Lesson 3.7
Mines, Explosive Remnants of War (ERW), Improvised Explosive Devices (IED) and Crater Analysis
Lesson 3.7 Content

- Mines, Explosive Remnants of War (ERW)
- Improvised Explosive Devices (IED)
- Safety and best practice
- Crater analysis
Learning Outcomes Lesson 3.7

• Explain how to operate in a mined mission area in a United Nations peace operation environment

• Identify indicators of IEDs, components and mitigation measures

• Explain the basic procedures for crater analysis
Safety Warning

DO NOT:

Move

Any ordnance explosive

Touch

Safely mark and report
UNMO Roles / Responsibilities

- Observe
- Monitor
- Assess
- Verify
- Report
Mine, ERW and IED Awareness

• Landmines
• ERW
• IED

Danger Mines
Landmines

Anti-personnel mines (AP)

Anti-vehicle mines (AV)

• Wound / kill
• Destroy / damage vehicles
• Buried, surface
• Camouflaged
• Locations shift in time
• Consult experts
• Do not touch or move
ERW

Unexploded Ordnance (UXO)

Abandoned Explosive Ordnance (AXO)
ERW

Small Arms and Light Weapons Ammunition

Grenades
ERW

Projectiles

Rockets

Bombs

Missiles
Where are Mines and ERW

Indicators to identify Danger Area:

• Armed clash took place
• Areas of military activities
• Damaged buildings / vehicles
• Bridges, culverts, water points
• Restricted / marked areas,
• Barriers, road closures
• Abandoned weapons
• Ammunition storage
• Injured / dead animals
• Over grown, not used areas or paths
Mines and ERW Markings

Official markings

Local markings

Humanitarian actors markings
Other Indicators of Mines / ERW

- Tripwires, low to ground
- Ammunition cans
- Dead or blast injured animals
- Damaged, cleared vegetation
- Regularly spaced potholes / craters
- By passes, tracks around good areas of road
Mines and ERW Difficult to Spot

- Hard to spot
- Partially covered
- Hidden amongst the rubble
Emergency Procedures in Minefields

**M**ovement **STOP**S

**I**nform **H**Q

**N**ote the area

**E**valuate your course of action

**D**o not move
Improvised Explosive Devices
Improvised Explosive Devices (IED)

- Placed or fabricated
- Improvised manner
- Destructive, lethal, noxious, pyrotechnic or incendiary chemicals
- To destroy, incapacitate, harass or distract
- May incorporate military stores
- normally devised from non-military components

Constraints facing manufactures of IEDs are components imagination to set up the devices
Improvised Explosive Devices

- Container
- Explosives
- Enhancements
- Switch
- Power Source
- Initiator
Improvised Explosive Devices

IEDs are categorized by the type of switch used to initiate the device:

• Victim Operated
• Command Initiated
• Time Initiated
Victim Operated IEDs

- **Main Explosive**
- **Power Source**
- **Solid Material - Wooden Plank**
- Aggressor retains control
- Optimum effect on intended target
- Most common are Command Wire and Radio Controlled
Radio Controlled IED

- Insurgent retains control
- Greater stand off between Contact Point and Firing Point
- Quick to emplace
- Receiver (Rx) and Transmitter (Tx) operating on same frequency

Keyless Entry Systems
Explosives / Main Charges

Military

Commercial

Home-made
IED Safety and Best Practice

IED indicators use - AWARE

- Atmospherics
- Warning Signs
- Aiming Markers
- Recognize Ground Signs

Examine surrounding for items out of place
• Ground Sign, most essential indicators
• Evidence of change from natural state
• Emplacement & concealment leaves signs
IED Warning and Aiming Markers

- Different warning markers
- Used by locals / terrorists to warn population
- Aiming markers - to initiate IED accurately at intended target
Avoid Setting Patterns

Attackers are quick to exploit patterns being set

In today’s asymmetric environment the UN is specifically targeted by armed groups
Avoid Setting Patterns

Vary departure times, locations and stops

Avoid patterns and always do a risk assessment / analysis before traveling
0/5/25 Meter Checks

• Look before you exit vehicle
• Search 5m around vehicle
• Expand search to 25m.
Actions on Finding an IED

STOP DO NOT APPROACH

DO NOT TOUCH

Actions- 5Cs

Confirm
Clear
Cordon
Control
Call
Crater Analysis

• Value of analysis
• Confirm presence of belligerent artillery
• Determine direction to source
• Verify or determine firing positions
• Detect presence of new weapons and caliber
Crater Analysis

EQUIPMENT

• Compass, stakes, wire
• Still or video camera
• Curvature template
Artillery Crater Analysis

Low-Angle Fuze Quick Craters (Artillery)

Crater from a rocket impacting, low or medium angle fall; analyzed as an artillery craters

Artillery Round Quick Fuze
(Center Stake Method)
Artillery Crater Analysis

- Artillery Round (Fuze Delay)
- Ricochet Furrow Method

Low-Angle Fuze Delay Craters
Mortar Crater Analysis

High-Angle Shell Craters (Mortars)

Rocket impacting high angle of fall analyzed same as a crater resulting from mortar round

Mortar Round
Direction and Point of Origin
• Duds and Low-Order Bursts
• High-Order Bursts
• Rotating Bands and Band Seats
• Tail Fins
• Fuzes
Lesson Take Away

• Do not touch, move explosive hazards
• Seek qualified help from UN experts
• IEDs are significant threats; components-SPICE
• Know IED signs; use AWARE
• Crater Analysis determine direction and location of weapon systems
Questions