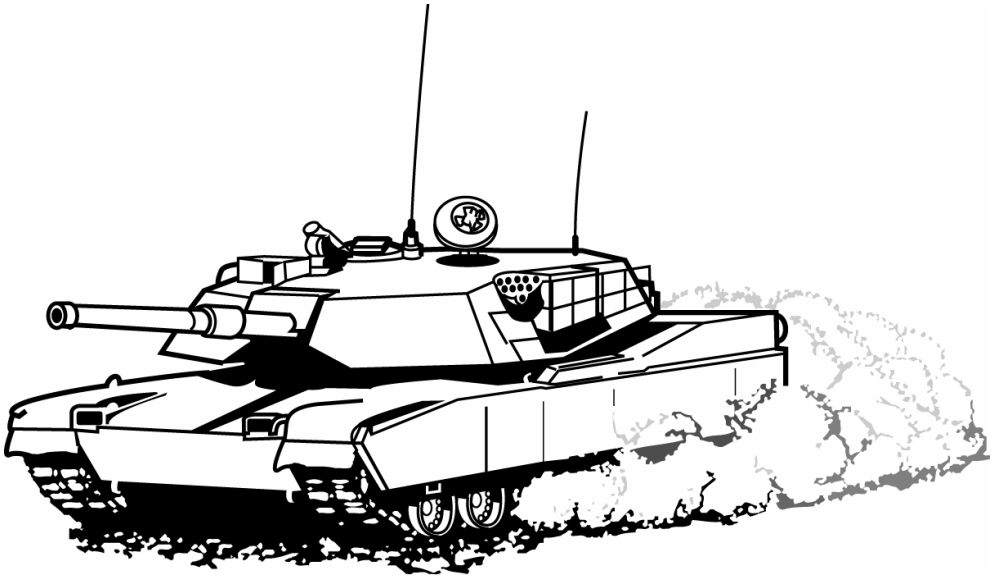
TANK COMMANDER



TACTICAL POCKET HANDBOOK

June 2006

TANK COMMANDER
TACTICAL POCKET CHECKLIST

The Distance Learning & Technologies Department (DLTD)
publishes and distributes this manual.

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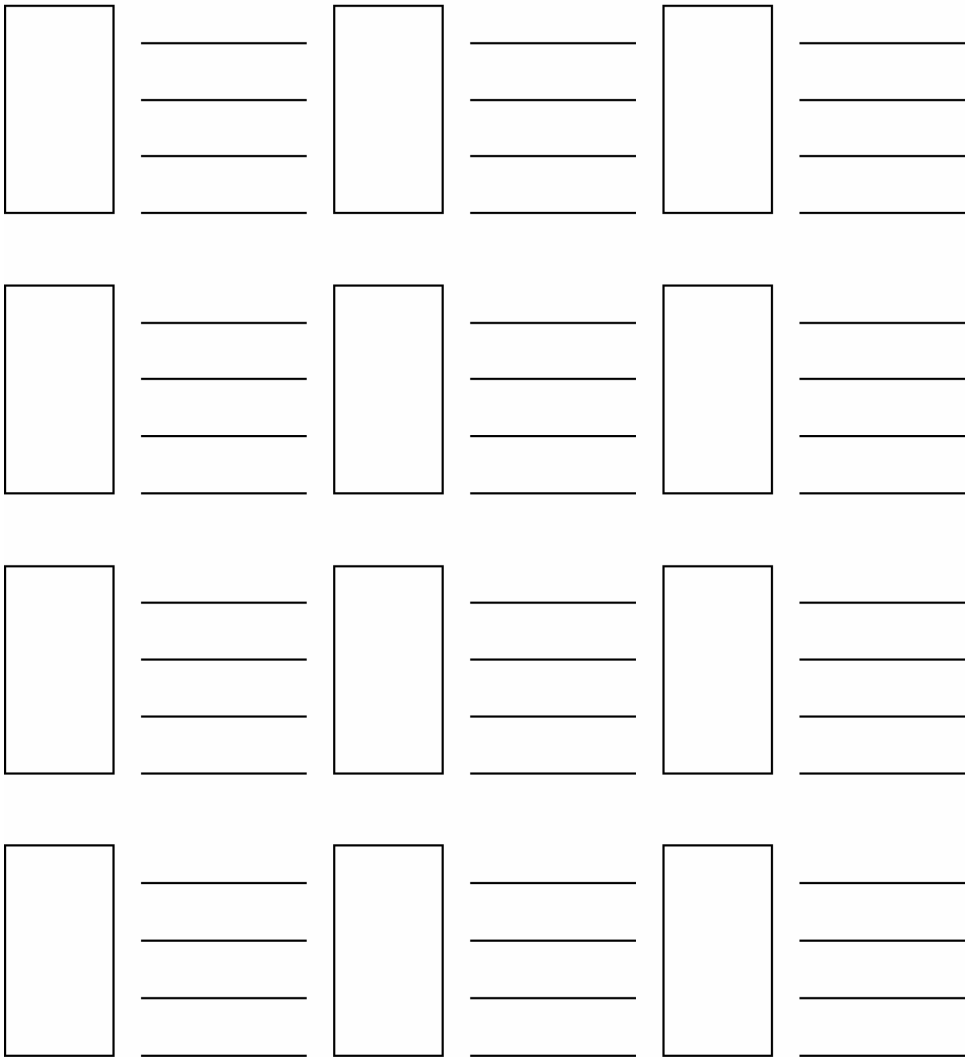
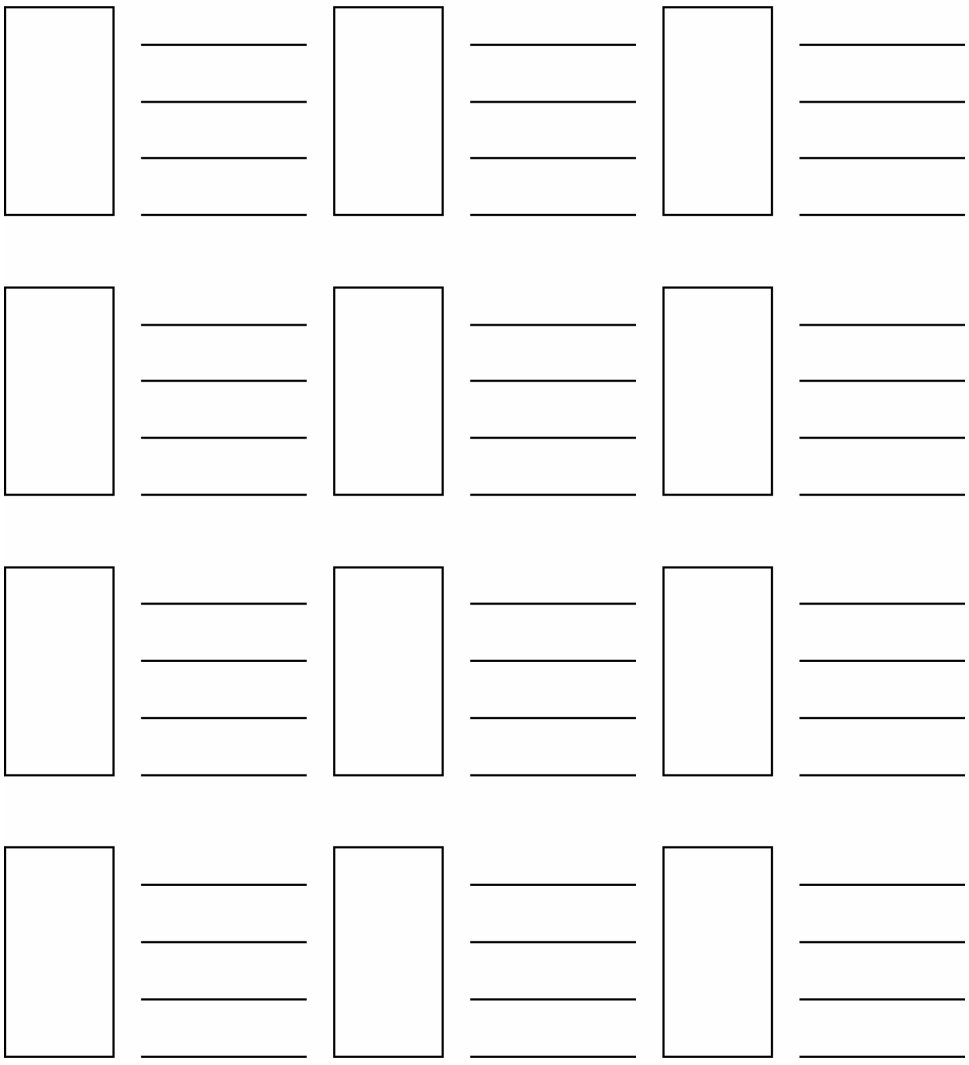
Crew Roster



Crew Roster



PERSONNEL MANIFEST

DATE:_____ **VEHICLE SER #: _____**

NAME	RANK	SSN

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120mm Main Gun Ammunition

Sabot
M829A3 APFSDS-T
M829A2 APFSDS-T
M829A1 APFSDS-T
M829 APFSDS-T (limited availability)
T-S1 M865

HEAT
M830 HEAT-MP-T
M831 HEAT-TP-T
M31A1 HEAT
M908 HE-OR-T

MPAT
M830A1 MPAT
M1002 TPMP-T

Canister
M1028 Canister

M2 .50 Cal. Machinegun

Weight of Receiver Group:	60 pounds
Weight of Barrel:	24 pounds
Maximum Effective Range:	1,200 to 1,600 meters (tracer burnout)
Maximum Range:	6,700 meters
Rate of Fire (sustained):	40 rounds or less per minute
Rate of Fire (Rapid):	More than 40 rounds per minute
Rate of Fire (cyclic):	450-550 rounds per minute
Muzzle Velocity (M2 Ball):	3050 feet per second (2,080 mph)
Ready Ammunition:	100 rounds
Length of Weapon:	65 inches

Caliber .50 Ammunition

Cartridge, Caliber .50 Ball, High pressure test, M1
Cartridge, Caliber .50 Blank, M1
Cartridge, Caliber .50 Blank M1A1
Cartridge Dummy, Caliber .50 M2
Cartridge, Caliber .50 Ball M2
Cartridge, Caliber .50 Ball M33
Cartridge, Caliber .50 Tracer, M1
Cartridge, Caliber .50 Tracer, M10
Cartridge, Caliber .50 Tracer, M17
Cartridge, Caliber .50 Incendiary, M1
Cartridge, Caliber .50 Incendiary, 23
Cartridge, Caliber .50 Ball, Armor Piercing, M2

M2 .50 Cal. Machinegun Misfire Procedures

COLD GUN (less than 150 rounds fired in 2 or more minutes)

1. Wait 5 seconds in case of a hang fire
2. Charge weapon and let bolt go home, observe ejection
3. Depress trigger and attempt to fire
4. If weapon fails to fire, wait 5 seconds, charge weapon locking the bolt to the rear
5. Open cover assembly, and remove belt of ammunition
6. Check to determine cause of stoppage

HOT GUN (150 or more rounds within a 2 minute period)

Caution: Do not open the cover assembly.

Warning: Immediate action must be applied within 10 seconds. The danger of a cook-off condition exists when the barrel is hot. Keep the weapon trained on the target.

Note: If the bolt cannot be retracted, keep the weapon trained down range. Allow 12 minutes for cooling. Notify the unit armorer for assistance. NEVER remove the backplate assembly from any weapon until the chamber has been cleared.

1. Wait 5 seconds for hang fire.
2. Apply immediate action. Fully retract the bolt assembly. Observe if the ejection occurs at the same time.
3. If a live round/ fired case ejects, attempt to fire the weapon.
4. If the weapon fires, continue to fire.
5. If the weapon fails to fire, allow at least 15 minutes of waiting time (cooling period).
6. After 15 minutes cooling, open the cover assembly, remove the ammunition belt, close the cover, retract the bolt assembly, and observe the ejection.
7. If a live round/ fired case ejects, the weapon is clear.
8. If no ejection, open the cover assembly and ensure the chamber is clear, move any obstruction.
9. Check the weapon (disassemble to determine the cause of the stoppage.)

M240 7.62mm Machinegun

Weight:	25.6 pounds
Maximum Effective Range:	1800 meters
Maximum Range:	3725 meters
Tracer Burnout:	900 meters
Grazing Fire:	600 meters
Rate of Fire (sustained):	100 rounds per minute
Rate of Fire (Rapid):	200 rounds per minute
Rate of Fire (cyclic):	650-950 rounds per minute
Muzzle Velocity (M2 Ball):	3050 feet per second (2,080 mph)
Ready Ammunition Loader:	100 rounds
Ready Ammunition Coax:	2,800 rounds
Length of Weapon:	45 inches

7.62 Ammunition

Cartridge, Ball M80
Cartridge, Tracer M62
Cartridge, Armor-Piercing M61
Cartridge, Dummy, M63
Cartridge, Blank M82

M240 Machinegun Immediate Action Procedures

Cold Gun

1. Announce “Stoppage.”
2. Charge the machinegun and observe the round or case ejection.
3. Attempt to fire.
4. If the gun did not fire, clear the weapon.

Hot Gun

1. Announce “Stoppage.”
2. Charge the machinegun and observe the round or case ejection.
3. Attempt to fire.
4. Wait 15 minutes and clear the weapon.

M250/M257 Grenade Launcher

Grenade	Spectrum Screened	Fill Material	Time to Effective Cloud	Obscuration Duration
L8A3	Visual	Red phosphorous	8 seconds	3 to 4 minutes
M76	Visual plus IR	Brass flake	2 seconds	45 seconds
M82	Visual	Titanium dioxide (smoke agent)	2 seconds	45 seconds
M81	IR plus radar	Brass flake and graphite	2 seconds	20 seconds

M250/M257 Smoke Grenade Launchers

Quantity: 2 assemblies, 6 grenades per
Grenade Type: UKL8A1, UKL8A3, M76, M82, and M81

Misfire Procedures

1. Keep vehicle pointed down range. Keep personnel under cover until misfire is cleared.

2. Wait 10 seconds after the fire attempt.

3. Place turret power and grenade power switch to off and back on.

4. Depress fire buttons and attempt to fire.

5. If the grenade fails to fire, place the grenade power switch and turret power switch to off.

6. Check the discharge tubes for unfired rounds. Stay clear of the discharger tubes. Once a round is located, check to ensure that it is firmly seated. Rotate the round 90 degrees.

7. Close all hatches, turn turret power to on, grenade power on, depress fire switches to fire.

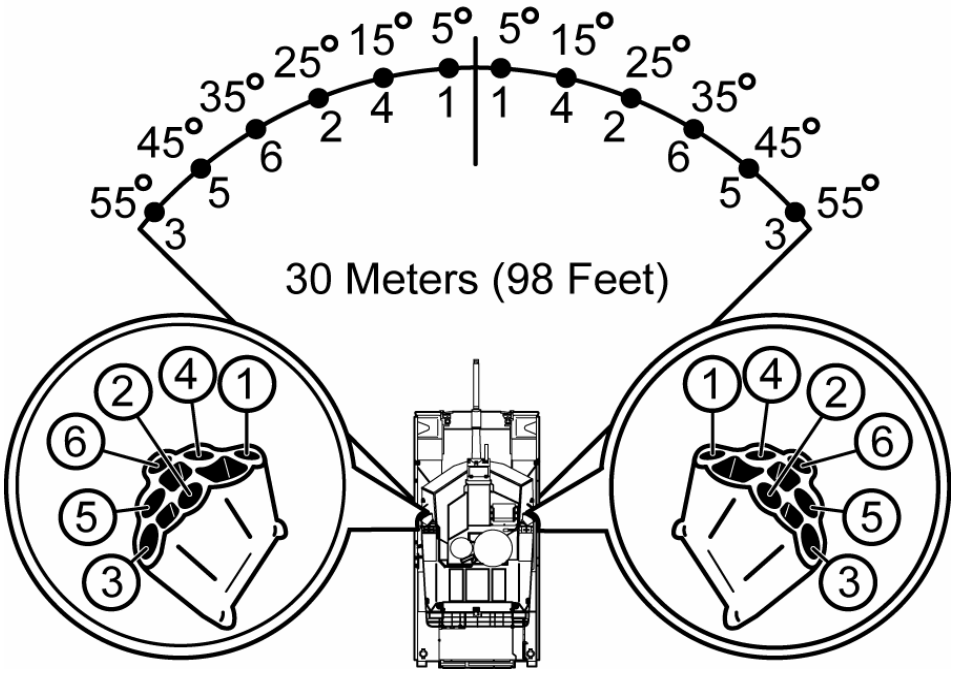
8. If the grenade still fails to fire, release the fire switches and turn the grenade and turret power switches to off. Wait 10 seconds.

9. Remove the grenade, load it in another tube and attempt to fire, steps 6 and 7.

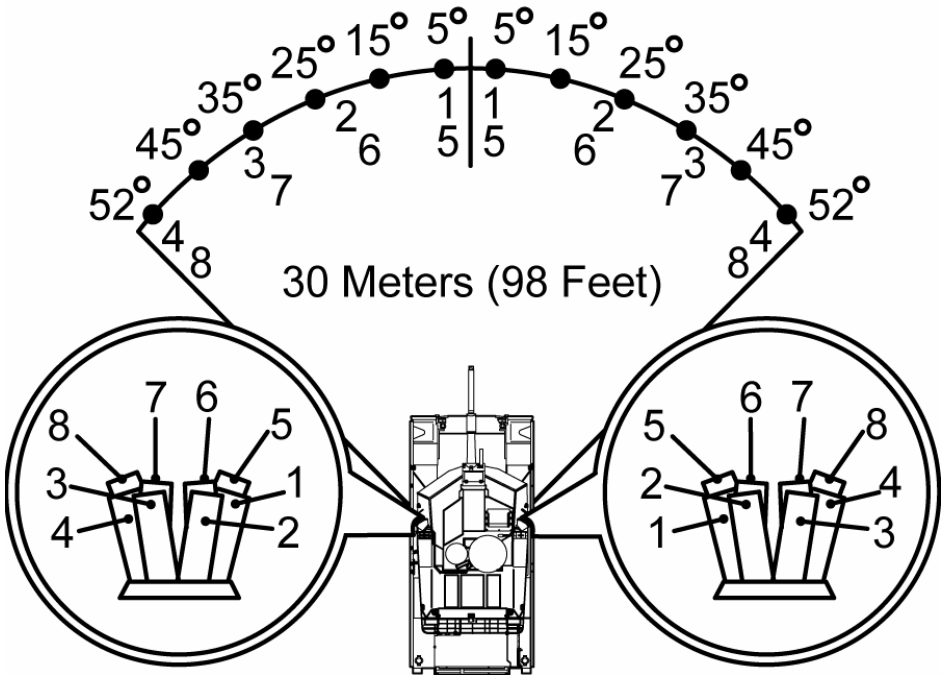
10. If the grenade will not fire, remove it and dispose of it as current Marine Corps directives tell you.

11. At the earliest possible opportunity, have maintenance check out the grenade system electrical circuit.

Salvo Pattern M250



Salvo Pattern M257



Fire Command M1A1

Alert – “Gunner”

Ammunition or Weapon – “Sabot”

Description – “Tank”

Direction (optional) – “Traverse Right – Steady – On”

Range (optional) – “One Two Hundred”

Execution – “Fire”

Alert - _____

Ammunition/Weapon - _____

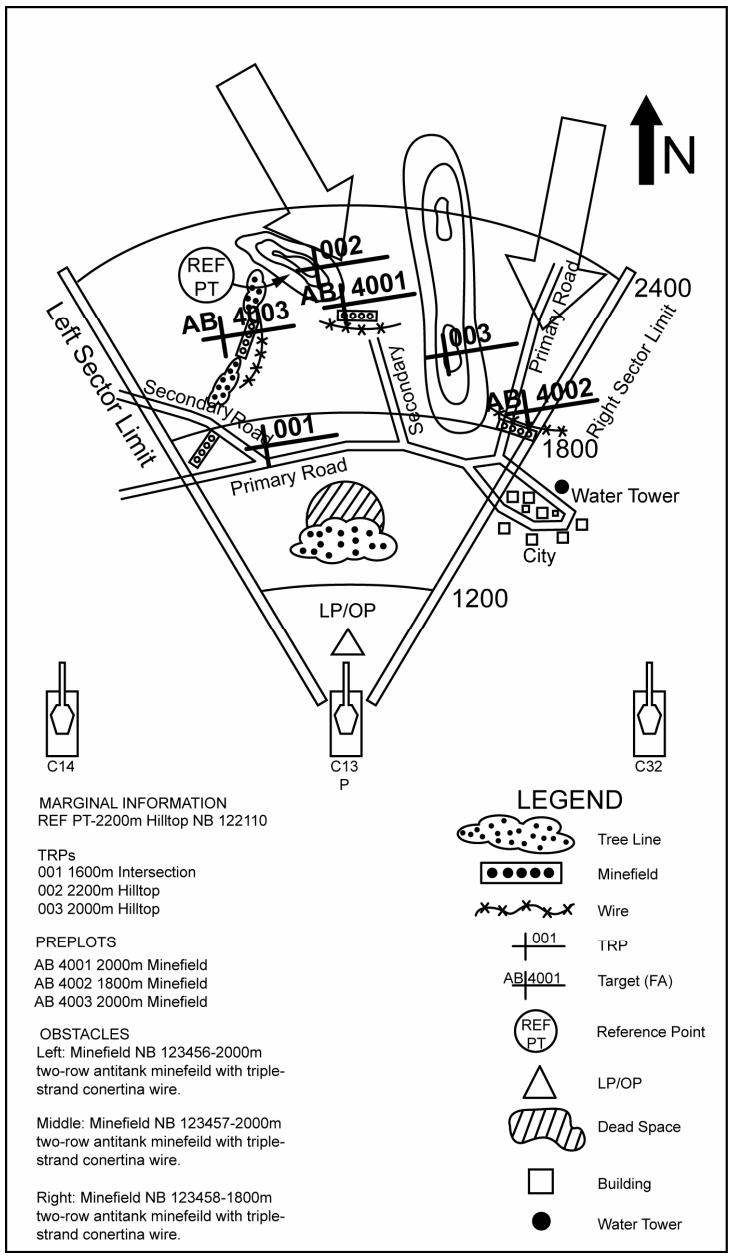
Description - _____

Direction - _____

Range - _____

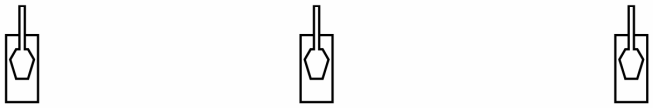
Execution - _____

Range Sketch Example



Range Sketch

N



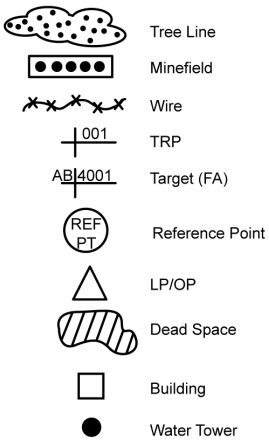
MARGINAL INFORMATION

TRPs

PREPLOTS

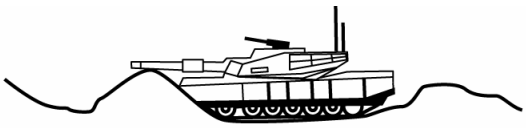
OBSTACLES

LEGEND

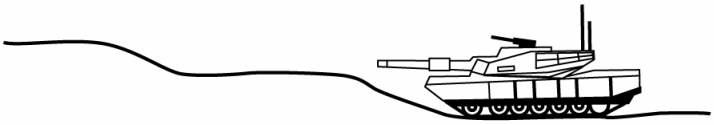


Sketch Card Notes

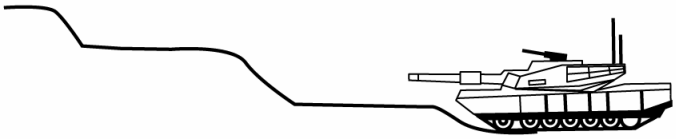
Fighting Positions



Hasty Fighting Position (Hull Down)



Deliberate Two-Tiered Fighting Position (Turret Down)



Deliberate Three-Tiered Fighting Position (Hide)

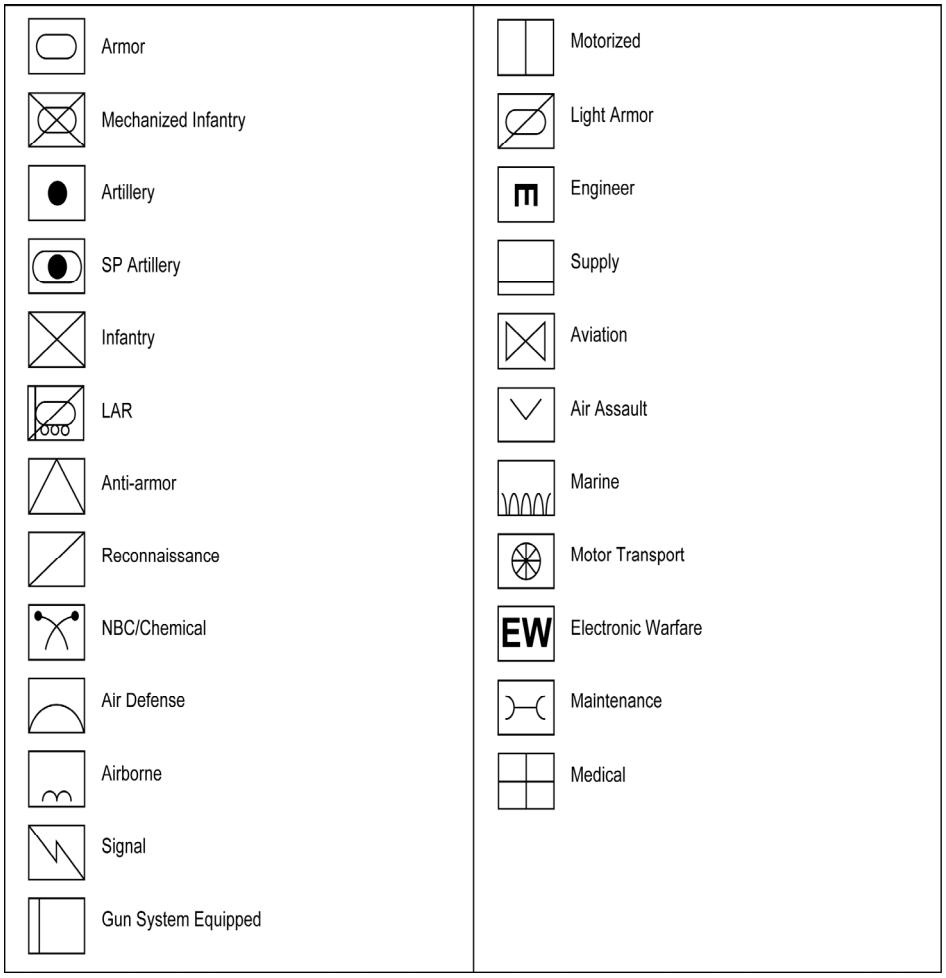
Map Symbols

Positions	
Battle	
Supplementary	
Strong point	

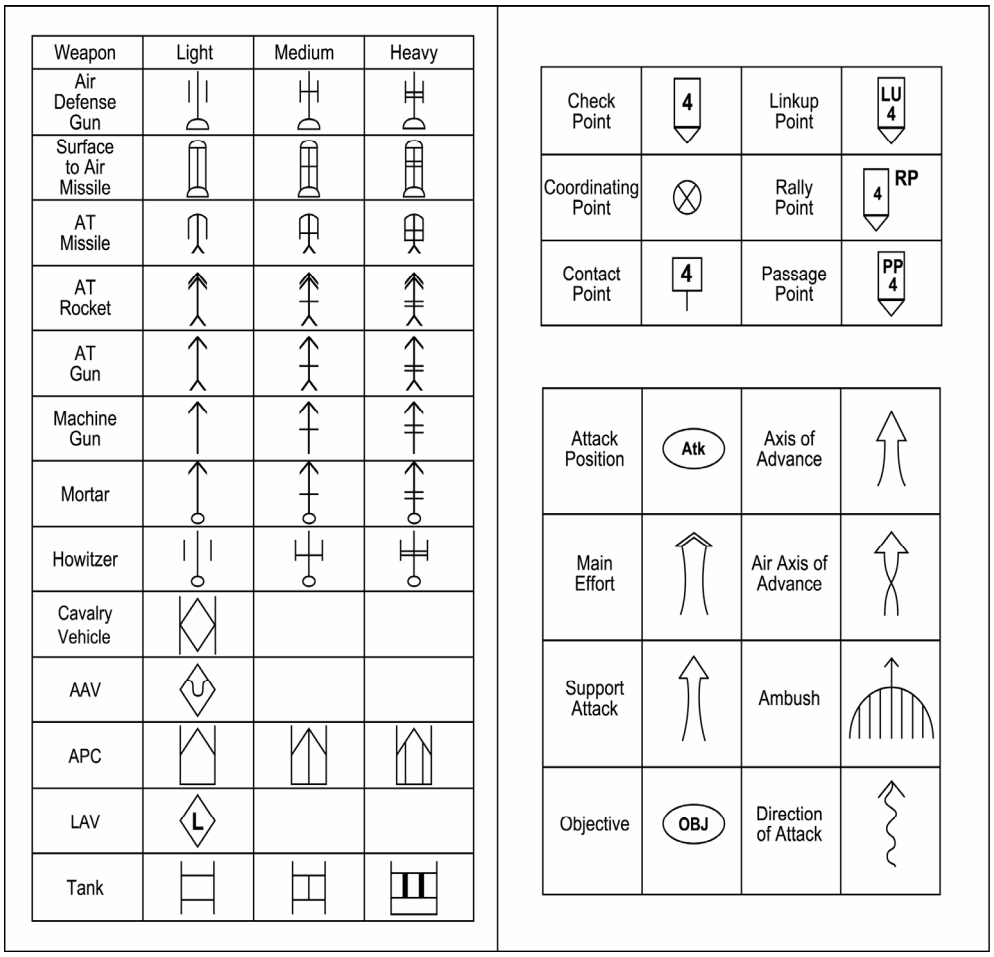
Frames	
Unit	
Command Post	
Observation Post	
Logistical/Medical	
Enemy Unit	

Unit Size	
Fire Team	
Squad	●
Section	●●
Platoon	●●●
Company	|
Battalion	||
Regiment	|||
Brigade	X
Division	XX
MEF/Corps	XXX

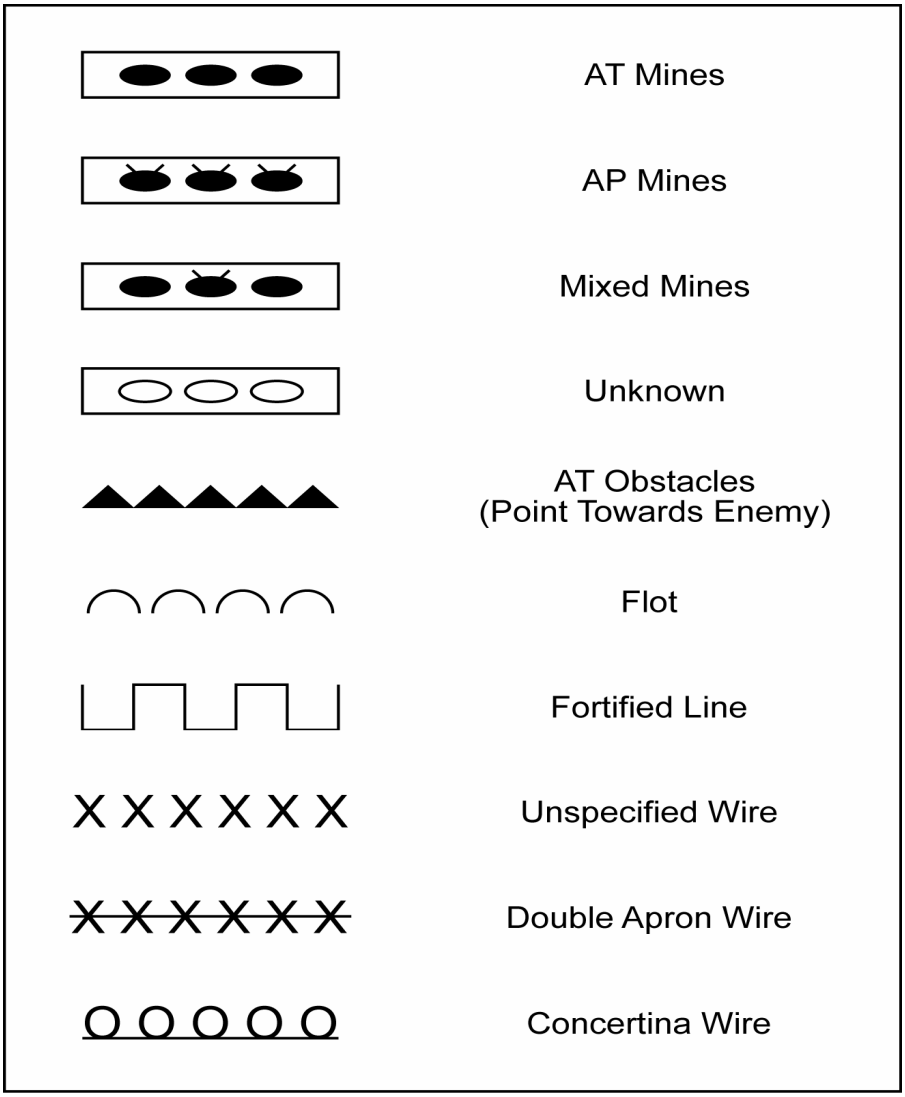
Unit Types


Armor
Mechanized Infantry
Artillery
SP Artillery
Infantry
LAR
Anti-armor
Reconnaissance
NBC/Chemical
Air Defense
Airborne
Signal
Gun System Equipped
Motorized
Light Armor
Engineer
Supply
Aviation
Air Assault
Marine
Motor Transport
EW
Electronic Warfare
Maintenance
Medical

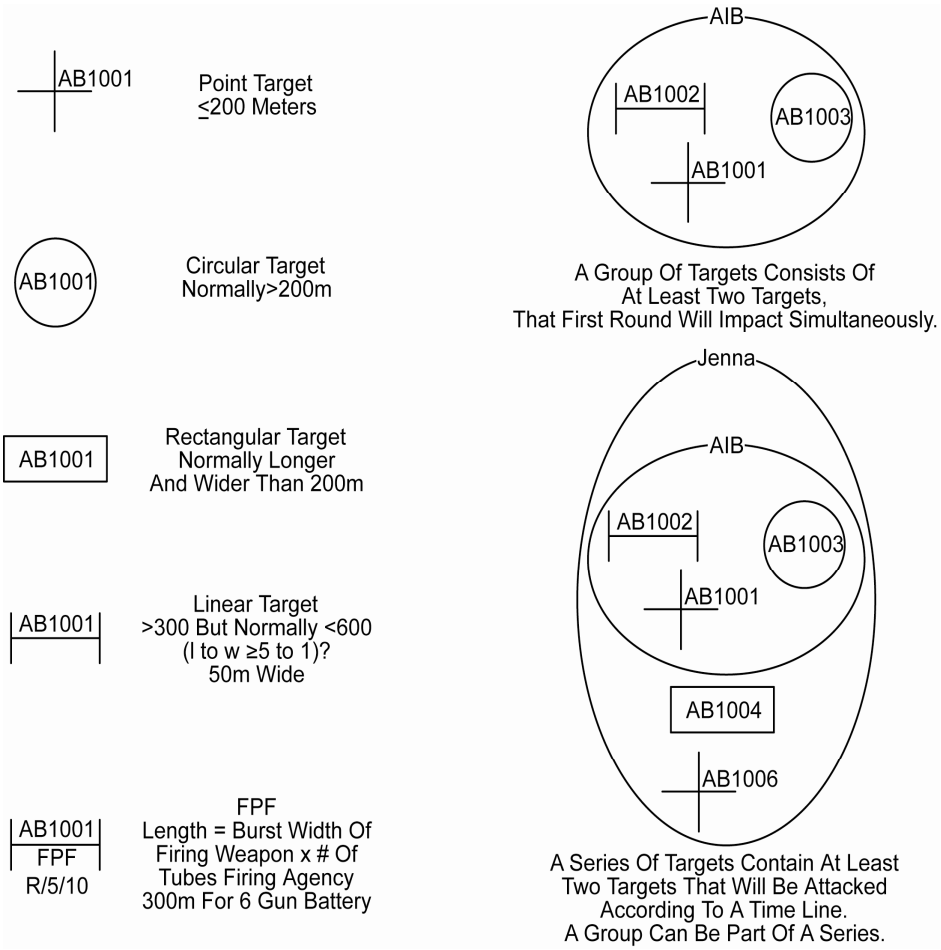
Weapons and Control Measures



Mines and Fortifications



Targets


AB1001
Point Target
≤200 Meters
AB1001
Circular Target
Normally>200m
AB1001
Rectangular Target
Normally Longer
And Wider Than 200m
AB1001
Linear Target
>300 But Normally <600
(l to w ≥5 to 1)?
50m Wide
AB1001
FPF
R/5/10
FPF
Length = Burst Width Of
Firing Weapon x # Of
Tubes Firing Agency
300m For 6 Gun Battery
AIB
AB1002
AB1003
AB1001
A Group Of Targets Consists Of
At Least Two Targets,
That First Round Will Impact Simultaneously.
Jenna
AIB
AB1002
AB1003
AB1001
AB1004
AB1006
A Series Of Targets Contain At Least
Two Targets That Will Be Attacked
According To A Time Line.
A Group Can Be Part Of A Series.

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Threat Tanks

THREAT	Main Gun (mm)	Max Rate of Fire (rds/min)	Max Range (m): Effective (m):	Optional Arms	Crew	Rd Speed (km/h)	Rd Range (km)
T-55AMV (Russia)	100	5-7	2500-4000 1000-2500	7.62 12.7 AT-10	4	50	390/600 w/extra tanks
T-62M (Russia)	115	3-5	1500-4000 1200-2000	7.62 AT-10	4	45	450/650 w/extra tanks
T-64B (Russia)	125	6-8	3000-5000 2000-3000	7.62 12.7 AT-8	3	60	500 w/extra tanks
T-72B (Russia)	125	4-6	3000-5000 2000-3000	7.62 12.7 AT-11	3	60	500/900 w/external tanks
T-80U (Russia)	125	7-8	3000-5000 2000-4000	7.62 12.7 AT-11	3	70	335/600 w/extra tanks
T-90 (Russia)	125	7-8	3000-5000 2000-4000	7.62 12.7 AT-11	3	60	500/650 w/extra tanks
Type 59-II (China)	105	6-10	3000-5000 1500-3000	2 x 7.62 12.7	4	50	440/600 w/external tanks
Type 85-IIM (China)	125	4-6	3000-5000 2000-3000	7.62 12.7	3	57	700/900 w/external tanks

Threat Personnel Carriers

THREAT	Type	Main Gun (mm)	Max Effective Range (meters)	Optional Arms	Total Personnel (crew/troops)	Rd Speed (km/h)	Rd Range (km)
BRDM –2 (Russia)	2 X 2 Wheeled Recon	14.5	2000	7.62	4/0	95	750
BRM-3K (Russia)	Tracked Recon	30 Auto Gun	2500-4000	7.62	6/0	70	600
BTR-60 (Russia)	4 x4 Wheeled APC	7.62 14.5	1000 2000	N/A	2/8	80	500
BTR-70 (Russia)	3 x 3 Wheeled APC	14.5 AT-3/4/5	2000 3000-4000	7.62	2/8	80	600
BTR-80A (Russia)	4 x 4 Wheeled APC	30 Gun	2000-4000	7.62	2/8	90	800
BTR-94 (Russia)	4 x 4 Wheeled APC	23 Gun	1500	7.62	3/10	80	800
BTR-152 (Russia)	3 x 3 Wheeled APC	7.62	1000	12.7	2/17	65	650
BTR-D (Russia)	Tracked APC	7.62	1000	N/A	1/12	61	500
BMD-1 (Russia)	Tracked IFV	73 Smooth AT-3	800-1000 3000	7.62	2/6	65	600
BMD-2 (Russia)	Tracked IFV	30 Auto Gun AT4/5	1500 2000-4000	7.62	2/8	80	450
BMD-3 (Russia)	Tracked IFV	30 Auto Gun AT-5	1500 4000	30mm GL 7.62 5.45	3/7	70	500
BMP-1 (Russia)	Tracked IFV	73 Smooth AT-3	800-1300 3000	7.62	3/8	65	600
BMP-2 (Russia)	Tracked IFV	30 Auto AT-4/5	1500-4000 2000-4000	7.62	3/7	65	600
BMP-3 (Russia)	Tracked IFV	100 Gun AT-10 30 Auto	4000-5200 4000 1500-4000	7.62	3/7	70	600
MT-LB (Russia)	Tracked Multi-purpose Vehicle	7.62	1000	N/A	2/11	61.5+	500
VTT-323 (N. Korea)	Tracked APC	2 x 14.5 ATGM	1500 3000	N/A	3/9	80	450
WZ 551 (China)	3 x 3 Wheeled APC	25 Auto Gun	2000	7.62	3/10	85	600
YW 531A/C (China)	Tracked APC	12.7	800-1600	N/A	4/10	42/66	500

Threat Rotary Wing

THREAT	Armament Options	Cruising Speed (km/h)	Range (km): Max Load Normal Load W/Aux fuel	Crew/ Passengers
Mi-2 Hoplite (Russia)	23mm Gun 7.62/12.7 MG 57mm Rockets AT-3 SA-7b	194	580 340 790	1/6-8
Mi-8 Hip (Russia)	Twin 23mm Gun Pod 2 x 7.62 or 1 x 12.7 MG 12.7 MG Pod 80mm Rocket Pods 57mm Rocket Pods AT-2/3 250/500 kg Bombs	225	Unk 460 950	2-3/24
Mi-17 Hip (Russia)	Twin 23mm Gun Pod 2 x 7.62 or 1 x 12.7 MG 12.7 MG Pod 80mm Rocket Pods 57mm Rocket Pods AT-2/3 250/500 kg Bombs	240	Unk 495 1065	2-3/24
Mi-24 Hind (Russia)	Twin 30mm Gun 12.7 (4 barrel) MG Twin 23mm Gun Pods 80mm Rocket Pods 57mm Rocket Pods AT-2/6 250/500 kg Bombs	295	Unk 450 950	2/8
Mi-28 Havoc (Russia)	30mm Cannon Twin 23mm Gun Pod 4 x 57 or 80mm Rocket Pod 500 kg Bomb 4 x AT-6/9	260	Unk 475 1100	2/0
Ka-50 Hokum (Russia)	2 x 23mm Gun Pods 30mm Cannon 500 kg Bombs 80 mm Rocket AT-16 AAM	270	Unk 460 Unk	2/0

Threat Fixed Wing

Threat	Armament Options	Combat Range (km)
MiG-21 Fishbed (Russia)	23mm Gun 30mm Gun Bombs Rockets	465 – 925
MiG-25 Foxbat (Russia)	Missiles Bombs	1730
MiG-23/27 Flogger (Russia)	23mm Gun 30mm Gun Bombs Rockets	1150
MiG-29 Falcrum (Russia)	30 mm Cannon Bombs Rockets	630-1500
Su-17 Fitter (Russia)	2 x 30mm Guns Bombs Rockets	330 – 685
Su-24D Fencer (Russia)	23mm Gun Bombs (Inc. Nuclear) Rockets	950
Su-25 Frogfoot (Russia)	30mm Gun Bombs Rockets ATGM's	556
Su-27 Flanker (Russia)	30mm Cannon Gun Pods Bombs Rockets	1500

Artillery/Mortar
CALL-FOR-FIRE

I. OBSERVER IDENTIFICATION: Use callsigns from the CEOI

II. WARNING ORDER:

a. Type of Mission:
   (1) Adjust Fire
   (2) Fire for Effect
   (3) Suppress (Planned Target)
   (4) Immediate Suppression/Immediate Smoke
   (5) Suppression of Enemy Air Defense (SEAD)

b. Size of Element to Fire:
   (1) Omission indicates a request for one artillery battery.
   (2) Larger units by stating the last letter of the battalion callsign.

c. Method of Target Location:
   (1) Grid: No announcement.
   (2) Polar Plot: Announce the word "POLAR."
   (3) Shift from a Known Point: Announce the word "SHIFT FROM" followed immediately by the designation of the known point or by tgt number.
   (4) Laser Polar: Announcing "LASER POLAR."

----------OVER----------

III. TARGET LOCATION:

a. Grid: Six-digit grid, i.e., "Grid 123456."
b. Polar: Direction (mils) and distance (meters) to the target from the observer's position.
c. Shift: Direction to the target (mils).
   Lateral Shift (left/right in meters).
   Range Shift (add/drop in meters).
   Vertical Shift (up/down in meters) if significant (≥35M).

----------OVER----------

IV. TARGET DESCRIPTION:

A word picture of the target (i.e., the number and type of vehicles/personnel observed, what the target is doing, number of elements in the target, degree of protection, size, and shape [length, width, attitude]).

V. METHOD OF ENGAGEMENT (Bold indicates standard):

a. Type Adjustment:
   (1) **Area Fire**: Standard without request.
   (2) Precision Fire: Used only with destruction or registration missions. Observer announces "Destruction."
b. Danger Close: Announced when applicable. (See page 4)
c. Mark: Used for orientation.
d. Trajectory:
   (1) **Low Angle**: Standard without request.
   (2) High Angle: Upon request of observer or when required due to masking terrain.
e. Ammunition:
   (1) Shell/Fuze desired in the Adjustment phase (**HE/Q**).
   (2) Shell/Fuze desired in the Fire for Effect phase.
   (3) Volume of fire desired in Fire for Effect stated in rounds per howitzer.
f. Distribution: Type sheaf desired. (**Circular,** Parallel, Converged, Open, or Special [Linear, Rectangular, or Irregular])

VI. METHOD OF FIRE AND CONTROL (Bold indicates standard):

a. Method of Fire:
   (1) **One weapon** is standard for adjustment phase.
   (2) Battery/platoon right/left on request.
   (3) Time interval (5 seconds between adjusting rounds if using more than one weapon.)
b. Method of Control:
   (1) **Fire when ready**: Standard without request.
   (2) At My Command (AMC)/By round at my command (BRAMC): Weapons fire at observer's command until cancelled
   (3) Cannot Observe: Fire will not be observed.
   (4) Time On Target: Rounds impact at a specified time.
   (5) Continuous Illumination: FDC will determine when to fire. (See page 12)
   (6) Coordinated Illumination: The firing of HE in coordination with illumination at optimum illumination. Observer may determine when illumination is fired or may use "At My Command" procedures. (See page 10)
   (7) Cease Loading: Used on missions with two or more rounds in effect. Causes the firing unit to stop loading rounds.
   (8) Check Firing: Temporary halt in firing. "Cancel check firing" resumes mission.
   (9) Continuous Firing: Firing as rapidly as possible at prescribed rate of fire. Continued until suspended by Cease Loading or Check Firing.
   (10) Repeat: Can be given during AF or FFE missions.
   (11) Followed By: Used to describe changes to subsequent volleys (HE followed by WP).
   (12) Request Splash: FDC will announce, "Splash" 5 seconds before round impacts.
   (13) Do Not Load: FDC computes data, but no projectile is loaded.

----------OVER----------

DANGER CLOSE

The term DANGER CLOSE will be included in the Method of Engagement portion of the call-for-fire when the target is within 600 meters of any friendly troops for both mortars and field artillery, and 2000 meters when using MLRS.

The creeping method of adjustment will be used exclusively during DANGER CLOSE missions when adjusting rounds toward friendly troops. Range or deviation changes are made by creeping the rounds to the target with corrections of no more than 100m.

OBSERVER-TARGET LINE (OTL)

The OTL is an imaginary straight line from the observer/spotter to the target. When determining direction to a target, you have determined it along the OTL. All corrections are made in respect to the OTL.

RANGE CORRECTION

During an adjustment on a target, the observer should establish a range bracket early in the adjustment. With the first definite range spotting, the observer should make a range correction causing the next round to be spotted opposite that of the previous round. If the first definite range spotting is SHORT, the observer should ADD to obtain an OVER spotting on the next round. Likewise, if a spotting is OVER, he should DROP to obtain a SHORT on the next round. The observer then splits each range correction in half, successively moving each round closer to the target. Use the following ranges to bracket: 800, 400, 200, 100, 50.

Naval Surface Fire Support
CALL-FOR-FIRE

I. OBSERVER IDENTIFICATION:
Use callsigns from the CEOI

II. WARNING ORDER/TARGET NUMBER:
Announce, "Fire mission, target number" (Spotter assigns from target block)

----------**OVER**----------

III. TARGET LOCATION

a. Grid: Announce: "Grid"
"Altitude" (meters understood, measured from mean sea level)
"Direction" (if method of control is spotter adjust)

b. Polar: Announce: "Direction" (OTL)
"Distance" (meters understood)
"Up (or down)" (vertical shift, meters understood)

c. Shift: Announce: "From reference point (or target number)"
"Direction" (OTL)
Lateral shift (if any, meters understood)
Range shift (if any, meters understood)
Vertical shift (if any, meters understood)

IV. TARGET DESCRIPTION

Include: what the target is and what its doing, number of elements in the target or physical dimensions, attitude (mils understood), and degree of protection.

V. METHOD OF ENGAGEMENT (Bold indicates standard)

a. Danger Close: Friendly troops within 750 meters
Send cardinal direction and distance <u>from</u> the target <u>to</u> nearest friendly unit

b. Trajectory:
(1) **Full Charge**
(2) Reduced Charge
(3) High Angle

c. Ammunition: Shell/fuze desired in adjustment phase and FFE (**HE/Q**)

d. Number of Guns: **One** or two guns

e. Number of Salvos: Indicates number of rounds fired per gun
(1) Send when entering FFE or if adjusting with more than one salvo
(2) If omitted, ship will fire one salvo

f. Special Instructions:
   (1) Interval: Used to cause FFE rounds to be fired with a specific time interval between each salvo. Announce "interval" followed by a desired time interval (seconds understood).
   (2) Sustained Fire: Used if there is a specific period of time in which fire for effect salvos must be spread over. Include the number of salvos and period of time in which they are required to be fired.
   (3) Time on Target: Used when initial salvos in fire for effect are to impact at a specific time.
   (4) Coordinated Illum: Used to inform the ship that HE will be requested simultaneously, after adjusting illumination.
   (5) Continuous Illum: Used when spotter requires constant light on a target. Use with discretion.

VI. METHOD OF CONTROL (Bold indicates standard)

a. Method of Control:
   (1) Spotter Adjust: **Method standard**
   (2) Fire For Effect (FFE): Used to enter into FFE phase without adjustments. Indicate number of salvos requested. Can be modified by the command, "Cannot Observe" when firing on a suspected target and when neither the ship nor spotter can see the target.
   (3) Ship Adjust: Used if the spotter believes the ship has a better view of the target. Use when possible.
   (4) At My Command: Used to control the firing of each salvo in adjustment, and the first adjustment in FFE. Ship will announce, "Ready, Over." Spotter sends, "Fire" when he is ready for the ship to fire. Remains in effect throughout the mission or when cancelled (announce, "Cancel At My Command").

----------**OVER**----------

PRE-FIRING REPORT

a. Gun-Target Line (GTL): Firing direction of ship.
b. Line of Fire (LOF): Used with illumination to indicate the illumination projectile trajectory. May be different from GTL.
c. Ready/Time of Flight (TOF): Ship will report, "Ready," followed by TOF (seconds understood). Spotter reads back and announces, "Break…Fire, Over."
d. First Salvo: Used in danger close situations. Ship will confirm the point of aim reported by spotter.
e. Summit: Highest altitude above mean sea level of flight path. Standard for aerial observers, ground observers may request. Reported in feet for aerial observers and meters to ground units.
f. Any Changes: Used if ship changes any portion of fire request.

REPORT UPON FIRING

SHOT / SPLASH – announced every volley in adjust and 1st FFE volley. No acknowledgement needed.

ERROR CORRECTION

a. Correction: Spotter has made an error in his transmission. Immediately transmit, "Correction" followed by the corrected data.
b. Wrong: Error made during readback. Announce, "Wrong" followed by the correct data.

SEQUENCE OF SUBSEQUENT CORRECTIONS:

1. Direction: If $\geq$ 100 mil change
2. Danger Close (Cancel): $\leq$ 750 meters
3. Trajectory: Full/Reduced charge or High Angle
4. Shell: To change during adjustment
5. Fuze: To change during adjustment
6. Deviation: L/R ___ meters
7. Range: +/- ___ meters
8. HOB: U/D ___ meters
9. Number of Guns: If more than one in adjustment/FFE
10. Number of Salvos: If more than one used in adjustment/FFE
11. Method of Control: i.e., Ship Adjust, FFE

FIRE FOR EFFECT PHASE

Enter the FFE phase when:

a. Splitting the 100-meter bracket for a point target
b. Splitting the 200-meter bracket for an area target

ENDING THE MISSION

Upon achieving the desired effects on target, the observer needs to transmit an end of mission statement to the firing unit, which is composed of four parts. Bolded items are always announced.

Refinement: Allows observer to make corrections under the normal deviation and range restrictions. (Use if recording the target)
Record as Target: Spotter assigns from target block.
End of Mission: Ends the current mission.
Surveillance: Should be brief but should provide casualty/damage information as accurately as possible.

Fresh Target Shift
(To shift to a higher priority tgt during a fire mission)

1. Spotter ID: Omitted
2. Fresh Tgt, Tgt #_____
3. Tgt Loc: Adjusted from last salvo
4. Tgt Description: Always sent
5. Method of Engagement: Omit if same
6. Method of Control: Omit if same

"Fresh Target, Target number ___, R/L ___, +/- ___, U/D ___, (Description), Over."

Spotter can return to original target by using the fresh target shift format.

New Target Shift
(To conduct two simultaneous missions)

1. Spotter ID: Omitted
2. New Tgt, Tgt # _____
3. Tgt Loc: Sent from last Salvo
4. Tgt Description: Always sent
5. Method of Eng.: Omit if same
6. Method of Control: Omit if same

"New Target, Target number ___, R/L___ +/- ___, U/D ___, (Description), Over."

Ship must have two mounts and an MK-86 gunfire control system.
Spotter must preface each correction with target number.

Sending Call-for-Fire

The standard call-for-fire is transmitted using field artillery radiotelephone procedures in three radio transmissions:

a. Observer's identification and warning order.

b. Target location.

c. Target description, method of engagement, and method of fire and control.

Example: Standard Call-for-Fire

OBSERVER ("SUMO")	FIRE DIRECTION CENTER ("NIGHTMARE")
Nightmare, this is Sumo, Adjust Fire, over	Sumo, this is Nightmare, Adjust Fire, out
Grid 123456, over	Grid 123456, out
3 tanks and 3 BMP's in the open, DPICM in effect, at my command, over	3 tanks and 3 BMP's in the open, DPICM in effect, at my command, out

Example: Immediate Suppression

This is Sumo, immediate suppression, grid 123456, over	This is Nightmare, immediate suppression, grid 123456, out

The simplified call-for-fire (used **only** with suppress and immediate suppression/smoke missions) is sent in one radio call containing, at a minimum, the observer's identification, warning order, and target location.

Determine Direction to Target

Determining direction is an essential skill for the FO. Direction is an integral part of terrain-map association, adjustment of fire, and target location. There are four methods to determine direction:

a. **USING A MEASURING DEVICE**. Using a lensatic or M2 compass, the FO can measure direction. The FO will add/subtract the GM angle to determine the grid direction to send to the FDC only when using a lensatic compass or if using a non-declinated M2 compass. The FO can use other measuring devices such as an aiming circle or a laser device that can provide direction to the nearest mil.

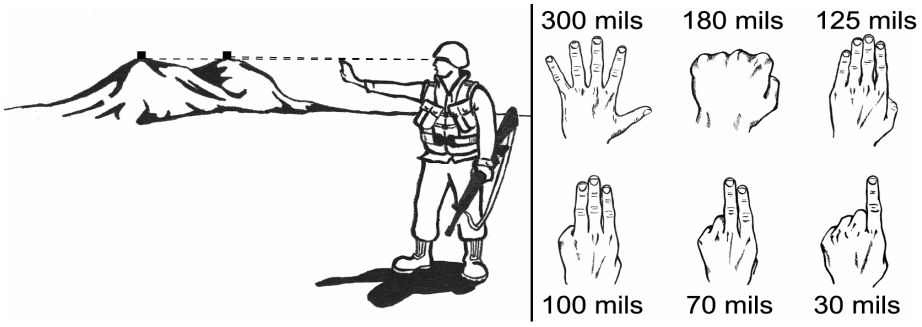
b. **MEASURING FROM A REFERENCE POINT**. By determining the angular deviation in mils between the reference point and the target, a direction can be computed by applying the deviation to the known direction. Use the RALS rule (right add, left subtract). Angular deviation can be determined by any instrument with a reticle pattern or by hand measurement.

c. **SCALING FROM THE MAP**. Using a protractor or an OF fan (Observed fire fan), the FO can scale direction from a map to an accuracy of 10 mils.

d. **ESTIMATING**. With a thorough terrain-map analysis, the FO can estimate direction by visualizing the eight cardinal directions (N, NE, E, SE, S, SW,W, NW). Least accurate method.

The FO should try to be as accurate as possible. The use of mils is preferred. All measured directions sent need to be expressed to the nearest 10 mils, prior to sending it to the FDC.

ESTIMATING ANGLES IN MILS WITH THE HAND



U.S. Artillery and Rocket Characteristics

Caliber	105mm[1]	105mm[1]	155mm	155mm	155mm[1]	227mm	227mm[1]	607mm[1]
Model	M102	M119A1	M198	M777	M109A5/A6	HIMARS	MLRS	ATACMS
Projectiles	HE, HC, WP, ILLUM, APICM	HE, HC, WP, ILLUM, APICM	HE, HC, WP, ILLUM, DPICM, M825 SMK, FASCAM, Copperhead	HE, HC, WP, ILLUM, DPICM, M825 SMK, FASCAM, Copperhead	HE, HC, WP, ILLUM, DPICM, M825 SMK, FASCAM, Copperhead	DPICM	DPICM	APAM
Fuzes	PD, VT MT, MTSQ, CP, Delay	PD, VT MT, MTSQ, CP, Delay	PD, VT, MT, MTSQ, ET, Delay	PD, VT, MT, MTSQ, Delay	PD, VT, MT, MTSQ, ET, Delay	ET	ET	ET
Maximum Range (m)	11,400	11,500	18,300 22,000[2]	30,000	18,200 21,700[2]	32,000[1] 45,000 60,000	32,000[1] 45,000 60,000	165,000[1] 300,000
Range of RAP (m)	15,300	19,500	30,100	40,000	30,000			
Range of DPICM (m)	10,500	14,100	18,000 28,200[3]	N/A	17,900 28,100[3]			
Minimum Range (m)						8,000 15,000	10,000 13,000	25,000 70,000
Maximum Rate of Fire (Rounds/min)	10	10	4	4	4	6/20 sec	12/40 sec	2/20 sec
Sustained Rate of Fire (Rounds/min)	3	3	2	2	1			
Illum Time (sec)	75	75	120	120	120			
HE Burst Width (1 Round)	35	35	50	50	50	100	100	
FPF	210 6 guns	210 6 guns	300 6 guns	300 6 guns	300 6 guns 150 3 guns			

Notes:
1. U.S. Marine Corps units do not possess these weapons systems. However, Marine Corps units may operate with Army units equipped with these weapons.
2. With M795 HE, M825 smoke ammunition.
3. BBDPICM M864.

U.S. Mortar Characteristics

Caliber	60mm	81mm	120mm
Model	M224	M252	M285
Projectiles	HE, WP, ILLUM	HE, WP, RP, ILLUM	HE, WP, ILLUM
Fuzes	MO	MO	MO
Maximum Range (m)	3,500[2]	5,600[3]	7,200[1]
Minimum Range (m)	75	70	200
Maximum Rate of Fire (Rounds/min)	30	35	15
Sustained Rate of Fire (Rounds/min)	20	15	5
Illumination Time (sec)	25	60	70
HE Burst Width (1 Round)	28	35	75
FPF	90 3 tubes	35 1 tube	75 1 tube

Notes: 1. U.S. Marine Corps units do not possess these weapons systems. However, Marine Corps units may operate with Army units equipped with these weapons.
2. With M720 ammunition.
3. With M821 ammunition.

Legend

CPHD-Copperhead
DPICM-Dual Purpose Improved Conventional Munitions
ET-Electronic Time
E-High Explosive
ILLUM-Illumination
MO-Multi-option fuze (VT, PD, Delay)
MT-Mechanical Time
MTSQ-Mechanical Time Superquick
PD-Point Detonating
RAP-Rocket Assisted Projectile
RP-Red Phosphorus
SMK-Smoke
VT-Variable Time
WP-White Phosphorus

Naval Gunfire Capabilities

Weapon	Full Charge Max Range (m)	RAP (M)	Reduced Charge Max Range (m)	Fire Rate (max/sust)	Ammo	Fuzes
5″/54	23,100	29,181	12,200	20/16	HE, ILLUM, WP, HC, RAP	Q, MT, CVT, VT, DEL
5″/62	82,000 (ERGM), 40,000 (Mk 172 ICM), 23,100 (Conv)	29,181	12,200	10/3-5 (ERGM) 20/10-12 (Conv)	HE, HC, ILLUM, WP, RAP, ERGM, ICM (Mk 172)	Q, MT, CVT, VT, DEL, GPS

Movement Formula
Time Distance

$$\textbf{TDIS} = \frac{\text{distance (miles or KM)}}{\text{Rate of march (mph or kph)}}$$

Example: Determine TDIS of a serial traveling 135 kilometers at a speed pf 24 kph (rate of march 20 kph)

TDIS = 135 (km)/20 (kph) = 6.75 hours

0.75 (fraction)
x 60 (minutes)
45.00 (minutes)

TDIS = 6 hours and 45 minutes

***Rate is determined by dividing distance by time: R=D/T**
***Distance is found by multiplying rate by the time: D=RxT**
***Time is calculated by dividing distances by rate: T=D/R**

Computation

TDIS = _____ (km)/_____ (kph) = _____ hours

(fraction)
x (minutes)
(minutes)

TDIS = _____ hours and _____ minutes

Movement Formula
Pass Time Distance

$$PST = \frac{\text{NO OF VEHS x 60}}{\textbf{DENSITY X SPEED}} + \frac{\text{NO OF VEHS}}{\textbf{25}} = \text{TIME GAPS (Mins)}$$

Example: Determine PST of a serial of 150 vehicles organized into 6 march units of 25 vehicles each, traveling at a speed of 24 kph, with a density of 15 vpkm, and using a 2-minute time gap between march units.

$$PST = \frac{150 \text{ x } 60}{15 \text{ x } 24} + \frac{150}{25} + (2\text{x}5) = \frac{9000}{360} + 6 + 10 = 25 + 10$$

PST = 41 Minutes

Notes: 1. Round off fractions of minutes to next higher minute.

2. EXTAL is allocated on the basis of 1 minute per 25 vehicles added to a serial pass time. EXTAL is equitably added to pass time of each march unit in the serial.

$$PST = \frac{__\text{x}__}{\text{x}} + ____ + (2\text{x}5) = _____ + \ + \ = \ +$$

PST =

Passage of Lines Checklist

1	☐	Designation of unit to pass
2	☐	Enemy situation (location, strength, recent activity)
3	☐	Mission of passing unit and tentative battle plan
4	☐	Friendly situation and positions
5	☐	Time of passage
6	☐	Contact and coordination points
7	☐	Passage points and lanes
8	☐	Number and types of vehicles to pass
9	☐	Vehicle identification
10	☐	Long- and short-range recognition signals
11	☐	Patrol routes and OP locations
12	☐	Obstacle types and locations
13	☐	Contaminated areas
14	☐	BHL
15	☐	Fire support plan
16	☐	Assembly area and attack positions
17	☐	CS and CSS to be provided and locations
18	☐	Routes and priority routes
19	☐	SOI information

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Classes of Supply

Class I Subsistence (Food)

Class II Clothing, individual equipment, tools, and administrative supplies

Class III Petroleum, oils, and lubricants

Class IV Construction/barrier materials

Class V Ammunition and explosives

Class VI Personal demand items (i.e., cigarettes, razor blades, PX items)

Class VII Major end items (i.e., complete pieces of equipment such as a rifle or a replacement AAV)

Class VIII Medical supplies

Class IX Repair Parts

Rapid Request, Maintenance

Unit Identification_____

AA. M1___ TAC_____ USMC_____ Warranty-yes/no

BB. Other, state end item/model as M1 51 A2C

_____

CC. Nature of casualty

_____

DD. Specific part(s) causing the deadline

_____

EE. (NSN) (SL4) (Item) (Page) (Figure)

(1)_____

(2)_____

(3)_____

(4)_____

(5)_____

(6)_____

FF. Contact team required

_____ yes_____ no

GG. Delivery point (grid coordinates)

_____

HH. Delivery zone identification (How will it be marked)

_____

II. Coordinating instructions, if any

_____

JJ. End item replacement (if end item is evacuated, is a replacement required _____yes _____no

Rapid Request, Transportation

Unit Identification _____

AA. Type required (i.e., truck, helo) _____

BB. Type cargo (personnel, drummed POL, boxed supplies, ammo)

_____

CC. Cargo quantity (number and type of containers)

_____

DD. Date and time of pickup delivery _____

EE. Pickup point/delivery point (grid coordinates) _____

FF. Delivery/pickup zone identification (How will LX be identified)

_____

GG. Coordinating instructions _____

Rapid Request, Supply

Unit Identification_____

AA. Nomenclature of the item requested, use DODIC for ammo
(1) _____
(2) _____
(3) _____
(4) _____
(5) _____
(6) _____

BB. Quantity requested by unit of issue
(1) _____
(2) _____
(3) _____
(4) _____
(5) _____
(6) _____

CC. Delivery point (grid coordinates) _____

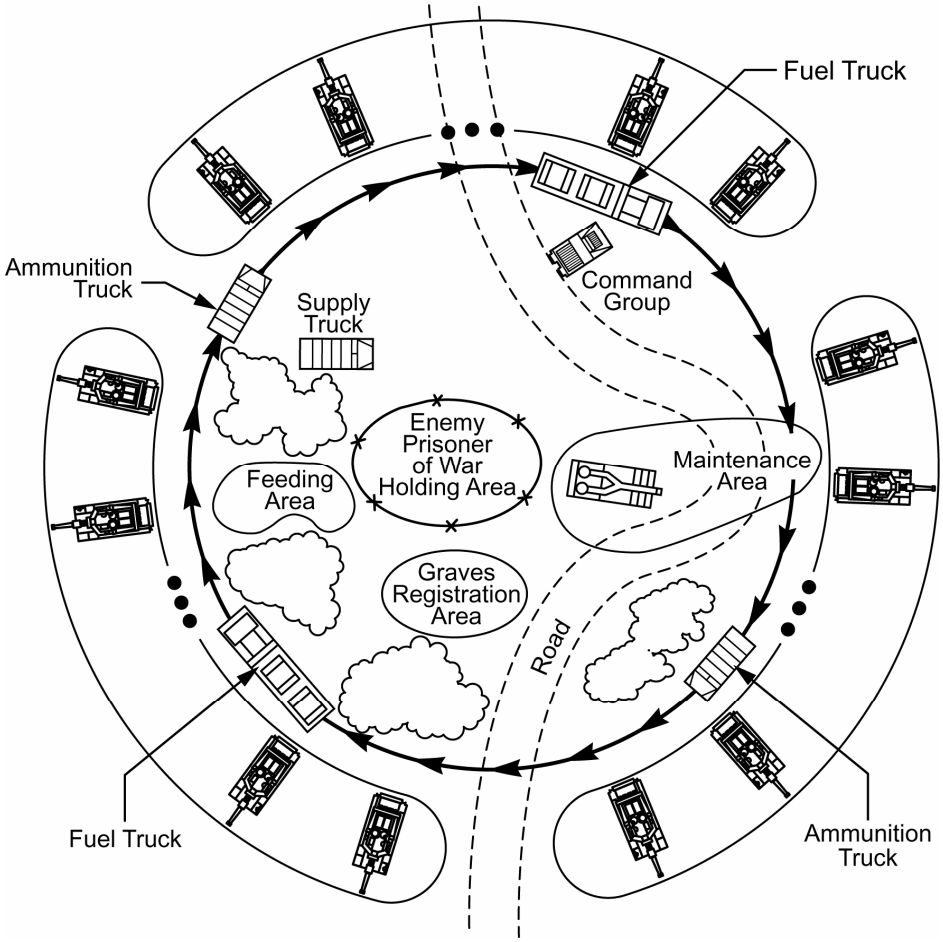
DD. Delivery zone identification (how it will be marked)
_____

EE. Date and time of pickup/delivery_____

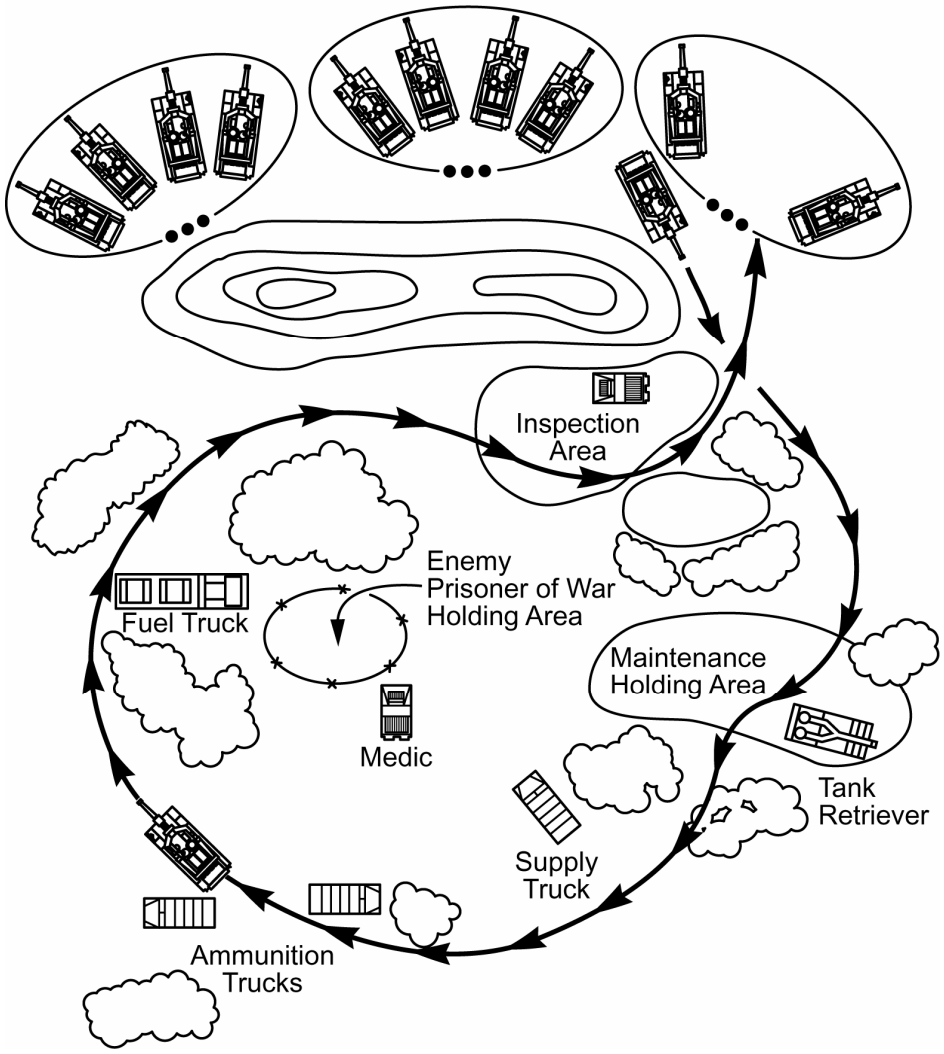
FF. Coordinated instructions, if any_____

Date in _____ Date out _____
Time in _____ Time out _____

Resupply
Tailgate



Resupply
Service Station



Fuel Calculation Chart

The tank commander starts in the left column, moving down to one half, then moves right to the next column, going to the three quarters fill line, then moves to the right to the one half fill column, where he reads the result. In that case, 225 gallons will be needed to completely fill all three tanks.

Left Front	Right Front	Rear E	Rear 1/4	Rear 1/2	Rear 3/4	Rear F
E	Empty	505	443	381	319	257
	1/4	476	414	352	290	228
	1/2	450	388	326	264	202
	3/4	424	362	300	238	176
	Full	398	336	274	212	150
1/4	Empty	467	405	343	281	219
	1/4	438	376	314	252	190
	1/2	412	350	288	226	164
	3/4	386	324	262	200	138
	Full	360	298	236	174	112
1/2	Empty	430	368	306	244	182
	1/4	401	339	277	215	153
	1/2	375	313	252	189	127
	3/4	349	287	225	163	101
	Full	323	261	199	137	75
3/4	Empty	393	331	209	207	145
	1/4	364	302	240	178	116
	1/2	338	276	214	152	90
	3/4	312	250	188	126	64
	Full	286	224	162	100	38
FULL	Empty	355	293	231	169	107
	1/4	316	264	202	140	78
	1/2	300	238	176	114	52
	3/4	274	212	150	88	26
	Full	248	186	124	62	0

Fuel Needed

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NBC 1 Report

A. Type of attack (N, E, or C) _____

B. Position of observer_____

C. Date and time of attack from observer_____

D. Date and time of attack (zulu or local) _____

E. Illumination time (seconds) nuclear time_____

F. Location of Attack_____

G. Means of delivery_____

H. 1. Type of burst (air, Sur, Under)_____
2. Type of toxic agent, if known_____
3. Type of attack (EW or CW)_____

I. Number of shells or munitons_____

J. Flash to Bang time (sec) nuclear only_____

K. Crater present or absent and diameter (if know, nuclear only) _____

L. Nuclear burst cloud width at H+5 min. (state miles or degrees) _____

M. Cloud top angle or bottom angle at H+10 min _____

SALUTE Report

Size_____

Activity_____

Location_____

Unit_____

Time_____

Equipment_____

Notes

Situation Report (SITREP)

A. Unit location (Grid)_____

B. Personnel Status (MO/ME/NO/NE)_____

C. Vehicle Status:

(1) Total on hand (by type) _____

(2) Total deadline (by type)_____

D. Services Required (specify quantity):

(1) Fuel: _____

(2) Water: _____

(3) Rations: _____

(4) Repair parts (state NSN): _____

(5) Other services: _____

E. Future Operations: _____

Platoon/Section Operations Order Format

1. Situation
   a. Enemy Forces
      (1) Weather
      (2) Terrain
      (3) Enemy Situation
          Size-
          Activity-
          Location-
          Unit-
          Time-
          Equipment-

   b. Friendly Forces
      Higher-
      Adjacent-
      Supporting-
      Patrols-

   c. Attachments/detachments

2. Mission
   Who-
   What-
   Where-
   When-
   Why-
   How-

3. Execution
   a. Concept of Operations
      (1) Commanders intent
      (2) Scheme of maneuver
      (3) Fire support plan

   b. Tasks

   c. Coordinating instructions

4. Administration and Logistics (4 B's)

5. Command and Signal

Platoon/Section Operations Order Notes

Landing Zone Brief

1. MISSION NO. _____

2. LOCATION _____

   COOR/RAD/DEM _____/_____/_____

3. UNIT CALLSIGN _____

4. FREQUENCY PRI UHF _____ FM _____

   SEC UHF _____ FM _____

5. LZ MARKING _____

6. WIND DIRECTION/VELOCITY _____/_____

7. ELEVATION/SIZE _____/_____

8. OBSTACLES _____

9. FRIENDLY POSITIONS:
   DIRECTION/DISTANCE _____/_____

10. ENEMY POSITIONS:
    DIRECTION/DISTANCE _____/_____

11. LAST FIRE RECEIVED:
    TIME/TYPE _____/_____

12. DIRECTION OF FIRE/DISTANCE _____/_____

13. CLEARANCE TO FIRE:
    DIRECTION/DISTANCE _____/_____

14. APPROACH/RETIREMENT
    (RECOMMENDED) _____/_____

15. PERSONNEL/EQUIPMENT _____/_____

16. OTHER _____

Fording Site Report

1. Location of crossing (grid coordinate or reference point)
_____

2. Length of crossing (meters bank to bank) _____
_____

3. Usable width (meters) _____

4. Current description (water speed, fast, slow, etc.) _____
_____

5. Maximum depth in meters (of water) _____

6. Bottom material and condition (rocky, sandy, muddy, etc.)
_____

7. Slope of entry bank (given in degrees) _____

8. Slope of far bank (given in degrees) _____

IED/UXO Report

LINE 1: (DTG) Date time group item discovered.

LINE 2: Reporting activity Unit Identification Code (UIC) and location of IED/UXO (grid).

LINE 3: Contact method: Radio frequency, call sign, point of contact, and contact number.

LINE 4: Type of ordnance: Dropped, projected, placed, or thrown. If known, give the size of the hazard area and number of items. Include information about size, shape, color, and condition.
NOTE: Don not disturb the item(s)

LINE 5: NBC contamination: If present, be specific as possible.

LINE 6: Resources threatened: Report any equipment, facilities, or other resources threatened.
.
LINE 7: Impact on mission: Provide a short description of your current tactical situation and the impact the IED/UXO has on the mission.

LINE 8: Protective measures: Describe any measures taken to protect personnel and equipment.

LINE 9: Recommended priority: Recommend a priority for response by EOD technicians or engineers.

Priorities

IMMEDIATE	STOPS UNITS MANEUVER AND MISSION CAPABILITY OR THREATENS CRITICAL ACCESS VITAL TO THE MISSION.
INDIRECT	SLOWS THE UNIT'S MANEUVER AND MISSION CAPABILITY OR THREATENS CRITICAL ASSETS IMPORTANT TO THE MISSION.
MINOR	REDUCES THE UNIT'S MANEUVER AND MISSION CAPABILITY OR THREATENS NON-CRITICAL ASSETS OF VALUE.
NO THREAT	HAS LITTLE OR NO EFFECT ON THE UNIT'S CAPABILITIES OR ASSETS.

IED/UXO Report

LINE 1: (DTG) _____

LINE 2: REPORTING ACTIVITY AND LOCATION _____
_____

LINE 3: CONTACT METHOD: _____
_____

LINE 4: TYPE OF ORDNANCE: _____
_____

LINE 5: NBC CONTAMINATION: _____
_____

LINE 6: RESOURCES THREATENED_____
_____

LINE 7: IMPACT ON MISSION: _____
_____

LINE 8: PROTECTIVE MEASURES: _____
_____

LINE 9: RECOMMENDED PRIORITY: _____

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Communications Frequency Chart

Net (Type)	Primary	Secondary	Callsign
PLT TAC	_____	_____	_____
CO MAINT.	_____	_____	_____
BN REAR (training only)	_____	_____	_____
CO TAC 1 (VHF)	_____	_____	_____
CO TAC 2 (VHF)	_____	_____	_____
BN TAC 1 (VHF)	_____	_____	_____
BN TAC 2 (VHF)	_____	_____	_____
TACP Local (VHF)	_____	_____	_____
TAR (HF)	_____	_____	_____
TAD 1 (UHF/VHF)	_____	_____	_____
TAD 2 (UHF/HF)	_____	_____	_____
FAC (A) (UFH/VHF)	_____	_____	_____
TAC (A) (HF/UHF)	_____	_____	_____
LF FSCC (VHF)	_____	_____	_____
BN FSCC (VHF)	_____	_____	_____
ARTY COF (VHF)	_____	_____	_____
MORTAR COF (VHF)	_____	_____	_____
NGF SPOT (HF)	_____	_____	_____
Boat A	_____	_____	_____
Boat B	_____	_____	_____

Net (Type)	Primary	Secondary	Callsign

Notes