

TM 9-1425-470-12

TECHNICAL MANUAL

OPERATOR'S AND ORGANIZATIONAL

MAINTENANCE MANUAL

FOR

TOW HEAVY ANTITANK/ASSAULT WEAPON SYSTEM

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HEADQUARTERS, DEPARTMENT OF THE ARMY

JANUARY 1974

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HEADQUARTERS,
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 Washington, D. C., 31 January 1974

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 MAINTENANCE MANUAL
 FOR
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Figure 1-1. TOW weapon system.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope.

This manual contains information and guidance for the operator, crew, and using organization on the operation, emplacement, and maintenance of the TOW Heavy Antitank/Assault Weapon System shown in figure 1-1.

1-2. Maintenance Allocation.

a. Operator. In general, the maintenance responsibilities of the operator are prescribed in the MAC (Appendix C). When the repair or adjustment is beyond the scope of tools, equipment, or supplies available to the operator, the maintenance will be referred to the organizational maintenance mechanic or to a higher category of maintenance.

b. Organizational Maintenance. In general, responsibilities of organizational personnel in maintaining the TOW weapon system are given in the MAC (Appendix C). When the repair, modification, or adjustment is beyond the authorization or capability of the using organization, the maintenance will be referred to the supporting maintenance unit.

1-2.1. Nomenclature.

A cross reference index of official nomenclature and technical manual nomenclature of the major TOW weapon system components is given in Appendix D.

1-3. Maintenance Forms and Records.

a. General. Maintenance forms, records, and reports which are to be used by maintenance personnel are listed in and prescribed by TM 38-750.

b. Reports of Accidents. Any accident that injures personnel or damages equipment shall be reported as required by AR 385-40.

c. Malfunctions Involving Ammunition (Para 2-12). If an ammunition malfunction involving personnel safety occurs during training or combat, the officer in charge will immediately discontinue firing ammunition of the lot concerned. He will report the malfunction as outlined in AR 75-1.

d. Missile Firing or Disposition Reports. When a missile is fired or disposed of, DA Form 2409 will be completed to reflect results of firing or means of disposition and forwarded to Commander, U. S. Army Missile Command, ATTN: AMSMI-NDM, Redstone Arsenal, Alabama 35809.

1-4. Report of Equipment Publication Improvements.

Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, U. S. Army Missile Command, ATTN: AMSMI-NPM, Redstone Arsenal, Alabama 35809.

1-5. Administrative Storage.

TM 740-90-1 contains information relative to the requirements and procedures for administrative storage.

1-6. Equipment Serviceability Criteria.

Equipment serviceability criteria (ESC) are provided in TM 9-1425-470-ESC.

Section II. DESCRIPTION AND DATA

1-7. General.

a. The TOW weapon system is a crew portable, heavy antitank weapon designed to attack and defeat armored vehicles and other targets such as field fortifications. The weapon system (fig. 1-2) consists of a launcher and guided missile. The components of the launcher are the launch tube, traversing unit, missile guid-

ance set, two battery assemblies (one spare), optical sight, and a tripod. Mounting kits are also provided for deployment on the tactical vehicles as shown in figures 1-3 through 1-6. The missile is tube-launched, optically-tracked, wire command-link (TOW) guided and is encased in a disposable launch container.

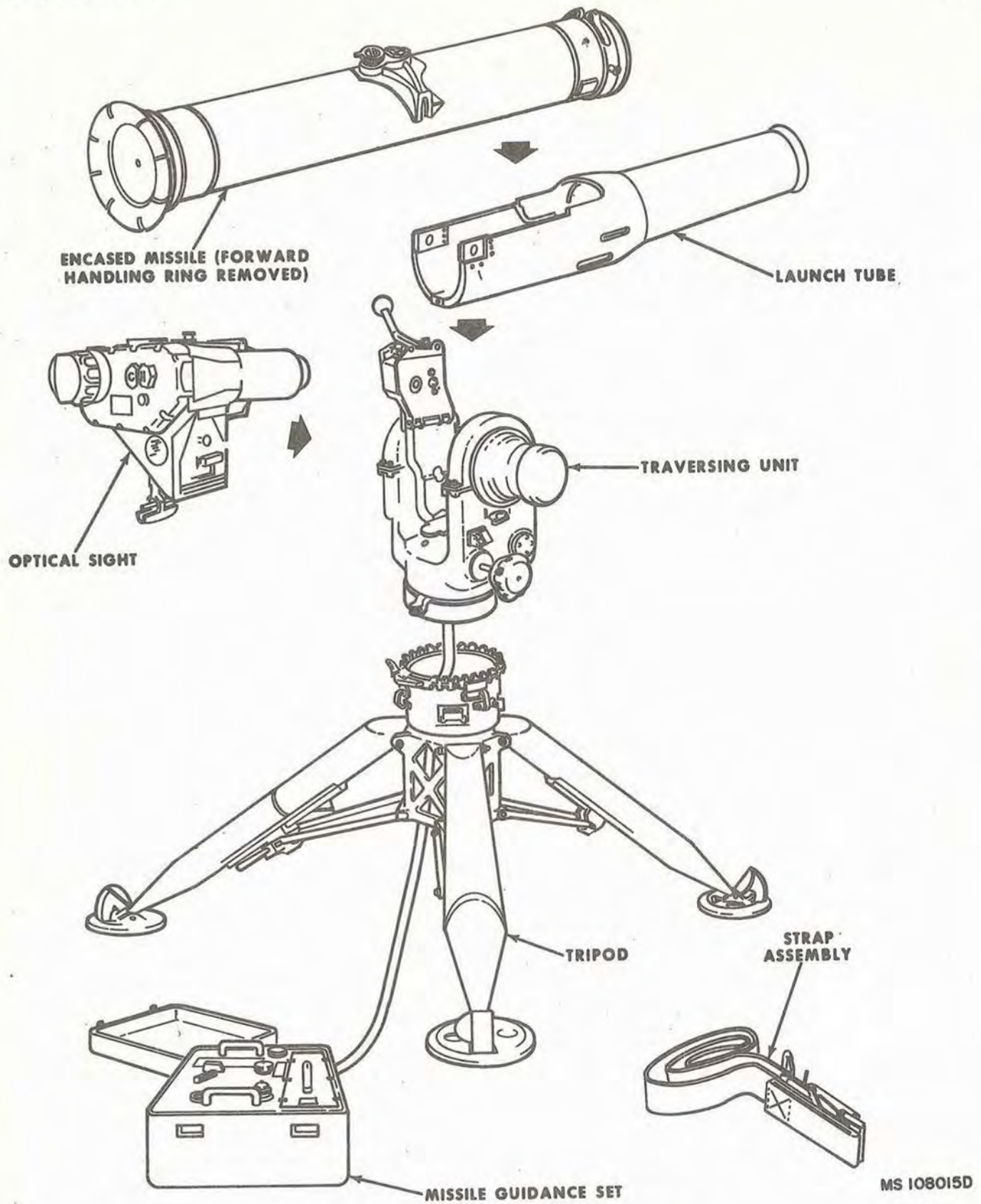
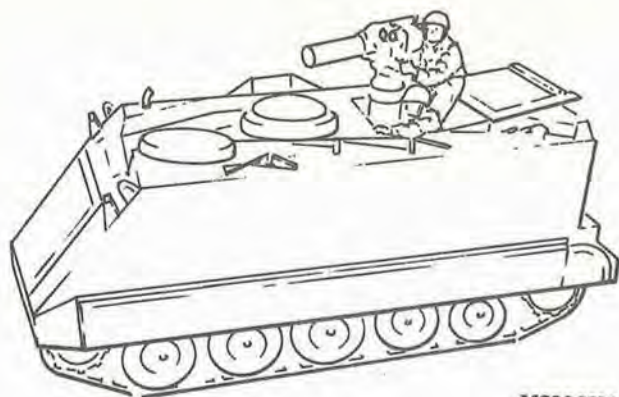


Figure 1-2. Components—TOW weapon system.

MS 108015D



MS006016

Figure 1-3. TOW launcher mounted on M113 armored personnel carrier (APC).

b. The system will operate in all weather conditions in which the gunner can see a target through the optical sight. Operating temperature range is from -32 to $+60^{\circ}\text{C}$ (-25 to $+140^{\circ}\text{F}$); the system will operate at altitudes up to 3,050 meters (10,000 feet).

c. The tracking and control capabilities of the system provide a high first-round hit probability against stationary and moving targets. System accuracy is achieved by the gunner keeping the crosshairs of his optical sight centered on the image of the selected target. Any error (deviations between the gunner's line-of-sight to the target and the flight path of the missile) is detected by the optical sight and sent to the missile guidance set. From this error information, steering commands are developed in the missile guidance set and sent through the command-link wires to the missile, correcting the flight path and guiding the missile to the target.

d. Other important features of the TOW weapon system are its mobility and ease of operation. The entire ground-emplaced weapon system can be hand-carried by a weapon crew. Field emplacement sites can be changed quickly to minimize detection or to engage targets that would not be within the range of a single emplacement. Vehicle-mounted weapon systems provide a greater degree of mobility and can be quickly prepared for use. Assembly and disassembly of the weapon system is accomplished readily in the field without the use of tools.



MS006017

Figure 1-4. TOW launcher mounted on M151 utility truck.

e. The operational condition of the launcher can be checked any time it is assembled through the use of built-in self-test circuits (no external test equipment is needed). Components which fail the self-tests can be replaced at the operating site.

f. The encased missile is transported and stored in a wooden overpack. At the organizational level, the encased missile may be removed from the wooden overpack for transport or storage on the tactical vehicle. No maintenance, test, or repair is performed on the encased missile at the organizational maintenance level; although limited, minor maintenance is authorized for the launch container.

1-8. TOW Launcher.

a. *Tripod.* The tripod (fig. 1-2) is a heavy-duty, lightweight component which provides a ground emplacement capability for the TOW weapon system. Each tripod leg is adjustable and is secured by detent stops and leg lock handles. Flat tripod feet adapt to various types of terrain and are provided with holes which allow the tripod to be staked down when necessary. Anchor claws provide additional stability. Two level indicators are provided to aid



Figure 1-5. M151 1/4-ton utility truck converted to a missile carrier.

in leveling the launcher. A coupling clamp is used to secure the traversing unit to the tripod.

b. Traversing Unit. The traversing unit (fig. 1-2) consists of a main housing and a trunnion device which serves as the mounting base for the launch tube and optical sight. The main housing is capable of continuous tracking throughout 360 degrees in the azimuth (horizontal) plane. The trunnion can rotate through an angle of 50 degrees in the elevation (vertical) plane (30 degrees above horizontal and 20 degrees below). Control knobs for use in tracking the target in azimuth and elevation are mounted on the sides of the main housing. A trigger is mounted on the main housing just above the right control knob. A molded cable, (coil cord) transfers signals between the traversing unit and the missile guidance set. The connector attaches to a cup underneath the main housing for storage. The bridge clamp, mounted at the top of the trunnion, secures the encased missile in the launch tube and provides electrical connection between the launcher and the encased missile. A launch tube latch provides a means of securing the launch tube to the traversing unit. The optical sight is mounted on the boresight plate on the left side of the traversing unit.

c. Optical Sight. The optical sight (fig. 1-2) consists of a 13x objective lens assembly IR (infrared) system, a tracker assembly, boresight

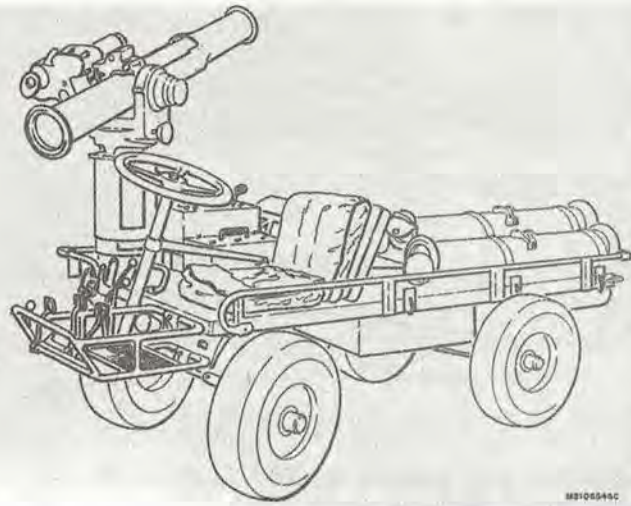


Figure 1-6. TOW launcher mounted on M274 1/2-ton weapons carrier (mule).

adjustments, and a bracket for mounting the night sight. The objective lens assembly provides the gunner a high-power image of the target. Crosshairs are provided to aid in centering the line-of-sight on the target. A reticle light provides illumination for the crosshairs. The eyepiece focus control allows the gunner to adjust the focus of the eyepiece until the crosshairs are seen clearly. Protective windows in front of each lens assembly seal out dust, dirt, and moisture. In operation, the IR tracker assembly receives IR energy from the missile during flight and senses any missile displacement from the line-of-sight. This information is used to generate the command signals which direct the missile toward the target. Boresight adjustments are used to obtain center-band readings for a boresight self-test. Out-of-band readings during the boresight self-test indicate that the line-of-sight of the objective lens system is not properly aligned with the line-of-sight of the IR tracker assembly.

d. Launch Tube. The fiberglass tube (fig. 1-2) secures the front end of the encased missile and provides the initial missile trajectory. In addition, the launch tube protects the weapon crew from the missile launch motor blast. The launch tube is positioned on the traversing unit by means of mounting lugs and a locating pin and is secured there by the launch tube latch.

e. *Missile Guidance Set.* The missile guidance set (fig. 1-2) contains the launcher electronic circuits used for control and test purposes. The top cover is removed during use. The forward section contains the control panel for system operation and the electronic circuitry which develops steering commands, provides system timing and self-test functions, and converts battery power into the required system voltages. The rear section houses the rechargeable battery assembly.

f. *Battery Assembly.* The battery assembly (fig. 1-7) is of nickel-cadmium design and consists of a 24-volt battery and two 50-volt batteries. The battery electrolyte is basically potassium hydroxide with a small percentage of lithium hydroxide. When in use, the battery assembly is installed in the missile guidance set and supplies power for the TOW weapon system. Two battery assemblies are provided as a part of the launcher. A properly charged battery, after storage schedules defined in table 1-0, should supply a minimum of 50 training exercises or missile firings. The TOW battery will not discharge if placed on the ground, or on metal, concrete or wood shelves. Batteries should be recharged after storage period has expired as specified in table 1-0.

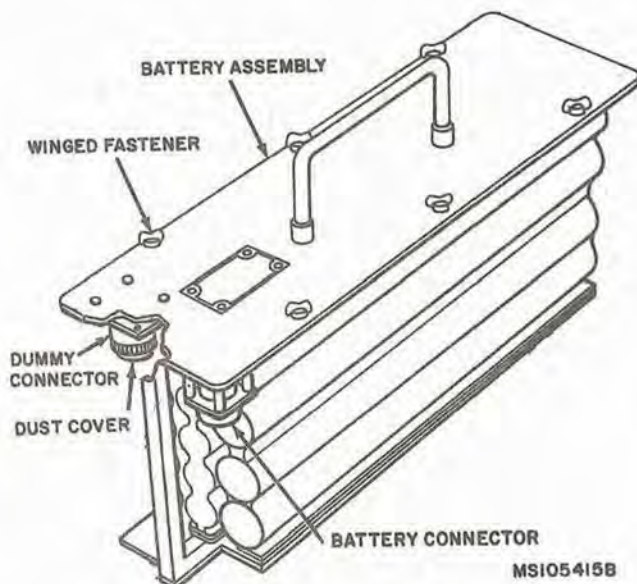


Figure 1-7. Battery assembly.

Table 1-0. Battery Charge Retention Storage Schedule

Schedule	Storage temperature	Hours per day	Storage period days
1	25 ±2.8C (77 ±5F)	24	30
2	37.8 ±2.8C (100, ±5F)	20	
	51.6 ±2.8C (125 ±5F)	4	14
3	65.5 ±2.8C (150 ±5F)	24	3

1-8.1. Transporting and Protective Equipment.

a. Shroud assembly bag, 10679791, and strap assembly 10679923 are components of the TOW weapon system. The shroud assembly bag is made of cotton canvas with a waterproof protective innerseal which protects the optical sight from most weather conditions. The strap assembly consists of five cotton webbing straps used for transporting components of the TOW weapon system.

b. Figure 1-7.1 shows the shroud assembly bag being used to carry the optical sight. Figure 1-7.2 shows the shroud assembly bag used to protect the optical sight on an assembled launcher. Figures 1-7.3 through 1-7.6 show the strap assembly being used to carry the other weapon system components.



Figure 1-7.1. Carrying optical sight in shroud assembly bag.

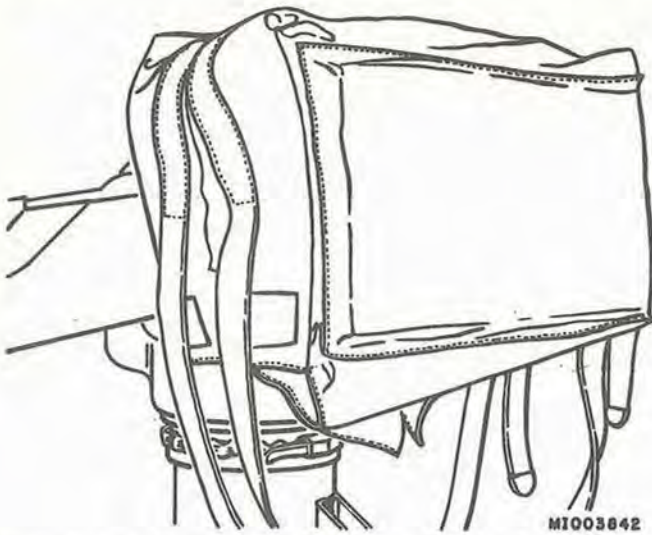


Figure 1-7.2. Shroud assembly bag protecting the optical sight on an assembled launcher.



Figure 1-7.5. Carrying the tripod with strap assembly.



Figure 1-7.3. Carrying the launch tube with strap assembly.

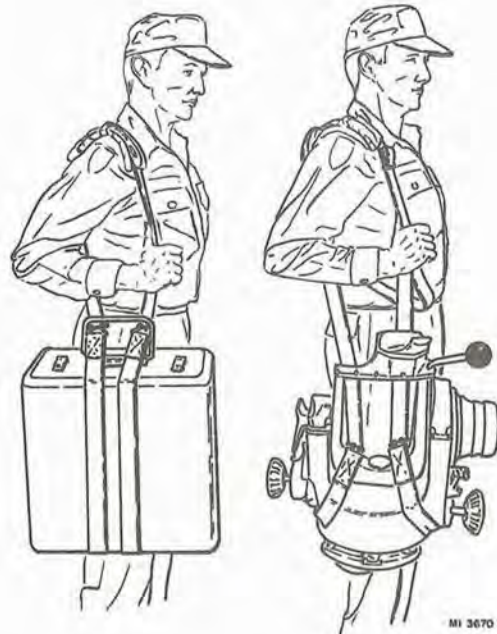


Figure 1-7.6. Carrying the missile guidance set and the traversing unit with the strap assembly.



Figure 1-7.4. Carrying the encased missile with the strap assembly.

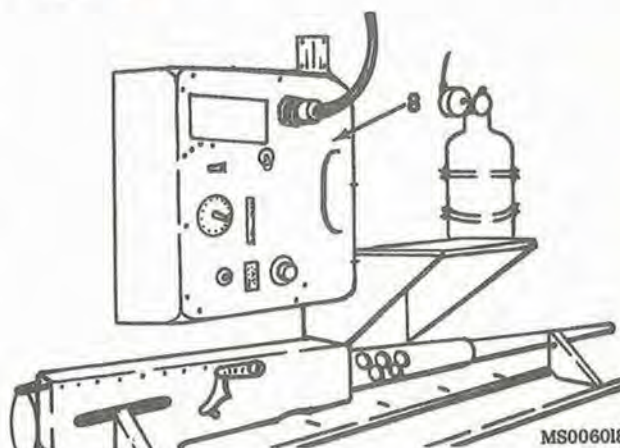
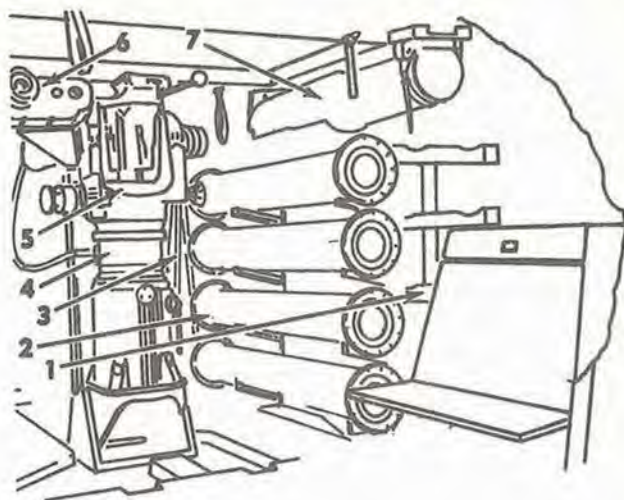
1-9. Mounting Kits.

Paragraphs *a* through *d* describe the mounting kits which provide a mounting capability for storage and deployment of the TOW weapon system on tactical vehicles.

a. M233 APC Mounting Kit. The M233 mounting kit provides facilities for installing the weapon system in the APC. Stowage facilities are also provided for 10 encased missiles, a spare battery assembly, and all ground emplacement components of the launcher. Missile racks (fig. 1-8) for stowing the encased missiles are located on the center right side of the vehicle. The launch tube is stowed in a support mechanism located just above the missile racks. The closed tripod is stowed in an upright position forward of the missile racks on the right side of the vehicle. The traversing unit and optical sight are installed in an operational ready state on the telescoping pedestal. This emplacement provides stability during travel and permits rapid deployment of the weapon system above the vehicle deck. The missile guidance set is installed in a bracket and strap assembly located on the upper left side of the vehicle just forward of the fuel tank and near the telescoping pedestal. The spare battery assembly is stowed in a storage rack located just aft of the missile racks.

b. M232 1/4-Ton Firing Vehicle Mounting Kit. The M232 mounting kit (fig. 1-4) provides facilities for installing the weapon system on the 1/4-ton vehicle. Stowage facilities are provided for two encased missiles and a launcher. Missile racks for stowing encased missiles are located on the right side of the vehicle. The traversing unit, optical sight, and launch tube are installed in an operational ready state on the launcher mount. The closed tripod is stowed in a support and secured by straps located on the right side of the vehicle. The missile guidance set is mounted on an elevated frame assembly on the vehicle floor just forward of the launcher mount.

c. M236 1/4-Ton Missile Carrier Vehicle Mounting Kit. The M236 mounting kit (fig. 1-9) consists of a rack for storing one battery assembly and left and right rack assemblies used to tie down the aft and forward ends respectively, of six encased missiles.



- | | |
|-------------------------|-------------------------|
| 1. Missile racks | 5. Traversing unit |
| 2. Missile | 6. Optical sight |
| 3. Tripod | 7. Launch tube |
| 4. Telescoping pedestal | 8. Missile guidance set |

Figure 1-8. Location of TOW weapon system components in APC.

d. M225 1/2-Ton Vehicle Mounting Kit. The M225 mounting kit (fig. 1-10) provides facilities for transporting and deploying the TOW weapon system on the 1/2-ton vehicle. The aft and forward rack assemblies are used to tie down the launch tube and the aft and forward ends respectively, of six encased missiles. The tripod rack assembly is used for stowing the tripod. The pallet assembly holds the missile guidance set. The elevating pedestal assembly, also mounted on the pallet supports the traversing unit and the optical sight in a ready to use configuration.

1-10. Encased Missile.

a. General. The encased missile (fig. 1-2) consists of a launch container and missile.

b. Launch Container. The launch container is a cylindrical fiberglass case with a handling ring at each end. The forward handling ring is attached to the launch container by a quick release clamp and must be removed before the round can be loaded into the launch tube. The aft handling ring is not removed. The launch container is equipped with a wiring harness that makes the necessary electrical connections between the missile and the launcher.

c. Missile. The TOW missile (fig. 1-11) is a tube-launched, optically-tracked, wire command-link guided missile. Missile electrical power is provided by internal batteries. A launch motor provides the thrust necessary to boost the missile out of the launch container. The launch motor firing circuit is internally disabled (short-circuited) until the round has been loaded in the launch tube, the bridge clamp

has been closed, and the arming lever has been raised to make the electrical connection between the launcher and the encased missile. After launch, the missile coasts for approximately 7 meters, then (allowing time for safety switch to operate) the flight motor ignites and accelerates the missile to the required velocity. An IR source in the aft end of the missile provides a means of comparing the missile flight path with the line-of-sight maintained from the launcher to the target. Flight-path errors (or deviations from this line-of-sight) are measured and processed by the missile guidance set into command signals. As the missile proceeds toward the target, it dispenses two wires through which guidance command signals are transmitted to the missile. Missile electronic circuits and movable control surfaces accomplish guidance and in-flight control functions. The warhead will detonate on impact.

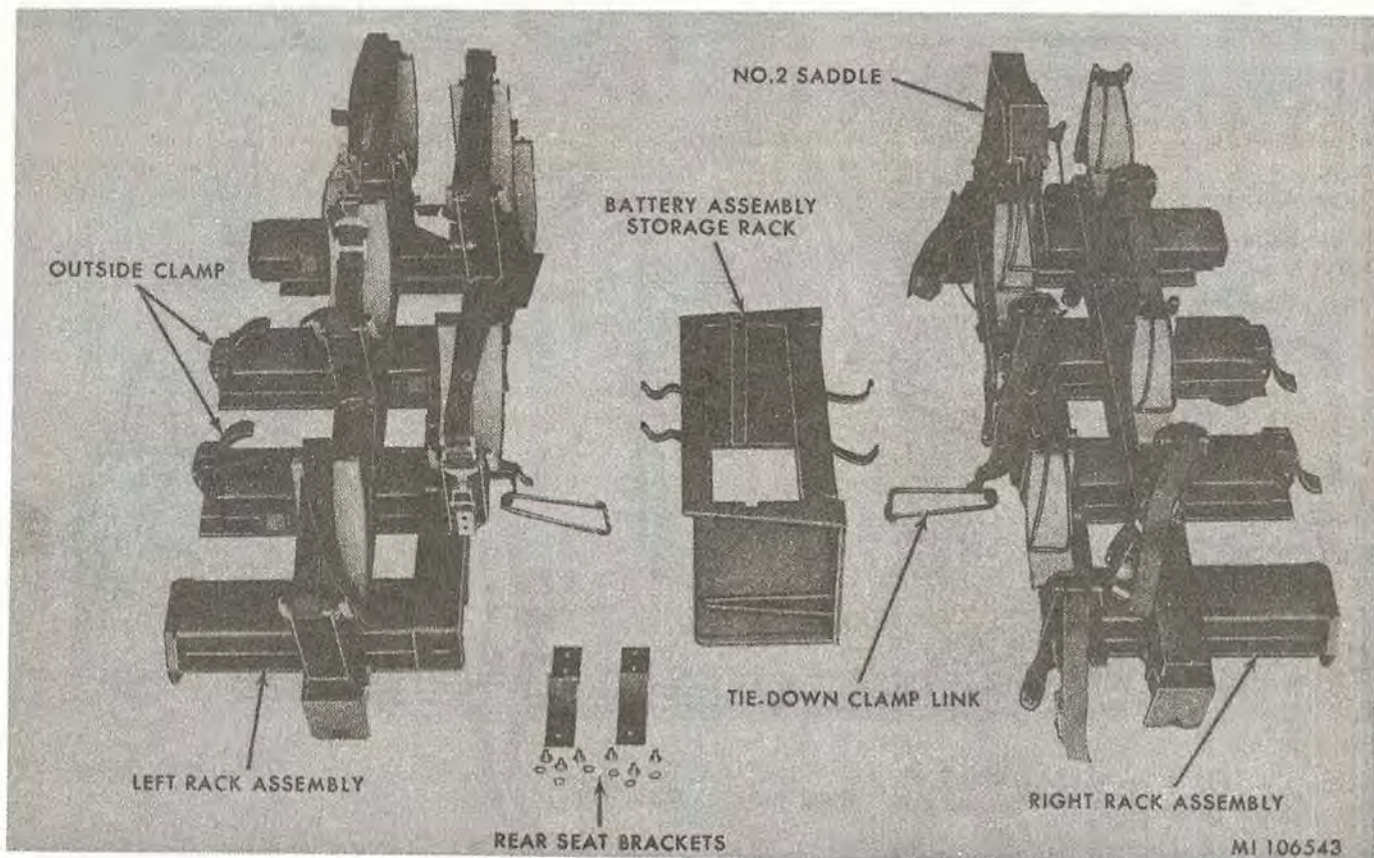


Figure 1-9. M236 1/4-ton vehicle/missile carrier mounting kit.

1-11. Functional Description.

a. Launcher Self Test (Table 2-6). The self test features built into the missile guidance set (MGS) provide the operator with a capability of performing a test of the MGS, the battery assembly, the optical sight, and the traverse rate sensing portion of the traversing unit. The self test controls and indicators are contained on the panel of the MGS. The optical sight boresight knobs and the traversing unit knobs are also used in the performance of self test. The TEST OPERATE switch applies power to the MGS for self test operation when held in the TEST position. The SELF TEST switch selects the circuits to be tested and the SELF TEST METERS indicate the test results. Internal optical sight boresighting is performed during self test by means of the AZIMUTH and ELEVATION boresight adjustment knobs on the optical sight in conjunction with the self

test controls and indicators. The rate sensing function of the traversing unit is tested, in conjunction with the self test controls, by exercising the traversing unit in azimuth and elevation while observing the indications of the SELF TEST meters.

b. System Operation.

(1) *Loading.* An encased missile is inserted into the launch tube of an assembled launcher and secured in place by closing the traversing unit bridge clamp and securing the locking handle. This action also positions the missile hold back pin in the launch container to a low-shear position to allow the missile to be launched from the container. Electrical connections are made between the launcher and the encased missile by raising the arming lever to the full up position. This action removes the short in the missile connector by displacing a spring loaded safety shorting plug in the connec-

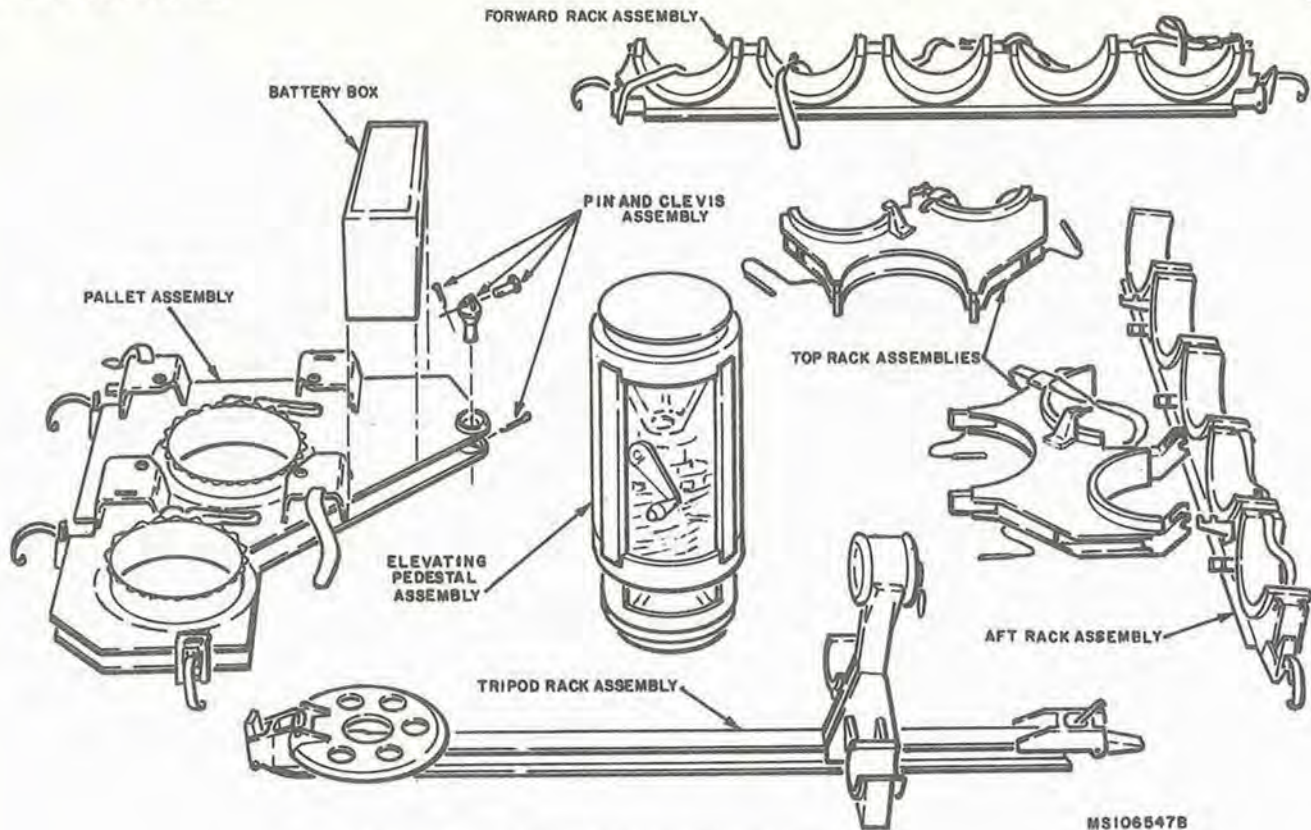


Figure 1-10. M225 1/2-ton vehicle mounting kit.

tor. The missile is then capable of being launched upon activation of the trigger.

(2) *Target acquisition.* To engage a target, the gunner looks through the optical sight and operates the traversing unit control knobs to center the reticle (crosshairs) on the target. A target is acquired when the crosshairs, as viewed by the gunner, are centered on the target. After acquiring the target, the gunner fires the missile and continues to keep the crosshairs centered on the target (whether target is stationary or moving) until missile impact. The in-flight missile is automatically guided to the point on the target where the gunner is aiming.

(3) *Launcher-missile operation.* The weapon system is in a passive state until the trigger is depressed. Depressing the trigger activates the weapon system. The MGS generates a signal which is delivered to the missile to energize the missile batteries and gyro. Approximately 1.5 seconds after trigger depressing, the MGS sends a firing signal to the launch motor. The launch motor ejects the missile from the launch container. As the missile leaves the launch tube, the missile wings and control sur-

faces extend for in-flight control. The extending action of the control surfaces activates a switch which completes circuits to allow a sequence of actions leading to: energizing the IR source, enabling the control actuator, unlatching the safety and arming device and after a short delay, igniting of the flight motor. The missile is accelerated by the flight motor and is automatically guided to the point where the gunner is aiming. Deviations of the missile from the launcher-target line-of-sight are sensed by the optical sight IR tracker and processed by the MGS as errors. Correction signals are transmitted to the missile electronics unit via the command link wires. These wires are dispensed from the missile during flight to maintain a launcher-to-missile command link. The correction signals transmitted to the missile electronics unit are processed and fed to the control surface actuators for missile control. At termination of missile flight, lifting the locking handle of the traversing-unit activates the wire cutters, cutting the command link wires and allowing removal of the empty launch container. Lifting the locking handle also deenergizes the launcher, restoring it to its passive state for reloading, standby, or disassembly.

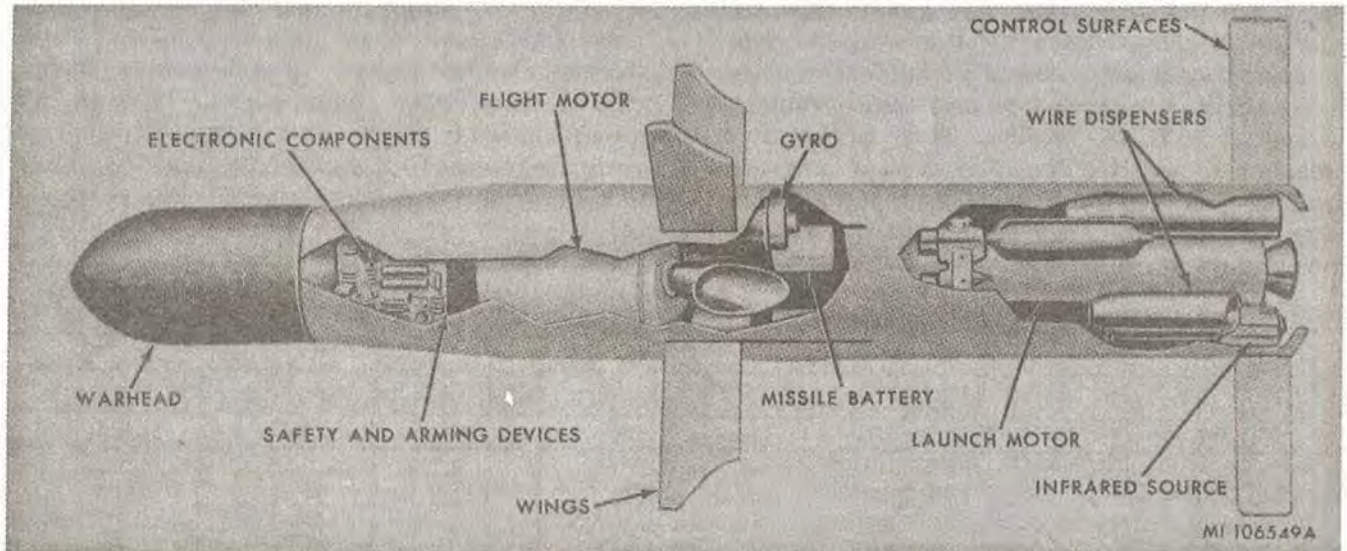


Figure 1-11. TOW missile.

1-12. System Data.

a. *Shipping and Storage Data.* Individual launcher components are shipped, stored, and handled in separate wooden overpacks within the Army supply system. Components shipped together as a complete launcher are placed in a single wooden crate at CONUS depot to preserve end item integrity and to facilitate

bulk cargo handling. The encased missile is shipped, stored, and handled in a wooden overpack throughout the Army supply system and then stored as unit basic load. However, combat load missiles are removed from the overpacks prior to storage in TOW system vehicles. Information concerning the physical dimensions of the various packaged system components is contained in table 1-1.

Table 1-1. TOW Weapon System Components Shipping Data

Item	Length (in.)	Width (in.)	Height (in.)	Volume (cu. ft)	Weight (lb)
Launcher (complete)	75	40.5	34.1	60	610
Missile guidance set	22.5	21	15.5	4.2	60
Battery assembly	22.4	12	15.1	2.3	26
Launch tube	45.5	12.5	12.5	4.1	31
Optical sight	32.6	22.75	23.5	10	72
Traversing unit	27.9	25.5	18	7.4	98
Tripod	49.25	15.5	14.75	6.6	51
Shroud assembly	20.6	11.6	4.9	.7	1.5
Strap assemblies	12.25	6.1	5.1	.2	1.7
Missile (in overpack)	57.25	11.5	11.5	4.4	83

b. *Field Handling Data.* The ground-mounted launcher is man-portable by the weapon crew. When employed with specially adapted vehicles, the launcher is mounted in and transported by the vehicle. These vehicles also transport a combat load of missiles. The vehicle mounted launcher may be transported in a fully operational mode for distances necessary for its repositioning on the battlefield. It is transpor-

ted in a semi-operational or administrative mode for travel over greater distances. The launcher can be rapidly dismounted from the firing vehicle when circumstances require its ground-mounted emplacement. Table 1-2 contains information concerning the physical dimensions of launcher components in their ready-for-use configuration.

Table 1-2. TOW Weapon System Ground Emplacement Data

Item	Length (in.)	Width (in.)	Height (in.)	Weight (lb)
Launcher, tubular GM (deployed-max.)	80	64	48	171
Missile guidance set (including battery assembly)	16.0	16.0	12.0	54
Battery assembly	15.5	4.8	7.0	21 ¹
Launch tube	42	9	8	11
Encased missile (table 4-2)				
Optical sight	22	13	14	32
Traversing unit	13	22	21	53
Tripod (retracted-lying down)	43	13	13	21

¹Spare battery weight, shroud and strap assemblies not included in total weight of launcher.

1-13. Deleted.

Prepare equipment as follows:

- a. Lower and secure vehicle windshield.
- b. Secure radio antenna to the tiedown.
- c. Unlock elevation and azimuth locks (if locked).

2-22. Perform Launcher Self Test and Inspection.

Perform the launcher self test and inspection procedures as defined in section VII of this chapter.

2-23. System Operating Procedures.

Loading, tracking, firing, and unloading procedures for the TOW weapon system are provided in section VIII of this chapter.

2-24. Preparation of 1/4-Ton Firing Vehicle for Limited Travel.

The 1/4-ton firing vehicle with weapon system mounted may be moved from one operational location to another with the weapon system loaded if distance is not excessive. Only minor preparation is required for limited travel.

- a. Lock the azimuth and elevation locks on the traversing unit.
- b. Insure that the RETICLE LIGHT switch on optical sight is set to OFF.
- c. Insure that bridge clamp is closed and locked.
- d. Insure that arming lever is lowered.

e. Insure that trigger protective cover is lowered over trigger.

f. Check stowed components in the 1/4-ton firing vehicle to insure that all items are secured to the vehicle.

2-25. Preparation of 1/4-Ton Firing Vehicle for Extensive Travel.

a. Lock azimuth and elevation locks on traversing unit.

b. Insure that the RETICLE LIGHT switch on optical sight is set to OFF.

c. Insure that optical surfaces and protective windows of the optical sight are clean and dry.

d. If the weapon system is loaded and the missile was not fired, open the bridge clamp, remove the encased missile, close the bridge clamp, replace the forward handling ring and secure the encased missile in its storage rack.

e. Insure that protective cover is lowered over trigger.

f. Release the radio antenna from the secured position.

g. Check stowed components on 1/4-ton firing vehicle to insure that all items are secured to the vehicle.

2-26. Ground Operation.

Remove the weapon system components and refer to section VI of this chapter for ground emplacement.

Section V. DEPLOYMENT OF 1/2-TON VEHICLE/TOW SYSTEM

2-27. Selection of Site.

The launch site should be selected to preclude firing a missile from a launcher that is canted (lateral slope to line-of-sight) in excess of ten degrees. The site must provide adequate surveillance of the target area, and adequate back blast clearance.

2-28. 1/2-Ton Firing Vehicle Deployment.

a. *Install Launch Tube.* Remove the launch tube from its stowed position and install on traversing unit.

b. *Raise Elevating Pedestal Assembly.* Adjust the elevating pedestal assembly for gunner preference by turning the crank assembly.

2-29. Perform Launcher Self Test and Inspection.

Perform the launcher self test and inspection procedures given in section VII of this chapter.

2-30. System Operating Procedures.

Loading, tracking, firing, and unloading procedures for the TOW weapon system are provided in section VIII of this chapter.

2-31. Preparation of 1/2-Ton Vehicle/TOW System for Limited Travel.

The 1/2-ton vehicle with TOW system mounted may be moved from one operational location to another with the weapon system loaded, if the distance is not excessive. Only minor preparation is required for limited travel.

a. Lock the azimuth and elevation locks on the traversing unit. The launch tube is not secured in the launch tube rack in this operation.

b. Insure that the RETICLE LIGHT switch on the optical sight is set to OFF.

c. Insure that bridge clamp is closed and locked.

d. Insure that arming lever is lowered.

e. Insure that trigger protective cover is lowered over trigger.

f. Check stowed components on 1/2-ton vehicle/TOW system to insure that all items are secured to the vehicle.

2-32. Preparation of 1/2-Ton Vehicle/TOW System for Extensive Travel.

a. Lock azimuth and elevation locks on traversing unit.

b. Insure that the RETICLE LIGHT switch on optical sight is set to OFF.

c. Insure that optical surfaces and protective windows of the optical sight are clean and dry.

d. If the weapon system is loaded and the missile was not fired, open the bridge clamp, remove the encased missile, close the bridge clamp, replace forward handling ring and secure the encased missile in its storage rack.

e. Insure that protective cover is lowered over trigger.

f. Remove launch tube from traversing unit and strap it to the rack.

g. Check stowed components on 1/2-ton vehicle/TOW system to insure that all items are secured to the vehicle.

2-33. Preparation of 1/2-Ton Vehicle/TOW System for Air Drop.

Refer to paragraph 3-16.

2-34. Ground Operation.

Remove the weapon system components and refer to section VI of this chapter for ground emplacement.

Section VI. EMPLACEMENT OF GROUND MOUNTED SYSTEM**2-35. Selection of Site.**

The launch site should be selected to preclude firing a missile from a launcher that is canted (lateral slope to line-of-sight) in excess of ten degrees. Proper adjustment of the tripod legs will compensate for uneven ground (up to a maximum slope of 30 degrees). Therefore, the site selected for ground emplacement of the TOW weapon system must not slope more than 30 degrees. The site must provide adequate surveillance of the target area, and adequate back blast clearance.

2-36. Emplacement.

a. *Set Up Tripod.*

CAUTION

When operating detent stop levers, move lever toward the leg.

(1) Release leg lock handles. Open tripod by pulling outward on each tripod leg until detent stop engages at the desired DETENT position. Press detent stop levers toward leg to make further leg adjustments.

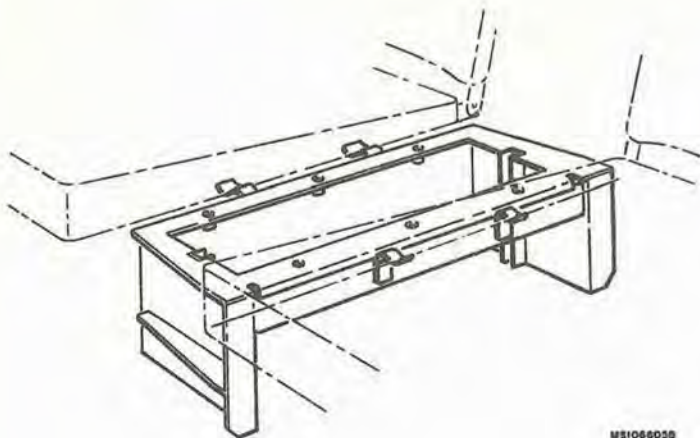


Figure 3-8. Installation of spare battery assembly storage rack.

(2) Remove cushion from rear seat and stow under seat.

(3) Fold rear seat to aft position and secure with strap at left rear tie-down.

NOTE
For vehicles that do not have rear seat brackets, install seat brackets using washers and screws (6 and 7, fig. 3-7) and existing holes in wheel-well walls.

(4) Place racks (4 and 5) on rear wheel wells by sliding forward section of rack flush against sloping portion of wheel well.

NOTE

If metal contact occurs, loosen bolts (8) and adjust forward stop bracket (9) so that contact is avoided.

(5) After placing racks on wheel wells adjust rear stops (10) so that the stops fit against the vehicle. To adjust, loosen bolts (8).

(6) Secure clamp link on inside clamp (1) to the seat bracket. Push end of clamp link against wheel well. Lock clamps.

(7) Secure outside clamps (2) under fender and lock into place.

Section VI. 1/2-TON VEHICLE/TOW SYSTEM

3-14. Installation and Removal of Launcher (Fig. 3-9).

a. Installation.

(1) *Tripod.* Clamp tripod to tripod rack assembly.

(2) *Launch tube.* Install launch tube to the top rack assemblies. The breech end of the launch tube should be installed into the aft brackets attached to the aft rack assembly. Secure the front end of the launch tube to the front rack assembly, using the tie-down strap.

(3) *Missile guidance set.* Install the missile guidance set on the pallet assembly using brackets and four tie-down straps.

(4) *Traversing unit.* Install the traversing unit to elevating pedestal assembly using coupling clamp.

(5) *Optical sight.* Refer to paragraph 2-36c.

b. Removal.

(1) *Optical sight.* Refer to paragraph 2-36c.

(2) *Traversing unit.* Disengage coupling clamp and remove traversing unit from elevating pedestal assembly.

(3) *Missile guidance set.* Disengage connecting brackets and straps and remove missile guidance set from the pallet assembly.

(4) *Launch tube.* Disengage strap and remove launch tube from top rack assemblies.

(5) *Tripod.* Unclamp tripod and remove from tripod rack assembly.

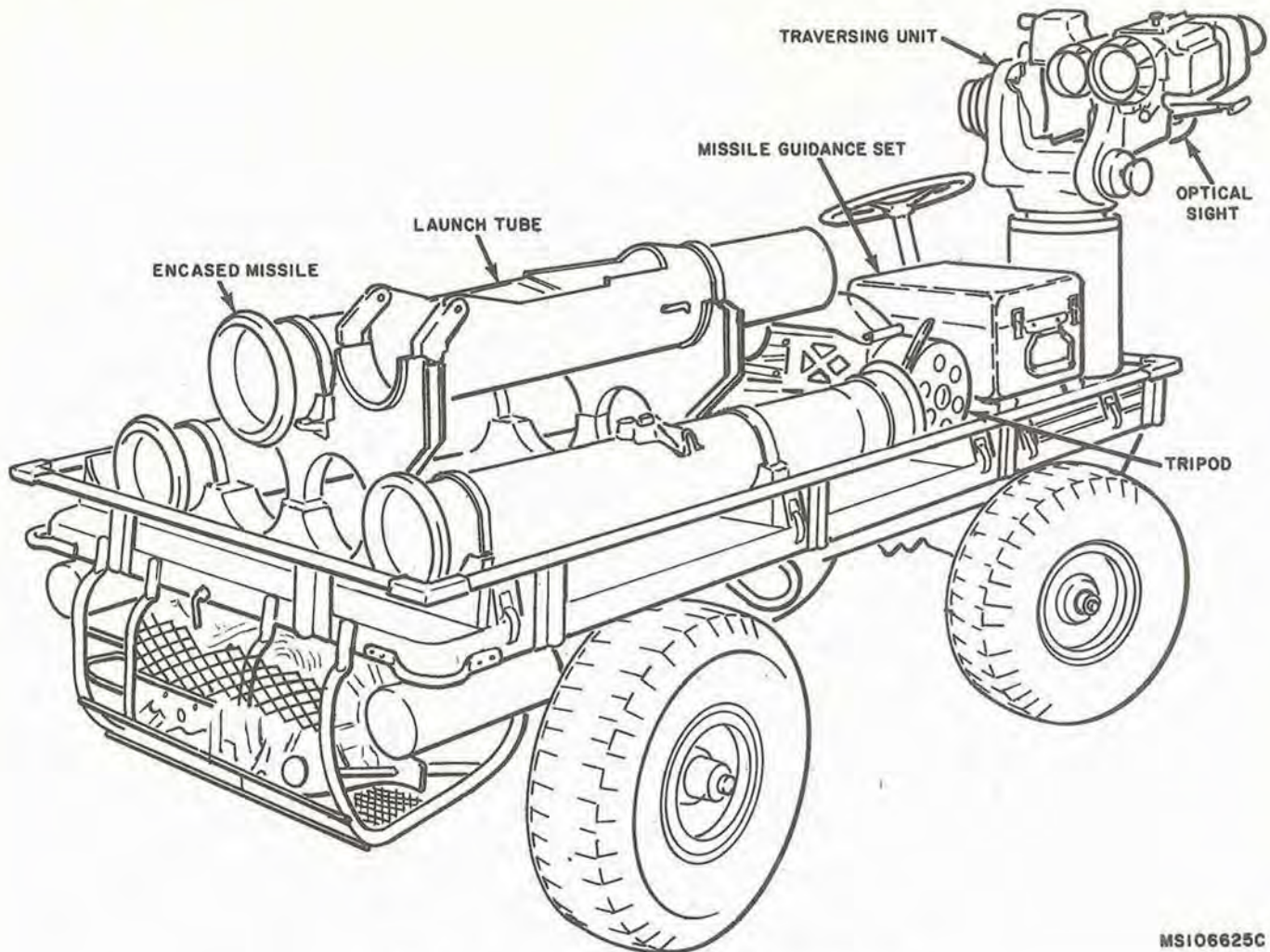
3-15. Installation and Removal of Encased Missiles.

a. Installation.

(1) Disconnect locking pins and remove top rack assemblies.

(2) Mount five encased missiles (nose end forward) with aft end resting in hooks on backside of the rear rack. Secure encased missiles with tie-down straps at both ends.

(3) Replace top rack assemblies and mount one encased missile in left side of top racks. Secure encased missile with tie-down straps at both ends.



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Figure 3-9. Launcher components on 1/2-ton vehicle.

b. Removal.

- (1) Loosen two tie-down straps and remove encased missiles from top rack assemblies.
- (2) Remove top rack assemblies and remove the remaining missiles.
- (3) Replace top rack assemblies.

3-16. Removal and Installation of Mounting Kit (Fig. 3-10).

a. Removal.

- (1) *Elevating pedestal.* Disengage coupling clamp and remove elevating pedestal (1).
- (2) *Pallet assembly.*

(a) Disconnect steering brace from mounting kit pin and clevis assembly (2). Rotate the pin and clevis assemblies to unlock them from the vehicle.

(b) Remove pallet assembly (3) by disengaging three latch assemblies.

(c) Insert vehicle pin and clevis assembly (5) to the vehicle and connect steering brace with pin and cotter pin removed in step (c) above.

(3) *Tripod rack assembly.* Disengage two latch assemblies on tripod rack assembly (6) and remove tripod rack assembly.

(4) *Forward rack assembly.* Disengage latch assemblies on each end of forward rack assembly (7) and remove rack assembly.

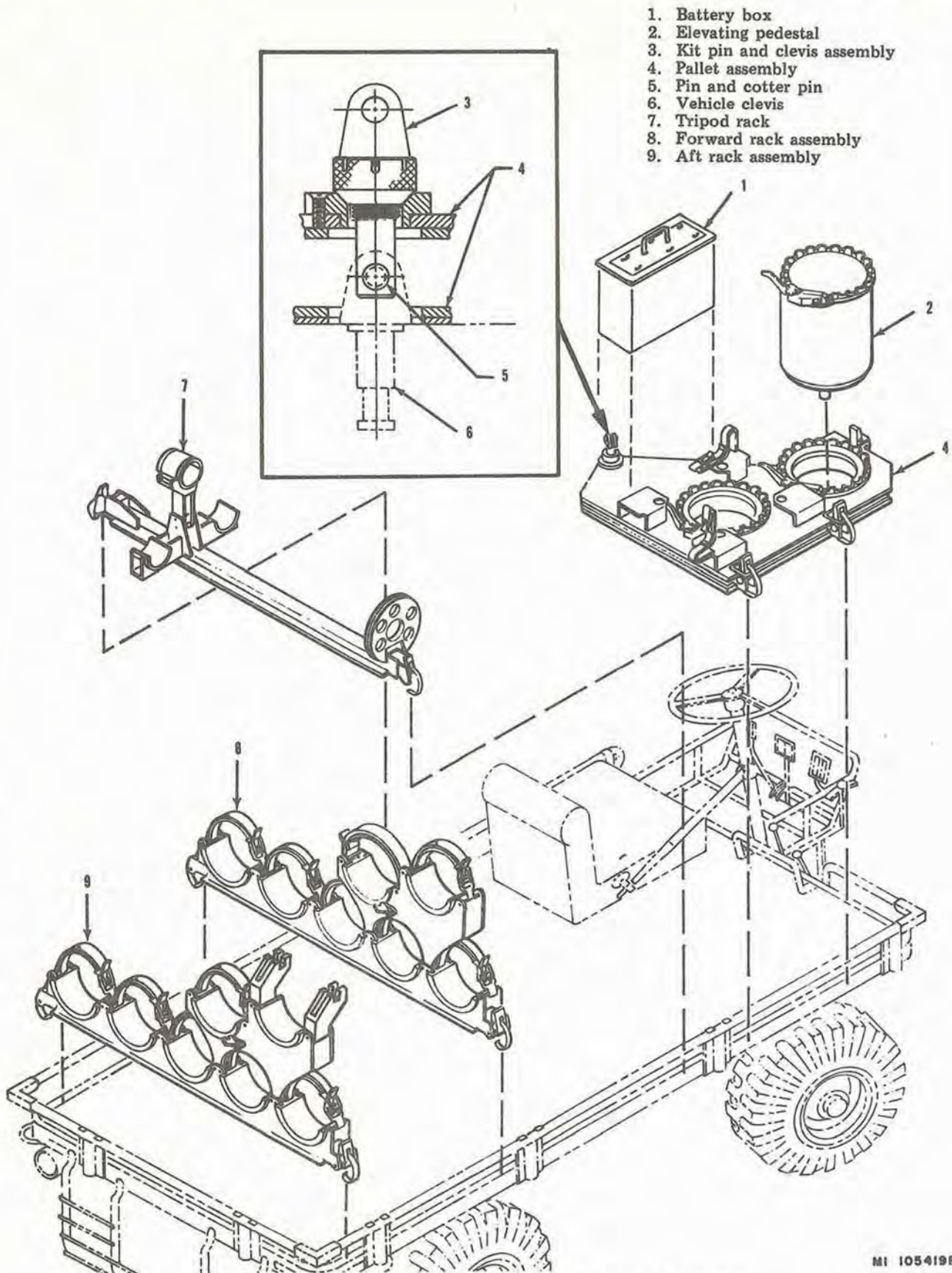


Figure 3-10. Installation of mounting kit on 1/2-ton vehicle.

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(5) *Aft rack assembly.* Disengage latch assemblies on each end of aft rack assembly (8) and remove rack assembly.

b. Installation.

(1) *Aft rack assembly.*

(a) Place aft rack assembly (8) five inches from rear end of the vehicle. Orient rack as shown in figure 3-10.

(b) Secure aft rack assembly using latch assemblies on each end of rack. Adjust flat hook of latch assembly as required to supply adequate pressure to securely fasten rack assembly.

(2) *Forward rack assembly.*

(a) Place forward rack assembly (7) 25 inches forward of aft rack assembly measured from center line to center line. Orient rack as shown in figure 3-10.

(b) Secure forward rack assembly using latch assemblies on each end of rack. Adjust flat hook of latch assembly as required to supply adequate pressure to securely fasten rack assembly.

(3) *Tripod rack assembly.*

(a) Place tripod rack assembly (6) 28 inches forward of forward rack assembly measured from center line to center line.

(b) Secure tripod rack assembly using latch assemblies on each end of rack. Adjust flat hook of latch assembly as required to supply adequate pressure to securely fasten rack assembly.

(4) *Pallet assembly.*

(a) Disconnect steering brace from pin and clevis assembly (5) on the vehicle. Rotate and remove the pin and clevis assembly.

(b) Insert the clevis end of the pin and clevis assembly removed from the vehicle into the pallet from the under side.

(c) Insert the mounting kit pin and clevis assembly (2), with knurled nut in place, into the pallet assembly from the top side. Pin it to the vehicle clevis and pin assembly and secure with cotter pin.

(d) Place the pallet assembly on deck of the vehicle (9) and insert the pin and clevis assembly into the mating hole on the vehicle. Twist the assembly to lock it.

(e) Secure the pallet with the three latch assemblies.

(f) If the pallet is not secured firmly the knurled nut on the clevis and pin assembly and the flat hook on the latch assemblies can be adjusted to take out slack.

(g) Connect the vehicle steering brace to the clevis and pin assembly.

(5) *Elevating pedestal.*

(a) Place the elevating pedestal (1) on the forward ring of the pallet with the crank facing the seat. The pedestal should be in the retracted position.

(b) Secure with coupling clamp on pallet.

3-17. Preparation for Air Drop.

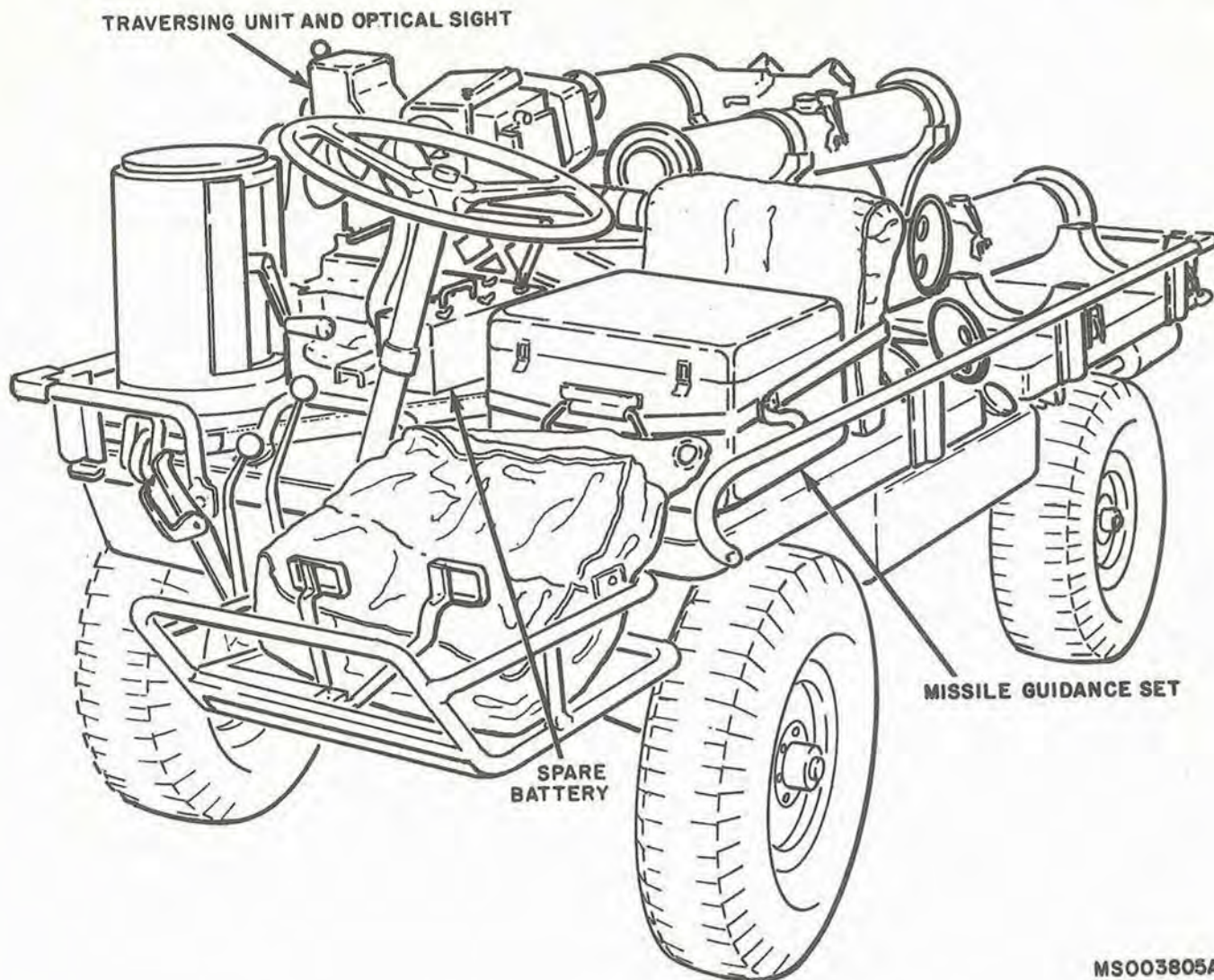
a. Install the tripod, launch tube, and encased missiles as described in paragraph 3-15.

b. Remove the seat cushion from the vehicle. Strap the missile guidance set in the seat using standard aircraft straps. Strap seat cushion to the vehicle.

c. Remove the traversing unit from the elevating pedestal and secure it to the pallet just aft of the elevating pedestal using coupling clamp.

d. Install optical sight on traversing unit.

e. Loosen coupling clamp and position traversing unit and optical sight in accordance with figure 3-11.



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Figure 3-11. 1/2-ton/TOW system (air drop mode).

MAINTENANCE ALLOCATION CHART for
MOUNTING KIT, VEHICLE GM SYSTEM, M225, CHART No. 11074342

(1) GROUP NUM- BER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY*					(5) TOOLS AND EQUIP- MENT		
			C	O	F	H	D			
8500	Mounting Kit, Vehicle, Guided Missile, M225	inspect	0.2					2		
		service	0.2							
		install	1.0							
		replace	2.0							
		repair			2.0					
8510	Pallet Assembly	inspect	0.1					2		
		service	0.1							
		install	0.5							
		replace	1.0							
		repair			1.0					
	Coupling Clamp	inspect	0.1					2		
		adjust			0.2					
		replace			0.5					
	Latch Assembly	inspect	0.1					2		
		replace			0.5					
	8520	Rack Assembly, AFT	inspect	0.1					2	
			service	0.1						
			install	0.5						
			replace	0.5						
			repair			1.0				
Latch Assembly			inspect	0.1						2
			replace			0.5				
		replace			0.3					
Top Rack Assy.		replace			0.5			2		
		repair			0.3					
Lanyard Assy.		replace			0.3			2		
		repair			0.3					
Rack Assembly, Weldment		replace			0.5			2		
		repair			0.5					
8525		Rack Assembly, Forward	inspect	0.1					2	
	service		0.1							
	install		0.2							
	replace		0.5							
	repair				1.0					

* C - operator/crew O - organizational F - direct support H - general support D - depot

MAINTENANCE ALLOCATION CHART for
MOUNTING KIT, VEHICLE GM SYSTEM, M225, CHART No. 11074342—Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY*					(5) TOOLS AND EQUIP- MENT
			C	O	F	H	D	
8530	Top Rack Assy	replace			0.3			2
		repair			0.5			
	Lanyard Assy.	replace			0.3			2
		repair			0.3			
	Latch Assembly	inspect	0.1					2
		replace			0.5			
	Rack Assembly, Weldment	replace			0.5			2
		repair			0.5			
	Elevating Pedestal	inspect	0.1					2
		service	0.1					
install		0.2						
replace		0.5						
repair				1.0				
Coupling Clamp	inspect	0.1					2	
	adjust			0.2				
	replace			0.5				
	repair			0.5				
Actuator Subassembly	inspect			0.2			2	
	replace			2.0				
Inter Sleeve Assembly	inspect			0.2			2	
	replace			2.0				
Outer Sleeve Assembly	inspect			0.2			2	
	replace			1.0				
Base Ring	replace			1.0			2	
	Support, spider, assembly	replace			1.5		2	
8540	Tripod, Rack Assembly	inspect	0.1				2	
		service	0.1					
		install	0.5					
		replace	0.5					
		repair			1.0			
	Support, Ring Assembly	replace			0.3		2	

* C - operator/crew O - organizational F - direct support H - general support D - depot

MAINTENANCE ALLOCATION CHART for
MOUNTING KIT, VEHICLE GM SYSTEM, M225, CHART No. 11074342—Continued

(1)	(2)	(3)	(4)					(5)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY*					TOOLS AND EQUIPMENT
			C	O	F	H	D	
	Leg, Support	replace repair			0.3 0.3			2
	Lanyard, Assy	replace			0.3			2
	Latch Assembly	replace			0.3			2
	Rack Assembly, Weldment	replace			0.5			2

* C - operator/crew O - organizational F - direct support H - general support D - depot

END ITEM: MOUNTING KIT, VEHICLE GM SYSTEM, M225, CHART No. 11074342—Continued

TOOL AND TEST EQUIPMENT REQUIREMENTS

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
1	F-H	Tool Kit, GM Maintenance: Wire-Guided Missile System Repairer MOS 27E	518-00-179-3574	N/A
		Shop Equipment, GM System: AN/TSM-94	4935-00-930-7251	N/A
		Test Station, GM System: AN/TSM-93	4935-00-930-7250	N/A
		Supplementary Equipment, GM System Test Station; TOW	4935-00-134-7730	N/A
2	F-H	Tool Kit, GM Maintenance: Wire-Guided Missile System Repairer MOS 27E	5180-00-179-3574	N/A
		Shop Equipment, GM System: AN/TSM-94	4935-00-930-7251	N/A

APPENDIX D
NOMENCLATURE CROSS REFERENCE

D-1. Scope.

This appendix is a cross-reference index of official nomenclature and technical manual nomenclature of the major TOW weapon system components, called out in TOW manuals.

D-2. Nomenclature Listing.

TM Nomenclature	Official Nomenclature
TOW Launcher	Launcher, Tubular, Guided Missile M220, or M220E1
Missile Guidance Set or MGS	Missile Guidance Set AN/TSQ-95 or AN/TSQ-102
Optical Sight	Sight, Optical, Guided Missile Launcher MX-9155/TSQ or MX-8230/TSQ
Traversing Unit	Traversing Unit, Guided Missile Launcher M53
Tripod or Tripod Mount	Mount, Tripod, Guided Missile Launcher M159E1
Launch Tube or Launcher Tube	Tube, Guided Missile Launcher M21 or M22
Battery Assembly or Battery	Battery Assembly BB-287(XO-2)/T
Shroud Bag	Bag, Shroud Assembly
Strap Assembly	TOW Strap Assembly
Jeep No. 1 or M232 1/4-Ton Firing Vehicle	Truck, Guided Missile Equipment (Jeep)
M232 Mounting Kit	Mounting Kit, Vehicle, Guided Missile System M232E1
1/4-Ton Jeep, or 1/4-Ton Utility Truck	Truck, Utility, 1/4-Ton, 4x4, M151A1 or Truck, Utility, 1/4-Ton, 4x4, M151A2
Jeep No. 2 or Guided Missile Truck	Truck, Guided Missile
M236 Mounting Kit	Mounting Kit, Vehicle, Guided Missile M236

TM Nomenclature

APC Missile Carrier

APC or Armored Personnel
Carrier

M233 Mounting Kit

MULE Missile Carrier or
1/2-Ton Missile Carrier
Vehicle

MULE or 1/2-Ton Vehicle

M225 Mounting Kit

Battery Charger

Official Nomenclature

Carrier, Guided Missile Equipment

Carrier, Personnel, Full Tracked, Armored
M113A1 (Diesel)Mounting Kit, Vehicle, Guided Missile
System M233E1

Vehicle, 1/2-Ton, Guided Missile Equipment

Truck, Platform, Utility, 1/2-Ton, 4x4,
M274Mounting Kit, Vehicle, Guided Missile
System M225

Charger, Battery, PP-4484(X0-1)/T

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