



Lesson 3.7

Mines, Explosive Remnants of War, Improvised Explosive Devices and Crater Analysis

Content



- Mines, Explosive Remnants of War (ERW)
- Improvised Explosive Device (IED)
- Safety and best practice
- Basic crater analysis

Learning Outcomes



- Explain how to operate in mines and ERW affected areas
- Identify indicators, components and mitigation measures of IED
- Explain best practice to foster safety & security related explosive hazards
- Describe 3 types of crater



Safety First



DO:

Safely mark and report



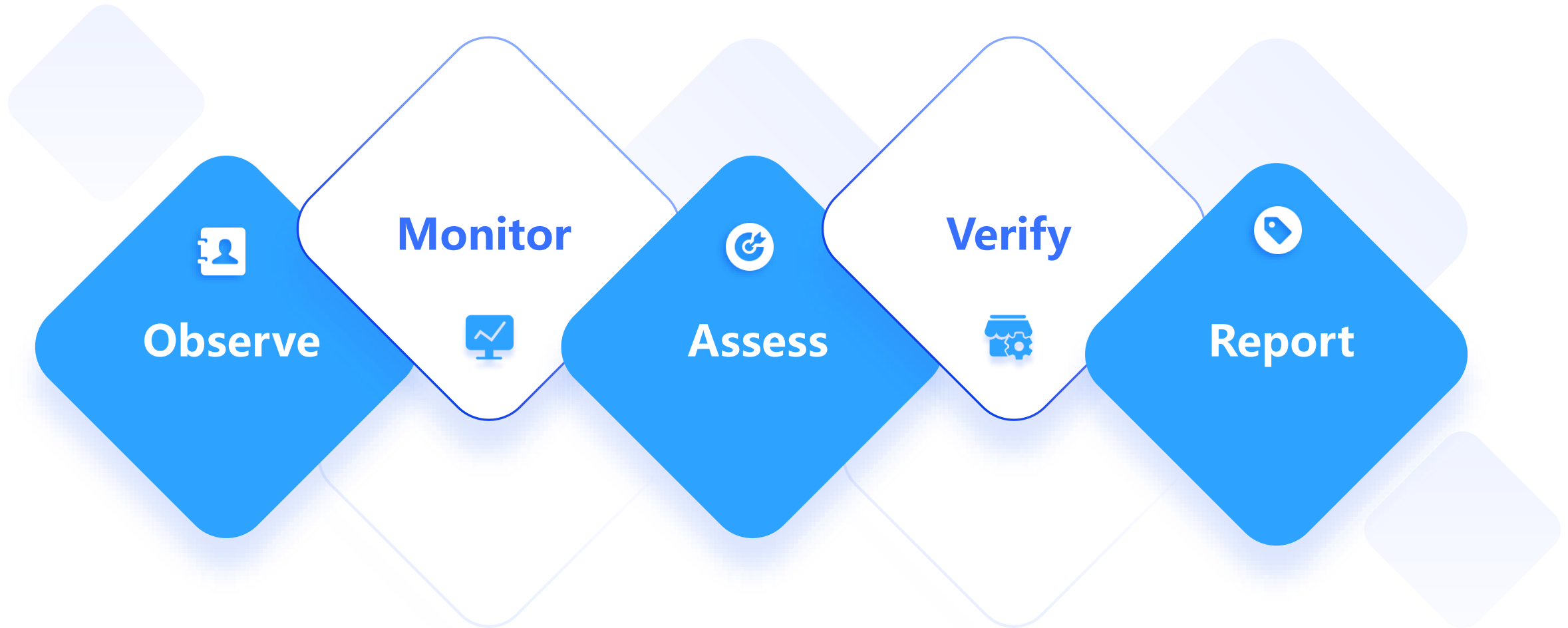
DO NOT:

Move

Touch

Any explosive ordnance

UNMO Roles in Explosive Hazards Mitigation





Landmines, ERW and IED



Landmine



Explosive Remnants of War



Improvised Explosive Device



Landmines



- **Anti-personnel (AP)**
 - Wound / kill
 - Camouflaged, buried



- **Anti-vehicle (AV) or Anti-Tank (AT)**
 - Destroy / kill / damage vehicles
 - Buried, surface



Landmines

Anti-Personnel Mines



Anti-Vehicles or Anti-Tank Mines





Landmines



- Where is one, there could be more
- Locations shift with time
- Never touch or move
- Report to UNMO TS
- Assistance from Experts

Explosive Remnants of War (ERW)



- **Unexploded Ordnance (UXO)**
 - Fired, but not detonated



- **Abandoned Explosive Ordnance (AXO)**
 - **Not** fired yet, but stockpiled

Explosive Remnants of War (ERW)



Submunitions



Small Arms and Light Weapons Ammunition



Grenades



Explosive Remnants of War (ERW)



Projectile



Bombs



Rockets



Missiles



Indicators - Where are Mines and ERW



- Restricted / marked areas
- Areas of armed conflict
- Areas of military activities
- Damaged building / vehicles
- Barriers / road closures



Hard to spot, Partially covered, Hidden within rubbles

Indicators - Where are Mines and ERW (Cont.)



- Abandoned weapons
- Ammunition storage
- Injured / dead animals
- Overgrown, unused areas/paths
- Bridges, culverts, water points

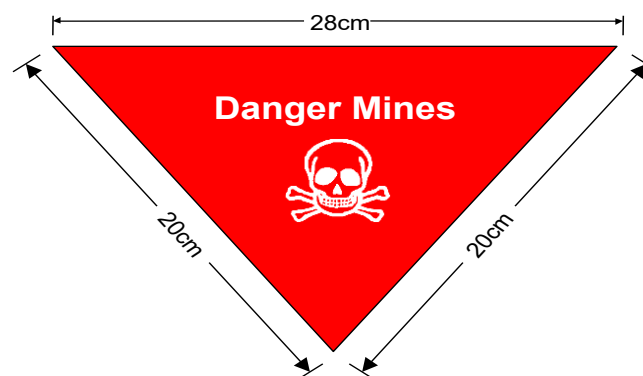


Hard to spot, Partially covered, Hidden within rubbles



Markings of Landmines and ERW

Official Markings



Unofficial Markings





Other Indicators of Landmines and ERW



Tripwires, low to ground



Ammunition box



Dead or blast injured animals



Damaged, cleared vegetation



Regularly spaced potholes / craters



Barriers, road closures

Example: UXO Marking in MINURSO



UXO MARKING FORM - MINURSO

Template Updated on 07 Nov 2017

DATE: 08 NOV 17	TIME: 1100 HRS	AOR: BLH	PTL CODE: VO702	TRACK: BLH BSO1 & TRG
UXO TYPE: AP MINE		COORDINATE: N 26 042.471 W 009 47.544		TRACK PLACE COORDINATE: N26 42.473 W 009 47.546

		NEAREST GRD FEATURE	PREV WP	NEXT WP	NEAREST UNIT	TS
NAME		HILL	T 044A	L BS-1	HQ 5 TH MR	BLH
COORDINATE	N	26 42.114	26 42.032	26 44.950	26 13.840	26 19.604
	W	009 47.545	009 48.917	009 44.500	009 35.800	009 32.980
DISTANCE		2.2 KM	2.4 KM	6.9 KM	56.4 KM	48.6 KM
BEARING TO UXO		175°	250°	047°	340°	330°
BEARING FROM UXO		355°	070°	227°	160°	150°

LEGEND	
★	UXO
■	TRACK PLACE
□	GRD FEATURE
●	WP
●	STONE
MARKING TYPE	☐ METAL SIGN
	☒ CARD SIGN
	☒ STONE PILE
	☐ OTHER
RANK & NAME	FLT LT MD ZIHADUL ISLAM KHAN
ID	10520
SIGN	

SKETCH

*** Note: The 'Sketch' should be clear. No need to put all the info that's already in the chart. Only the UXO and nearest prominent ground features should be marked in the Sketch. [The data, shown here, isn't real, just for example]

The sketch shows a central star representing the UXO. To the top right is a square representing a hill, with a bearing of 355° and a distance of 2.2 KM. To the top left is a square representing a tree, with a distance of 50 M. To the right is a square representing a well, with a distance of 100 M. Below the UXO is a horizontal line representing a water body labeled 'BLH BSO1 & TRG', with a distance of 10 M. At the bottom right is a dot representing a water point labeled 'L BS-1'. A north arrow is in the top right corner.

Emergency Procedures in Minefield



Movement stops immediately

Inform HQ and warn people around you

Note the area

Evaluate course of action

DO NOT MOVE !



Improvised Explosive Device (IED)



Improvised Explosive Devices (IEDs) are explosive devices assembled by a user, and not made in a factory



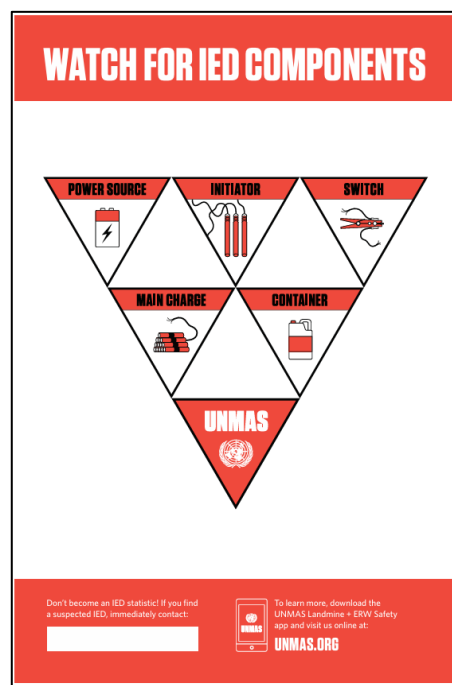
Improvised Explosive Device (IED)



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



Components of IED - PIECES



Switch

Enhancements

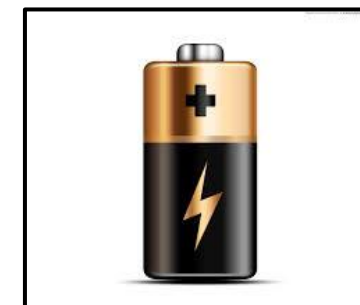


Container



Explosives /
Main charge

Power
Source



Initiator /
Detonator



Types of IED



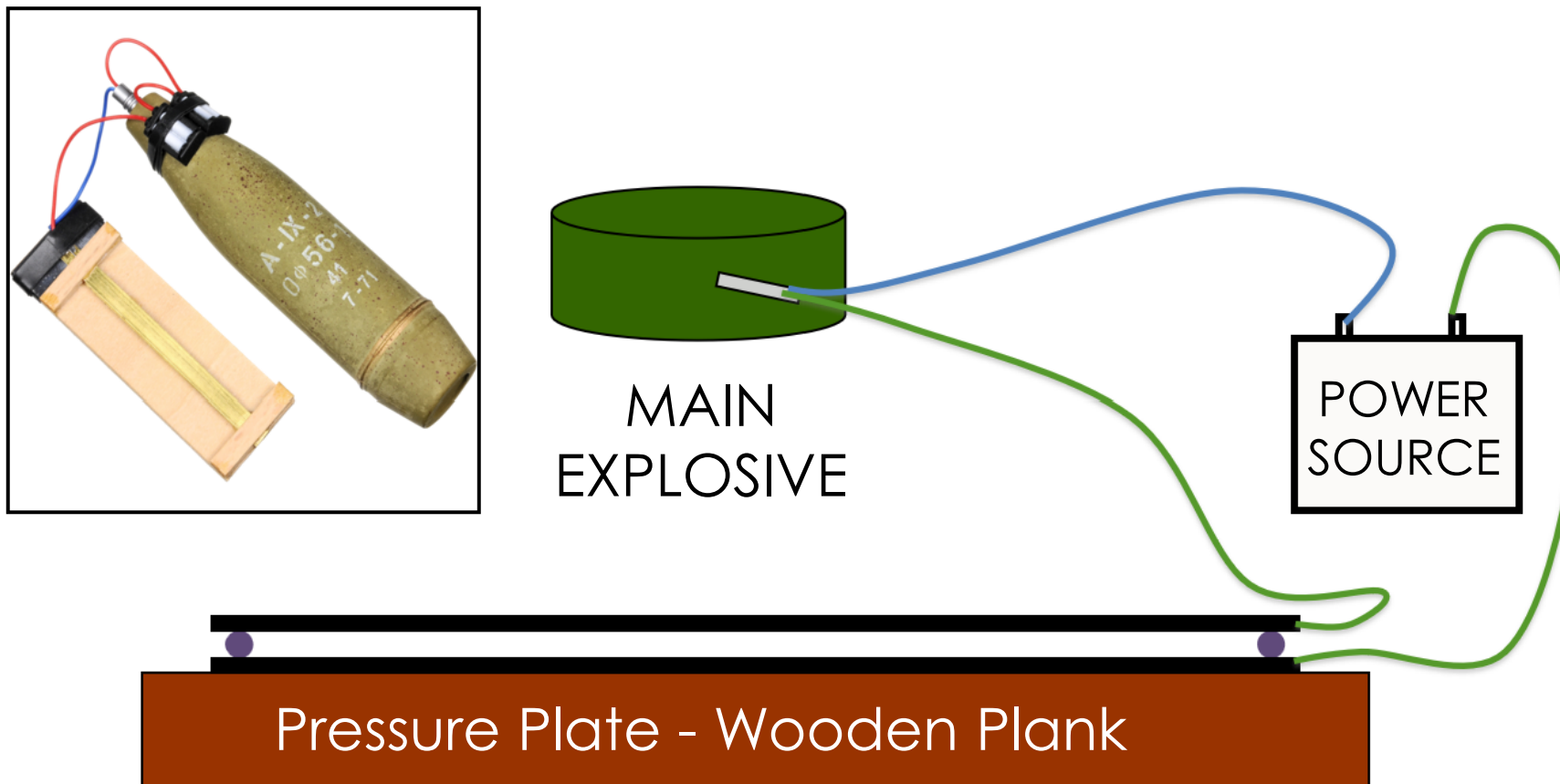
IEDs are categorised by the type of switch used to initiate the device:



- Victim Operated
- Command Initiated
- Time Initiated



Victim Operated IED

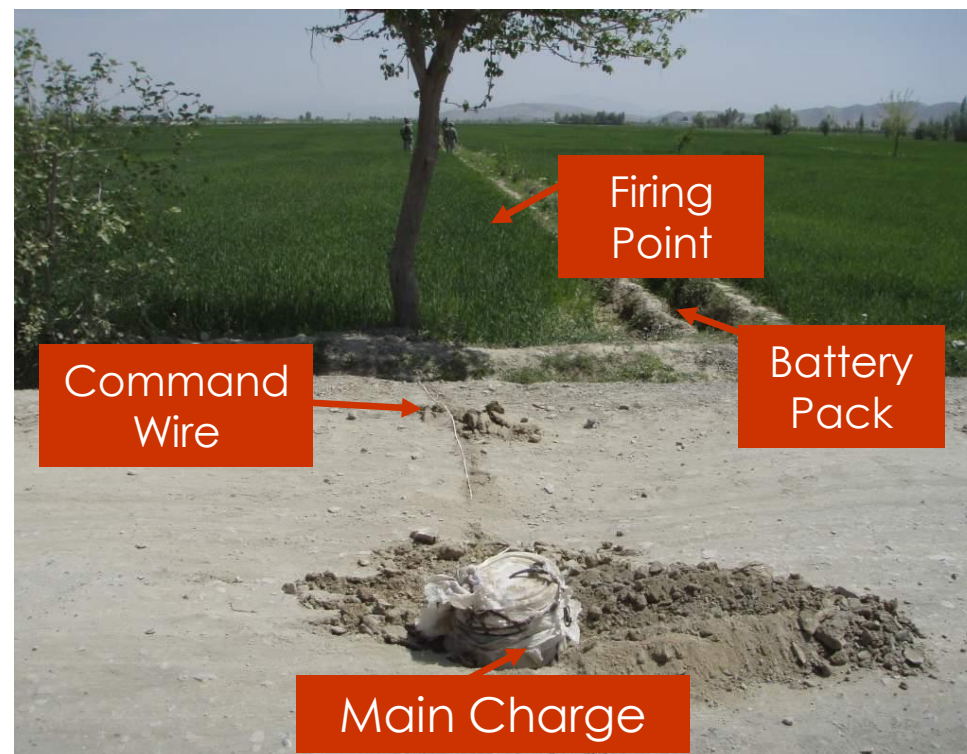
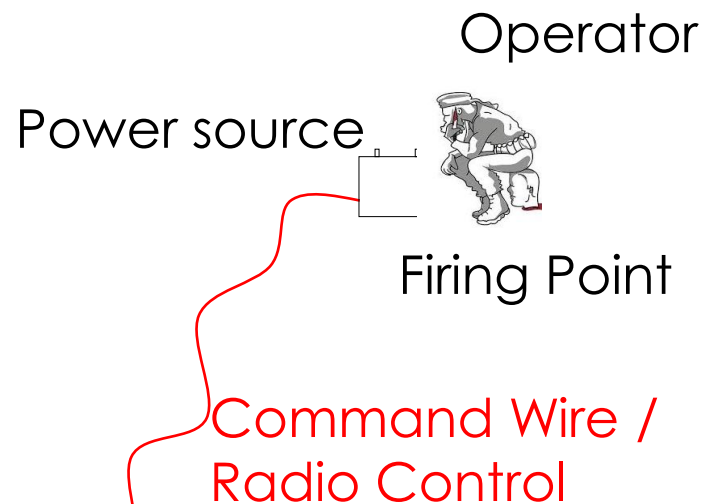




Command Initiated IED



Person Borne IED





Time Initiated IED



Igniferous Delay



Mechanical Delay



Electronic Delay

IED Indicators - AWARE



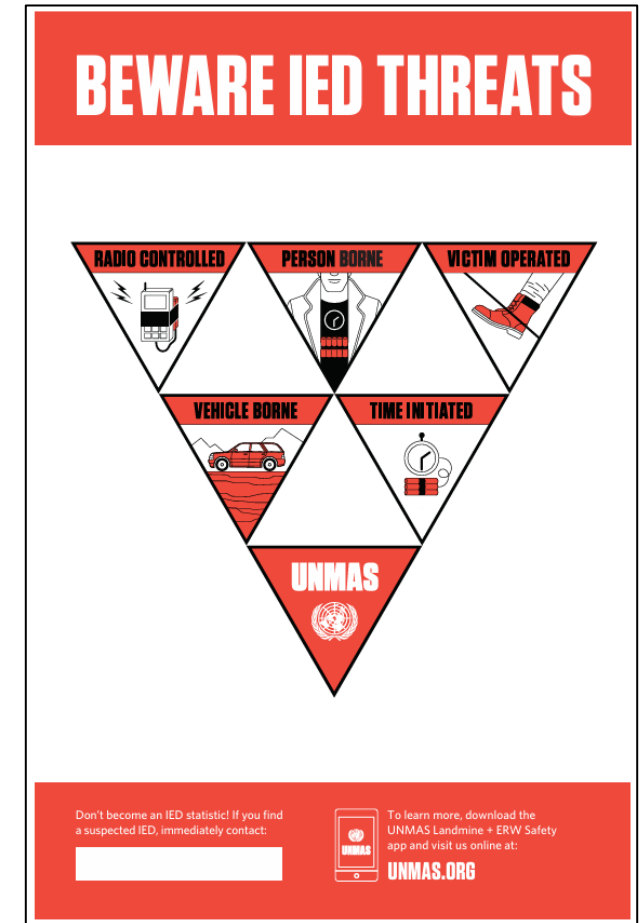
Atmospherics

Warning Signs

Aiming Markers

Recognize Ground Signs

Examine surrounding for items out of place





IED Indicators - Ground Signs

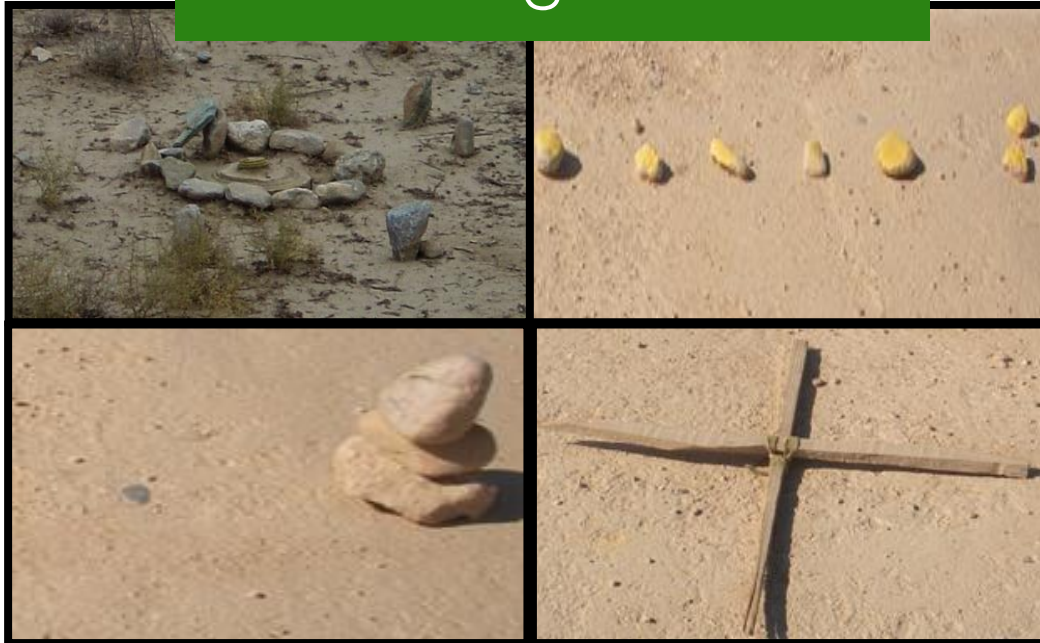


- Ground Sign: most essential indicators
- Evidence of change from natural state
- Emplacement & concealment leaves signs

IED Indicators - Warning Marker & Aiming Marker



Warning Marker



Aiming Marker

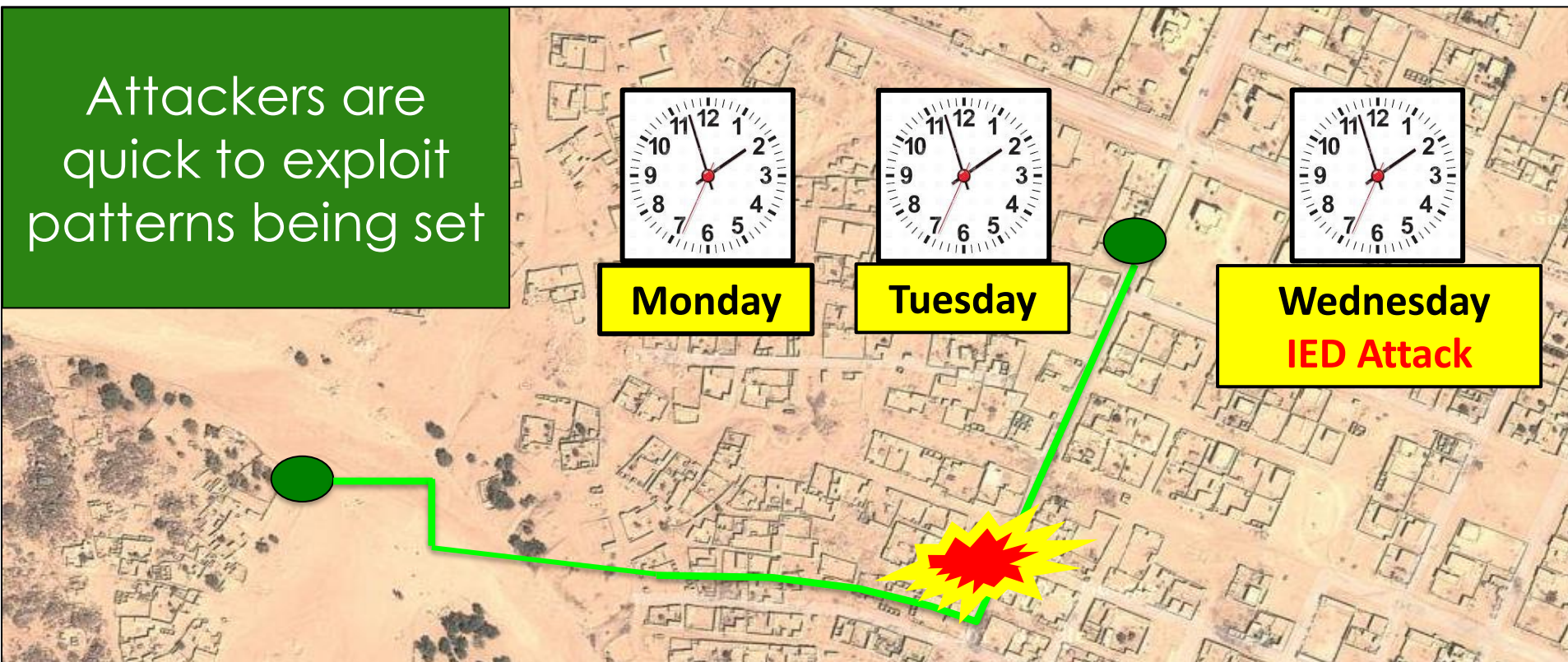


- Different warning markers
- Used by locals / terrorists to warn population
- Aiming markers - to initiate IED accurately at intended target



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

Monday, 13:30

Tuesday, 13:00

Avoid patterns and always do a risk assessment / analysis before traveling

Wednesday, 14:00



Evacuation Distance Guide

UNMAS EVACUATION DISTANCE GUIDE			
THREATS	EXPLOSIVE WEIGHT kg/lbs	MINIMUM EVACUATION DISTANCE m/ft	RECOMMENDED EVACUATION DISTANCE m/ft
PIPE BOMB	2.3 kg 5 lbs	130 m 427 ft	366 m 1,200 ft
SUICIDE BOMBER	9 kg 20 lbs	150 m 492 ft	518 m 1,700 ft
BRIEFCASE/ BACKPACK	23 kg 50 lbs	185 m 607 ft	564 m 1,850 ft
COMPACT CAR	227 kg 500 lbs	270 m 886 ft	580 m 1,900 ft
FULL SIZE CAR	457 kg 1,000 lbs	300 m 985 ft	732 m 2,400 ft
VAN/ SUV	1,814 kg 4,000 lbs	375 m 1,231 ft	1,159 m 3,800 ft
SMALL TRUCK/ MOVING VAN	4,536 kg 10,000 lbs	440 m 1,444 ft	1,555 m 5,100 ft
WATER TANKER	13,608 kg 30,000 lbs	525 m 1,723 ft	2,408 m 7,900 ft
SEMI-TRAILER	27,216 kg 60,000 lbs	570 m 1,870 ft	2,835 m 9,300 ft

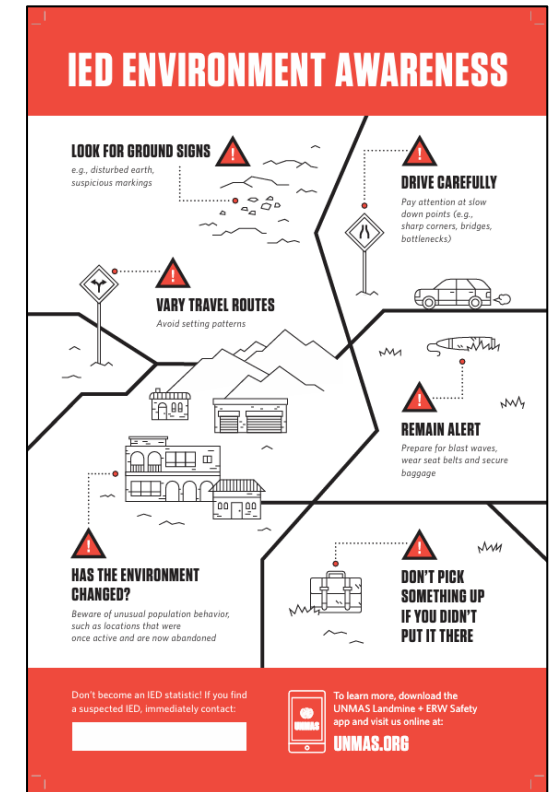


UNMAS Evacuation Distance Guide				
Threats		Explosive Weights Kg/lbs	Min Evacuation Distance M/Ft	Suggested Evacuation Distance M/Ft
Pipe Bomb		2.3kg/5lbs	130m/430ft	375m/1200ft
Suicide Bomber		9kg/20lbs	150m/500ft	525m/1700ft
Briefcase/Backpack		23kg/50lbs	190m/600ft	575m/1900ft
Compact Car		230kg/500lbs	270m/870ft	600m/2100ft
Full Size Car		460kg/1000lbs	300m/1000ft	725m/2400ft
Van/SUV		1800kg/4000lbs	375m/1275ft	1160m/3800ft
Small Truck/Moving Van		4600kg/10000lbs	440m/1450ft	1560m/5100ft
Water Tanker		13600kg/30000lbs	525m/1725ft	2410m/7900ft
Semi Trailer		27200kg/60000lbs	575m/1875ft	2840m/9300ft
CALL EOD AS SOON AS POSSIBLE				

Patrol Safety – IED Environment Awareness

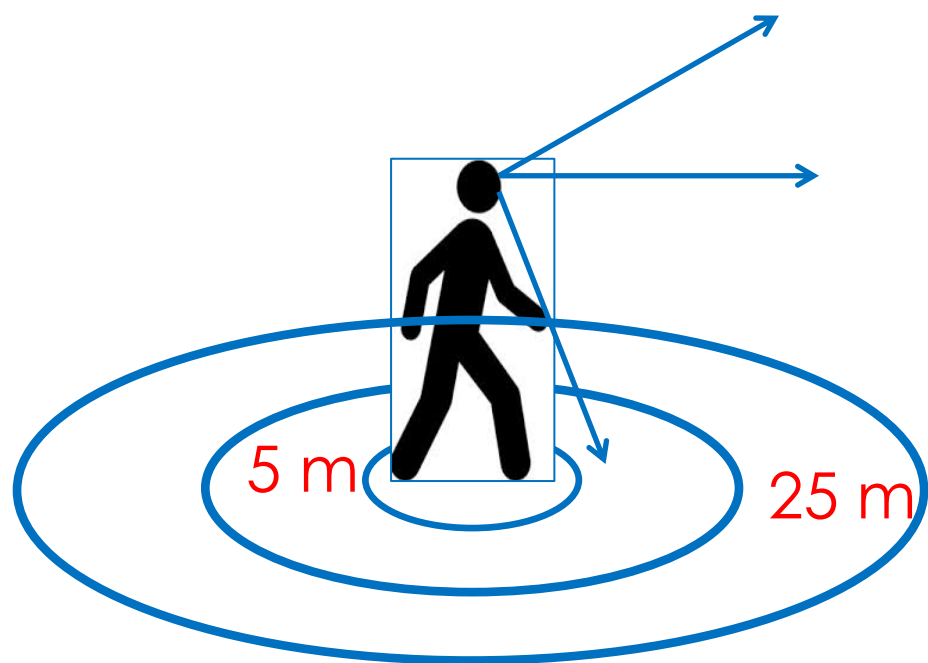


- **Before patrol:**
 - Prepare PPE and plan route
- **During patrol:**
 - Stay on the clear track
 - No short cut
 - Stop in safe area
 - Do not touch, pick up, remove, drive over suspicious objects



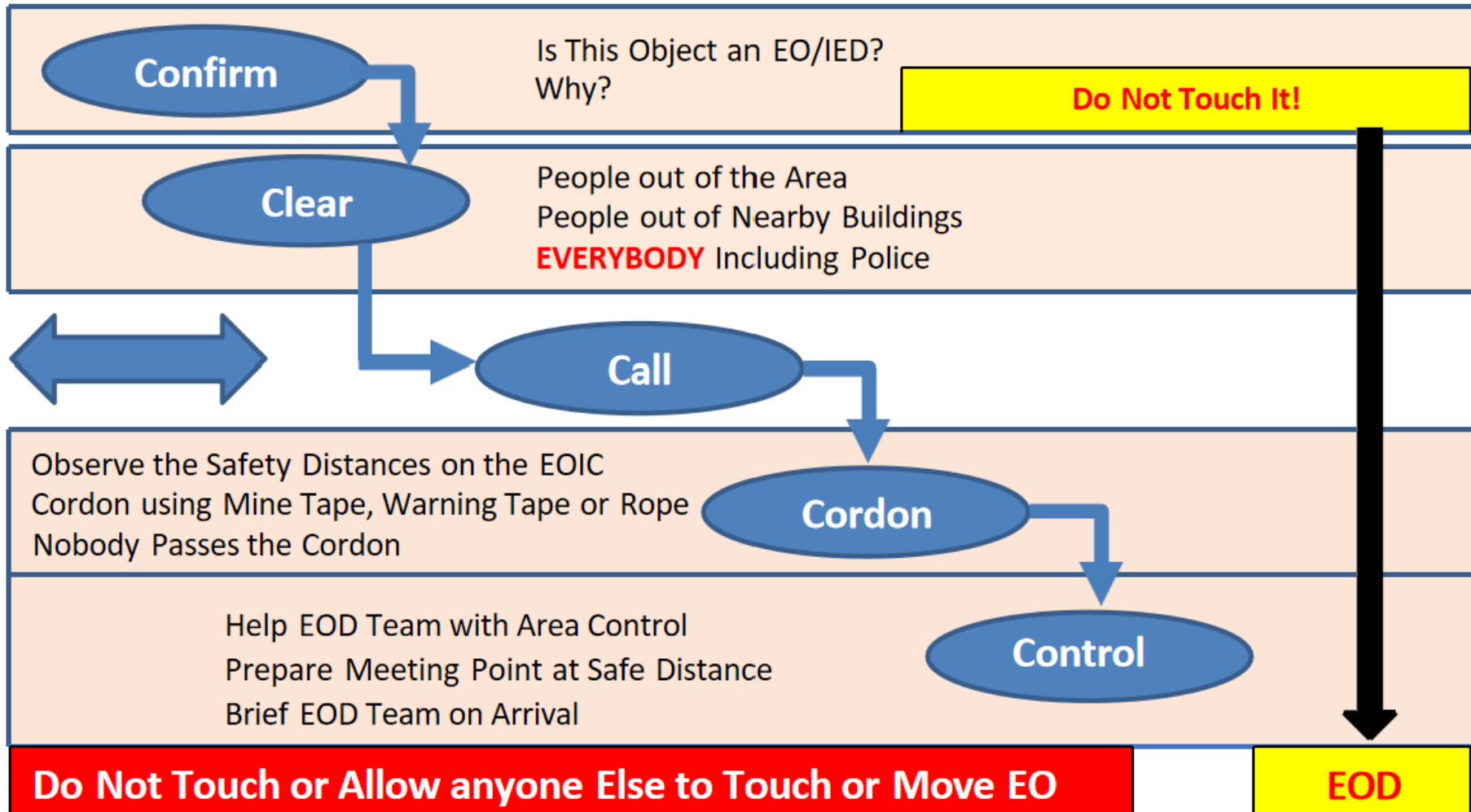


0/5/25 Meter Checks



- Look before you exit vehicle
- Search 5m around vehicle
- Expand search to 25m

Actions on Encountering EO/IED – 5 C Drill



5 Cs



Reporting

- **DO's:**

- Use the 10-Liner report format for passing information

- **DON'Ts:**

- **Don't** touch, move or disturb the EO/IED

- **Don't** use a mobile phone or radio within 50m of the EO/IED

- **Don't** allow anyone to re-enter the cordon

- **Don't** give information to unauthorised persons or to the media

SAMPLE "10-LINE" EOD (UXO/IED) INCIDENT REPORT

Recording Number and Delivery DTG		RADIO MESSAGE	
--UPONABOVE-- THIS --LINE-- RESERVED --TO-- SIGNAL SOLDIER--			
ORIGINAL AUTHORITY	DATE-TIME-GROUP	TOP SECRET	FLASH
BANBAT	062035 Z JUN 2020	SECRET	VERY URGENT
TO: SEHQ G3 CHIEF, G3 FUOPST, G3 CIED		CONFIDENTIAL	URGENT OPERATION
INFO: SEC COMD, COS, G2 CHIEF, BANBAT CHIEF		RESTRICTED	URGENT
TEXT: EOD 10-LINER REPORT (ENGLISH)		UNCLASSIFIED	ROUTINE
			DIFFERE
Serial	Heading	Information	
(a)	(b)	(c)	
1	DTG OF INCIDENT / FIND	061750 Z JUN 2020	
2	GRID OF INCIDENT:	15°50'07.04" N, 00°17'46.00" E AT AREA GOUTEHOUM	
3	DESCRIPTION OF SCENE / SUSPECTED ITEMS	UXO: SUSPECTED IED: PRESSURE PLATE	
4	CALL SIGN (C/S) ACTIVITY PRIOR TO INCIDENT/FIND	Mission/ Tasks: BANBAT PATROL WAS FALLING BACK TO TOB AFTER WATER COLLECTION FROM GAO SUPER CAMP Vehicle Types: APC and MRAP	
5	RV LOC & APPROACH	RV Coordinates:- HLZ Grid:- Safe Route: GAO ANSONGO MAIN ROAD	
6	INCIDENT COMD / POC	C/S: BN-1 Command: MAJ NASIR	
7	TACTICAL SITUATION	Hostile activity: NORMAL/ SAFE	
8	THREAT ASSESSMENT	Short Term: DISRUPTION OF ANY KIND OF MOVEMENT Long Term: PROVIDE THREAT TO MINUSMA/ IF/ LP, INFLICT CASUALTY TO MINUSMA/ IF/ MDSF/LP	
9	INITIAL C/S REQUEST	Secondary Hazards: Cordon in Place? YES Evacuation started? NOT REQUIRED Personnel protected? NOT REQUIRED	
10	REQUESTED PRIORITY Immediate Urgent (Pre-Explosion) Urgent (Post-Explosion) Minor Routine No Threat	IMMEDIATE	
Guidance to not communicate		Instructions for the message	
U3 Chief:		SIGNATURE:	
Approving Officer:		SIGNATURE:	



Basic Crater Analysis

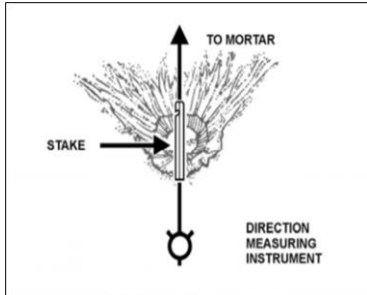


- Confirm presence of belligerent artillery
- Determine direction of source
- Verify or determine firing positions
- Detect presence of new weapons and caliber

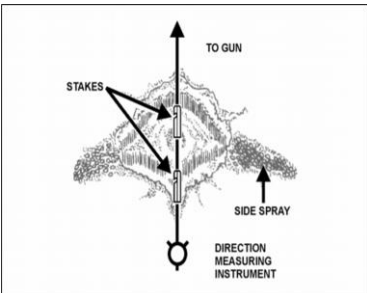
Seek help from experts for further technical crater analysis



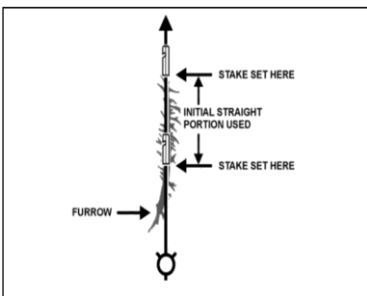
Types of Crater



- High-Angle Shell Craters



- Low-Angle Contact Fuse Craters

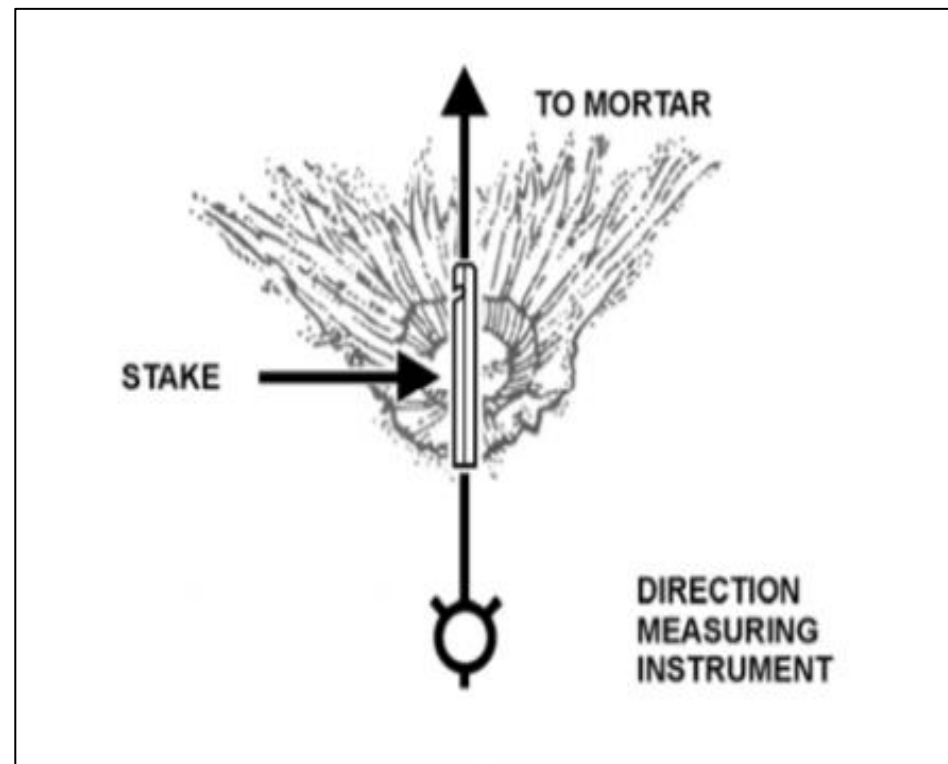


- Low-Angle Delay Fuse Craters

A typical shell/impact crater is more often an exception than a rule !!!

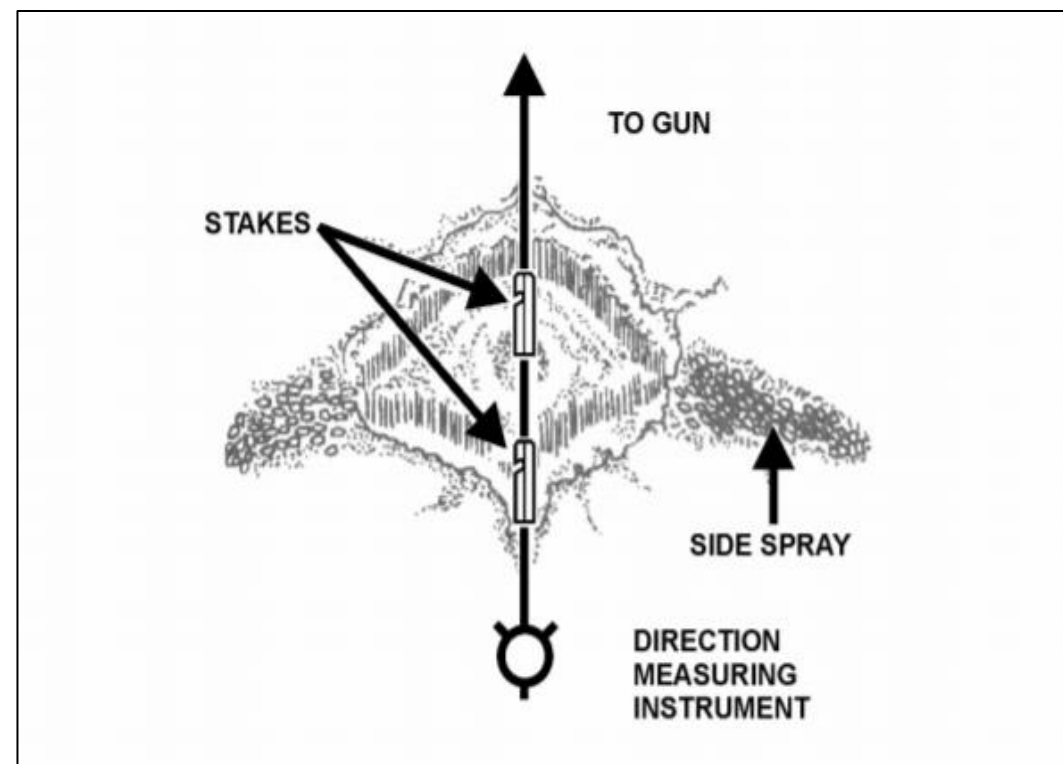


High-Angle Shell Craters



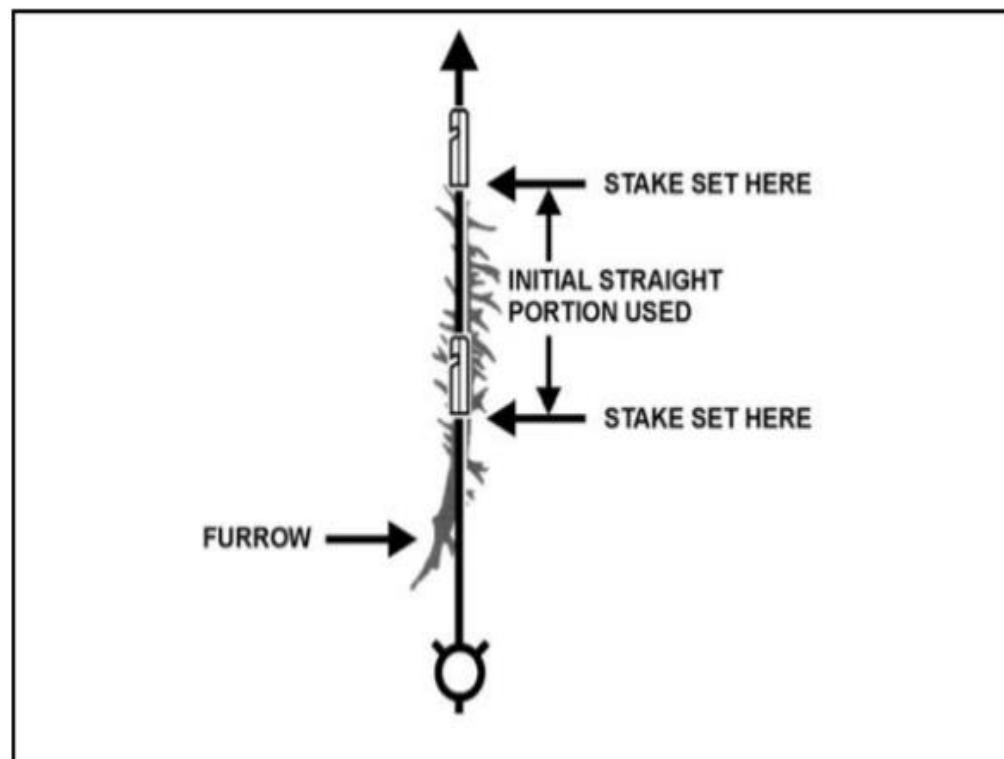


Low-Angle Contact Fuse Craters





Low-Angle Delay Fuse Craters





Summary of Key Messages

- Be aware of the different types of explosive hazards in mission
- Be familiar with the indicators, signs, markings of explosive hazards
- Keep MINED procedure, AWARE indicators, evacuation distance guide, 0/5/25-meter checks and 5 Cs in mind
- Avoiding setting patterns is the best precaution against IED threats
- Prepare PPE, plan your route before patrol, and stay alert during patrol
- Never attempt to touch or move any EO/IED, use established format and procedure to report and seek assistance from experts



Learning Activity 1

Plenary Quiz (True or False)

1. In relation to the Emergency Procedures in Minefield, the MINED procedure means:

- M – Movement stops immediately.
- I – Inform and warn the people around you.
- N – Note the area.
- E – Evaluate your course of action.
- D – Do move as fast as you can!

() True

() False

Learning Activity 1



2. During a patrol, stay on clear tracks/roads and use well-established parts of the route; however, during the rainy season is allowed to use unused, new routes or old tracks.

() True

() False



Learning Activity 1

3. If you find an EO/IED, **DO NOT**:

- Touch, move, or disturb the EO/IED.
- Use a mobile phone or radio within 50 meters of the EO/IED.
- Allow anyone to re-enter the cordon.
- Give information to civilians or the media.

() True

() False



Learning Activity 2

Group discussion

Total Time: 20 min

Preparation: 12 min

Discussion: 8 min

- What should UNMO do upon finding a landmine or ERW?
- What should UNMO do if they accidentally enter a minefield?
- List some common IED indicators and briefly explain each one.