EXPLOSIVES AND UXO’S – A CHANGING STORY

MASTS 12th Annual Science Meeting

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Thursday 10th November 2022
Richard Battrick

• Richard Battrick, Managing Director, UXOcontrol

• Former Royal Navy MCDO and CO of the SDG

• Overview of regulatory frameworks, overview of the problem and differences between explosives and UXOs
Regulatory Frameworks
Legislation

Health and Safety at Work Act 1974
• All safety regulations are made under the umbrella of this act

Construction, Design and Management Regulations (CDM) 2015
• Sets out what people involved in construction work need to do

Explosives Regulations 2014
• Relate to the transfer of explosives, security issues, stores, on-site mixing, CE Marking, what can be sold to customers, marking and tracking of explosives throughout Europe

BREXIT - CII/61 - Explosives for civil uses
• Under the direction of the Standards Policy and Strategy Committee provides the UK input to CEN/TC 321
Transportation

Transport of explosives on the road is covered by

- Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009
- ADR 2009: European Agreement for International Carriage of Dangerous Goods by Road
International Frameworks

- **IMAS 09.60** - Underwater Survey and Clearance of Explosive Ordnance (EO)
- **IMAS 07.11** - Land release
- **IMAS 09.30** - Explosive Ordnance Disposal
- **CWA 15464:2005** - EOD Competency standards
Best Practice – Risk based

- **CIRIA C681** - Unexploded ordnance (UXO) A guide for the construction industry for the management of risks associated with UXO from WWI and WWII aerial bombardment

- **CIRIA C754** - Assessment and management of unexploded ordnance (UXO) risk in the marine environment

- **BS5607:2017** – Code of Practice for the safe use of explosives in the Construction Industry
National Occupational Standards (NOS)

Standards Setting Body for Explosives Munitions and Search Occupations (SSB for EMSO) sets the industry benchmark

- Promotes continuing development of competence standards and qualifications for the explosives industry
- Supports the development of the frameworks, evidence, specifications and assessment
Differences between explosives and Unexploded Ordnance (UXO)
Low and High Explosives

Two basic types of explosive:

**Low Explosive**
- Does not detonate but burns very quickly
- VoD is less than 1,000 m/s
- Produces lots of heat and gas
- An example is Gun Powder

**High Explosive**
- Does detonate
- VoD greater than 1,000 m/s
- Produces shock as well as heat and gas
- An example is Ammonium Nitrate Fuel Oil (ANFO)
Black Powder

• Not Really an EXPLOSIVE
  ✓ Burns Quickly
  ✓ Deflagrates < 1000 m/s

• Various Grain Sizes

• Used for:
  ✓ ‘Gentle’ Rock Breaking
  ✓ Special Effects
  ✓ Fireworks
Unexploded Ordnance (UXO) - categories

Inert
• An item that contains no explosives whatsoever

Blind
• An item that has fired, but failed to function as intended

Live
• An item which has not been fired therefore hasn’t gone through it’s arming procedure
Sea Mines

Air Dropped Mine

Submarine Launched Mine
Land Mines / Service Ammunition

Anti-Vehicle Mine
Mortar
Mills Grenade
40mm AA ammunition
Torpedoes – air / surface / submarine launched
Magnitude of the Problem
Historic Ordnance

- WW1 and WW2 maritime activity
  - Artillery projectiles
  - Small arms ammunition
  - Mortars/light weapons
  - Depth charges
  - Torpedoes
  - Sea mines

- Present day activity
  - Dumping/offshore wind developments
Dumping at Sea

KEY:
- Number of targets/square kilometre

- 50,000
- 10,000
- 5,000
- 1,000
- 100
- 0

UXOcontrol
Vessel Management

- N-Sea Spirit
- N-Sea Geosea
- N- Sea Focus
- N-Sea Pathfinder
- N-Sea Protea
ASSETS  Offshore UXO Survey, MAGsense
ASSETS Offshore UXO Survey, MAGsense (LARS)
ASSETS Offshore UXO identification
Utility ROV System (UTROV)

- Transfer and lift capability / boulder removal
- Hydraulic power and fitted tooling
- 5 tonne SWL – lift capacity exceeds RoV
- Also used for debris removal, rock bag installation, mattrass deployment / recovery etc.
ASSETS Offshore UXO identification (Dredge Pp / manipulators / cameras etc.)
ASSETS near-offshore UXO Disposal
ASSETS near-offshore UXO Disposal
Cobra MDS Configuration Toolbox

5KG OPC Charge

BX-90

BX-30

BX-420
ASSETS near-offshore UXO Disposal, mammal mitigation
ASSETS near-offshore UXO lifting bag / Ambu remote
Trajectories

• Development of new technologies

• Review of Explosive Techniques / equipment outfit

• Energy baseline analysis for each specific equipment outfit

• Awareness of equipment and weapon lifecycle perspective
Equipment and Weapon Lifecycle Perspective
THANK YOU

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