

Summary Report for Individual Task  
551-88M-1411  
Perform Tiedown Procedures  
Status: Approved

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**Distribution Restriction:** Approved for public release; distribution is unlimited.

**Destruction Notice:** None

**Foreign Disclosure: FD5** - This product/publication has been reviewed by the product developers in coordination with the Fort Lee, VA foreign disclosure authority. This product is releasable to students from all requesting foreign countries without restrictions.

**Condition:** In an operational environment, your unit is tasked with a supply mission. Given either a 5-ton cargo vehicle loaded with general cargo, a tractor-semitrailer combination loaded with a vehicle payload, or a HEMTT-LHS/PLStruck loaded with containerized cargo, and all necessary basic issue items, tools, and tiedown materials capable of securing the load to the vehicle.

**Standard:** Ensure proper placement of the load on the vehicle keeping the vertical center of gravity as low as possible and the horizontal center of gravity as indicated on the vehicle data plates; inspect the tiedown materials to be used and secure the load by properly blocking and bracing (if needed) and using the proper tiedown configuration. The load is to be inspected by supervisor or other proper authority and deemed secure and ready for movement.

**Special Condition:** None

**Safety Risk:** Low

**MOPP 4:**

<b>Task Statements</b>
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**Cue:** You are required to tie down the cargo load on a tactical wheeled vehicle. Your mission is in support of a tactical movement of supplies and equipment.

**DANGER**

Adhere to all DANGER statements provided in the technical reference materials for the specific equipment being used.

**WARNING**

Adhere to all WARNING statements provided in the technical reference materials for the specific equipment being used.

**CAUTION**

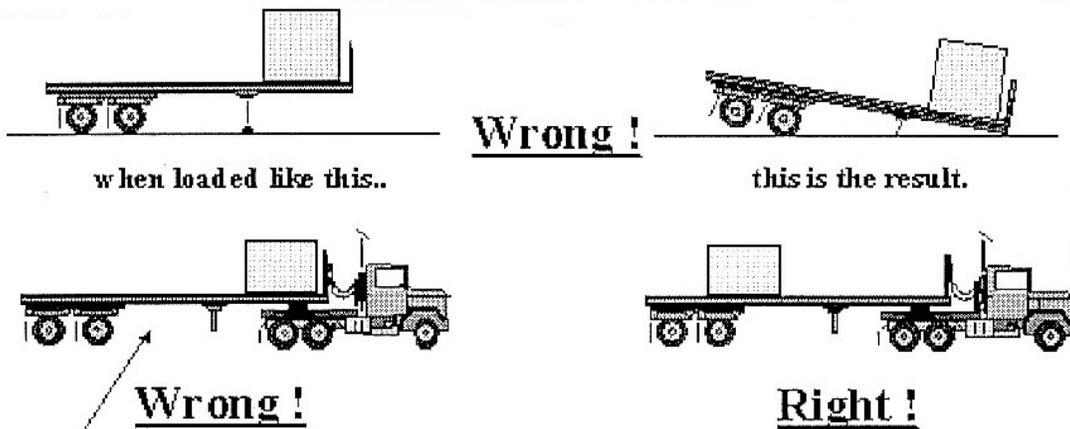
Adhere to all CAUTION statements provided in the technical reference materials for the specific equipment being used.

**Remarks:** None

**Notes:** This task exercises the loading of some configurations of cargo and payload vehicles. There are numerous other configurations that are possible but this task cannot cover them all. Extreme discretion is required in order to provide a safe tiedown of cargo and safe shipment/movement of materials.

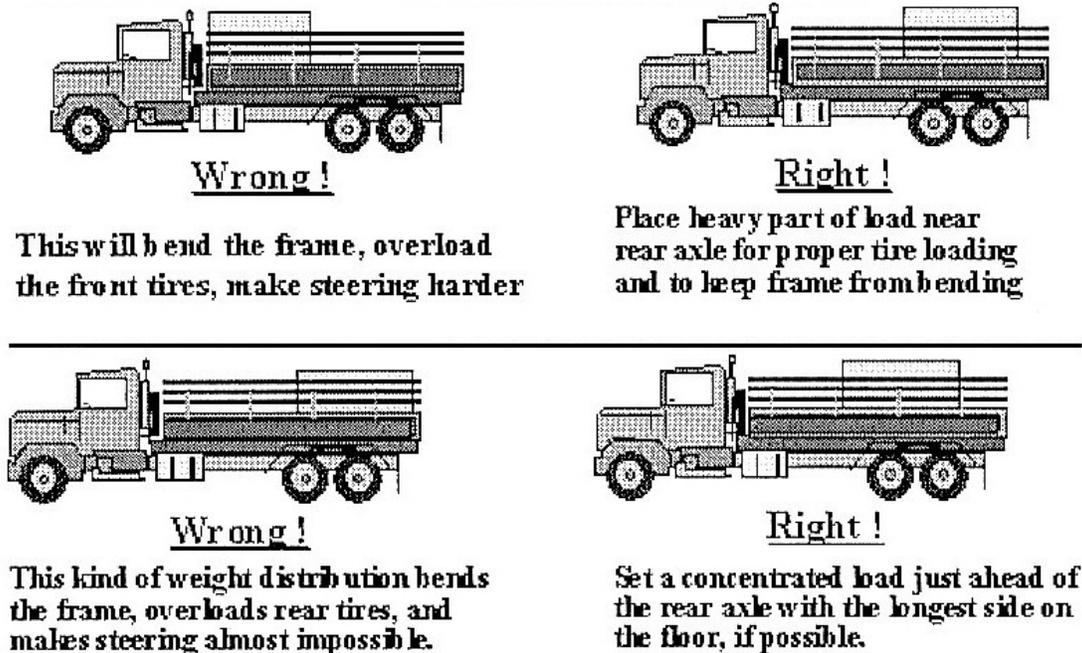
**Performance Steps**

1. Ensure load is properly positioned for tiedown.



This overloads and shortens tire life, bends the truck rear axle housing. Applying the trailer brakes may lock the wheels, cause flat spots and skidding.

Figure 3-25a.  
Load Balancing



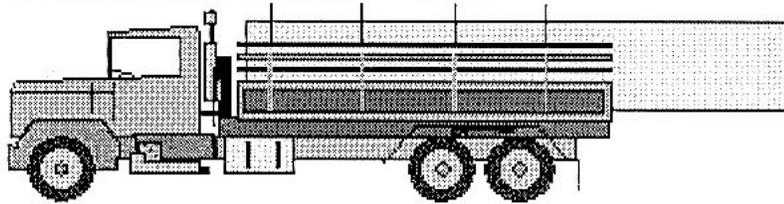
This will bend the frame, overload the front tires, make steering harder

Place heavy part of load near rear axle for proper tire loading and to keep frame from bending

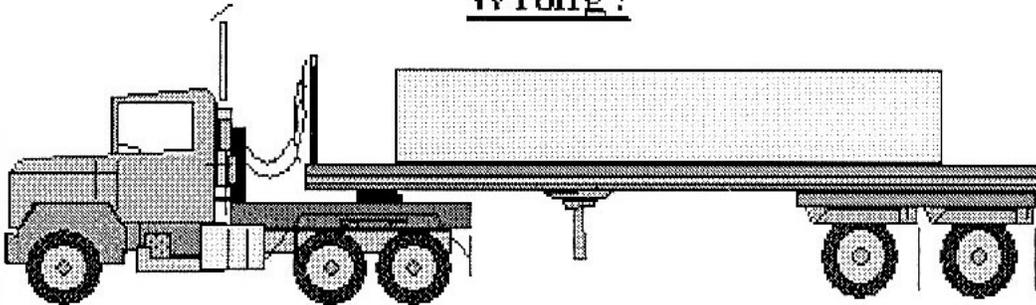
This kind of weight distribution bends the frame, overloads rear tires, and makes steering almost impossible.

Set a concentrated load just ahead of the rear axle with the longest side on the floor, if possible.

Figure 3-25b.  
Load Balancing



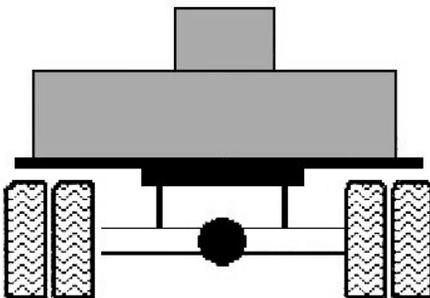
**Wrong!**



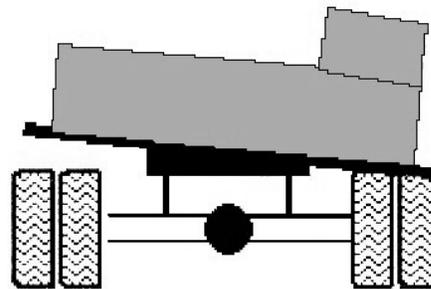
**Right!**

Figure 3-25c.  
Load Balancing

## **Weight and Balance**



**Right!**



**Wrong!**

Nothing overloaded.  
Frame will not twist and  
loosen cross-member rivets.

This overloads one spring and  
set of tires. Brakes lock on the  
right side, causing skids.

Figure 3-25d.  
Load Balancing

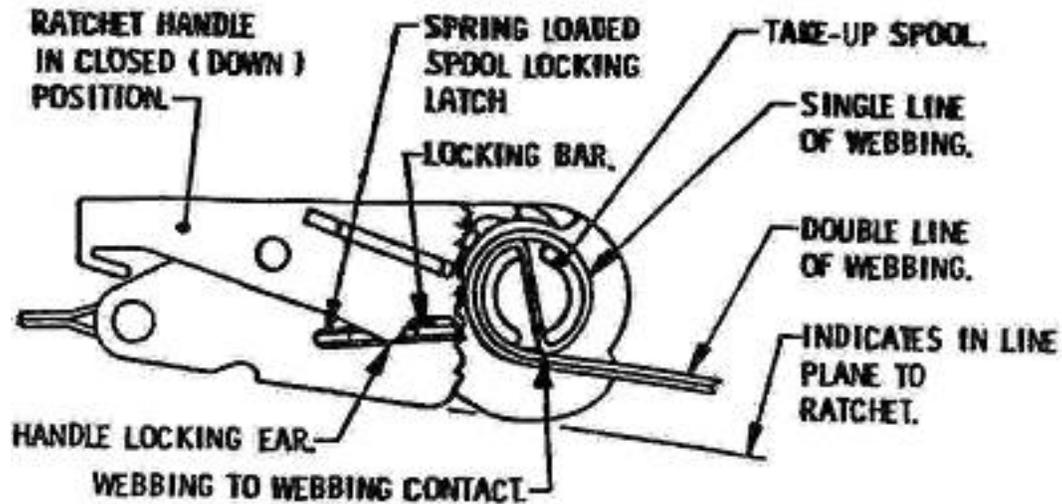


Figure 3-26.  
Web-to-Web Contact

**THIS VIEW DEPICTS THE LOCATION OF THE FIXED MARK ON THE RATCHETING HANDLE, WITH ANOTHER MATCHING MARK ON THE END OF THE TAKE-UP SPOOL, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE.**



Figure 3-27.  
Locking Latches

a. Check configuration of general cargo load.

(1) Ensure that cargo is placed on vehicle with the heaviest items on the bottom and spread evenly across the vehicle both longitudinally and laterally.

(2) Ensure items are not stacked too high to allow for the lowest center of gravity.

(3) If the load extends more than 4 feet beyond the end of the bed, ensure that a red flag (measuring not less than 12 x 12 inch square) is attached to the load. During nighttime, use a red light (if tactical situation permits).

(4) Check vehicle data plate and TM to ensure that vehicle weight and cube limitations have not been exceeded.

b. Check configuration of ammunition (on HEMTT and PLS flatrack).

(1) Ensure that cargo is placed on vehicle/flatrack with the heaviest items on the bottom and spread evenly across the vehicle both longitudinally and laterally.

(2) Ensure items are not stacked too high to allow for the lowest center of gravity.

(3) Ensure that load does not extend past vehicle cargo area perimeters and that cargo truck tailgate is raised and locked in place.

(4) Check vehicle data plate and TM to ensure that vehicle weight and cube limitations have not been exceeded.

c. Check configuration of vehicle payload.

(1) Ensure that payload vehicle center of gravity is located over the desired point on the semitrailer. Center of gravity marking should be legible on both sides of payload vehicle.

## CAUTION

### CAUTION

Do not use bumperettes, axles, towing pintles, or towing hooks as points of attachment for chains.

(2) Ensure that all shackles are on the vehicle.

(3) Remove or band canvas and bows to prevent wind damage (as applicable).

(4) Protect windshield of payload vehicle if needed.

(5) Ensure that fuel tank of payload vehicle is no more than three-quarters full.

(6) Reduce payload vehicle to lowest height configuration consistent with the operational requirement and unit SOP.

(7) Secure any materials or equipment loaded in the beds of cargo vehicles by banding, chains, or cargo straps.

(8) Remove all sensitive or pilferable items that cannot be secured.

(9) Ensure that vehicle antennae are tied down or removed in accordance with local SOP.

d. Ensure containerized cargo is properly placed on the HEMTT-LHS/PLS truck.

2. Inspect tiedown materials.

a. Chains and load binders (used for vehicle payload). Inspect chains including the hooks, at least once a month. Inspect those that are used for heavy and continuous loading more frequently. Give particular attention to the small radius fillets at the neck of the hooks for any deviation from the original inner arc. Examine each link and hook for small dents and cracks, sharp nicks and cuts, worn surfaces, and distortions. Replace any of those that show any of these weaknesses. If several links are stretched or distorted, do not use the chain; it probably was overloaded or hooked improperly, which weakened the entire chain. Inspect load binders for structural cracks in the metal. Inspect chain and hooks using same criteria cited above; if ratchet type, ensure mechanism works freely without binding. Inspect lever pivot mechanism for excessive signs of wear or stress on pin. Do not use if any portion of the load binders possesses any of the above signs of wear or misuse.

b. Web tiedown straps (used for general cargo and ammunition tiedown). Before each use, straps should be inspected for burns, tears, punctures, cuts, caustic damage, oil or grease contamination, and fraying or broken stitches. Inspect metal parts for improper operation, corrosion, cracks, or distortion. If any of these conditions exist, the tiedown should be replaced. They should not be used for any mode of transport if they have been damaged. No strength testing of straps will be made.

c. Blocking and bracing materials (as needed, depending on platform and load). Ensure that if needed, the materials are of a size and configuration to support the tiedown of the load. Use 4X4 materials if available. All lumber used for blocking must be free of knots and strong enough to provide a rigid and stable support for the load en route.

d. Locking mechanisms on the HEMTT-LHS/PLS trucks.

3. Secure general cargo to bed of 5-ton cargo truck using web tiedown straps.

Note: Not all loads will require blocking and bracing. Blocking and bracing is used for applications involving a partially loaded vehicle to prevent from shifting.

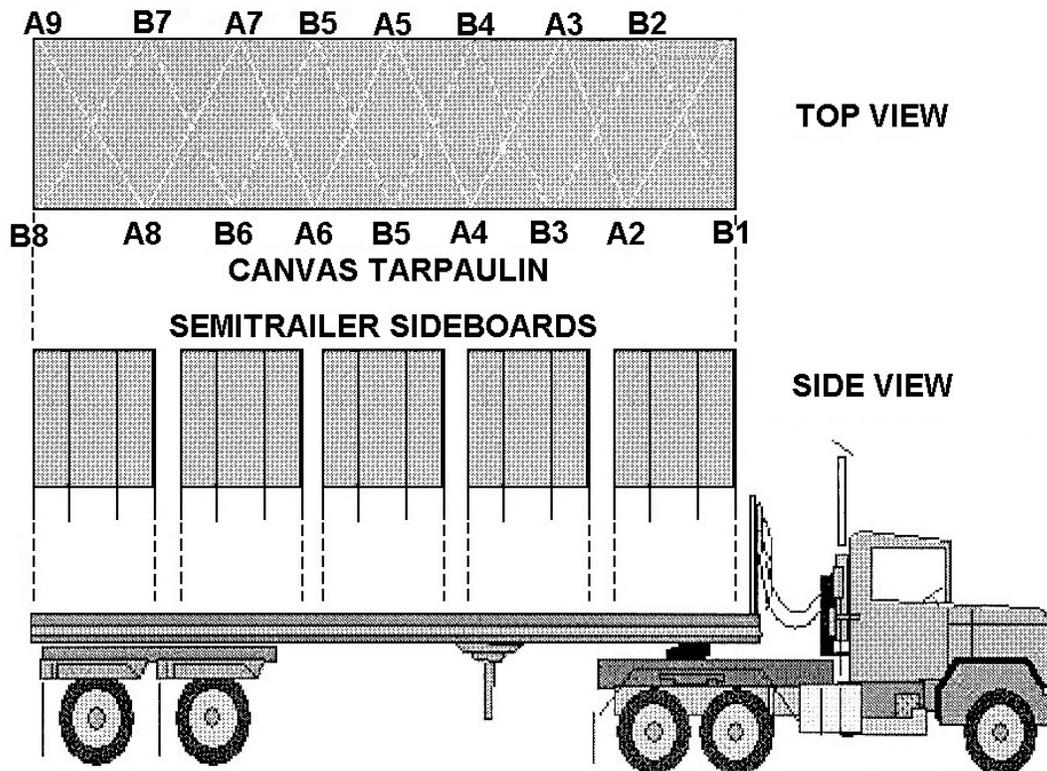


Figure 3-29.  
Load Lashing

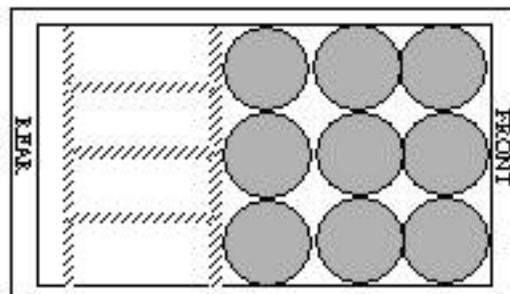


Figure 3-28.  
Blocking and Bracing

a. Block and brace load as needed.

b. Attach and secure all necessary web tiedown straps.

(1) Ensure all strap hooks are completely engaged and safety latches are completely closed around tiedown anchor point.

(2) Ensure that strap is tensioned to form at least 1 1/2 turns on the take-up spool. This is accomplished after web-to-web contact has been made on the take-up spool. To prevent movement of cargo, each tiedown must be tightened until about equal tension is applied throughout the tiedown arrangement.

(3) After tensioning is completed, the take-up spool-locking latch must be checked to ensure that it is fully seated at both ends of the spool in the matching locking notches. The scuff sleeve may have to be removed to allow tightening of tiedowns. Secure loose ends of straps by suitable means.

(4) Reinforce sharp edges of cargo with suitable materials to prevent both crushing edges of the load when strap is tensioned and to prevent slicing into strap webbing.

c. Lash the load and canvas to the truck.

Note: Load lashing is done to protect the load and prevent casual observation for sensitive items.

(1) Fasten the end of one rope to one of the front lash hooks or rings (A1).

(2) Pass the rope diagonally across the top of the load through or under the second rope support on the opposite side (A2).

(3) Pass the rope diagonally back across the top of the load through or under the third rope support (A3). Pull the rope tight.

(4) Continue this process until you reach the rear of the vehicle. Secure the rope.

(5) With the second rope, repeat the entire process, starting at the front lash hook or ring (B1).

4. Secure ammunition to PLS/HEMTT-LHS flatrack using web straps.

Note: The M1077 and M1 flatracks are applicable to this step. Web straps are used to secure boxes, pallets, and off shaped cargo.

NOTE: All items, no matter how small, should be secured in place.

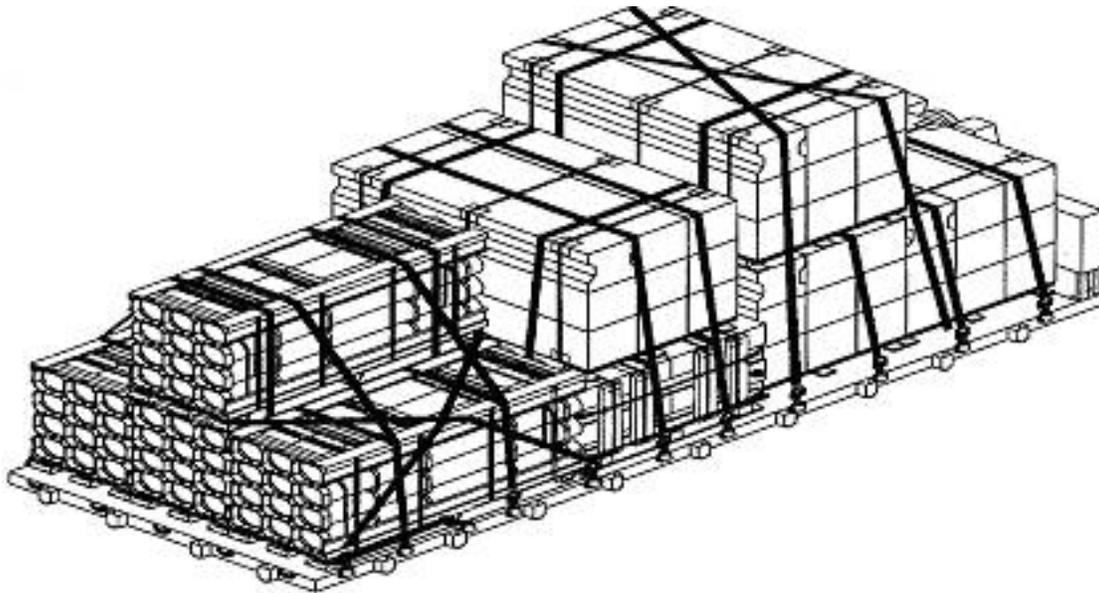


Figure 3-30.  
Tiedown on Flatrack

a. Refer to flatrack data plate for particular characteristics regarding the flatrack you are using.

b. Use small tiedown rings for cargo no heavier than 10,000 pounds.

c. Use large tiedown rings for cargo no heavier than 25,000 pounds.

d. Check for proper center of gravity (CG) mark on flatrack and use as basis for load positioning. CG markings on the M1077 and M1 are different.

(1) CG for the M1077 is 106 inches from front edge of flatrack.

(2) CG for the M1 is 116 inches from front edge of flatrack.

e. Attach all web strap tiedowns to load.

(1) Ensure all strap hooks are completely engaged and safety latches are completely closed around tiedown anchor point.

(2) Ensure that strap is tensioned to form at least 1 1/2 turns on the take-up spool. This is accomplished after web-to-web contact has been made on the take-up spool. To prevent movement of cargo, each tiedown must be tightened until about equal tension is applied throughout the tiedown arrangement.

(3) After tensioning is completed, the take-up spool-locking latch must be checked to ensure that it is fully seated at both ends of the spool in the matching locking notches. The scuff sleeve may have to be removed to allow tightening of tiedowns. Secure loose ends of straps by suitable means.

## **WARNING**

### **WARNING**

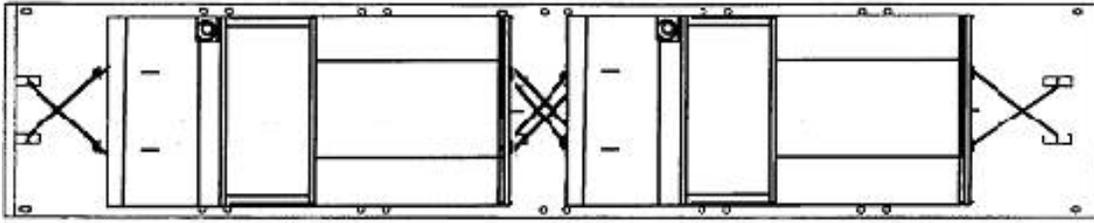
**EXTREMELY HAZARDOUS HANDLING BEHAVIOR CAN OCCUR IF PAYLOADS NEAR THE GROSS LOAD RATING ARE LOADED IN SUCH A WAY THAT THEIR CG FALLS REARWARD OF THE LONGITUDINAL CENTER OF THE FLATRACK.**

**NOTE:** Cargo such as boxes, pallets, and odd shaped cargo should be loaded as far forward and as low as possible on the flatrack.

(4) Reinforce sharp edges of cargo with suitable materials to prevent both crushing edges of the load when strap is tensioned and to prevent slicing into strap webbing.

5. Secure payload vehicle to semitrailer using load binders and chains (general procedures applicable to M872 semitrailers).

## TOP VIEW



## SIDE VIEW

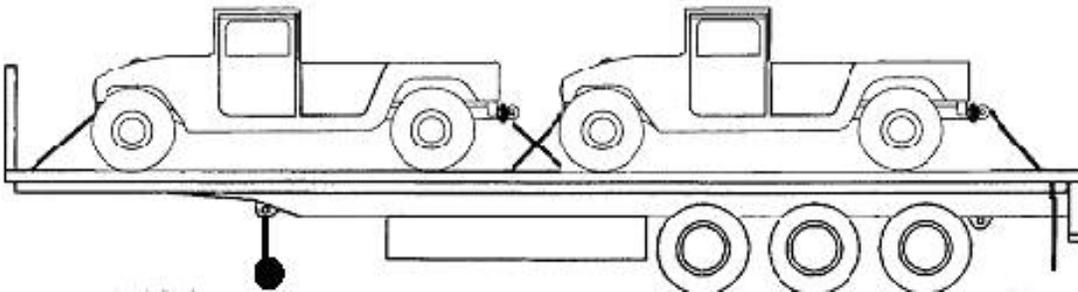


Figure 3-31.  
Vehicle Payload on M872 Semitrailer

a. Emplace chock blocks as necessary.

b. Adhere to all safety issues concerning chains and load binders.

(1) Failure to use load binder properly may result in serious injury or even death.

(2) Do not operate load binder while standing on the load.

(3) Move handle with caution. It may whip - keep body clear.

(4) Keep yourself out of the path of the moving handle.

(5) You must be familiar with state and federal regulations regarding size and number of chain systems required for securing loads on trucks.

(6) Always consider the safety of nearby workers as well as yourself when using load binders.

## **WARNING**

### **WARNINGS**

USE CAUTION WHEN MOVING AROUND LOAD ON SEMITRAILER. A FALL FROM THE SEMITRAILER COULD CAUSE SERIOUS INJURY.

NEVER USE A CHEATER PIPE OR HANDLE EXTENDER TO RELEASE HANDLE. USE A STEEL BAR AND PRY UNDER THE HANDLE AND STAY OUT OF THE PATH OF HANDLE AS IT MOVES UPWARD.

(7) While under tension, load binders must not bear against an object.

c. Attach chains and load binders to front and rear of vehicle.

Note: It is not possible to illustrate all possible configurations in this step of tying down a vehicle on the M872 semitrailer. The vehicle included is the M998 HMMWV, 1 1/4 ton vehicle. Similar vehicles may be used as substitute.

d. The following restrictions apply to this procedure (NTE = Not To Exceed).

(1) Vehicle payload NTE 12,000 lbs. Use 3/8-inch chain. One chain required for each corner of vehicle.

(2) Vehicle payload NTE 17,000 lbs. Use 3/8-inch chain. One chain for left and right front corners of payload vehicle. Two chains required for left and right of rear corners of vehicle.

(3) Vehicle payload NTE 19,000 lbs. Use 7/16-inch chain. One chain for each front corner of vehicle payload. Two chains required for left and right rear corners of vehicle payload.

(4) Vehicle payload NTE 27,000 lbs. Use 7/16-inch chain. One chain for left and right front corners of payload vehicle. Two chains required for left and right rear corners of vehicle payload.

(5) Vehicle payload NTE 48,000 lbs. Use 3/4-inch chains. One chain for left and right front corners of payload vehicle. Two chains required for left and right rear corners of vehicle payload.

## CAUTION

### CAUTION:

All chains are attached to the cargo tiedown rings. DO NOT use the outside stake pockets of the semitrailer for vehicle payloads.

NOTE: Additional chains are required on the rear of the vehicle, because forces seen when braking are higher than when accelerating.

(6) Vehicle payload NTE 67,000 lbs. Use 3/4-inch chains. One chain for left and right front corners of payload vehicle. Two chains required for left and right rear corners of vehicle payload.

e. Use only tiedown provisions on the vehicle to attach chains (refer to 1c(2) above).

f. Attach load binder hooks to chains so that open part of hook throat faces upward whenever possible. Secure load binder handle by wiring to chain.

6. Ensure supervisor checks load for security prior to vehicle movement.

(Asterisks indicates a leader performance step.)

**Evaluation Guidance:** Score the soldier GO if all performance measures are passed. Score the soldier NO-GO if any performance measure is failed. If any performance measure is failed, tell the soldier what was done wrong and how to do it correctly.

**Evaluation Preparation:** Setup: Brief Soldier on task performance specifications. Provide a vehicle/load configuration as specified in task condition statement.

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Ensured load was properly positioned for tiedown.			
2. Inspected tiedown materials.			
3. Secured general cargo to bed of 5-ton cargo truck using web tiedown straps.			
4. Secured ammunition to flatrack using nylon tiedown web straps.			
5. Secured payload vehicle to semitrailer using load binders and chains.			
6. Ensured that supervisor checked load prior to movement.			

**Supporting Reference(s):**

Step Number	Reference ID	Reference Name	Required	Primary
	TC 21-305-20	Manual for the Wheeled Vehicle Operator {AFMAN 24-306(I)}	Yes	No
	TEA PAM 55-20	Tiedown Handbook for Truck Movements	Yes	No
	TM 3-34.86	Rigging Techniques, Procedures, and Applications {MCRP 3-17.7j}	Yes	No
	TM 9-2320-279-10-1	Operators Manual for M977 Series 8X8 Heavy Expanded Mobility Tactical Trucks (HEMTT), Truck, Cargo, With Winch, M977; Truck, Cargo, With Winch, M977A2; Truck, Cargo, With Winch, M977A2R1; Truck, Cargo, Without Winch, M977; Truck, Cargo, Wit	Yes	No
	TM 9-2320-345-10	OPERATORS MANUAL FOR TRUCK, LOAD HANDLING SYSTEM (LHS), W AND W/O WINCH, 8X8 M1120A4 (NSN 2320-01-534-1872)(EIC BG7) (THIS ITEM IS INCLUDED ON EM 0288)	No	No
	TM 9-2320-364-10	OPERATORS MANUAL FOR TRUCK, TRACTOR, M1074 AND M1075 PALLETIZED LOAD SYSTEM (PLS) (NSN 2320-01-304-2277) (2320-01-304-2278)	Yes	No
	TM 9-2320-392-10-1	OPERATORS MANUAL FOR THE M1083A1 SERIES 5 TON, 6X6 MEDIUM TACTICAL VEHICLES (MTV) VOLUME NO. 1 OF 2 MODEL TRK., CAR., M1083A1 W/WN (2320-01-447-3884) (EIC BUL);W/O WN (2320-01-447-3890) (EIC BUL);W/O WN	No	No
	TM 9-2320-392-10-2	OPERATORS MANUAL FOR THE M1083A1 SERIES 5 TON, 6X6 MEDIUM TACTICAL VEHICLE (MTV) VOLUME NO. 2 OF 2. MODEL TRK, CAR., MTV, M1083A1 W/WN (NSN 2320-01-447-3884) (EIC BUL);W/O WN (2320-01-447-3890) (EIC BT9)	No	No

**Environment:** Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects. Refer to FM 3-34.5 Environmental Considerations and GTA 05-08-002 ENVIRONMENTAL-RELATED RISK ASSESSMENT. Ensure that every effort is made to minimize or eliminate the spillage of hazardous waste of any kind into the environment. Use waste catch container under vehicles whenever possible.

**Safety:** In a training environment, leaders must perform a risk assessment in accordance with ATP 5-19, Risk Management. Leaders will complete the current Deliberate Risk Assessment Worksheet in accordance with the TRADOC Safety Officer during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and

weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection, FM 3-11.5, Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination. Ensure that all specifications of tiedown equipment are not exceeded as well as limitation of the cargo vehicle being used. Ensure that vehicle load capacities are not exceeded and that loads are properly distributed to prevent a dangerous situation during shipment/movement.

**Prerequisite Individual Tasks :** None

**Supporting Individual Tasks :** None

**Supported Individual Tasks :**

Task Number	Title	Proponent	Status
551-88M-2374	Supervise Loading/Unloading of a Tracked/Wheeled Vehicle onto/from a Semitrailer	551 - Transportation (Individual)	Analysis

**Supported Collective Tasks :** None