P6: Range Card

Based on:
071-000-0008-Prepare a Range Card
071-326-0512-Estimate Range
TC 2-21.75

Task: Prepare a range card for a machine gun.

Condition: You are a member of a platoon gun team at a defensive fighting position in a non-CBRNE environment. You have a tripod-mounted machine gun with a traversing and elevation (T&E) mechanism. Grader will then identify the primary sector of fire with recognizable targets (either a Final Protective Line [FPL] or Principal Direction of Fire [PDF]) and the secondary sector of fire with recognizable targets.
Standard: Complete the marginal information. Sketch the primary sector of fire, develop the sketch for the primary sector of fire and record the weapon system data. Sketch the secondary sector of fire, label the dead space, and record the position of the weapon system. All directions/deflections must be accurate within 54 mils, all ranges with no more than a 20% margin of error. Correctly perform all tasks within 20 minutes.

Station Requirements: A calibrated compass, protractor, and complete military map with either the gun position plotted or an easily identifiable known reference point. Tripod-mounted machine gun with a T&E mechanism and sector stakes. Binoculars or a magnified optical device mounted on the machine gun. All administrative information required. Laminated range card, superfine point alcohol pens, and eraser and a basic calculator. While a correctly filled out range card will be available in the holding area, during testing the Candidate must not be given any Graphic Training Aids (GTAs), cheat sheets, etc. At the test site, the Candidate must not be able to see any of the information/equipment until the Grader identifies the targets and sectors of fire; time will start as soon as the Candidate acknowledges the target area. Provide the Candidate with, or ensure the Candidate has a watch with the correct date and time. The scenarios/grids/targets must differ between the training week, test holding area, and at least two test sites. Provide a variety of targets including deep and/or linear targets. A laser range finder or other accurate device must be used to determine the distance to each target since the Candidate is required to estimate the range with no more than a 20% margin of error. The Grader will have an answer key with the allowed margins of error to be able to rapidly grade the Candidate upon completion. These instructions are written for T&E mechanisms with wheels; modify as necessary.

1. Complete the marginal information located at the top and center of the standard range card.
    a. Record the squad, platoon, and company designations. Note: Do not record unit designations higher than company.
    b. Record the relative direction of magnetic north.
        1. Use the magnetic north symbol.
        2. Orient the range card to the terrain.
        3. Determine magnetic north.
    c. Record your defensive position as primary, alternate, or supplementary.
    d. Record the date and time the range card was prepared.
    e. Record the type of weapon system used.
    f. Record the incremental distance of the nine range circles.

Note: If the distance to this terrain feature is less than 450 meters then each circle represents 50 meters. If the distance is between 450 and 900 meters, then each circle represents 100 meters. If the distance to this terrain feature is greater than 900 meters, then each circle represents 200 meters.

        1. Use the farthest prominent terrain feature that is within the weapon system's range.
        2. Determine the distance that each range circle represents.
        3. Record the distance.
        4. Draw this terrain feature on the sketch.
2. Sketch the primary sector of fire using either an FPL or PDF.
    a. Sketch the primary sector of fire using a PDF.
        1. Draw the symbol appropriate to your weapon system or vehicle pointing in the direction of the PDF.
        2. Draw two solid lines, one for the left limit and one for the right limit to the left and right of the symbol.

Note: These limits should be 437 mils to the left and right of the PDF unless reduced by the presence of friendly positions. Both lines are drawn out to the maximum range of the weapon or to the ninth range circle,

whichever is less. If you cannot use the maximum traverse to establish a left or right firing limit, then you must record the actual direction of the limit at the end of the arrow or line.

b. Sketch the primary sector of fire using an FPL.

1. Draw the symbol appropriate to your weapon system or vehicle as a long line down the appropriate left or right limit.

2. Draw another long arrow for the opposite limit (left or right).

Note: For a tripod-mounted machine gun, this line represents the line formed by maximum traverse of the weapon system (875 mils). Both arrows are drawn out to the maximum range of the weapon or to the ninth range circle, whichever is less.

3. Sketch the grazing fire and dead space along the FPL.

Note: Grazing fire is represented by a shaded blade on the inside of the FPL line; dead space is represented by breaks in this shaded blade. Since the enemy situation in this case prevents a person from walking the FPL, the gunner estimates the locations and limits of dead space and the maximum range of grazing fire, recording the results on the sketch as appropriate.

i. Observe a Soldier walking the FPL by looking through or over the sights.

ii. Adjusts the elevation to achieve maximum amount of grazing fire out to the 600 meters maximum range of grazing fire.

iii. Record the actual maximum range of grazing fire at the end of the shaded blade.

iv. Identify any area of dead space by determining where this person drops below the weapon's LOS and where they return to the LOS.

3. Develop the sketch for the primary sector of fire.

a. Identify all prominent terrain features within the primary sector of fire.

Note: Prominent terrain features are locations where enemy elements may position themselves during periods of limited visibility, such as road junctions, buildings, and ditches as targets.

b. Sketch an appropriate symbol for each target at the approximate positions within the primary sector of fire.

c. Number all targets consecutively, beginning with number 2, in order of tactical importance; circle numbers. *Note: The FPL or PDF, whichever is used, is numbered as target 1.*

d. Number all mounted avenues of approach by placing a small, circled number around each.

e. Draw Maximum Engagement Line (MEL). *Note: Have MEL for all weapon systems that could be used in sector. The MEL is a line beyond which you cannot engage a target. This line may be closer than the maximum engagement range of your weapon. Both the terrain and the maximum engagement range of your weapon will determine the path of the MEL.*

4. Record the weapon system firing data in appropriate space of the data section.

a. Record the target numbers, in numerical order in the NO block.

b. Record DIRECTION/DEFLECTION' data in the appropriate block. ***All directions/deflections must be accurate within 54 mils.***

Note: Confirm the T&E mechanism is properly connected, and the center traversing hand wheel is on the center mark. Block one is always either the FPL or the PDF and uses unique data.

1. Record FPL data by writing either "L" or "R" whichever traversing limit designates the FPL (Block 1 only).

2. Record PDF data by writing either "0" if the tripod is centered on the PDF or the actual left or right direction/deflection of the PDF (Block 1 only).

3. Record data for all other targets.

i. Lay the weapon system on the base of the target.

ii. Determine the direction of the weapon system (L or R).

iii. Record the direction.

c. Record ELEVATION data in the appropriate block (mounted weapon systems only).

1. Record, for FPL only, any elevation change used to obtain the maximum distance of grazing fire (Block 1 only).

2. Record the actual elevation for PDF and all other targets.

i. Ensure the barrel is in line with the target.

ii. Use the weapon mount to elevate the weapon system until the sight picture reaches the base of the target.

iii. Determine the elevation.

iv. Record the elevation in the elevation column.

d. Record the RANGE data, in meters, in the appropriate block. ***All ranges must be accurate within 20%.***

1. Record for a FPL, the maximum achieved distance of grazing fire.
2. Record for the PDF and all other targets the distance to the target.

e. Record any special ammunition required in the AMMO block. ***Given by the Grader in the instruction brief.***

f. Describe the target in the block labeled DESCRIPTION.

1. Record an FPL as "FPL."
2. Record a PDF as "PDF."
3. Describe all other targets by providing a simple description of the target.

g. Record REMARKS in the appropriate block.

1. Record the elevation change, for the FPL only that causes the rounds to strike the ground at the beginning of the first dead space.
2. Record mounted machine gun specific data.
   i. Record data for Large (Deep) targets that defines the target's depth.
      a) Lay the weapon on target.
      b) Record target number.
         - Write and circle the target number in the remarks section.
         - Write the letters "TD" (target depth).
         - Write the already determined elevation and the word "to."
      c) Rotate the elevating hand wheel until the sight picture reaches the top of the target.
      d) Determine the depth.

Note: This is a second elevation reading, which can be done by reading the number above the first visible line on elevating screw scale (including the "+" or "-") and then reading the number on the elevating hand wheel.

      e) Record these two numbers after the "to." Example TD +50/15 to +50/22.
3. Record data for Linear targets that defines the target's width.
   i. Record target number.
      a) Write and circle the target number in the remarks section.
      b) Write letters "TW" (target width) followed by some blank space and then a slash.
   ii. Lay the gun on the target using existing data.

Note: The initial target data should lay the gun on the most dangerous point of the target, which may be anywhere on the target.

   iii. Traverse from this initial lay point to the most dangerous edge of the target.
      a) Count the number of MILS.
      b) Note the direction (L or R) of movement.
   iv. Record this data to the right of the slash. ***Accurate within 54 mils.***
   v. Traverse the gun to the opposite edge of the target counting the total number of MILS.
   vi. Record this data to the left of the slash. ***Accurate within 54 mils.*** Example TW 15 / L8.

5. Sketch the secondary sector of fire.
   a. Draw a "V" using two broken lines to represent the left and right limits of the secondary sector of fire.
   b. Sketch identified targets in the secondary sector of fire.
   c. Record range (in meters) to each target above the target's sketch. ***All ranges must be accurate within 20%.***
   d. If necessary, employ field expedient firing aids for the secondary sector.
   e. Sketch the field expedient firing aid above the target for ease of identification.

Note: Firing data is not determined for the secondary sector of fire as the tripod remains fixed in the primary firing position. To fire in the secondary sector of fire, the gun is dismounted from the tripod, moved, and fired in the bipod mode. The gunner uses field expedient firing aids for targets in the secondary sector.

6. Label the area between the primary and secondary sectors as dead space.
7. Record the position of the weapon system or vehicle **using one of the two below methods**.
   a. Use the Grid Method.
      1. Determine the eight-digit grid coordinate of the gun.
      2. Record the coordinate directly below the gun position.
   b. Use the Reference Point Method.

1. Orient firing position to a prominent terrain feature (visible on map) no more than 1000m away.
2. Draw a line between these two points, with barbed arrows pointing to the gun position.
3. Determine the azimuth from the terrain feature to the gun position.
4. Record azimuth in mils or degrees below barbed line. ***Accurate within three degrees or 54mils.***
5. Determine distance from terrain feature to the gun position and recording above the barbed line.