



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION



Industrial Ammunition Demilitarisation

PREPARED FOR

RASR Meeting

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PRESENTED BY

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- 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)





Kalynivka, 27 Sep 17 explosions/fire



Balaklia, 23 Mar 17 explosions/fire

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 destructions. 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.





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 CO₂
2. Western German Depot to Eastern German facility 90 KEUR (truck only) 60 Ton CO₂

Transport costs typically one third of total demil cost: CO₂ very significant – NO_x, noise etc?

Air cargo - 0.8063 kg of CO₂ per Ton-Mile

Truck - 0.1693 kg of CO₂ per Ton-Mile

Train - 0.1048 kg of CO₂ per Ton-Mile

Sea freight - 0.0403 kg of CO₂ per Ton-Mile

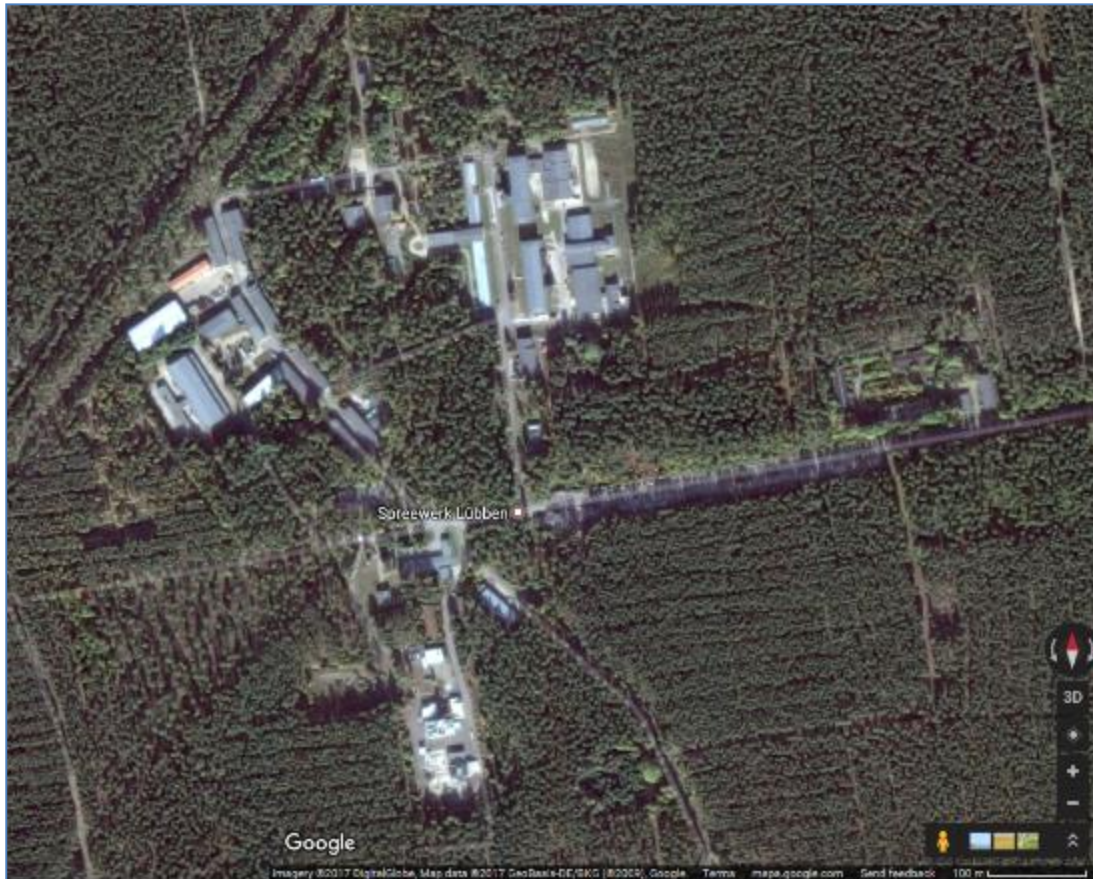
Source: OECD



- 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 Demil facility



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



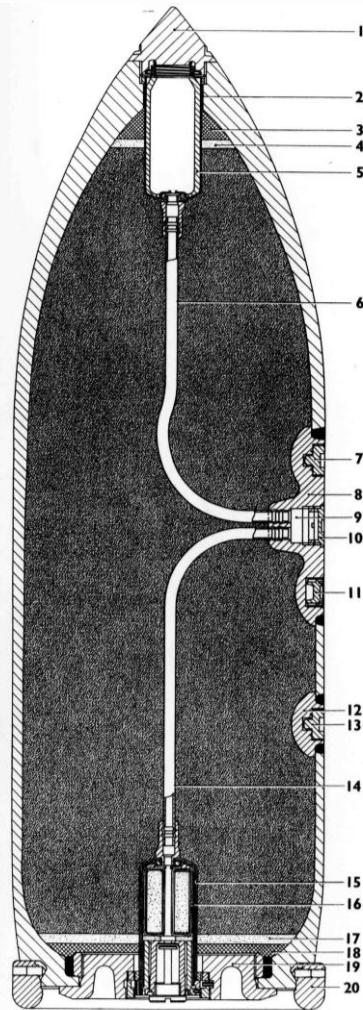
Modular ISO Cnr based units designed for specific process lines

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)

Munition	Quantity	Unit cost Eur	Note
30mm HEI	27,000	2.12	Part of larger consignment
20mm API	34,000	0.96	
30mm HEI	10,000	1.29	
1000lb MK10 bomb	2,200	346	
540lb bomb	600	225	
105mm Tk HESH	100	8.80	Part of larger consignment
105mm WP	10,000	12.30	

KEY



- 1 NOSE
- 2 FUZE WELL
- 3 SEALING COMPOSITION
- 4 LAYER OF T.N.T.
- 5 SUPPORT CUP
- 6 CHARGING TUBE
- 7 SPIGOT PLUG
- 8 LUG BLOCK
- 9 CHARGING WELL
- 10 BOMB PLUG
- 11 TRANSIT PLUG
- 12 LUG BOSS
- 13 SPIGOT PLUG
- 14 CHARGING TUBE
- 15 FUZE WELL
- 16 EXPLODER ADAPTER
- 17 LAYER OF T.N.T.
- 18 SEALING COMPOSITION
- 19 FILLING PLUG
- 20 TRANSIT BASE

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 fuze 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



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





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

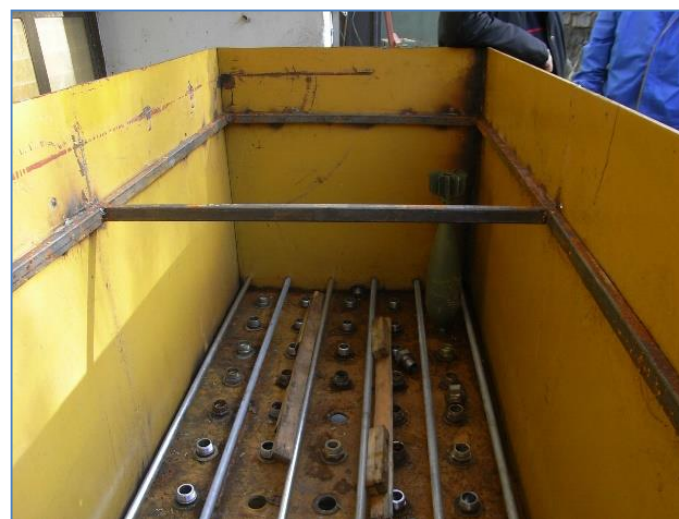
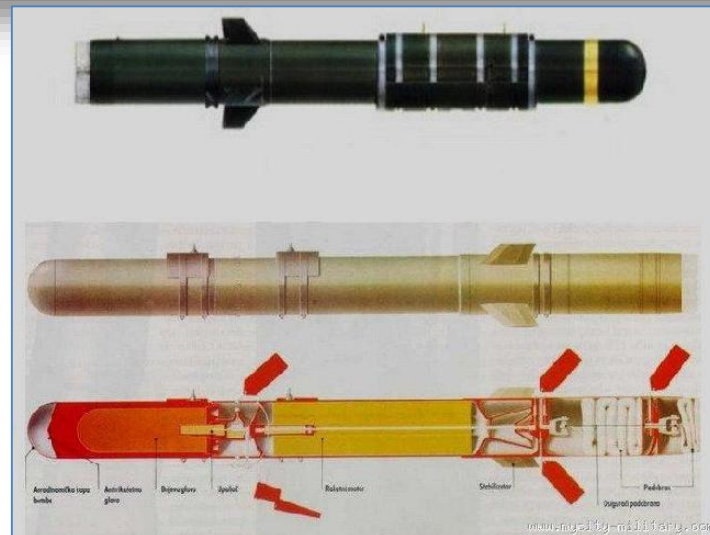


Melt-out TNT from anti-tank mines



Remote cutting of metallic mine casing

Melt out of warhead



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

- MEur 22 2001-2018.



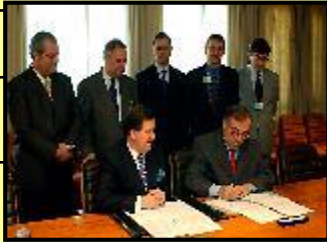



*Turkey recognises The Republic of Macedonia with its constitutional name.

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

Aims	Destruction of 8,700 tonnes SALW ammunition	
Projected cost	EUR 6.4 million	 
Lead Nation	Canada 	
Project duration	December 2002 – October 2007	
Contributors		
Achievements	105 million 7.62, 12.7, 14.5 mm cartridges; 2 million hand grenades; 130,000 mortar rounds destroyed	





Albania III - Completed

Aims	Destruction of 24,000 tonnes surplus ammunition. Capability and capacity enhancement (equipment). Infrastructure refurbishment. 70,000 SALW destruction.
Project cost	MEUR 6.56
Lead Nation	Albania USA (PMWRA)
Project duration	October 2010 – December 2015
Contributors	 
Achievements	Destruction of 12,231 tonnes ammo and 66,600 SALW. New capability & capacity enhancement





Serbia & Montenegro I - Completed

Achievements	Destruction of 27,500 SALW
Projected cost	EUR 375,000
Lead Nation	The Netherlands 
Project duration	September 2003 - December 2003 (South Eastern Europe Initiative (SEEI) Trust Fund Project)
Contributors	





Serbia & Montenegro II - Completed

Aims	Destruction of 1.4 million Anti-Personnel Mines			
Projected cost	EUR 1.69 million			
Lead Nations	Canada & Austria			   
Project duration	February 2005 – May 2007			
Contributors	           			
Achievements	+1.404.829 A/P Mines destroyed			








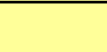


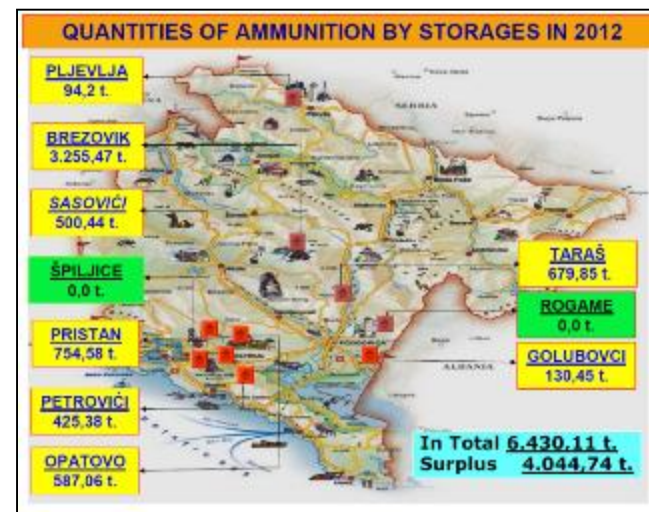
Serbia - Implementation

Aims	Ammunition demilitarization and capability building
Projected cost	MEUR 3.6 - Gap MEUR 0.5
Lead Nation	United Kingdom 
Project duration	Project start 24 March 2016. Opening Ceremony 12 October 2016 October 2016 – October 2019
Contributors	
Achievements	Some Eur 1M equipment/building upgrades provided. 240 tonnes ammo demilitarised (delay due to Feb 17 incident).



Montenegro - Implementation

Aims	Support to MNE MoD for demilitarization of 416 tonnes of surplus munitions & assessment of EOD clearance of WWII ammo bunker
Projected cost	MEUR 0.7 – Fully funded
Lead Nations	UK 
Project duration	15 months. Project Official opening 31 January 2017.
Contributors	      
Achievements	Technical Report Petrovici. Ammo demil T 1 complete, T2 by early 2019



Bulgaria US Implementation

Aims	Destruction of Clusters Munitions, Improvement of physical security of Manportable Air Defense Missiles (MANPADS) stocks
Projected cost	MUSD 2.25
Sponsor Nation	USA
Project duration	Delayed implementation likely start now late 2018



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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

<http://www.nspa.nato.int/en/news/news-20141209-7.htm>

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)





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)