

UNITED STATES MARINE CORPS
School of Infantry
Training Command
PSC Box 20161
Camp Lejeune, CA 28542-0161

AT1503
05 AUG 04

STUDENT OUTLINE

TOW2 WEAPON SYSTEM OPERATOR MAINTENANCE

1. TERMINAL LEARNING OBJECTIVE

a. Given an SL-3 complete, M220E4 TOW2 weapon system, authorized cleaning gear, and lubricant, perform operator maintenance for a M220E4 TOW2 weapon system in accordance with TM 9-1425-450-12. (52TR.01.01)

2. ENABLING LEARNING OBJECTIVES

a. Given an SL-3 complete, M220E4 TOW2 weapon system, inspect a M220E4 TOW2 weapon system in accordance with TM 9-1425-450-12. (52TR.01.01a)

b. Given an SL-3 complete, M220E4 TOW2 weapon system and authorized cleaning gear, clean a M220E4 TOW2 weapon system in accordance with TM 9-1425-450-12. (52TR.01.01b)

1. AUTHORIZED CLEANING GEAR

a. Clean Dry Wiping Rags. Used on: launcher components and rubber parts (NOT LENSES).

b. Clean Water Damp Wiping Rags. Used on: rubber parts, battery assemblies (NOT LENSES).

c. Alcohol Damp Wiping Rags. Used on: launcher components, electrical connectors (NOT LENSES).

d. Alcohol Damp Lens Paper. Used on: optical sight lens.

e. Alcohol Damp Cotton Pad. Used on: thermal sight lens.

f. Water. Used on: thermal sight lens.

g. Rubber Syringe. Used on: optical sight lens.

h. Camel Hair Brush. Used on: optical sight lens.

i. Scrub Brush. Used on: launcher components (NOT LENSES).

j. Detergent. Used on: rubber parts (NOT LENSES).

k. Dowel Rod. Used on: electrical connectors (NOT LENSES).

2. PREVENTIVE MAINTENANCE

a. Launcher Components. Use dry, clean wiping rags to remove dust, dirt, grease, moisture, or other foreign matter from the metal or plastic areas of launcher components. For stubborn dirt, brush area to be cleaned with a scrub brush. For grease or dirt, which the scrub brush cannot remove, dampen a wiping rag with alcohol and remove the grease or dirt. Clean off any excess alcohol with dry wiping rags.

b. Rubber Parts. Wipe rubber parts with clean, dry wiping rags. For grease, or if the dry wiping rag cannot remove the dirt, mix detergent and water. Wet a clean wiping rag with the detergent and water mixture and wipe rubber parts. Then, using a clean wet wiping rag with only water, wipe the rubber parts again. Dry rubber parts with a clean dry wiping rag. If detergent is not available, plain warm water can be used to clean rubber parts. Do not use a wire brush on any launcher component. Do not get alcohol on any rubber parts or sealants. Alcohol may cause rubber parts to crack or melt.

c. Electrical Connectors. Wrap a clean rag around a dowel rod, dampen with alcohol, and use it as a swab to clean the connectors.

d. Cold Weather Operations. If the temperature is below +32 degrees F, add glycerol to the cleaning water. This will prevent it from freezing on the part being cleaned.

(1) Alcohol, applied with lens tissue, may be used to clean glass surfaces if a dry lens tissue does not work.

(2) If moisture has frozen on glass surfaces, dab on deicer or place the component in a warm area until the ice melts. Blow dry the glass surface, and pat (do not rub!) with a dry cotton pad to absorb the moisture. Clean with lens paper when the surface is dry.

e. Painting. Organizational maintenance personnel are authorized to spot paint the TOW 2 Weapon System equipment.

3. INITIAL INSPECTION PROCEDURES

a. Make an initial inventory when the equipment is received. Note any missing items and report them right away.

b. Check stock numbers and serial numbers to make sure that the correct items are received.

c. Perform an inspection of each component

(1) Tripod

(a) Operation of detent stop lever.

(b) Check for dirt, rust, loose or damaged and missing parts.

(c) Check level vials for serviceability and that the bubbles are present.

(d) Clean as necessary (as stated in Preventive Maintenance). Clean the exterior of the tripod with a clean wiping rag. Remove heavy dirt with a hard bristle scrub brush. Remove grease with a wiping rag and alcohol

(2) Traversing Unit (TU)

- (a) Bridge clamp locking handle and arming lever work properly.
- (b) Optical sight and launch tube can be mounted.
- (c) Azimuth and elevation locks and elevation brake work.
- (d) Traversing Unit mates with tripod.
- (e) Check Coil Cable and post amplifier for damage, cable connectors for damage, broken pins, foreign material and damaged guide grooves.
- (f) Umbilical connector and guide grooves are free of dirt and damage and check for bent or broken pins.
- (g) Clean as necessary (as stated in Preventive Maintenance).
Clean the exterior of the traversing unit with a clean wiping rag. Remove heavy dirt with a hard bristle scrub brush. Remove grease with a wiping rag and alcohol. Clean electrical connections with wooden dowel, rag, and alcohol.

(3) Launch Tube

- (a) Check for cracks, pits, tears, visible raised areas, exposed fabric or exposed threads inside.
- (b) Look for dirt or foreign material.
- (c) Indexing lugs for damage, and if launch tube will engage TU properly.
- (d) Clean as necessary (as stated in Preventive Maintenance).
Clean the launch tube by wiping the launch tube with a wiping rag moistened with water. Remove grease or dirt with a wet wiping rag with alcohol.

(4) Optical Sight

- (a) Damaged or missing components.
- (b) Check latch assembly, focus control, elevation boresight adjustment knob, azimuth boresight adjustment knob and reticle light switch all operates properly.
- (c) Image can be seen through eyepiece.
- (d) Optical sight mates securely to the traversing unit.
- (e) Humidity indicator's 30 percent section is blue, if pink or white you notify maintenance so they can replace desiccant.
- (f) Clean as necessary (as stated in Preventive Maintenance).
Using a rubber syringe, blow loose dust off of the lens surface. Lightly brush the lens with a camel hair brush. Do not use the camel hair brush to dust off anything but the lenses! If the lens is still dirty, fold lens

paper and lightly wipe the lens, starting in the center and working outward in a circular motion. If the lens has grease or dirt on it, wet a new piece of lens paper with alcohol and repeat the cleaning procedures until the lens is clean.

(5) Thermal Sight

- (a) Damage or missing components.
- (b) Lens cover is on and the retaining strap is not broken.
- (c) Mounts securely on the optical sight.

(d) Check the azimuth and elevation boresight knobs and locks, field of view selector, range focus knob, range stadia lines, battery monitor, diopter focus control, brightness and contrast controls, coarse azimuth control, relief valve, ON/OFF/STANDBY switch, security shutter and the Latching Handle operate properly.

(e) Clean as necessary (as stated in Preventive Maintenance). Rinse the thermal sight lens by pouring clean water over the lens surface. Using a cotton pad, dampened with lens cleaning solution, lightly dab (do not rub) the cotton pad on the lens, covering it completely. Do not let lens cleaning solution dry on the lens, as damage to the lens could occur. Wait between one to three minutes for the cleaning solution to loosen dirt, then rinse the solution off with clean water. Repeat until the lens is clean.

(f) When wiping the thermal sight lens, the wiping motion should be in one direction only (i.e., left to right, right to left, top to bottom, or bottom to top). Wiping in more than one direction can damage the coating on the lens. Do not reuse dirty cotton pads or used lens paper.

(6) Boresight Collimator

- (a) Check collimator and case for damage or missing components.
- (b) Inspect lenses and mirrors for cracks or scratches.
- (c) Collimator mates properly to the thermal sight.

(d) Check azimuth and elevation adjustment knobs and the Securing Latches operate properly.

(e) Clean as necessary (as stated in Preventive Maintenance). Blow any loose dust off the surface of the lenses by using a rubber syringe. Clean lenses of boresight collimator with lens paper moistened with alcohol.

(f) Clean external components with a wet wiping rag moistened with water.

(7) Missile Guidance Set (MGS)

- (a) Check for damaged or missing components.
- (b) Check connectors for damage and bent or broken pins.

(c) Check Test /Operate switch, display intensity and azimuth and elevation lamps operate and the test display indicates PASS/FAIL of system during self-test.

(d) Clean as necessary (as stated in Preventive Maintenance). Clean the exterior with a clean wiping rag. Remove heavy dirt with a hard bristle scrub brush. Remove grease with a wiping rag and alcohol.

(e) Clean a missile guidance set electrical connections with a swab moistened with alcohol.

(8) Battery Assembly

(a) Check for cracks, dents or any other damage that might prevent operation.

(b) Ensure at least four wing nuts operate correctly.

(c) Battery can be installed in MGS.

(d) Clean as necessary (as stated in Preventive Maintenance). Clean with scrub brush for dirt. Wet a wiping rag with water and wipe the battery assembly with the rag. Dry battery assembly with a clean, dry rag.

(9) TOW Vehicle Power Conditioner (TVPC)

(a) Check for damaged or missing components.

(b) Ensure at least four wing nuts operate correctly.

(c) Check ON/OFF switch, and the power indicator light operates properly.

(d) Check connectors and guide grooves for damage and bent or broken pins.

(e) Clean as necessary (as stated in Preventive Maintenance).

(10) Vehicle Power Conditioner (VPC)

(a) Check for damaged or missing components.

(b) Check that the CB1 switch operates properly.

(c) Check connectors for damage and bent or broken pins.

(d) Clean as necessary (as stated in Preventive Maintenance).

(11) Battery Power Conditioner (BPC)

(a) Check for damaged or missing components.

(b) Check that the POWER switch operates properly.

(c) Check connectors for damage and bent or broken pins.

(d) Clean as necessary (as stated in Preventive Maintenance). Clean battery power conditioner with a wet wiping rag moistened with water. Clean the battery power conditioner electrical connections with a swab moistened with alcohol.

(12) Perform necessary cleaning after the components have been inspected for serviceability. When all components are cleaned, you then assemble the weapon and conduct a system checkout procedure.

(13) Report any deficiencies to organizational personnel using applicable reports, records and forms.

REFERENCES: TM 9-1425-450-12 Operator's Organizational Maintenance Manual for the TOW2 Weapon System; Chapter 2 Pages 2-18 through 2-54

PERFORMANCE EXAMINATION CHECKLIST

EXAM ID: 1403P

TLO/ELO: 52TR.01.01

EXAM TITLE: M220E4 TOW2 Weapon System Operator Maintenance

EVALUATOR INSTRUCTIONS:

1. Each Marine is assessed individually on this task.
2. The procedures and requirements outlined in the Assistant Instructor Guide for the associated lesson will be used to conduct the performance examination.
3. There is no time limit for this task.
4. This examination is evaluated mastery or non-mastery. Record student performance using the Performance Examination Checklist. To achieve mastery, a Marine must perform each of the performance steps correctly.

STUDENT INSTRUCTIONS:

1. You are an anti-tank guided missileman and must perform preventive maintenance of your M220E4 TOW2 weapon system.
2. There is no time limit for this task.
3. To achieve mastery, you must perform each of the performance steps correctly.

	1 st Attempt		2 nd Attempt		3 rd Attempt	
	M	NM	M	NM	M	NM
1. Remove the thermal sight from the storage case.						
2. Inspect the thermal sight for damage.						
3. Rinse the thermal sight lens by pouring clean drinking water over the surface of the lenses.						
4. Lightly dab a cotton pad moistened with lens cleaning solution on the thermal sight lens surface, covering surface completely.						
5. Rinse lens-cleaning solution off the thermal sight lens by pouring clean drinking water over the lens surface.						
6. Clean thermal sight electrical connections with a cotton swab moistened with alcohol.						
7. Clean the exterior of the thermal sight with a clean wiping rag. Remove heavy dirt with a scrub brush. Remove						

grease with a wiping rag and alcohol.						
8. Clean the thermal sight eyepiece by wiping with wiping rags to clean off loose dirt and dust.						
9. Remove the optical sight from the optical sight shroud bag.						
10. Inspect the optical sight for damage.						
11. Blow loose dust off the surface of the optical sight lenses by using a rubber syringe. Use lens paper moistened with alcohol to remove grease and remaining dirt.						
12. Clean optical sight electrical connections with a swab moistened with alcohol.						
13. Clean the exterior of the optical sight with a clean wiping rag. Remove heavy dirt with a scrub brush. Remove grease with a wiping rag and alcohol.						
14. Clean the optical sight eyepiece by wiping with wiping rags to clean off loose dirt and dust.						
15. Inspect the traversing unit for damage.						
16. Clean traversing unit electrical connections with a swab moistened with alcohol.						
17. Clean the exterior of the traversing unit with a clean wiping rag. Remove heavy dirt with a scrub brush. Remove grease with a wiping rag and alcohol.						
18. Inspect the tripod for damage.						
19. Clean the exterior of the tripod with a clean wiping rag. Remove heavy dirt with a scrub brush. Remove grease with a wiping rag and alcohol.						
20. Remove the missile guidance set cover.						
21. Inspect the missile guidance set for damage.						
22. Clean the exterior of the missile guidance set with a clean wiping rag. Remove heavy dirt with a scrub brush. Remove grease with a wiping rag and alcohol.						
23. Clean the missile guidance set electrical connections with a swab moistened with alcohol.						
24. Inspect the battery assembly for damage or corrosion.						
25. Clean battery assembly with a scrub brush for dirt. Wet a wiping rag with water and wipe the battery assembly with the rag. Dry the						

battery assembly with a clean, dry cloth.						
26. Open the battery power conditioner lid and inspect the battery power conditioner for damage.						
27. Clean the battery power conditioner with a wet wiping rag moistened with water.						
28. Clean the battery power conditioner electrical connections with a swab moistened with alcohol.						
29. Inspect the launch tube for damage.						
30. Clean the launch tube by wiping the launch tube with a wiping rag moistened with water. Remove grease or dirt with a wet wiping rag with alcohol.						
31. Remove the boresight collimator from the carrying case and inspect for damage.						
32. Blow loose dust off the surface of the lenses by using a rubber syringe. Clean the boresight collimator lenses with lens paper moistened with alcohol.						
33. Clean the external components of the boresight collimator with a wet wiping rag moistened with water.						