇦 🇫🇮 🇳🇴 🇧 mContext-4x-4 to 724x32</td>
</tr>
</tbody>
</table>
## Serbia & Montenegro II - Completed

<table>
<thead>
<tr>
<th>Aims</th>
<th>Destruction of 1.4 million Anti-Personnel Mines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected cost</td>
<td>EUR 1.69 million</td>
</tr>
<tr>
<td>Lead Nations</td>
<td>Canada &amp; Austria</td>
</tr>
<tr>
<td>Project duration</td>
<td>February 2005 – May 2007</td>
</tr>
<tr>
<td>Contributors</td>
<td><img src="flags.png" alt="Flags" /></td>
</tr>
<tr>
<td>Achievements</td>
<td>+1,404,829 A/P Mines destroyed</td>
</tr>
</tbody>
</table>

![Images of mine destruction and related activities]
# Serbia - Implementation

<table>
<thead>
<tr>
<th><strong>Aims</strong></th>
<th>Ammunition demilitarization and capability building</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Projected cost</strong></td>
<td>MEUR 3.6 - Gap MEUR 0.5</td>
</tr>
<tr>
<td><strong>Lead Nation</strong></td>
<td>United Kingdom [UK flag]</td>
</tr>
<tr>
<td><strong>Project duration</strong></td>
<td>Project start 24 March 2016. Opening Ceremony 12 October 2016 October 2016 – October 2019</td>
</tr>
<tr>
<td><strong>Contributors</strong></td>
<td>🇬🇧 🇺🇸 🇮🇹 🇨🇭 🇨🇿 🇳🇴 🇷🇺 🇮🇱 🇹🇷 🇩🇪</td>
</tr>
<tr>
<td><strong>Achievements</strong></td>
<td>Some Eur 1M equipment/building upgrades provided. 240 tonnes ammo demilitarised (delay due to Feb 17 incident).</td>
</tr>
</tbody>
</table>
Montenegro - Implementation

<table>
<thead>
<tr>
<th>Aims</th>
<th>Support to MNE MoD for demilitarization of 416 tonnes of surplus munitions &amp; assessment of EOD clearance of WWII ammo bunker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected cost</td>
<td>MEUR 0.7 – Fully funded</td>
</tr>
<tr>
<td>Lead Nations</td>
<td>UK</td>
</tr>
<tr>
<td>Contributors</td>
<td>🇹(TYPESET)lovakia 🇫🇷France 🇨🇿Czech Republic 🇩🇪Germany 🇹🇷Turkey 🇬🇧United Kingdom</td>
</tr>
<tr>
<td>Achievements</td>
<td>Technical Report Petrovici. Ammo demil T 1 complete, T2 by early 2019</td>
</tr>
</tbody>
</table>
### Bulgaria US Implementation

<table>
<thead>
<tr>
<th>Aims</th>
<th>Destruction of Clusters Munitions, Improvement of physical security of Manportable Air Defense Missiles (MANPADS) stocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected cost</td>
<td>MUSD 2.25</td>
</tr>
<tr>
<td>Sponsor Nation</td>
<td>USA</td>
</tr>
<tr>
<td>Project duration</td>
<td>Delayed implementation likely start now late 2018</td>
</tr>
</tbody>
</table>
Points of Contact

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Strategy

- Encourage regional ammo demil commercial market
- Demonstrate (to RASR participants) that movement across national borders is feasible
- Encourage best practice and efficiency
- Leverage existing donor funded capacity

Albania/Montenegro Pilot

Montenegro’s Deputy Minister Mr. Radusinovic

Albania’s Defence Minister Ms. Kodheli

20mm API Cannon
How far can an individual donor assist?

Political & senior leadership intervention

Complex equipment (demil facility and propellant surveillance lab)

Low level skills and direct support (MANPADS destruction)
Functional Management & Expertise

Defence Policy

MoD
Management/resources

J4

Storage Depots  Transport  Testing/training  Monitoring  Procurement  Disposal

Ammunition Competencies

- Basic Awareness
- Functional responsibility
- Expert knowledge

- Nation’s own knowledge, resources and experts
- Use of another nations expertise or international management
- Use of advisors (ammunition experts – Regional, OSCE, UN, NGO, NATO, commercial)