A Mobile Facility for Munitions and Explosives

TNO Prins Maurits Laboratory

Nico van Ham
TNO Prins Maurits Laboratory
“Institute for Protection”

Protection Experts

- Explosives
- Ballistics
- High toxic substances
- Modeled the effects
- Weapons System Analysis
- Threat Analysis
- Experiments
Munitions treatment depends on calibre

- **Large calibre** $> 40$ mm
  - Waterjet cutting and wash-out

- **Medium calibre** 20-35 mm
  - Shreddering and heat treatment

- **Small Calibre** $< 20$ mm
  - Heat treatment
Principle of Mobile Disposal Facility

- Waterjet Cutting Munitions
- High pressure water wash-out
- Desensitizing of explosives
- Storage and transport as Class 4.1
- Incineration as industrial waste
Waterjet Cutting Munitions
High Pressure Water wash-out
Desensitizing of Explosives

- Explosives mixed with water
- Explosives sized down to correct particle size
- Addition of stabilizer to prevent settling of explosives
Safety Testing of Explosive Slurry

- BAM Impact
- BAM Friction
- EU Detonation Test
- DDT Test
- Koenen Test
- Vacuum Stability Test
- Time Pressure Test
- Cap Sensitivity Test
- Electro Static Discharge Test
- Thermo Analytical Tests DSC, TGA, DTA
Gap test with TNT slurry

- Tube dimensions:
  - O.D. = 60 mm
  - Length = 500 mm

- End fragmentation

- Velocity = 3.79 mm/μs
Conclusions Safety Testing

- Slurry is not Explosive
- Transportation as Hazardous Waste
- Storage as Hazardous Waste
- Mobile Water Washout Facility
- Demilitarisation at Storage Site / No Transport of Munitions necessary
- Incineration of Explosive Waste in Commercial Waste Incinerator
Containerized High pressure wash-out
Mobile Waterjet Cutting System

• Can be used independent from wash-out installation

• Munitions are rendered safe by removing the fuze by cutting it from the main load

• Main load can safely be transported to central point were wash-out is located

• Fuze can be safely transported in special bom proof container
Conclusion

• New approach for Explosive Ordnance Disposal

• Better for the environment

• Better for the health of EOD technician

• Economic solution: estimated cost for total mobile unit is 800 K Euro