1 DEGREE=17.8 MILS

FIRING BATTERY SUPERVISOR'S REFERENCE SQUARE
GTA 06-01-003* **OCTOBER 1987**
Headquarters, Department of the Army

LAY BY GRID AZIMUTH
1. **MATH STEP:** SUBTRACT THE AZ OF FIRE FROM THE DC (+6400m IF NEC).
2. PLACE RESULTS ON AIMING CIRCLE (UPPER MOTION) USE THE BLACK NUMBERS.
3. CENTER MAGNETIC NEEDLE (LOWER MOTION).
4. SIGHT ON PANTEL (UPPER MOTION).

LAY BY ORIENTING ANGLE
1. PLACE AC OVER ORIENTING STATION.
2. **MATH STEP:** SUBTRACT THE AZ OF FIRE FROM AZ TO THE OL (+6400m IF NEC).
3. PLACE RESULT ON AIMING CIRCLE (UPPER MOTION) USE THE BLACK NUMBERS.
4. SIGHT ON EOL (LOWER MOTION).
5. SIGHT ON PANTEL (UPPER MOTION).

COMMANDS FOR LAYING THE BTRY
1. "BATTERY ADJUST AIMING POINT THIS INSTRUMENT"
2. "NUMBER (SO AND SO) AIMING POINT IDENTIFIED"
3. "NUMBER (SO AND SO) DF _ _ _ _ _ _ _ _ _".
4. "NUMBER (SO AND SO) DF _ _ _ _ _ _ _ _ (_ _ _ _ MILS"
5. "NUMBER (SO AND SO), READY FOR RECHECK". CONTINUE 3-5 UNTIL WEAPON IS ZERO MILS.
6. "NUMBER (SO AND SO) IS LAID."

LAY BY COMPASS
1. PLACE COMPASS ON STEADY OBJECT.
2. MEASURE AZ TO PANTEL OF BP.
3. **MATH STEP:** SUBTRACT THE AZ OF FIRE FROM THE AZ MEASURED TO THE WEAPON'S PANTEL.
4. RESULT IS DF. USE THE PROPER COMMANDS TO LAY BP.
5. **COMMAND:** "BP ADJ AIMING POINT THIS INSTRUMENT DF _ _ _ _ _ _ _ _ _." "BP AIMING POINT IDENTIFIED. DF _ _ _ _ _ _ _ _ _" "BP IS LAID, BTRY ADJ AIMING POINT BP."

MEASURE THE ORIENTING ANGLE
1. SET UP AC OVER ORIENTING STATION.
2. **COMMAND:** "NUMBER (SO AND SO) REFER AIMING POINT THIS INSTRUMENT."
3. SET REFERRED DF ON THE AC USING THE (UPPER MOTION).
4. SIGHT ON PANTEL (LOWER MOTION).
5. SIGHT ON EOL (UPPER MOTION). READ THE ORIENTING ANGLE.

Index Point

LAY BY AIMING POINT (AP) AND DEFLECTION
1. SCALE AZ TO AP FROM MAP.
2. **MATH STEP:** SUBTRACT THE BACK AZ OF FIRE FROM THE AZ TO AP (+6400m IF NEC).
3. RESULT IS DF. USE THE PROPER COMMANDS TO LAY THE BTRY.
4. **COMMAND:** "BTRY ADJ, AIMING POINT _ _ _ _ _ DF _ _ _ _." "NUMBER (SO AND SO), AIMING POINT IDENTIFIED, DF _ _ _ _ _ _ " "THE BTRY IS LAID".

LAY BY HOWITZER BACKLAY METHOD
1. PLACE AC WHERE IT CAN BE SEEN BY ALL THE PIECES
2. AFTER THE BP FIRES THE FIRST ROUND COMMAND, BP REFER AIMING POINT THIS INSTRUMENT. "BP AIMING POINT IDENTIFIED, DF _ _ _ _ _ _ _ _ _".
3. PLACE THE REFERRED DF ON THE AIMING CIRCLE (UPPER MOTION).
4. SIGHT ON PANTEL (LOWER MOTION).
5. LAY THE BTRY (UPPER MOTION).

DECLINATION
1. PLACE AC OVER DECLINATION STATION.
2. SET KNOWN AZ (UPPER MOTION).
3. SIGHT ON THE AZ MARKER (LOWER MOTION).
4. CENTER MAGNETIC NEEDLE (UPPER MOTION).
5. RECORD INSTRUMENT READING AND REPEAT PROCESS ON SECOND KNOWN POINT. AVERAGE AND EXPRESS TO THE WHOLE MIL.

MEASURE THE AZIMUTH OF FIRE
1. SET UP AC AWAY FROM MAGNETIC ATTRACTIONS.
2. **COMMAND:** "NUMBER (SO AND SO) REFER AIMING POINT THIS INSTRUMENT".
3. SET REFERRED DF ON THE AC USING THE (UPPER MOTION).
4. SIGHT ON PANTEL (LOWER MOTION).
5. CENTER MAGNETIC NEEDLE (UPPER MOTION).
6. **MATH STEP:** SUBTRACT THE INSTRUMENT READING FROM THE DC (+6400m IF NEC) RESULT IS THE AZIMUTH OF FIRE.

XO REPORT

Btry Coord _____ , Alt _____

1. Btry is laid

2. AZ of fire or OA _____ DF _____

3. Minimum QE

   CH ____ ____   CH ____ ____

   CH ____ ____   CH ____ ____

   CH ____ ____   CH ____ ____

4. Piece displacement

   #1 Df_____ Dist_____ m   #4 Df_____ Dist_____ m

   #2 Df_____ Dist_____ m   #5 Df_____ Dist_____ m

   #3 Df_____ Dist_____ m   #6 Df_____ Dist_____ m

FIRE COMMANDS

1. Warning Order
2. Pieces to Follow/Pieces to Fire/Method of fire
3. Special Instructions
4. Projectile
5. Ammunition Lot
6. Charge
7. Fuze/Fuze Setting
8. Direction
9. Quadrant Elevation
10. Method of Fire for Effect

COMPUTATION OF XO'S MIN QE

$\angle$ a GREATEST $\angle$ OF SITE TO CREST
$\angle$ b VERTICLE $\angle$ (5m + PIECE TO CREST RG EXP IN 1000s)
$\angle$ c ($\angle$ a + $\angle$ b) X COMP SITE FACTOR (TAB G, COL 12)

$\angle$ 1 $\angle$ a + $\angle$ b + $\angle$ c
$\angle$ 2 EL TO PIECE TO CREST RG (RG (TAB F, COL 2))
$\angle$ 3 2 FORKS AT PIECE TO CREST RG (TAB F, COL 6)

XO'S MIN QE FZ Q & Tι ($\angle$ 1 + $\angle$ 2 + $\angle$ 3)

NOTES:

SHELL/FUZE COMBINATIONS

SH ICM → M565, M577
SH WP → M557, M564, M739
SH ILL → M565, M577
SH SMK HC → M565, M577
SH HE → M78, M557, M564, M582, M728, M732, M739

SIMULTANEOUS OBSERVATION

MASTER STATION

1. SET THE KNOWN AZIMUTH VALUE ON THE AIMING CIRCLE AND SIGHT ON THE AZ MARK.
2. TRACK THE SUN (UPPER MOTION) AND ANNOUNCE TIP. READ THE AZIMUTH TO THE SUN OFF THE AIMING CIRCLE AND ANNOUNCE IT TO THE FLANK STATION.
3. WHEN THE FLANK STATION IS READY, TRACK THE SUN (UPPER MOTION) AND ANNOUNCE TIP AGAIN AND RECORD THE SECOND AZIMUTH.
4. DETERMINE THE CLOCKWISE ANGLE BETWEEN THE FIRST AND SECOND AZIMUTH. ANNOUNCE THE CHECK ANGLE TO THE FLANK STATION.

FLANK STATION

1. SET 0.0 MILS ON THE AIMING CIRCLE (UPPER MOTION).
2. WITH THE (LOWER MOTION), SIGHT ON AND TRACK THE SUN UNTIL THE MASTER STATION ANNOUNCES TIP.
3. DEPRESS THE TELESCOPE OF THE AIMING CIRCLE AND PLACE THE EOL SQUARELY ALONG THE AIMING CIRCLE LINE OF SIGHT. RECORD THE AZIMUTH THAT IS ANNOUNCED BY THE MASTER STATION.
4. WITH THE (UPPER MOTION), TRACK THE SUN UNTIL THE MASTER STATION ANNOUNCES TIP.
5. READ THE ANGLE THAT WAS MEASURED AND COPY THE CHECK ANGLE FROM THE MASTER STATION.
6. INSURE THAT THE CHECK ANGLE AND THE READING ON THE AIMING CIRCLE AGREE WITHIN ± 2 MILS.
7. THE AZIMUTH RECORDED IN STEP 3 IS THE AZIMUTH TO THE EOL.

½   0   1   2
Statute Miles