

UNITED STATES MARINE CORPS
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Training Command
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CS0204
14 DEC 05

STUDENT HANDOUT

RANGE CARDS

1. **LEARNING OBJECTIVES:** This is a lesson purpose only class.

2. **DEFINITION/PURPOSE OF A RANGE CARD**

a. Definition. A range card is a sketch or drawing of an assigned sector of fire.

b. Purpose. The purpose of a range card is to serve as a record of firing data and as a document for defensive planning.

(1) Accurate range cards permit fire to be delivered on targets rapidly during periods of reduced visibility.

(2) Machineguns are the "backbone of the defense" and should be layed first to ensure even fire distribution of fire across the entire defensive sector. Range Cards are the most basic fire coordination measure and must be submitted as quickly as possible to be incorporated in the units fire plan sketch.

3. **COMPONENTS OF A RANGE CARD.** There are two components to a range card the sketch section and the data section.

a. The sketch section is an overhead view drawing of the teams assigned sector of fire. It must contain sufficient detail that a team member can identify all targets and significant features within the sector of fire but not so detailed that it is difficult to read. Features that are difficult to draw should be labeled (i.e.: a road drawn as two parallel lines could be interpreted as a stream so write "ROAD" between the lines).

b. The data section contains identifying information, target data, and instructions to the gun team. For the team to successfully engage predetermined targets it is essential that the firing data be as accurate as possible. If the tactical situation permits targets should actually be registered by firing short bursts on target to achieve accurate firing data. If not the gunner will lay on each target using the most accurate range estimation available and carefully note the firing data.

4. **TYPES OF RANGE CARDS.** There are two types of range cards the **Final Protective Line** (FPL) and the **Principle Direction of Fire** (PDF). An FPL is a predetermined line along which grazing fire is placed to stop an enemy assault. A PDF is Principle Direction of Fire and is generally in the center of the sector. Final Protective Lines and Principle Directions of Fire are

two distinctly different missions. When in the defense a FPL is usually preferable but cannot always be obtained, so a PDF may be specified.

5. PREPARING A RANGE CARD. A range card is prepared immediately upon occupying a position and being assigned a sector of fire. The team leader will prepare the range card within 15 minutes with one copy for the gun position and one copy submitted to higher. The Standard Range Card is DA Form 5517-R. This form has concentric circles in the sketch section to aid in drawing the sketch to scale. If this form is unavailable the range card will be prepared on whatever writing material is available. Cardboard from an MRE box is a good material as it is durable and large enough to permit sufficient detail. A pencil is recommended to fill out the range card so mistakes can be neatly erased and corrected.

a. Sketch Section: The team leader starts the sketch section first while the gunner is developing the data for the targets. The following items will be included in the sketch section.

1. The team leader will select a scale that each concentric circle will represent.

2. The gun position will be recorded as a dot in the center of the smallest concentric range circle.

3. The left and right lateral limits will be recorded as a dashed line extending outward from the gun position and terminating in an arrowhead. The magnetic azimuth is recorded along the outboard, top portion of each lateral limit line.

4. A magnetic back azimuth is recorded in degrees to a prominent terrain feature behind the weapon. This is drawn as a line with multiple arrowheads, pointing towards the position, along its length with the azimuth and meters to position written above or below the line. This is so higher unit personnel reading the range card can find the position. The terrain feature selected will not be in the CP itself but nearby.

5. An arrow with one half of the arrowhead will be drawn in the space provided, depicting magnetic north to aid in orienting the range card.

6. On a PDF range card (Figure 5) the principle direction of fire will be drawn as an arrow to the target with the target labeled PDF and the magnetic azimuth in mils recorded along the line. The PDF is not necessarily the first target on the PDF range card. Targets will be numbered from right to left or left to right.

7. On a FPL range card (Figure 4) the final protective line will be drawn as a solid line along the left or right lateral limit. Grazing fire will be determined by having a Marine walk the FPL noting where the dead space is by keeping a pace count and noting where along the FPL he can not see the gun position. Grazing fire will be recorded as a heavily shaded line along the FPL and dead space will be recorded as a gap in the heavily shaded line. The magnetic azimuth in mils and the distances where dead space begins and ends will be recorded along the outboard edge of the FPL. The FPL is always the first target on an FPL range card. Other targets will be numbered from the FPL starting with 2.

8. Targets other than the PDF or FPL will be recorded with a solid line (no arrow head) from the gun position to the target. They will be numbered from either left to right or right to left starting with target number 2 on a FPL range card and number 1 on a PDF range card. Target will be abbreviated TGT followed by its corresponding target number.

9. Deadspace that is not recorded on an FPL is recorded by outlining the deadspace with a solid line and filling in the outlined shape with solid diagonal lines.

10. Significant terrain features and man made objects are sketched in. If the team leader has difficulty rendering a feature or object it should be labeled. Simple drawings are best. The team leader needs to ensure that the range card is not cluttered with excessive drawing to the point that it is difficult to read.

b. Data Section: Once the team leader has finished the sketch section he will complete the data section. The data section will contain the following information.

1. The unit information up to company level will be filled out in the space provided. If the gun team is in general or direct support the platoon will be Weapons Platoon (Rifle Company) or Heavy Machine Gun Platoon (Weapons Company). If the gun team is attached the platoon and company will be the unit to which attached.

2. The gun number (gun 1 or 2 not the armory number) will be recorded next to the unit information in the top left hand corner of the block labeled "MAY BE USED FOR ALL DIRECT FIRE WEAPONS".

3. The guns position identification will be recorded as an 8-digit grid in the space provided.

4. The date time group will be recorded in the space provided.

5. The weapon type will be recorded in the space provided.

6. The scale of the concentric circles will be recorded in the space provided.

7. The target number will be recorded in the block provided.

8. The direction to target from the T&E will be recorded in the block provided. When laying the gun for direction the traversing slide will be utilized first. If it is necessary to use the traversing handwheel it must be zeroed before laying in on a subsequent target.

9. The elevation data from the T&E will be recorded in the block provided.

10. The range to the target will be recorded in the block provided.

11. The type of ammunition will be recorded in the block provided. The caliber of ammunition does not need to be recorded in this block.

12. The target description will be recorded in the block provided. If the target is the PDF or FPL that information is recorded here.

13. Any instructions to the gun team necessary to accomplish the mission will be recorded in the remarks block. FPL rangecards will contain the following remarks at a minimum: primary and alternate signal to commence and cease the FPL, and the rates of fire to engage the FPL. PDF range cards will contain the following remarks at a minimum: target precedence (not target number), and rates of fire. An example of target precedence would be " Trucks, then platoon sized elements of dismounted infantry, then smaller elements of dismounted infantry".

c. Utilizing the Traversing and Elevation Mechanism to complete the range card. In order to properly complete the range card, the T&E mechanism must be properly utilized.

(1) Traversing and Elevation Mechanism (T&E). The traversing and elevation mechanism (T&E) provides controlled manipulation of the weapon and the ability to engage predetermined targets in times of low visibility. The traversing and elevating mechanism consist of the traversing hand wheel, traversing screw, offset head, and traversing slide with lock lever. The traversing slide is what attaches the T&E to the tripod.

(a) Traversing Hand Wheel. The traversing and elevating hand wheels are measured in mils. One click equals 1 mil. One complete turn of the hand wheel equals 25 mils (see figure 6). With the traversing hand wheel, the gun can be traversed approximately 100 mils (50 mils right and 50 mils left of center).

(b) Elevating Hand Wheel. Engraved on the hand wheel is a scale divided into 5 mil divisions and then divided into 1-mil subdivisions for a total of 50 mil increments. There are 200 mils above and below the zero mark for a total of 400 mils in elevation change (see figure 1).

(c) Traversing Slide Lock Lever. This allows rapid lateral adjustment along the traversing bar (see figure 1).

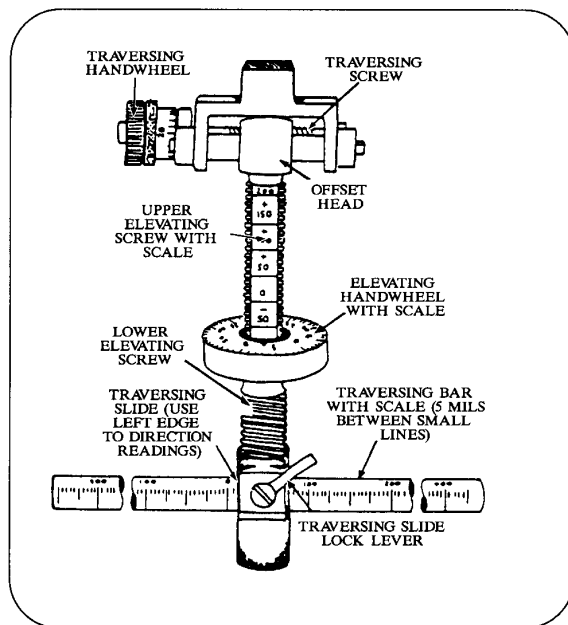


Figure 1

(2) Mount The Gun. To mount the gun, use the following procedures.

(a) Prepare the tripod by extending the legs until the sleeve latch engages, locking them open. The front leg must point toward the center of the target or sector of fire.

(b) Prepare the T&E by rotating the elevating handwheel until approximately 1 ½ inches (two fingers) are visible on the upper elevating screw, and the same on the bottom of the screw. Rotate the traversing handwheel until the offset head is centered.

(c) Insert the flex-mount pintle into the tripod's pintle bushing and then engage the pintle locking lever.

(d) Lower the traversing slide over the traversing bar with the traversing wheel to the left. Secure it by turning the locking lever clockwise.

(e) Attach the gun to the flex-mount by pushing the recesses on the forward bottom portion of the receiver against the forward bushings on the flex-mount. Lower the rear of the weapon and secure it with the retaining pin.

(3) Read The T&E Direction.

(a) Center the traversing hand wheel and loosen the traversing slide lock lever.

(b) Move the traversing slide along the traversing bar until the machine gun is laid on the center base of a point target and on either flank of a linear target. Lock the traversing slide to the traversing bar.

(c) Read the direction from the scale on the traversing bar. If the left edge of the traversing slide does not fall exactly on a 5-mil graduation, move the left edge of the traversing bar slide back to the next smaller graduation, and use the traversing handwheel to complete the initial lay (Figure 2).

NOTE: You must reset the traversing handwheel to zero before laying the gun on another target.

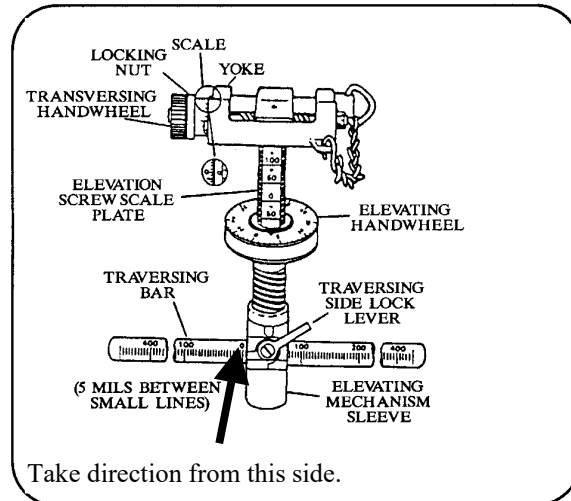


Figure 2

1. Read the direction as RIGHT (number of mils) when the traversing slide is to the left of "0" on the traversing bar.

2. Read the direction as LEFT (number of mils) when the traversing slide is to the right of "0" on the traversing bar.

NOTE: (L) OR (R) IS DETERMINED BY DIRECTION BARREL IS POINTED.

(4) Read The T&E Elevation.

(a) Lay the machine gun at the base of the target.

(b) First portion is taken from the engraved scale on the upper elevation screw plate.

(c) The second portion is taken from the engraved scale on the top of the elevating handwheel, using the indicator as the index

(d) The two portions are separated by a slash (/) when recorded.

(e) Determine the MAJOR READING, using the upper elevating screw and plate with scale (15).

1. Lower your head until your eyes are level with the top of the elevating hand wheel.

2. Record the first number above the first visible index line above the elevating hand wheel. Ensure that either a plus (+) or a minus (-) sign has been designated as the major reading unless 0.

(f) Determine the MINOR READING, using the mil scale on top of the elevating hand wheel (16).

1. Record the number that is on line with the dial pointer. For example, the entire elevation reading is -50/3 (Figure 3).

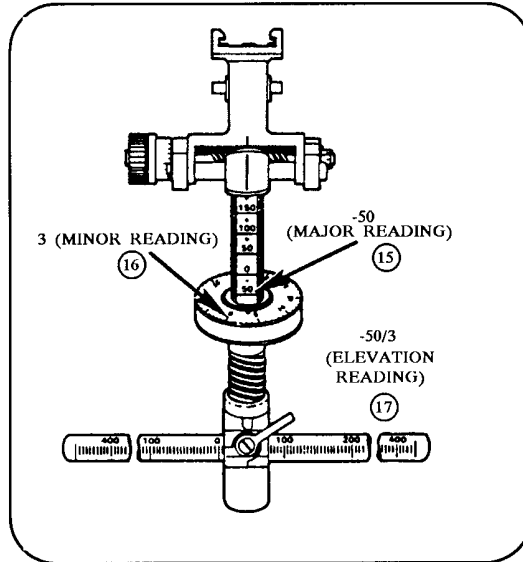


Figure 3

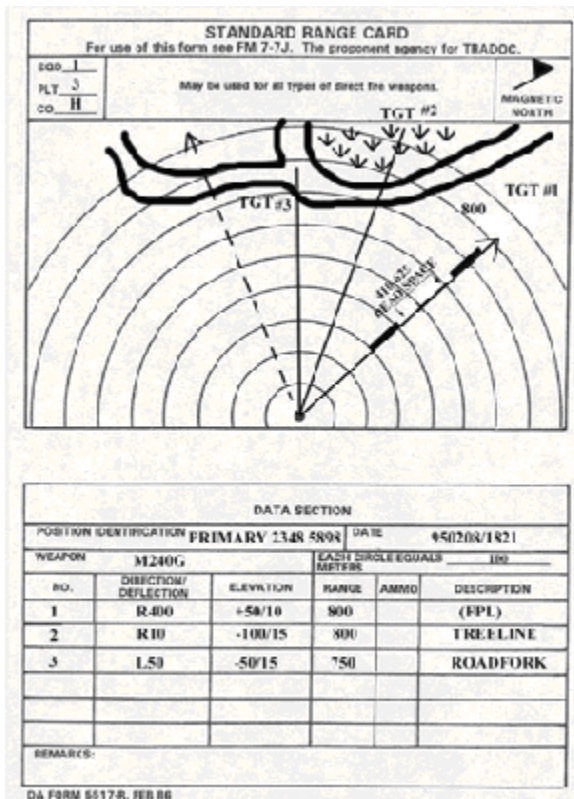


Figure 4 Range Card with FPL

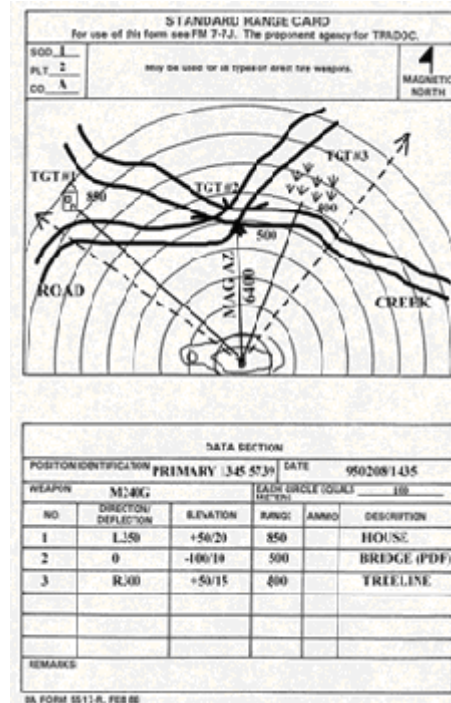


Figure 5. Range Card with PDF

STANDARD RANGE CARD		
For use of this form see FM 7-7J. The proponent agency for TRADOC.		
SOD _____ PLT _____ CO _____	May be used for all types of direct fire weapons.	MAGNETIC NORTH

DATA SECTION					
POSITION IDENTIFICATION				DATE	
WEAPON			EACH CIRCLE EQUALS _____ METERS		
NO.	DIRECTION/ DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
REMARKS:					

DA FORM 5517-R, FEB 85

REFERENCES: MCWP 3-15 Machine Guns and Machine Gun Gunnery; FMFM 6-5 The Marine Rifle Squad