CHAPTER 9

GUNNER'S EXAMINATION

The gunner's examination tests the proficiency of the gunner. It is also a test of the three qualified assistants whom the candidate is allowed to choose. The candidate's success in the examination depends mainly on his ability to work harmoniously with these assistants. The examining board must consider this factor and ensure uniformity during the test. Units should administer the gunner's examination at least semiannually to certify crew proficiency.

Section I. PREPARATORY INSTRUCTION

Preparatory instruction for the gunner's examination teaches the soldier how to properly and accurately perform the gunner's duties. The squad leader is responsible for this preparation instruction. In TOE units, squad members should be rotated within the squad so that each member can become proficient in all squad positions. Individual test scores should be maintained; squad scores should be determined and compared with other squads to build esprit de corps.

9-1. METHODS OF INSTRUCTION

The applicability method of instruction is used for the gunner's examination.

a. The conditions and requirements of each step of the qualification course are explained and demonstrated. Then each candidate is given practical work and is constantly supervised by his squad leader to ensure accuracy and speed--accuracy is stressed from the start; speed is attained through repetition.

b. The platoon leader/platoon sergeant monitors the instruction given by the squad leaders within the platoon. Demonstrations are usually given to the entire group. Also, squads perform practical work under the supervision of the squad leader.

9-2. PRIOR TRAINING

A soldier must be proficient in mechanical training, crew drill, and fire commands and their execution before he qualifies to take the examination.

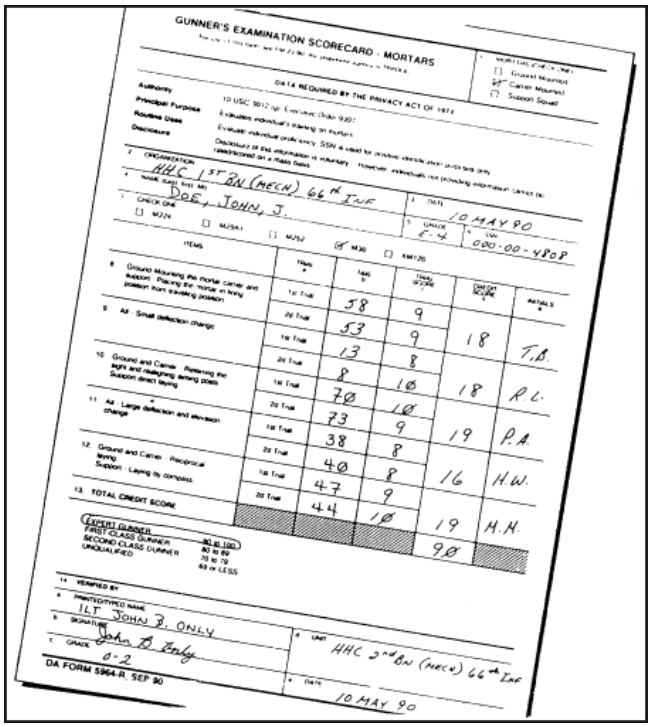
9-3. PREPARATORY EXERCISES

The preparatory exercises for the gunner's examination consist of training in those steps found in the qualification course. After sufficient preparatory exercises, candidates are

given the gunner's examination. Those failing the examination should be retrained for testing at a later date.

9-4. EXAMINING BOARD

The examining board consists of one officer and two senior NCOs who are proficient with the weapon. Not more than one member is selected from officers who are assigned to the candidate's organization. (The commander having authority to issue special orders appoints the board.) Scores are recorded on DA Form 5964-R (Gunner's Examination Scorecard) (Figure 9-1). A blank copy of this form is located in the back of this publication for local reproduction on 8 1/2-inch by 11-inch paper.



GUNNER'S EXAMINATION SCORECARD - MORTARS

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority: 10 USC 3012 (g) (Executive Order 9397)

Principal Purpose: Evaluates individual's training on mortars.

Routine Uses: Evaluate individual proficiency. SSN is used for positive identification purposes only.

Disclosure: Disclosure of this information is voluntary. However, individuals not providing information cannot be established on a mass basis.

2. ORGANIZATION: HHC 1ST BN (MECH) 66TH INF
3. DATE: 10 MAY 90
4. NAME (Last, First, MI): DOE, JOHN, J.
5. GRADE: E-4
6. SSN: 000-00-4808
7. CHECK ONE: ☐ M224 ☐ M252A1 ☐ M252 ☒ M30 ☐ KM120

ITEMS	TRIAL	TIME	TRIAL SCORE	CREDIT SCORE	INITIALS
8. Ground Mounting the mortar carrier and mission. Placing the mortar in firing position from traveling position.	1st Trial	58	9	18	T.B.
	2d Trial	53	9		
9. All - Small deflection change.	1st Trial	13	8	18	R.L.
	2d Trial	8	10		
10. Ground and Carrier - Retaining the sight and readapting aiming posts. Position direct laying.	1st Trial	70	10	19	P.A.
	2d Trial	73	9		
11. All - Large deflection and elevation change.	1st Trial	38	8	16	H.W.
	2d Trial	40	8		
12. Ground and Carrier - Reciprocal laying. Position - Laying by compass.	1st Trial	47	9	19	H.H.
	2d Trial	44	10		
13. TOTAL CREDIT SCORE				90	

EXPERT GUNNER — 90 to 100
FIRST CLASS GUNNER — 80 to 89
SECOND CLASS GUNNER — 70 to 79
UNQUALIFIED — 69 or LESS

14. VERIFIED BY
a. PRINTED/TYPED NAME: ILT JOHN B. ONLY
b. SIGNATURE: John B. Only
c. GRADE: O-2
d. UNIT: HHC 3rd BN (MECH) 66th INF
e. DATE: 10 MAY 90

DA FORM 5964-R, SEP 90

Figure 9-1. Example of completed DA Form 5964-R.

9-5. LOCATION AND DATE

Each unit armed with a mortar weapon system gives examinations semiannually. Other units may conduct examinations or allow their eligible members to take the qualification

tests at nearby stations. (The commander authorized to issue special orders determines the date of the examination.) The area selected should be on flat terrain consisting of soil that allows for aiming posts to be easily positioned at 50 and 100 meters from the station position.

9-6. ELIGIBLE PERSONNEL

The following personnel are eligible to take the examination:

- Commissioned officers and enlisted men assigned to a mortar unit.
- Commissioned officers and enlisted men whose duties require them to maintain proficiency in the use of mortars, as determined by battalion and higher commanders.

9-7. QUALIFICATION SCORES

A candidate's earlier qualification ends when he is administered a record course with the mortar. He is classified according to his latest examination score as follows:

- Expert gunner 90 - 100
- First-class gunner 80 - 89
- Second-class gunner 70 - 79
- Unqualified 69 or less

9-8. GENERAL RULES

Conditions should be the same for all candidates during the test. The examining board ensures that information obtained by a candidate during testing is not passed to another candidate, and that candidates do not receive sight settings or laying of mortars left by a previous candidate.

a. Unit equipment should be used in the examination; however, it should be the best available. Sight settings are considered correct when any part of the index coincides with any part of the line of graduation of the required setting.

b. The left side of the aiming post is used for alignment. The elevation and cross-level bubbles are considered centered when the bubbles are resting entirely within the outer etched lines on the vials.

c. The candidate is permitted to traverse the mortar to the middle point of traverse before each trial at laying the mortar, except at Station No. 5.

d. In any test that calls for mounting or emplacing the mortar, either by the candidate or the board, the surface emplacement is used. Digging is not allowed, and the rear of the baseplate assembly is not staked.

e. In time trials, the candidate does not receive credit for the trial if he performs any part of it after announcing, "Up."

f. The candidate selects his assistants from within his squad to participate in the test. When squad members are unavailable for testing, the candidate may select his assistants from outside the squad but from within his organization. The board makes sure that no unauthorized assistance is given the candidate during the examination.

g. A candidate is given three trials--one for practice and two for record. If he takes the first trial for record, then he must take the second trial for record even if he fails it. His credit score is the total of the two trials. When he fails in any trial through the fault of an examiner, defective sight, mortar, mount, or other instrument used, that trial is void and the candidate is given another trial as soon as possible. If his actions cause the mortar to function unsatisfactorily during testing, he receives no credit for that portion of the test.

h. When there is a mechanical failure and a mortar fails to maintain the lay after the candidate announces, "Up," a board member twists or pushes the mortar (taking up the play without manipulation) until the cross-level bubble is within the two outer etched lines. He then looks through the sight and if the vertical line is within two mils of the correct sight picture, the candidate is given credit for that trial, as long as other conditions are met.

i. The candidate must repeat all commands. Commands should be varied between trials, using even and odd numbers, and right and left deflections.

Section II. GUNNER'S EXAMINATION WITH GROUND-MOUNTED MORTAR

This examination tests the gunner's ability to perform basic mortar gunnery tasks with the ground-mounted mortar system.

9-9. SUBJECTS AND CREDITS

The examination consists of the following tests with maximum credit scores as shown.

Mounting the mortar	20 points
Small deflection change	20 points
Referring the sight and realigning aiming posts	20 points
Large deflection and elevation change	20 points

Reciprocal laying 20 points

9-10. EQUIPMENT

The recommended equipment needed for the five stations includes 5 mortars, 5 sights, 1 aiming circle, 8 aiming posts, 5 stopwatches, and 16 filled sandbags or ammunition boxes (4.2-inch only).

9-11. ORGANIZATION

The organization prescribed in Table 9-1 is recommended for the conduct of the gunner's examination. Variations are authorized, depending on local conditions and the number of men being tested.

STATION	PHASE	EQUIPMENT	
		FOR CANDIDATE	FOR EXAMINING OFFICER
1	Mounting the mortar.	1 mortar 1 sight 2 sandbags (4.2-inch only) 1 baseplate stake	1 stopwatch
2	Small deflection change.	1 mortar 1 sight 2 sandbags (4.2-inch only) 2 aiming posts	1 stopwatch
3	Referring the sight.	1 mortar 1 sight 4 sandbags (4.2-inch only) 2 aiming posts	1 stopwatch
4	Large deflection and elevation change.	1 mortar 1 sight 4 sandbags (4.2-inch only) 2 aiming posts	1 stopwatch
5	Reciprocal laying.	1 mortar	1 stopwatch

		1 sight 4 sandbags (4.2-inch only) 2 aiming posts	1 aiming circle

Table 9-1. Organization for conducting gunner's examination (ground-mounted).

9-12. PROCEDURE

The candidate carries his scorecard (Figure 9-1) from station to station. The evaluator at each station fills in the time, trial scores, and credit score, and initials the appropriate spaces.

9-13. MOUNTING OF THE MORTAR

The candidate is tested at station No. 1 on his ability to perform the gunner’s duties in mounting the mortar.

a. **Equipment.** Prescribed in Table 9-1.

b. **Conditions.** The candidate is directed to mount the mortar with his authorized assistants. The conditions of the test are as follows:

(1) *(All mortars)* The candidate arranges his equipment as outlined in Figures 9-2 through 9-6. The emplacement is marked before the examination.

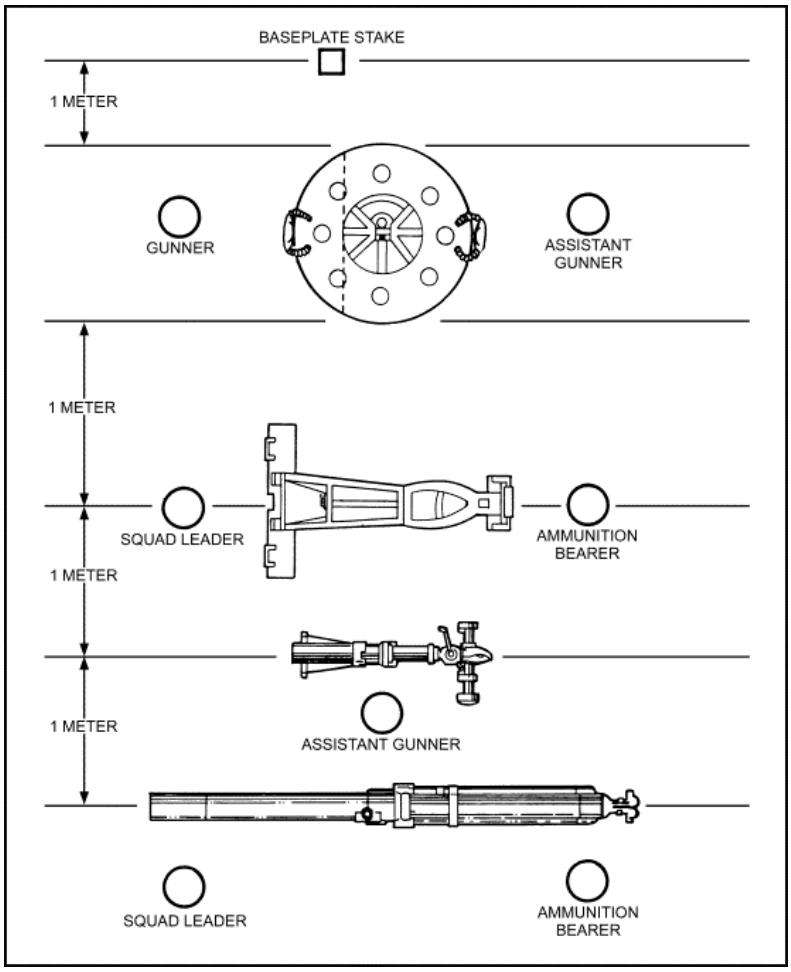


Figure 9-2. Diagram of equipment layout and position of personnel for the gunner's examination (4.2-inch mortar).

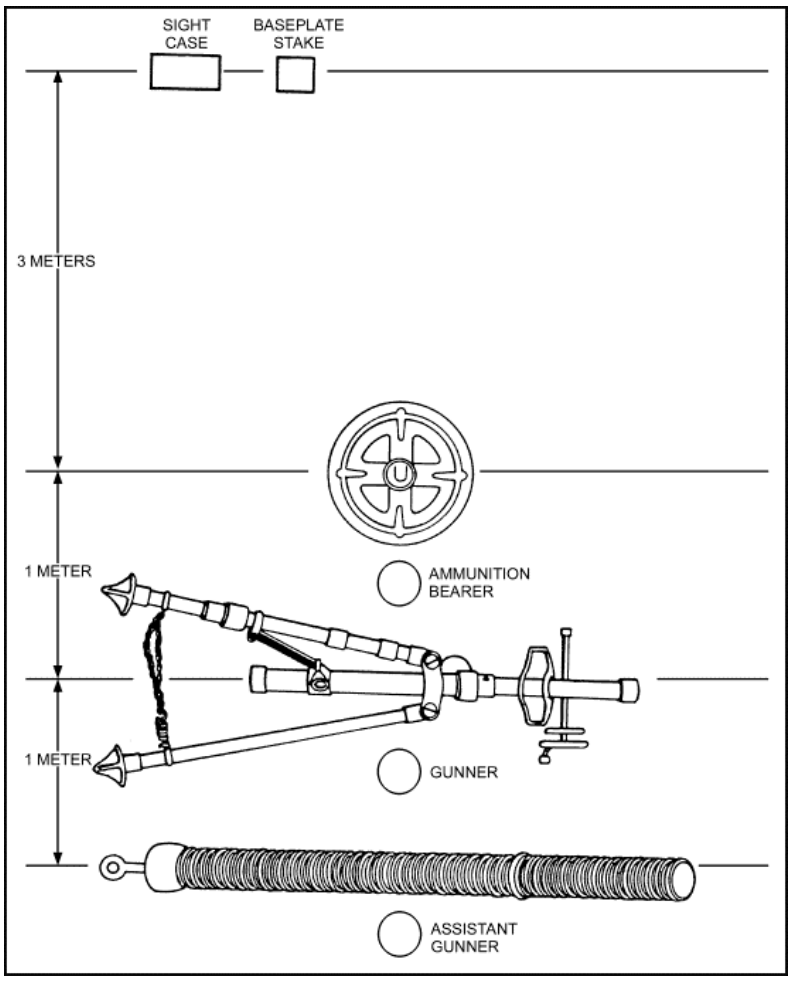


Figure 9-3. Diagram of equipment layout and position of personnel for the gunner's examination (81-mm mortar, M29A1).

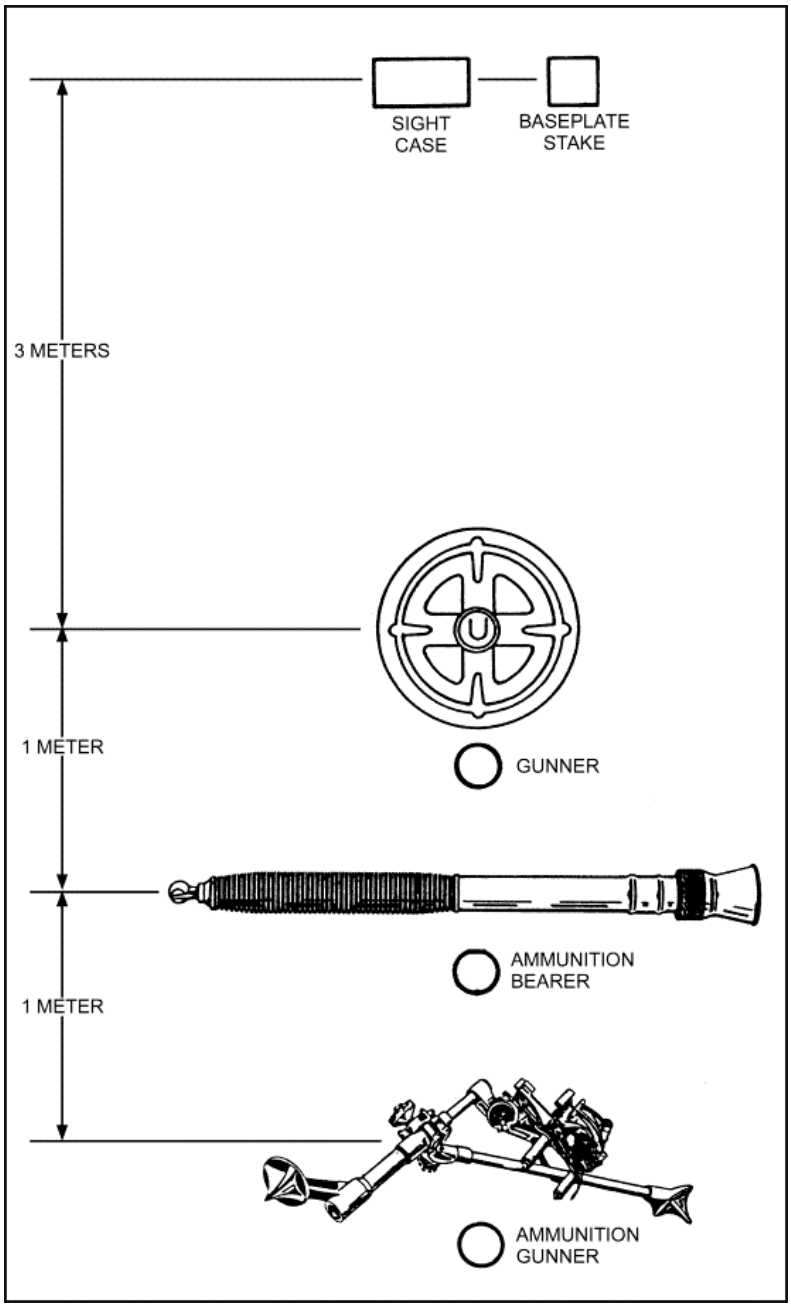

SIGHT
CASE
BASEPLATE
STAKE
3 METERS
1 METER
GUNNER
AMMUNITION
BEARER
1 METER
AMMUNITION
GUNNER

Figure 9-4. Diagram of equipment layout and position of personnel for the gunner's examination (81-mm mortar, M252).

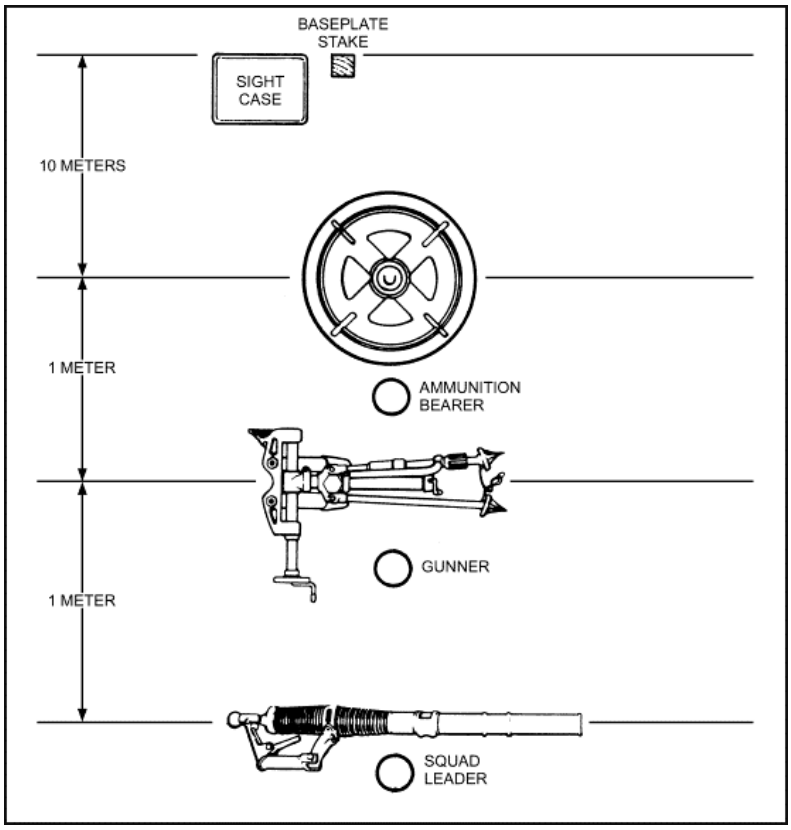


Figure 9-5. Diagram of equipment layout and position of personnel for the gunner's examination (60-mm mortar).

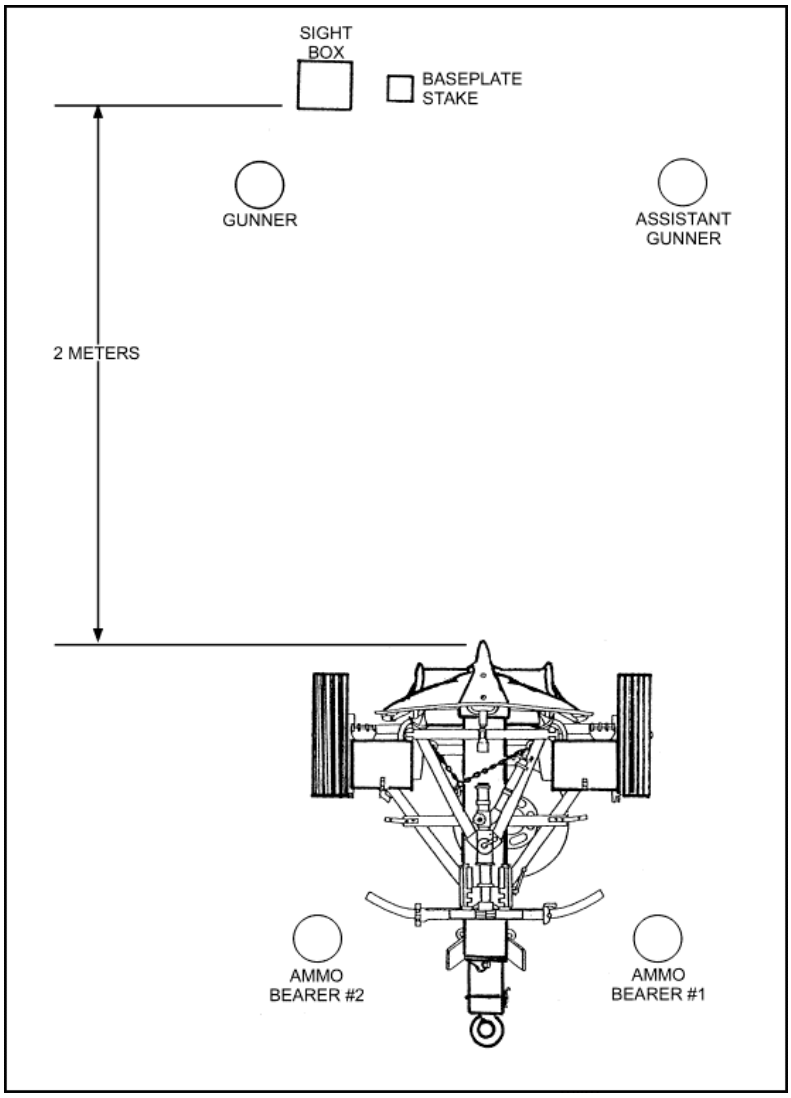


Figure 9-6. Diagram of equipment layout and position of personnel for the gunner's examination (120-mm mortar).

(2) *(All mortars)* The mortar sight is seated in its case with 3800 mils (3200 mils for the M64 sights) set on the deflection scale and 0800 mils set on the elevation scale, and the sightbox is closed and latched.

(3) *(4.2-inch only)* The two sandbags or ammunition boxes are placed under the spade to prevent the baseplate assembly from tilting. They are in position at the start of the examination.

(4) *(4.2-inch only)* The standard assembly is in low range at its lowest elevation, with the traversing assembly side traversed all the way to the right with the crank closed.

(5) *(4.2-inch only)* The mortar locking pin is fully inserted and locked.

(6) *(All mortars except 4.2-inch)* The candidate should examine the equipment before mounting.

(7) *(120-mm only)* Traverse extension is locked and centered.

c. **Procedure.** The candidate is given two trials; his credit score is the total of these two trial scores.

(1) The candidate and his assistants take their positions. The candidate is instructed to mount the mortar at 3200 mils deflection and 900 mils elevation for the 4.2-inch mortar, or 3200 mils deflection and 1100 mils elevation for all other mortars.

Note: When using the M53 series sightunit, the red deflection scale is used for all laying procedures.

(2) The evaluator points to the exact spot where the mortar is to be mounted. He indicates the initial direction of fire by pointing in that direction and gives the command ACTION, at which time the candidate begins mounting the mortar. After mounting the mortar, he should have 3200 mils deflection and 900 mils elevation on the sight for the 4.2-inch mortar or 1100 mils elevation and 3200 mils deflection for all other mortars.

(3) The assistants may manipulate the sight mount knob and elevation crank. They may center the connection for the mortar locking pin assembly, but they MUST NOT manipulate the sight for deflection or elevation settings.

(4) When the test is completed, the candidate announces, "Up." Time is charged against him from the command ACTION to the announcement "Up."

d. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when the--

- Time exceeds 1 minute, 40 seconds (4.2 inch only); time exceeds 1 minute and 15 seconds (120-mm only); time exceeds 90 seconds (all other mortars).
- Sight is not set correctly for deflection and elevation.
- Cross-level and elevation bubbles are not centered.
- Mortar locking pin, or the clevis lock pin is not fully locked.
- Connection for the mortar locking pin assembly (buffer carrier, 60-mm mortar) or the traversing slide assembly is off center more than two turns.
- Assistant manipulates the sight for a deflection or elevation setting.
- The baseplate is not positioned correctly in relation to the baseplate stake.
- The selector switch on the barrel is not on D for drop-fire (60-mm mortar only).
- The collar assembly is not positioned on the lower saddle (60-mm mortar only).
- Firing pin recess is not facing upwards on the barrel (81-mm mortar, M252 only).
- Traverse is more than four turns (120-mm only).
- Barrel clamp is not locked (120-mm only).
- Cross-level lock is not tight (120-mm only).
- Leg-locking handwheel is not wrist-tight (81-mm mortar, M252 only).
- The coarse cross-level nut is not wrist-tight (60-mm and 81-mm, M29A1, mortars only).
- The collar locking knob is not secured (hand-tight) to the barrel (60-mm and 81-mm, M252, mortars only).
- The bipod legs are not fully extended and the spread cable or chain is not taut (60-mm; 81-mm, M29A1; and 120-mm mortars only).

(2) When the mortar is correctly mounted within the prescribed limits, credit is given as follows:

TIME (seconds)	**POINT CREDIT FOR EACH TRIAL**

120-mm	4.2-inch Mortar	All Other Mortars	
51 or less	50 or less	65 or less	10
52 to 57	51 to 60	66 to 70	9
58 to 63	61 to 70	71 to 75	8
64 to 69	71 to 80	76 to 80	7
70 to 75	81 to 90	81 to 85	6
	91 to 100	86 to 90	5
76 or over	101 or over	91 or over	0

9-14. SMALL DEFLECTION CHANGE

The candidate is tested at station No. 2 on his ability to perform the gunner's duties when he is given commands that require a change in deflection.

a. **Equipment.** Prescribed in Table 9-1.

b. **Conditions.** A mortar is mounted with the sight installed. The sight is laid on two aiming posts (placed out 50 to 100 meters from the mortar) on a referred deflection of 2800 mils and 900 mils elevation for the 4.2-inch mortar, and 2800 mils deflection and 1100 mils elevation for all other mortars. The mortar is center of traverse, and the vertical line of sight is on the left edge of both aiming posts.

(1) The candidate is allowed to check the deflection set on the sight before each trial.

(2) He is allowed to start each trial with his hand on the deflection knob. (The assistant may start with his hand on the sight mount knob [4.2-inch only]).

(3) The change in deflection does not involve movement of the bridge assembly but causes the candidate to traverse the mortar at least 50 mils and not more than 75 mils (4.2-inch) and at least 20 mils and not more than 60 mils (all mortars except 4.2-inch).

(4) Traversing extension is locked and centered (120-mm).

c. **Procedure.** The candidate is given two trials; his credit score is the total of these two trials.

(1) The candidate is given one assistant. A different command is given for each trial. The evaluator records the time and checks the candidate's work after each command has been executed.

(2) The evaluator announces an initial command requiring a change in deflection of 50 to 75 mils for the 4.2-inch mortar. All other mortars require a change in deflection of 20 to 60 mils and an elevation change of 35 to 90 mils. The candidate may proceed with the exercise as soon as the deflection element is announced. The evaluator announces the command in normal sequence and cadence.

(3) No manipulation by the assistant is allowed except for cross-leveling on the 4.2-inch mortar.

(4) Time is charged against the candidate from the announcement of the last digit of the elevation element until the candidate announces, "Up."

d. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when the--

- Time exceeds 20 seconds (4.2-inch); time exceeds 76 seconds (120-mm); time exceeds 35 seconds (all other mortars).
- Sight is not set correctly for deflection or elevation.
- Elevation bubble is not centered.
- Cross-level bubble is not centered.
- Assistant manipulates the mortar or sight for elevation or deflection.
- Vertical cross line of the sight is more than 2 mils off the correct sight picture.

(2) When the mortar is laid correctly within the prescribed limits, credit is given as follows:

TIME (seconds)			**POINT CREDIT FOR EACH TRIAL**
120-mm	**4.2-inch Mortar**	**All Other Mortars**	
20 or less	8 or less	20 or less	10
21 to 23	9 to 11	21 to 23	9

24 to 26	12 to 14	24 to 26	8
27 to 31	15 to 17	27 to 31	7
32 to 35	18 to 20	32 to 35	6
36 or over	21 or over	36 or over	0

9-15. REFERRING OF THE SIGHT AND REALIGNMENT OF AIMING POSTS

The candidate is tested at station No. 3 on his ability to perform the gunner's duties in referring the sight and realigning the aiming posts.

a. **Equipment.** Prescribed in Table 9-1.

b. **Conditions.** The mortar is mounted with the appropriate or proper sight installed. The sight is laid on two aiming posts (placed out 50 and 100 meters from the mortar) on a referred deflection of 2800 mils and 900 mils elevation for the 4.2-inch mortar, and 2800 mils deflection and 1100 mils elevation for all other mortars.

(1) The mortar is within two turns of center of traverse (four turns for the 120-mm). The candidate receives an administrative command with a deflection of 2860 or 2740 mils. The mortar is then re-laid on the aiming posts using the traversing crank.

(2) The candidate checks the conditions before each trial and is allowed to start the test with his hand on the deflection knob of the sight.

(3) The change in deflection in the command must be less than 25 mils but greater than 5 mils. The elevation remains constant at 900 or 1100 mils.

(4) The candidate is allowed two assistants--one to place out aiming posts and one to move the bridge or bipod (mount) and to cross-level. The assistants do not manipulate the sight or mortar for elevation or deflection.

(5) Traverse extension will not be used. It will remain locked in the center position.

c. **Procedure.** The candidate is given two trials; his credit score is the total of these two trials.

(1) A different command is given for each trial. The evaluator records the time and checks the candidate's work after each command has been executed.

(2) When the candidate is ready, he is given a command--for example, REFER, DEFLECTION TWO EIGHT EIGHT ZERO (2880), REALIGN AIMING POSTS.

(3) The candidate repeats each element of the command, sets the sight with the data given in the command, and directs one assistant in realigning the aiming posts. Then he centers his traversing assembly and, with the help of the assistant gunner, moves the bridge or bipod (mount) assembly and re-lays on his aiming posts. After he lays the mortar on the realigned posts, he announces, "Up."

Note: This procedure ensures that, after a registration mission (using a parallel sheaf), the mortars have matching deflections.

(4) Time is taken from the announcement of refer and align aiming post to the candidate's announcement of "Up."

(5) The candidate's assistant may not leave the mortar position until he hears the word POSTS in the command REALIGN AIMING POSTS.

d. **Scoring.** Scoring procedures are as follows:

(1) No credit is given when the--

- Time exceeds 1 minute, 40 seconds (4.2-inch only); time exceeds (120-mm only); time exceeds 1 minute, 15 seconds (all other mortars).
- Traversing crank is turned before the aiming posts are realigned.
- Sight is not set correctly for deflection or elevation.
- Mortar is not cross-leveled or correctly laid for elevation.
- Vertical line of the sight is more than 2 mils off the correct sight picture.
- Traversing assembly slide is more than two turns (four turns for the 120-mm) to the left or right of the center position.
- Assistant manipulates the sight or mortar for elevation or deflection.

(2) When the mortar is found to be correctly laid within the prescribed limits, credit is given as follows:

TIME (seconds)	**POINT CREDIT FOR EACH TRIAL**

120-mm	4.2-inch Mortar	All Other Mortars	
60 or less	70 or less	60 or less	10
61 to 65	71 to 80	61 to 65	9
66 to 70	81 to 90	66 to 70	8
71 to 75	91 to 100	71 to 75	7
76 or over	101 or over	76 or over	0

9-16. LARGE DEFLECTION AND ELEVATION CHANGES

The candidate is tested at station No. 4 on his ability to perform the gunner's duties when he is given commands requiring a large change in deflection and elevation.

a. **Equipment.** Prescribed in Table 9-1.

b. **Conditions.** A mortar is mounted with the sight installed. The sight is laid on two aiming posts placed out 50 to 100 meters from the mortar on a referred deflection of 2800 mils (1100 mils elevation for the 120-mm). For the first trial, using the 4.2-inch mortar, 900 mils elevation (low range) is used; for the second trial, 1065 mils elevation (high range) is used (for all mortars but the 4.2-inch, the elevation change will be greater than 100 mils but less than 200 mils). The mortar is within two turns of center of traverse (four turns for the 120-mm).

(1) The candidate is allowed to check the deflection and elevation setting before each trial. He is allowed to start each trial with his hand on the deflection knob.

(2) The change in deflection involves movement of the bridge or bipod assembly and causes the candidate to shift the barrel not less than 200 mils and not more than 300 mils. The change in elevation causes him to elevate or depress the barrel from low range to high range, or vice versa.

(3) Traverse extension is locked and centered (for the 120-mm).

c. **Procedure.** The candidate is given two trials; his credit score is the total of these two trials.

(1) The candidate is given two assistants--one assistant may visually align the mortar while the other shifts the bridge and standard assemblies. The assistants neither manipulate the sight nor lay the mortar for deflection. A

different command is given for each trial. The evaluator records the time and checks the candidate's mortar after each command has been executed.

(2) The evaluator announces a command that requires a change in deflection and elevation, involving movement of the bridge assembly and a change in the elevation range--for example: NUMBER ONE, HE QUICK, ONE ROUND, DEFLECTION THREE ZERO FOUR FIVE (3045), CHARGE TWO FOUR (24), ELEVATION ONE ZERO SIX FIVE (1065).

(3) The candidate repeats each element of the command. As soon as the deflection element is given, he places the data on the sight and re-lays on the aiming point with a compensated sight picture. As soon as the mortar is laid, he announces, "Up." The assistants must remain in their normal positions until the deflection element is given.

(4) Time is taken from the announcement of the last digit of the elevation element of the fire command until the candidate announces, "Up."

d. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when the--

- Time exceeds 1 minute and 15 seconds (60-mm mortar); time exceeds 55 seconds (120-mm); time exceeds 60 seconds (all other mortars).
- Sight is not set correctly for deflection or elevation.
- Mortar is not correctly laid for elevation.
- Mortar is not cross-leveled.
- Vertical line is more than 2 mils off the compensated or aligned sight picture.
- Traversing assembly slide is more than two turns (four turns for the 120-mm) to the left or right of the center position.
- Assistants make unauthorized movements or manipulations.
- Collar assembly is not positioned on the correct saddle for the announced elevation (60-mm).
- Traverse extension is not locked and centered (for the 120-mm).

(2) When the mortar is laid correctly within the prescribed limits, credit is given as follows:

TIME (seconds)	**POINT CREDIT FOR EACH TRIAL**

120-mm	4.2-inch Mortar	All Other Mortars	
35 or less	40 or less	35 or less	10
36 to 40	41 to 47	36 to 40	9
41 to 45	48 to 54	41 to 45	8
46 to 50	55 to 61	46 to 50	7
51 to 55	62 to 68	51 to 55	6
	70 to 75	56 to 60	5
56 or over	76 or over	61 or over	0

9-17. RECIPROCAL LAYING

The candidate is tested at station No. 5 on his ability to perform the gunner's duties in laying a mortar for direction.

a. **Equipment.** Prescribed in Table 9-1.

b. **Station Setup.** The evaluator sets up the aiming circle about 25 meters to the left front of the station. He levels the instrument and orients the aiming circle so that the 0-3200 line is in the general direction the mortar is mounted. A direction stake is placed out about 25 meters in front of the mortar position.

c. **Conditions.** The candidate is given one assistant to shift the bridge or bipod assembly. The assistant does not manipulate the sight or mortar in laying for elevation or deflection. The conditions of the test are as follows:

(1) The 4.2-inch mortar is mounted for the candidate at 900 mils elevation, 3200 mils deflection. All other mortars are mounted at 3200 mils deflection and 1100 mils elevation. The mortar is laid on a direction stake on the initial mounting azimuth with the traversing mechanism centered.

(2) The mounting azimuth on which the candidate is ordered to lay the mortar is not less than 150 mils or more than 200 mils away from the initial mounting azimuth.

(3) The evaluator sets up the aiming circle about 25 meters to the left front of the mortar, with the instrument leveled and the 0-3200 line already on the mounting azimuth on which the mortar is to be laid.

(4) The candidate is allowed to start the test with his hand on the deflection knob. The assistants must remain in their normal positions until the evaluator gives the first deflection element.

(5) Traverse extension is locked and centered (for the 120-mm).

d. **Procedure.** The candidate is given two trials; his credit score is the total of these two trial scores.

(1) The evaluator operates the aiming circle during this test. He lays the vertical line on the mortar sight and commands AIMING POINT THIS INSTRUMENT.

(2) The candidate refers his sight to the aiming point and replies AIMING POINT IDENTIFIED.

(3) The evaluator then announces the deflection--for example, "Number one, deflection two three one five (2315)."

(4) The candidate repeats the announced deflection, sets it on his sight, and lays the mortar on the center of the aiming circle lens. He then announces, "Number one ready for recheck." The evaluator announces the new deflection immediately so that there is no delay.

(5) The operation is completed when the candidate announces, "Number one, zero (or one) mil(s), mortar laid."

(6) Time is taken from the last digit of elevation first announced by the evaluator until the candidate announces, "Number one, zero (or one) mil(s), mortar laid."

e. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when the--

- Time exceeds 1 minute, 55 seconds.
- Sight is not set correctly for deflection or elevation.
- Elevation bubble is not centered.
- Cross-level bubble is not centered.
- Vertical line of the sight is not centered on the aiming circle lens.
- The mortar sight and the aiming circle deflection difference exceeds 1 mil.
- Assistant performs unauthorized manipulations or movements.
- Traversing mechanism is more than two turns (four turns for the 120-mm) from center of traverse. Traverse extension is not locked in the center position.

(2) When the mortar is laid correctly within the prescribed limits, credit is given as follows:

TIME (seconds)	POINT CREDIT FOR EACH TRIAL
55 or less	10
56 to 67	9
68 to 79	8
80 to 91	7
92 to 103	6
104 to 115	5
116 or over	0

Section III. GUNNER'S EXAMINATION WITH THE TRACK-MOUNTED MORTAR

This examination tests the gunner's ability to perform basic mortar gunnery tasks with the track-mounted mortar system.

9-18. SUBJECTS AND CREDITS

The examination consists of the following tests with maximum credit scores as shown.

Placing the mortar into a firing position from the traveling position	20 points
Small deflection change	20 points
Referring the sight and realigning the aiming posts	20 points
Large deflection and elevation changes	20 points
Reciprocally laying	20 points

9-19. EQUIPMENT

The minimum equipment needed for the five stations includes five mortars, five M106-series carriers, five sights, one aiming circle, eight aiming posts, and five stopwatches.

9-20. ORGANIZATION

The organization prescribed in Table 9-2 is recommended for the conduct of the gunner's examination. Variations are authorized, depending on local conditions and the number of men being tested.

STATION	PHASE	EQUIPMENT	
		FOR CANDIDATE	FOR EXAMINING OFFICER
1	Placement of the mortar into firing position from the traveling position.	1 mortar carrier 1 mortar 1 sight	1 stopwatch
2	Small deflection change.	1 mortar carrier 1 mortar 1 sight 2 aiming posts	1 stopwatch
3	Referring of the sight and realignment of the aiming posts.	1 mortar carrier 1 mortar 1 sight 2 aiming posts	1 stopwatch
4	Large deflection and elevation changes.	1 mortar carrier 1 mortar 1 sight 2 aiming posts	1 stopwatch
5	Reciprocal laying.	1 mortar carrier 1 mortar 1 sight 2 aiming posts	1 stopwatch 1 aiming circle

Table 9-2. Organization for conducting gunner's examination (carrier-mounted).

9-21. PROCEDURE

The candidate carries his scorecard from station to station. The evaluator at each station fills in the time, trial scores, and credit score, and initials the appropriate spaces.

9-22. PLACEMENT OF MORTAR INTO A FIRING POSITION FROM TRAVELING POSITION

The candidate is tested at station No. 1 on his ability to perform quickly and accurately the gunner's duties in placing the mortar into the firing position from the traveling position.

a. **Equipment.** Prescribed in Table 9-2.

b. **Conditions.** The mortar is secured in the traveling position by the mortar tie-down strap.

(1) The sight is in its case, and the case is in its stowage position.

(2) The candidate selects an assistant gunner.

(3) The blast attenuator device is removed and stored properly for the 120-mm mortar system.

(4) The mortar hatch covers are closed and locked (the ramp may be in the up or down position).

(5) The gunner and assistant gunner are seated in their traveling positions.

(6) The evaluator ensures that the candidate understands the requirement of the test and instructs him to report I AM READY before each trial.

c. **Procedure.** The candidate is given two trials; his credit score for the test is the total of these two trials.

Note: The traverse extension (120-mm) is not used during the gunner's examination. It remains locked in the center position.

(1) The evaluator positions himself inside or outside the carrier where he can best observe the action of the candidate. The evaluator's position should not interfere with the action of the candidate.

(2)The trial is complete when the candidate announces, "Up."

d. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when the--

- Time exceeds 1 minute, 30 seconds (4.2-inch only); time exceeds 1 minute, 15 seconds (120-mm only).
- Sight is not set at 3200 mils deflection and 900 mils elevation for the 4.2-inch only; sight is not set at 3200 mils deflection and 1100 mils elevation for the 120-mm only.

- Elevation and cross-level bubbles are not centered (within outer red marks).
- Turntable and traversing assembly slide are not centered. (For the 120-mm, the traverse extension must also be centered and locked.)
- Mortar standard assembly support is not in the firing position (raised) (4.2-inch only).
- The traversing lock handle is not locked.
- The detent pins are not in the innermost detent (4.2-inch only).
- The standard base trunnions are not correctly seated and aligned in the standard support trunnion bearing (4.2-inch only).
- The elevation locking cam is not locked (4.2-inch only).
- The recoil stop clamp is not in position and the wing nut is not taut (4.2-inch only).
- The white line on the barrel is not aligned with the white line on the buffer housing assembly (120-mm only).
- The mortar locking pin is not fully seated and locked (4.2-inch only).
- The mortar carrier rear hatch covers are not securely latched.
- The safety mechanism is not set on FIRE (F showing) (120-mm only).
- The cross-level locking knob is not hand tight (120-mm only).
- The buffer housing assembly is not positioned against the lower collar stop (120-mm only).
- The blast attenuator device knob is not hand tight (120-mm only).
- The assistant manipulates the sight and or mortar for elevation and or deflection (120-mm only).

(2) When the mortar is found to be in the correct firing position within the prescribed limits, credit is given as follows:

TIME (seconds)		**POINT CREDIT FOR EACH TRIAL**
120-mm	**4.2-inch Mortar**	
50 or less	65 or less	10
51 to 57	66 to 70	9
58 to 63	71 to 75	8
64 to 69	76 to 80	7

70 to 75	81 to 85	6
	86 to 90	5
76 or over	91 and over	0

9-23. SMALL DEFLECTION CHANGE

The candidate is tested at station No. 2 on his ability to perform the gunner's duties when he is given commands that require a change in deflection.

a. **Equipment.** Prescribed in Table 9-2.

b. **Conditions.** The mortar is prepared for action with sight installed.

(1) The sight is laid on two aiming posts (placed out 50 to 100 meters from the mortar) on a referred deflection of 2800 and 900 mils elevation (for the 120-mm, referred deflection of 2800 and 1100 mils elevation). The turntable is centered, and the traversing mechanism is within two turns of center of traverse. For the 120-mm, the turntable is centered, the traversing mechanism is within four turns of center of traverse, and the traverse extension is centered and locked. The vertical line of the sight is on the left edge of both aiming posts.

(2) The change in deflection causes the candidate to traverse the mortar at least 50 but not more than 75 mils. For the 120-mm, traverse the mortar 20 to 60 for deflection and 30 to 90 for elevation.

(3) The candidate selects an assistant gunner (4.2-inch only).

(4) The candidate is allowed to begin the test with his hand on the deflection knob.

c. **Procedure.** The candidate is given two trials; his credit score for the test is the total of these two trials.

(1) The evaluator announces an initial command requiring a change in deflection.

(2) The candidate repeats each element of the command, sets the sight with the data given, and traverses and cross-levels the mortar until he obtains the correct sight picture.

(3) Time is charged against the candidate from the announcement of the last digit of the elevation element until the candidate's announcement of "Up."

(4) For the 120-mm, deflection of 20 to 60 mils and elevation 30 to 90 mils.

(5) For the 120-mm, traverse extension will not be used.

d. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when--

- The time exceeds 20 seconds (35 seconds for the 120-mm).
- The deflection is not indexed correctly (deflection and elevation are not set correctly for the 120-mm).
- The elevation and cross-level bubbles are not centered within the outer lines.
- The vertical cross line of the sight is not within 2 mils of the left edge of the aiming post.
- The traverse extension is centered and locked in position (120-mm only).

(2) When the mortar is laid correctly within the prescribed limits, credit is given as follows:

TIME (seconds)		**POINT CREDIT FOR EACH TRIAL**
120-mm	**4.2-inch Mortar**	
20 or less	10 or less	10
21 to 23	11 and 12	9
24 to 26	13 and 14	8
27 to 31	15 and 16	7
32 to 35	17 and 18	6
	19 and 20	5

36 or over	21 or over	0

9-24. REFERRING OF THE SIGHT AND REALIGNMENT OF AIMING POSTS

The candidate is tested at Station No. 3 on his ability to perform the gunner's duties in referring the sight and realigning the aiming posts.

a. **Equipment.** Prescribed in Table 9-2.

b. **Conditions.** The sight is laid on two aiming posts (placed out 50 and 100 meters from the mortar) on a referred deflection of 2800 mils and 900 mils elevation for the 4.2-inch mortar (1100 mils elevation for the 120-mm). The ramp is down with ammunition bearer in or outside the vehicle.

(1) The mortar is within two turns of center of traverse (four turns for the 120-mm). The candidate receives an administrative command with a deflection of 2860 or 2740 mils. The mortar is then re-laid on the aiming posts using the traversing crank.

(2) The candidate checks the conditions before each trial. He is allowed to start the test with his hand on the deflection knob of the sight.

(3) The change in deflection in the command must be less than 25 mils but greater than 5 mils. The elevation remains constant at 900 mils (1100 mils for the 120-mm).

(4) The candidate selects two assistants--one assistant realigns the aiming posts and the other assists in moving the turntable and cross-leveling. The assistants do not manipulate the sight or mortar for elevation or deflection.

(5) The traversing extension will not be used. It will remain locked in the center position.

c. **Procedure.** The candidate is given two trials; his credit score is the total of these two trials.

(1) A different command is given for each trial. The evaluator records the time and checks the candidate's work after each command has been executed.

(2) When the candidate is ready, he is given a command--for example, REFER, DEFLECTION TWO EIGHT EIGHT ZERO (2880), REALIGN AIMING POSTS.

(3) The candidate repeats each element of the command, sets the sight with the data given in the command, and directs one assistant in realigning the aiming posts. Upon completion of these actions, the candidate centers the traversing assembly and, with the help of the other assistant, moves the turntable and re-lays on the aiming posts. After he lays the mortar on the realigned aiming posts, he announces, "Up."

(4) Time is taken from the announcement of REFER, DEFLECTION TWO EIGHT EIGHT ZERO (2880), REALIGN AIMING POSTS until the candidate announces, "Up."

(5) The candidate's assistants are not permitted to leave the carrier until the command REALIGN AIMING POSTS is given.

d. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when the--

- Time exceeds 1 minute, 40 seconds for the 4.2-inch; time exceeds 1 minute, 15 seconds for the 120-mm.
- Traversing assembly slide is turned before the aiming posts are realigned.
- Traverse extension and turntable are not locked in the center position (120-mm).
- Sight is set incorrectly for deflection or elevation.
- Elevation and deflection bubbles are not centered.
- Sight picture is not correct.
- Traversing assembly slide is more than two turns (four turns for the 120-mm) to the left or right of the center position.
- Assistant manipulates the sight or mortar for elevation or deflection.

(2) When the mortar is laid correctly within the prescribed limits, credit is given as follows:

TIME (seconds)		**POINT CREDIT FOR EACH TRIAL**
120-mm	**4.2-inch Mortar**	
60 or less	75 or less	10
61 to 65	76 to 80	9

66 to 70	81 to 85	8
71 to 75	86 to 90	7
76 to 80	91 to 95	6
	96 to 100	5
81 or over	21 or over	0

Note: If for any reason either of the aiming posts fall before the candidate announces, "Up," the trial will be terminated and re-administered.

9-25. LARGE DEFLECTION AND ELEVATION CHANGES

The candidate is tested at station No. 4 on his ability to perform the gunner's duties when he is given commands requiring a large change in deflection and elevation.

a. **Equipment.** Prescribed in Table 9-2.

b. **Conditions.** The evaluator selects a deflection change that is at least 200 but not more than 300 mils off the referred deflection of 2800 mils and 1100 mils elevation.

(1) The change in deflection involves movement of the turntable. The change in elevation causes the candidate to elevate or depress the barrel from low range to high range, or vice versa. The change in elevation is not less than 100 mils and not more than 200 mils for the 120-mm mortar.

(2) The candidate selects two assistants.

(3) Traversing extension and turntable are locked the center position.

(4) The candidate is allowed to check the deflection and elevation settings before each trial.

(5) The candidate is allowed to begin the test with his hand on the deflection knob.

c. **Procedure.** The candidate is given three trials. If he chooses to use the first (practice) as record, he must use the second as record. If he chooses to use the first trial as practice, he must use the second and third trials as record. He selects two assistants--one assistant may visually align the mortar, while the other elevates or depresses the standard assembly and assists in moving the turntable. The assistant does not manipulate the sight or lay the mortar for deflection.

(1) The evaluator announces a command that requires a change in deflection involving movement of the turntable and an elevation change involving movement of the elevating mechanism cam.

(2) The candidate is allowed to start the test with his hand on the deflection knob. He repeats each element of the fire command and sets the sight with the data given in the command.

(3) As soon as the deflection element is announced, he can immediately place the data on the sight. The assistants must remain in their normal positions until the elevation element is given.

(4) The evaluator times the candidate from the announcement of the last digit of the elevation command to the candidate's announcement of "Up."

(5) A different deflection and elevation are given in the second trial.

d. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when the--

- Time exceeds 60 seconds (55 seconds for the 120-mm).
- Sight is not indexed correctly for deflection or elevation.
- Elevation and cross-level bubbles are not centered.
- Vertical line of the sight is more than 2 mils off the correct compensated sight picture.
- Traversing mechanism is more than two turns (four turns for the 120-mm) off center of traverse.
- Turntable is not in the locked position.
- Assistants make any unauthorized manipulation of the mortar or sightunit for elevation or deflection.
- Traversing extension is not locked in the center position.

(2) When the mortar is laid correctly within the prescribed limits, credit is given as follows:

TIME (seconds)		**POINT CREDIT FOR EACH TRIAL**
120-mm	**4.2-inch Mortar**	
45 or less	35 or less	10

46 to 50	36 to 40	9
51 to 55	41 to 45	8
56 to 60	46 to 50	7
61 to 65	51 to 55	6
	56 to 60	5
66 or over	61 or over	0

9-26. RECIPROCAL LAYING

The candidate is tested at station No. 5 on his ability to quickly and accurately perform the gunner's duties in reciprocally laying the mortar.

a. **Equipment.** Prescribed in Table 9-2.

b. **Conditions.** The mortar is prepared for action and laid on an initial azimuth by the evaluator and his assistants.

(1) The sight is set at 3200 mils deflection and 900 mils elevation.

(2) The evaluator sets up the aiming circle about 75 meters from the carrier where it is visible to the gunner.

(3) The evaluator orients the aiming circle on an azimuth of not less than 150 mils or not more than 200 mils away from the initial azimuth.

(4) The candidate is allowed to begin the test with his hand on the deflection knob with the carrier engine running.

(5) A relay man is positioned halfway between the aiming circle and carrier to relay commands.

(6) The traversing mechanism is centered and the traversing extension is locked in the center position.

c. **Procedure.** The candidate is given three trials. If he chooses to use the first (practice) as record, then he must use the second as record. If he chooses to use the first trial as practice, then he must use the second and third trials as record.

(1) The evaluator operates the aiming circle during the test.

(2) Once the candidate identifies the aiming point, the evaluator announces the deflection.

(3) Time is started from the last digit of the first deflection announced by the evaluator.

(4) When the candidate announces, "Ready for recheck," the evaluator immediately announces the new deflection.

(5) The trial is complete when the gunner announces, "Zero mils (or one mil), mortar laid."

d. **Scoring.** Scoring procedures are as follows:

(1) The candidate receives no credit when the--

- Time exceeds 2 minutes, 15 seconds for the 4.2-inch; time exceeds 1 minute, 33 seconds for the 120-mm.
- Difference between the deflection setting on the sight and the last deflection reading from the aiming circle is more than 1 mil.
- Elevation and cross-level bubbles are not centered.
- Vertical reticle line of the sight is not centered on the lens of the aiming circle.
- Traversing extension is not locked in the center position.
- The mortar sight and the aiming circle are not sighted on each other with a difference of more than 1 mil between deflection readings.
- Turntable is not centered and locked.

(2) When the mortar is laid correctly, credit is given as follows:

TIME (seconds)		**POINT CREDIT FOR EACH TRIAL**
120-mm	**4.2-inch Mortar**	
55 or less	60 or less	10
56 to 67	61 to 75	9
68 to 79	76 to 90	8
80 to 90	91 to 105	7

91 to 95	106 to 120	6
	121 to 135	5
96 or over	136 or over	0

9-27. SUPPORT SQUAD

Support squads are located in cavalry units, task units, and light infantry units. The gunner's examination for the support squad is the same as that used by the mortar section, except for the reciprocal laying, and refer and realign stations. The tests below are substituted respectively for the reciprocal laying and for the refer and realign stations. The entire refer and realign station is eliminated, and the procedures for direct lay are used.

a. **Reciprocal Laying.** In this test (4.2-inch mortar only) the compass is substituted for the aiming circle.

(1) *Conditions.* The mortar is prepared for action and laid on an initial azimuth by the evaluator and his assistants.

(a) The turntable is centered with the sight set at 3200 mils deflection and 900 mils elevation.

(b) The evaluator places the M2 compass on a stake about 75 meters from the mortar carrier and measures the azimuth to the mortar sight. He then selects a mounting azimuth from the azimuth measured to the mortar sight.

(c) The candidate selects an assistant gunner and driver.

(d) The evaluator ensures that the candidate understands the requirements of the test and instructs him to report I AM READY before each trial.

(2) *Procedure.* The candidate is given two trials; his credit score for the test is the total of these two trials.

(a) The evaluator operates the compass during the test.

(b) When the candidate identifies the aiming point, the evaluator announces the deflection.

(c) When the gunner is laid back on the aiming point, he announces, "Up," and the evaluator commands REFER,

DEFLECTION TWO EIGHT ZERO ZERO (2800), PLACE OUT AIMING POSTS.

(d) The ammunition bearer moves out as soon as the initial deflection has been announced by the evaluator and places out the aiming posts as directed by the gunner.

(e) The trial is complete when the gunner announces, "Up," after the aiming posts are in position.

(3) *Scoring*. The scoring procedures are as follows:

(a) The candidate receives no credit when the--

- Time exceeds 2 minutes, 15 seconds.
- Deflection placed on the sight is incorrect.
- Elevation and cross-level bubbles of the sight are not centered.
- Turntable is not centered.
- Aiming posts are not properly aligned.

(b) When the mortar is laid correctly, credit is given as follows:

TIME (seconds)	**POINT CREDIT FOR EACH TRIAL**
70 or less	10
71 to 81	9
82 to 92	8
93 to 103	7
104 to 114	6
115 to 125	5
126 or over	0

b. **Reciprocal Laying (Light Infantry Mortars).** In this test, the sight-to-sight method is used to reciprocal lay the mortar.

(1) *Conditions.* The mortar is prepared for action on an azimuth by the evaluator and his assistants.

(a) The sight is set at 3200 mils deflection and 1100 mils elevation.

(b) The evaluator sets up the base mortar about 35 meters from the test mortars where it is visible to the gunner.

(c) The evaluator orients the base mortar on an azimuth of not less than 150 mils or more than 200 mils away from the initial azimuth.

(d) The candidate selects an assistant gunner (optional for the 60-mm mortar).

(e) The candidate is allowed to begin the test with his hand on the deflection micrometer knob.

(f) The evaluator ensures that the candidate understands the requirements of the test, and he instructs him to report I AM READY before each trial.

(2) *Procedure*. The candidate is given two trials; his credit score is the total of these two trials.

(a) The evaluator positions himself at the base mortar and commands AIMING POINT THIS INSTRUMENT.

(b) The gunner refers his sight to the aiming point and replies, "Aiming point identified."

(c) The evaluator reads the deflection from the sight of the base mortar. He determines the back azimuth of that deflection by adding/subtracting 3200 mils and announces the deflection--for example, the deflection on the base mortar is 1200 mils. The evaluator adds 3200 mils to this deflection (1200 + 3200 = 4400 mils) and announces, "Number one, deflection four four zero zero (4400)."

(d) The candidate repeats the announced deflection, sets it on the sight, and, with the help of his assistant gunner, lays the mortar on the center of the base mortar sight lens. He then announces, "Number one ready for recheck." The evaluator announces the new deflection as soon as possible so that there is no delay.

(e) The operation is completed when the candidate announces, "Number one, zero (or one) mil(s), mortar laid."

(3) *Scoring*. The scoring procedures are as follows:

(a) The candidate receives no credit when the--

- Time exceeds 1 minute, 55 seconds.
- Deflection placed on the sight is incorrect.
- Elevation and cross-level bubbles of the sight are not centered.
- Mortar is not within two turns of center of traverse (four turns for the 120-mm).
- The sight and the base mortar sight are not sighted on each other with a difference of not more than 1 mil between deflection readings.

(b) When the mortar is laid correctly, credit is given as follows:

TIME (seconds)	**POINT CREDIT FOR EACH TRIAL**
55 or less	10
56 to 67	9
68 to 79	8
80 to 91	7
92 to 103	6
104 to 115	5
116 or over	0