

TECHNICAL MANUAL

TRANSPORTABILITY GUIDANCE

TRUCKS, 2-1/2-TON, 6X6 (NSN 2320)

TRUCK, CARGO: M35 WWN (00-835-8464); M35 WOWN
(00-835-8463); M35A1 WWN (00-542-5634); M35A1 WOWN (00-542-5633);
M35A2 WWN (00-077-1617); M35A2 WOWN (00-077-1616); M35A2C WWN (00-926-0875);
M35A2C WOWN (00-926-0873); M36 WWN (00-647-0505); M36 WOWN (00-391-0569);
M36C WWN (00-200-1369); M36C WOWN (00-200-1368);
M36A2 WWN (00-077-1619); M36A2 WOWN (00-077-1618)

TRUCK, DUMP: M59 WWN (00-835-8597); M59 WOWN (00-835-8595);
M342A2 WWN (00-077-1644); M342A2 WOWN (00-077-1643)

TRUCK, TANK, FUEL-SERVICING, 1,200-GAL.: M49A1C WWN (00-440-3346),
M49A1C WOWN (00-440-3349); M49A2C WWN (00-077-1632), M49A2C WOWN (00-077-1631);
M49C WWN (00-141-8237), M49C WOWN (00-141-8235)

TRUCK, TANK, WATER, 1,000-GAL.: M50 WWN (00-174-1601), M50 WOWN (00-835-8344);
M50A1 WWN (00-440-8305), M50A1 WOWN (00-440-8307); M50A2 WWN (00-077-1634),
M50A2 WOWN (00-077-1633); M50A3 WWN (00-937-5264), M50A3 WOWN (00-937-4036)

TRUCK, TRACTOR: M48 WWN (00-835-8346), M48 WOWN (00-835-8345);
M275 WWN (00-835-8611), M275 WOWN (00-835-8609); M275A1 WOWN (00-446-2479);
M275A2 WWN (00-077-1641), M275A2 WOWN (00-077-1640)

TRUCK, VAN, EXPANSIBLE: M292 WWN (00-542-4444), M292 WOWN (00-325-6574);
M292A1 WWN (00-440-8317), M292A1 WOWN (00-440-8318); M292A2 WWN (00-696-0684),
M292A2 WOWN (00-077-1642); M292A3 WOWN (00-699-3546);
M292A4 WOWN (00-699-3593); M292A5 WOWN (00-699-3746)

TRUCK, VAN, SHOP: M109 WWN (00-289-6473), M109 WOWN (00-835-8515);
M109A1 WWN (00-706-2224), M109A1 WOWN (00-690-8365); M109A2 WWN (00-440-8308),
M109A2 WOWN (00-440-8313); M109A3 WWN (00-077-1637), M109A3 WOWN (00-077-1636)

TRUCK, WRECKER: M60 WWN (00-835-8343); M108 WWN (00-835-8526), M108 WOWN (00-690-7500)

Change

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 12 September 1986

TRANSPORTABILITY GUIDANCE

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M35A2C WOVN (00-926-0873); M36 WVN (00-647-0505), M36 WOVN (00-391-0569);
M36C WVN (00-200-1369), M36C WOVN (00-200-1368);
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TRUCK, WRECKER: M60 WVN (00-835-8343); M108 WVN (00-835-8526), M108 WOVN
(00-690-7500)

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1. New or changed material is indicated by a vertical bar in the margin. Remove old pages and insert new pages as indicated below:

<i>Remove pages</i>	<i>Insert pages</i>
4-1 through 4-13	4-1 through 4-1
6-1 through 6-5	6-1 through 6-5
7-1 through 7-8	7-1 through 7-6
B-1 and B-2	B-1 and B-2

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TRUCK, WRECKER: M60 WVN (00-835-8343); M108 WVN (00-835-8526), M108 WOWN (00-690-7500)

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CHAPTER I

INTRODUCTION

1 -1. Purpose and Scope

This manual provides transportability guidance for logistic handling and movement of trucks, 2 1/2-ton, 6x6. It provides transportation officers and other personnel responsible for movement, or providing transportation services, with information considered appropriate to safe transport. Significant technical and physical characteristics as well as safety considerations required for worldwide movement by the various modes of transportation are included. When considered necessary, metric equivalents are given in parentheses following dimensions or other measurements. Conversion tables are contained in appendix A.

1-2. Reporting of Recommendations and Comments

The reporting of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications and Blank Forms) and **forwarded to Director, Military Traffic Management Command Transportation Engineering Agency, ATTN: MTT-TRP, P.O. Box 6276, Newport News, Virginia 23606.**

NOTE

Attention is invited to the stamped and preaddressed tear-out questionnaire following appendix B. Request that this questionnaire be completed and mailed within 6 months of the manual publication date.

1-3. Safety

Appropriate precautionary measures required during movement of the items are contained in chapter 3.

1-4. Definitions of Warnings, Cautions, and Notes

Throughout this manual, warnings, cautions, and notes emphasize important or critical guidance. They are used for the following conditions:

a. *Warning.* An operating procedure or practice that, if not correctly followed, could result in personal injury or loss of life.

b. *Caution.* An operating procedure or practice that, if not strictly observed, could result in damage to or destruction of equipment.

c. *Note.* An operating procedure or condition that must be emphasized.

CHAPTER 2

TRANSPORTABILITY DATA

Section I. GENERAL

2-1. Scope

This chapter provides a general description of the 2 1/2-ton, 6x6 trucks, identification photographs, tabulated transportability characteristics, and data that are necessary for movement of the vehicles.

2-2. Descriptions

The trucks, 2 1/2-ton, 6x6, covered in this manual are of various wheel bases and body styles; all have a tandem rear axle and dual rear tires. A brief description of the various chassis and body

types follows:

a. *Truck, Cargo, M35A2 (Fig 2-1).* The M35-series truck is designed for use as a general purpose cargo and troop carrier.

b. *Truck, Cargo, M36 (Fig 2-2).* The M36-series truck is an extra long wheelbase cargo truck. The M36C is modified with the acquisition antenna transport kit.

c. *Truck, Dump, M59 (Fig 2-3).* The M59 truck is equipped with a metal dump body and hydraulic hoist cylinder and is used primarily to transport loose bulk material.



Figure 2-1. Truck, cargo, 2 1/2-ton, 6x6, M35A2.



Figure 2-2. Truck, cargo, 2 1/2-ton, 6x6, M36

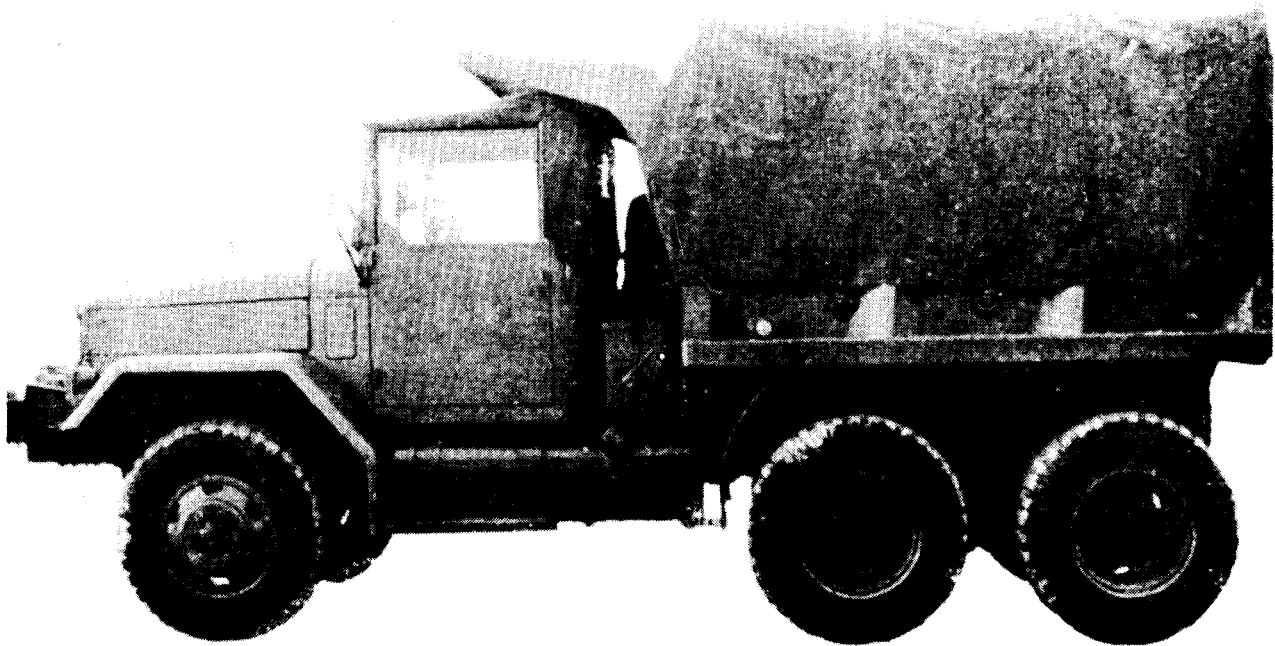
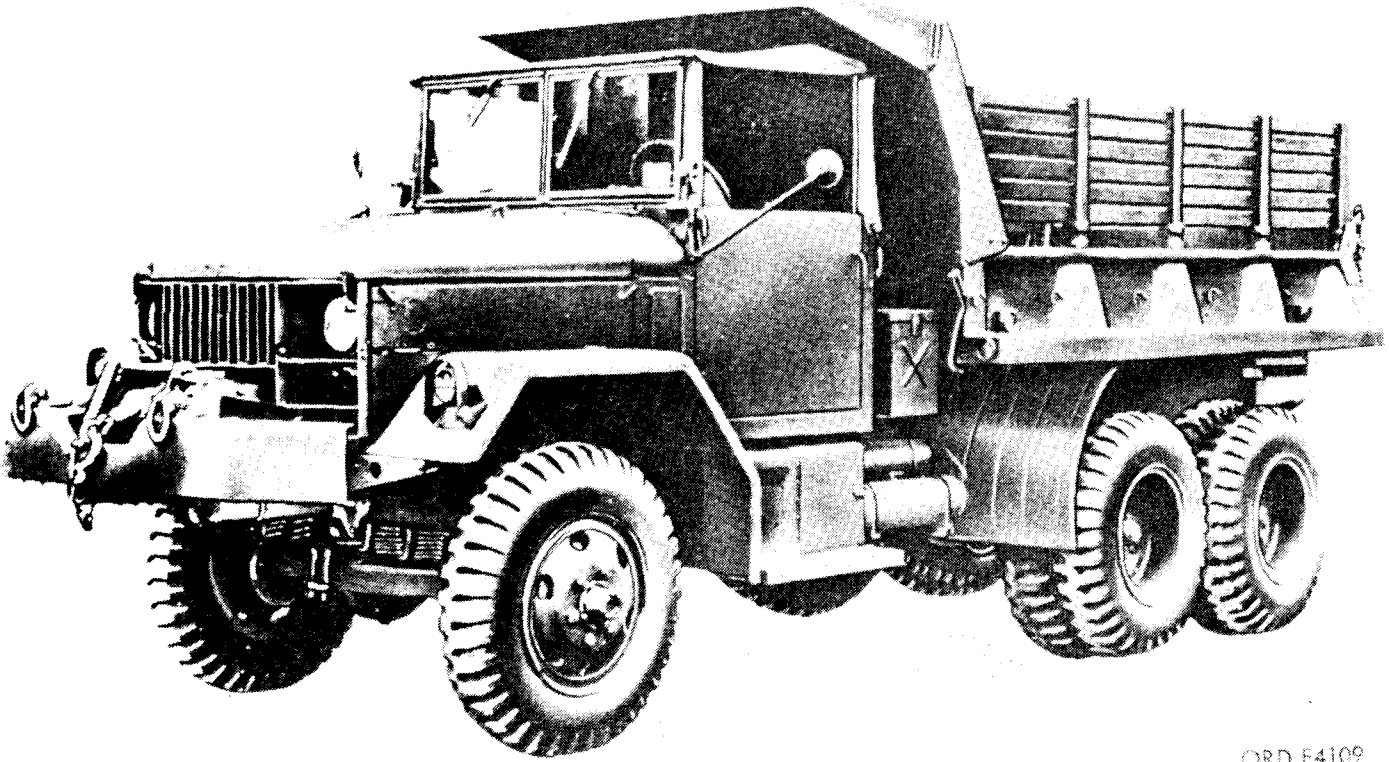


Figure 2-3. Truck, dump, 2 1/2-ton, 6x6, M59.

d. *Truck, Dump, M342A2 (Fig 2-4).* The M342A2 truck is equipped with a metal dump body and two hydraulic hoist cylinders and is used primarily to transport loose bulk material.

e. *Truck, Tank, Fuel Servicing (FS), M49A2C (Fig. 2-5).* The M49-series truck is designed to transport and distribute liquid fuels and is equipped with a power-driven pump.



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Figure 2-4. Truck, dump, 2 1/2-ton, 6x6, M342A2.

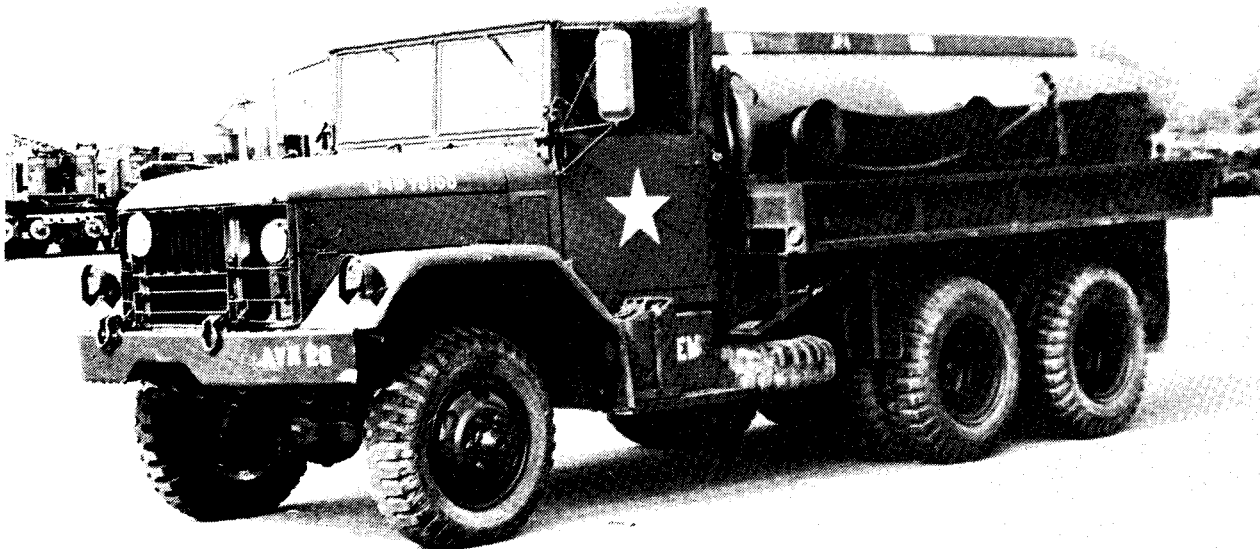


Figure 2-5. Truck, tank, FS, 2 1/2-ton, 6x6, M49A2C.

f. *Truck, Tank, Water, M50 (Fig 2-6).* The M50-series truck is designed to transport and distribute water for various purposes.

g. *Truck, Tractor, M48 (Fig 2-7).* The M48 truck is designed to tow tank, stake, van, and flatbed semitrailers.

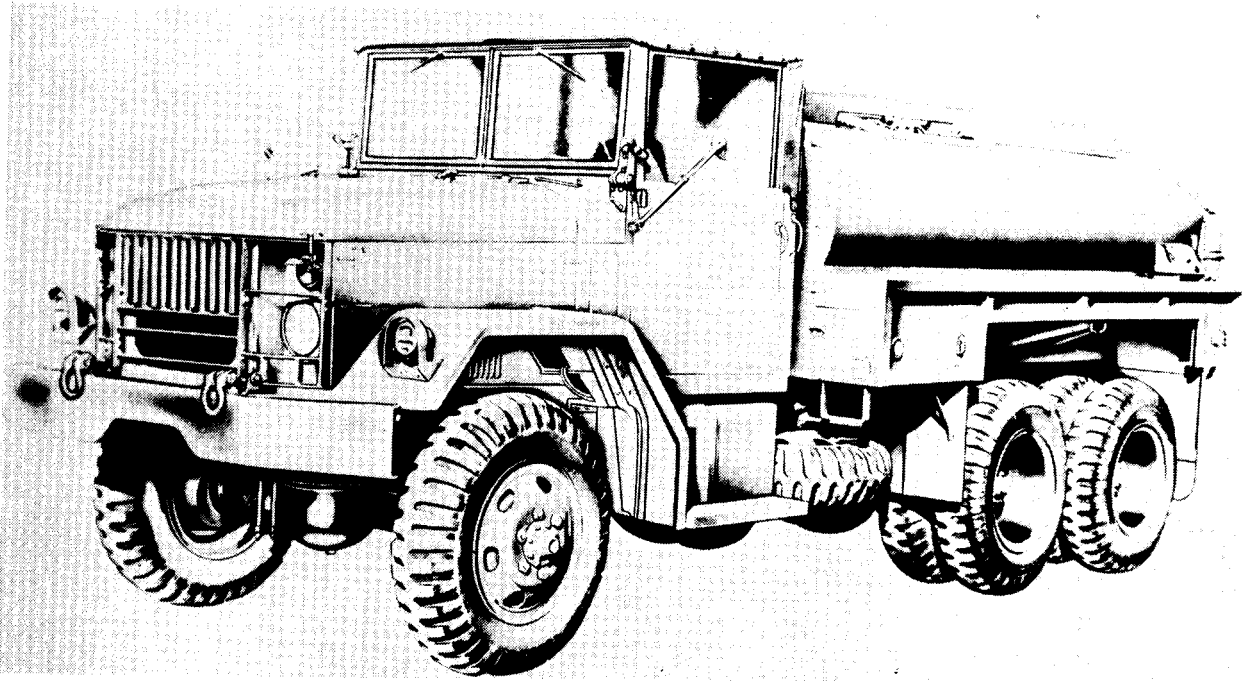


Figure 2-6. Truck, tank, water, 2 1/2-ton, 6x6, M50.

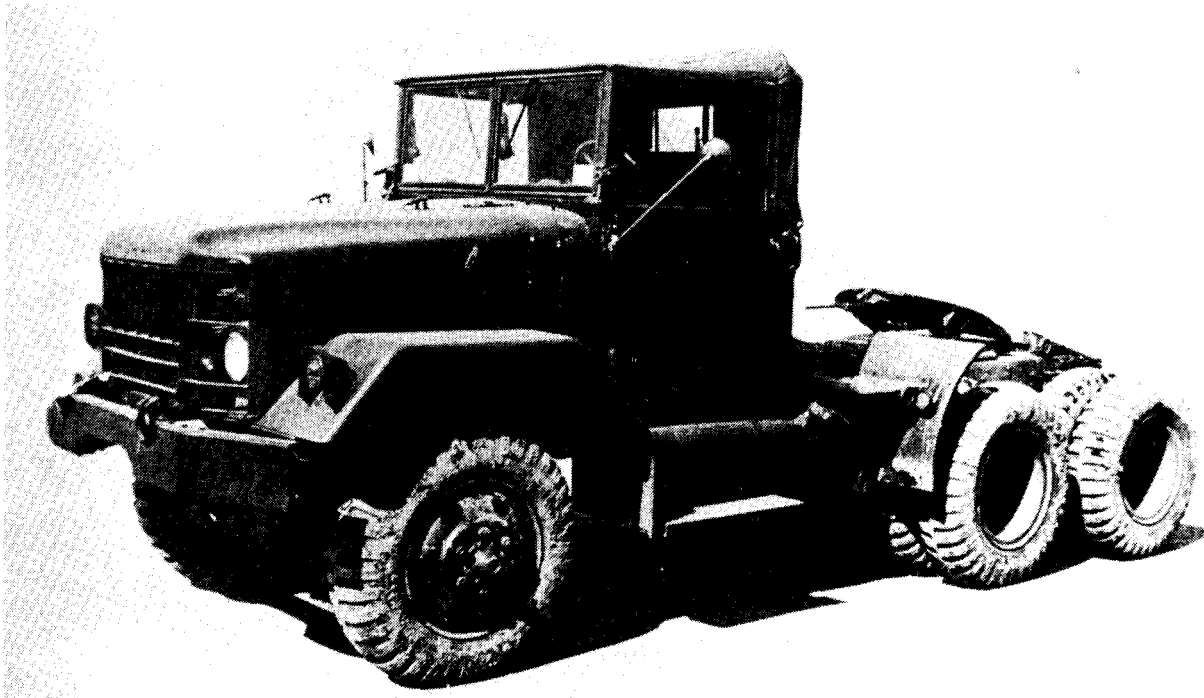


Figure 2-7. Truck, tractor, 2 1/2-ton, 6x6, M48.

h. *Truck, Tractor, M275 (Fig 2-8).* The M275-series truck is designed to tow tank, stake, van, and flatbed semitrailers.

The M292-series truck is designed to house and transport various bulky items of technical equipment.

i. *Truck, Van, Expansible, M292 (Fig 2-9).*

j. *Truck, Van, Shop, M109 (Fig 2-10).* The

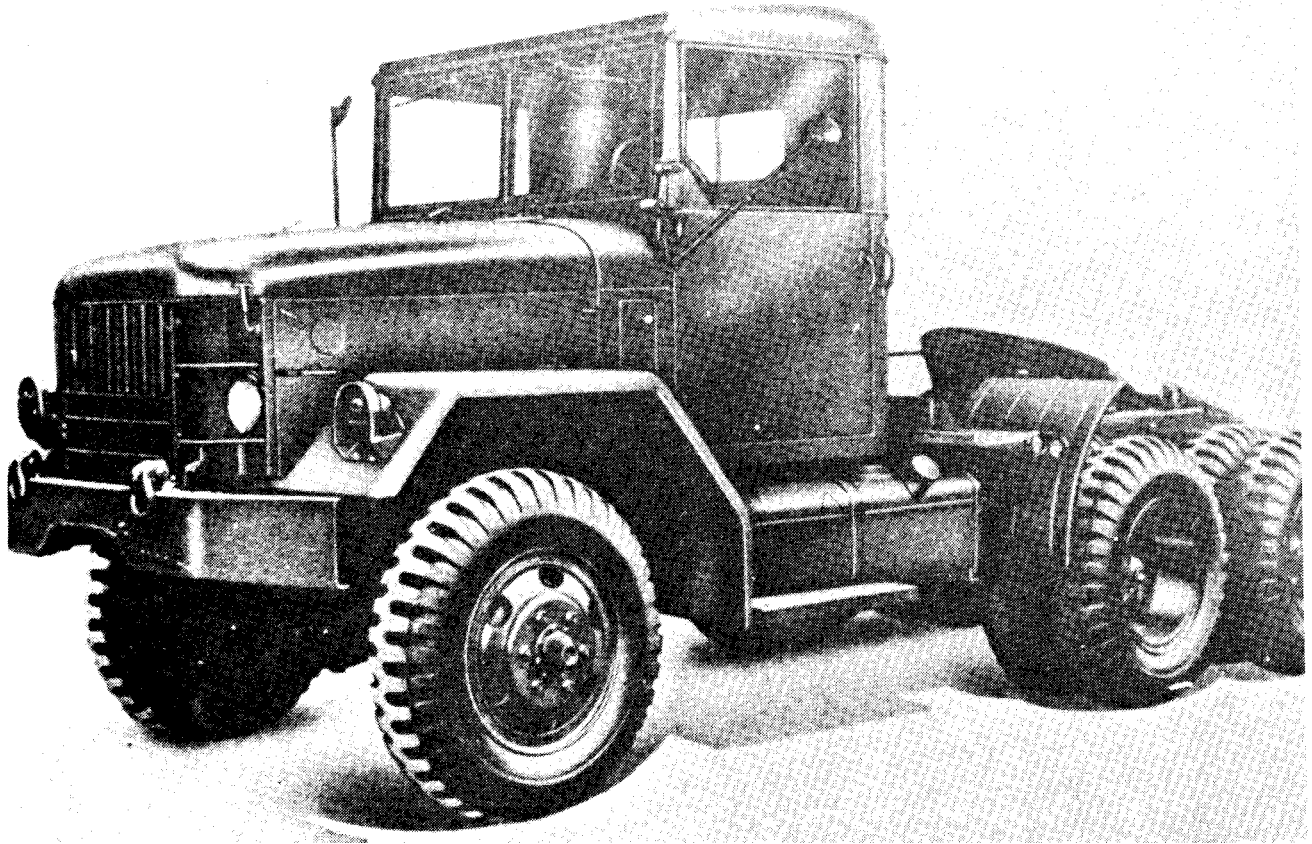


Figure 2-8. Truck, tractor, 2 1/2-ton, 6x6, M275.



Figure 2-9. Truck, van, expandable, 2 1/2-ton, 6x6, M292.

M109-series truck is designed as an all-purpose mobile workshop for maintenance and repair serv-

ices.

k. *Truck, Wrecker, M60 (Fig 2-11).* The M60



Figure 2-10. Truck, van, shop, 2 1/2-ton, 6x6, M109.

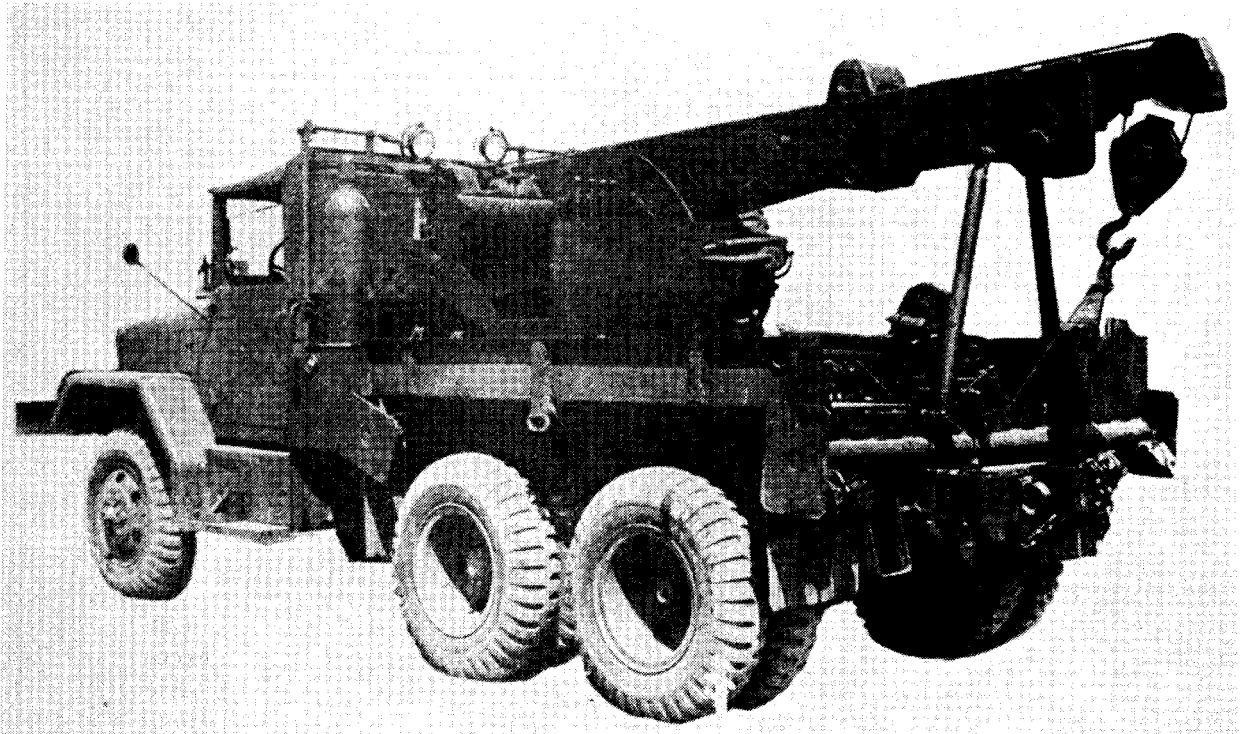
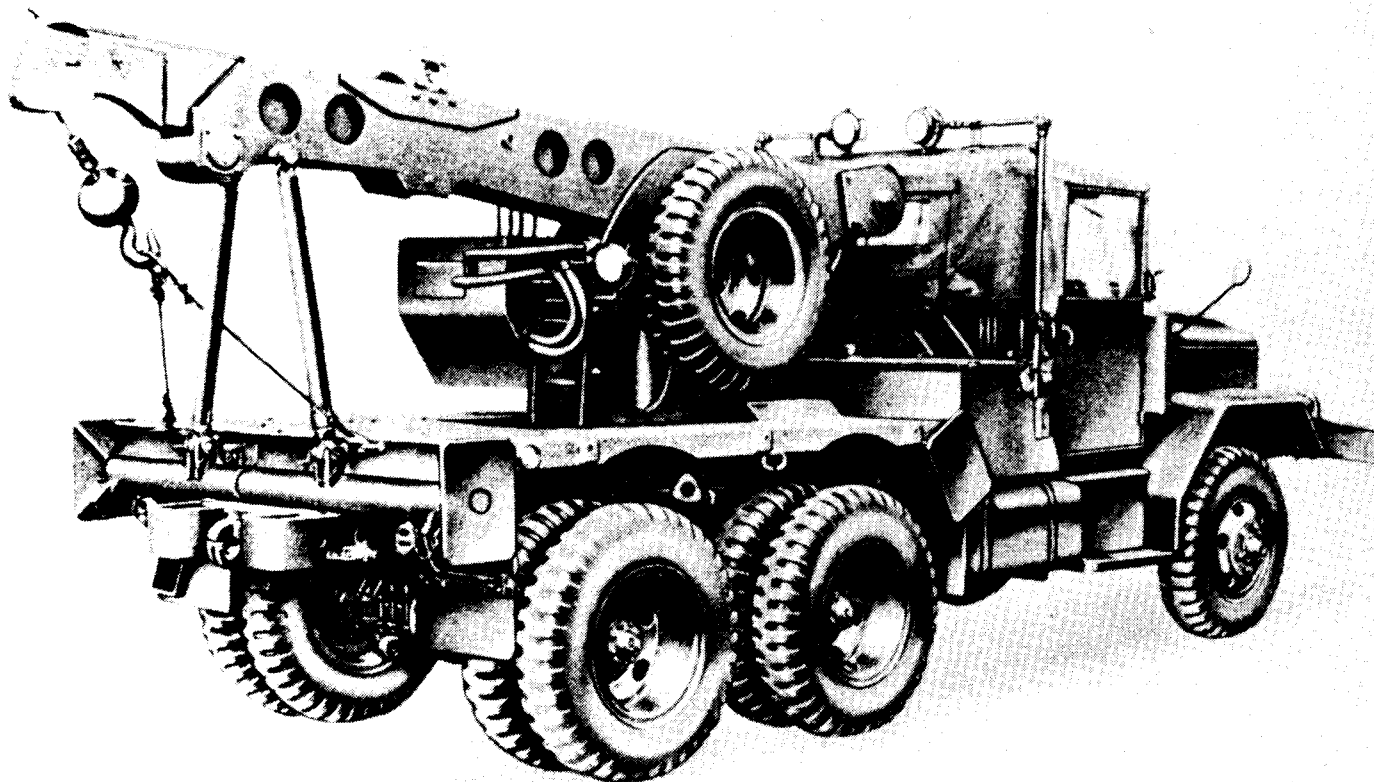


Figure 2-11. Truck, wrecker, 2 1/2-ton, 6X6, M60.

truck is designed to tow, salvage, and recover vehicles and equipment.

1. *Truck, Wrecker, M108 (Fig 2-12). The*

M 108 truck is designed to tow, salvage, and recover vehicles and equipment.



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Figure 2-12. Truck, wrecker, 2 1/2-ton, 6x6, M108.

Section II. CHARACTERISTICS AND RELATED DATA

2-3. General

Truck characteristics contained in table 2-1 are applicable to model number or National Stock Number (NSN) shown. Changes in model number or NSN may affect the loadability of the trucks as related to the guidance shown in this manual. Data are based on empty trucks unless otherwise noted.

2-4. Side and Rear Elevation Drawings

This chapter provides drawings (fig 2-13 through 2-36) that are necessary for determining the load ability of the vehicles for movement by various

transportation modes.

2-5. Descriptions

Transportation economies can be obtained by reducing each vehicle to its minimum dimensions for transport by ship. Removable items such as bows, tarpaulins, and exhaust pipe extensions should be stowed within the confines of the vehicle cargo compartment. Cargo transported in the vehicle should not exceed the minimum dimensions or weight limitation of the vehicle. Examples of dimensional reductions for the 2 1/2-ton trucks are found in table 2-2.

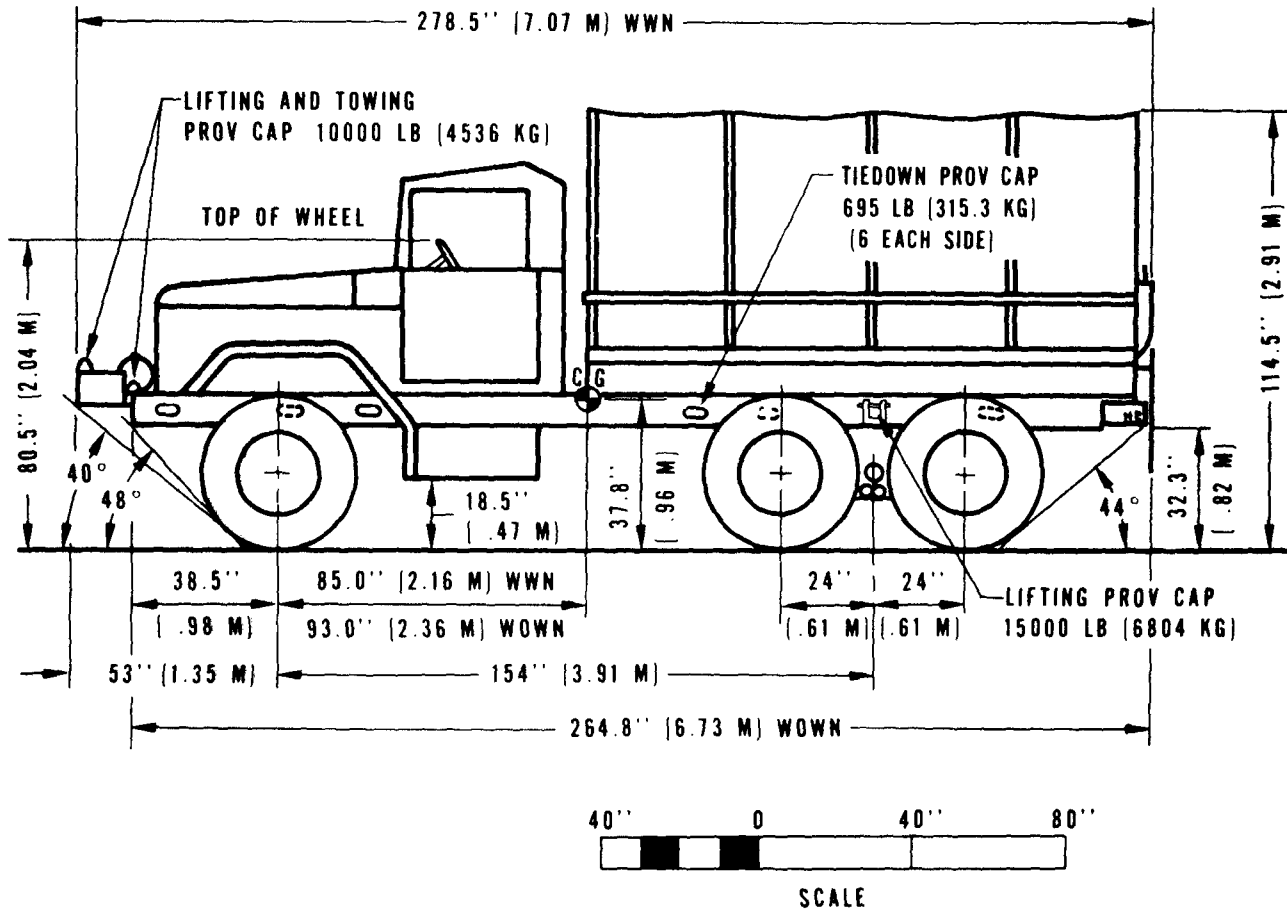


Figure 2-13. Side elevation, truck, cargo, WWN and WOWN, M35A2.

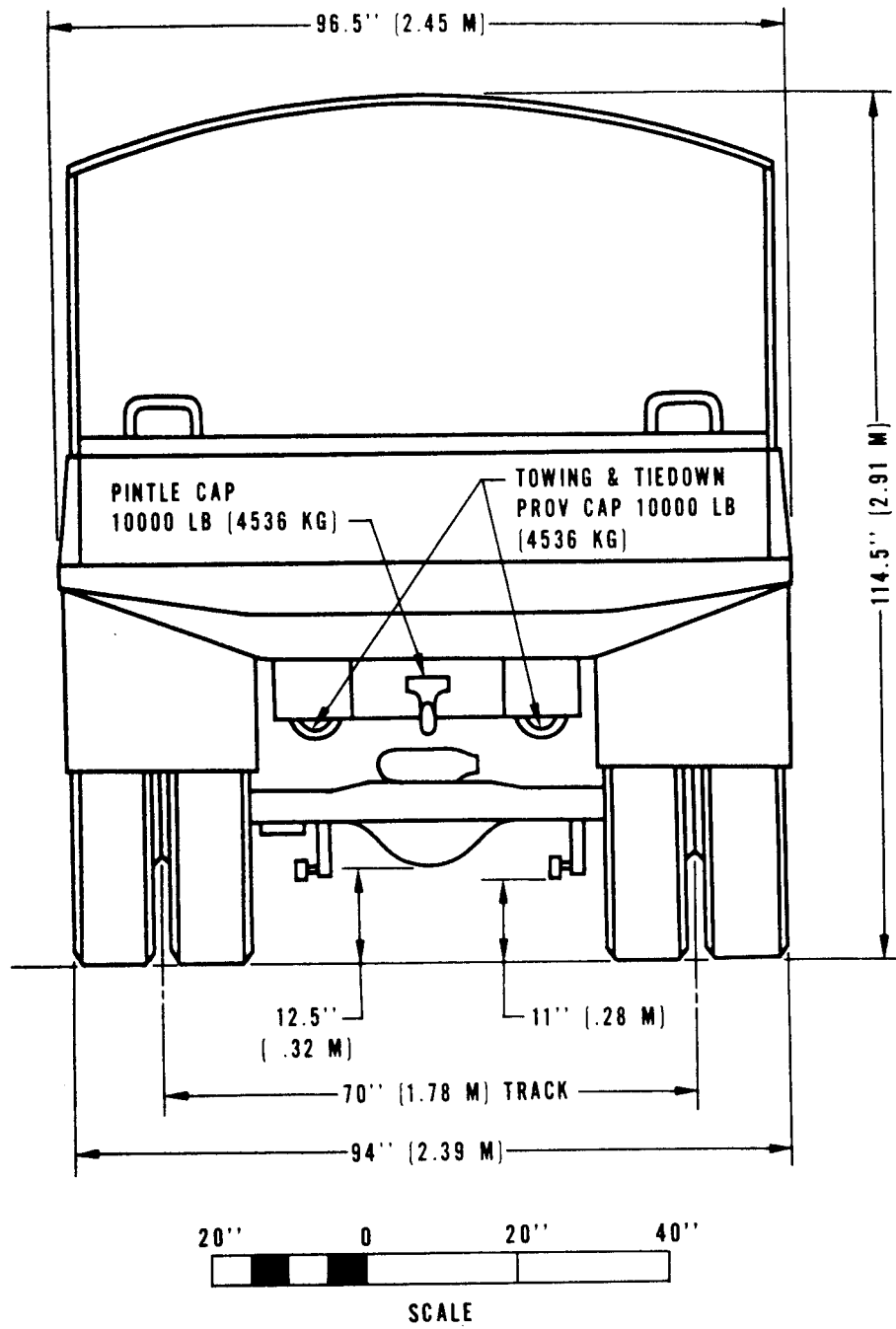


Figure 2-14. Rear elevation, truck, cargo, M35A2.

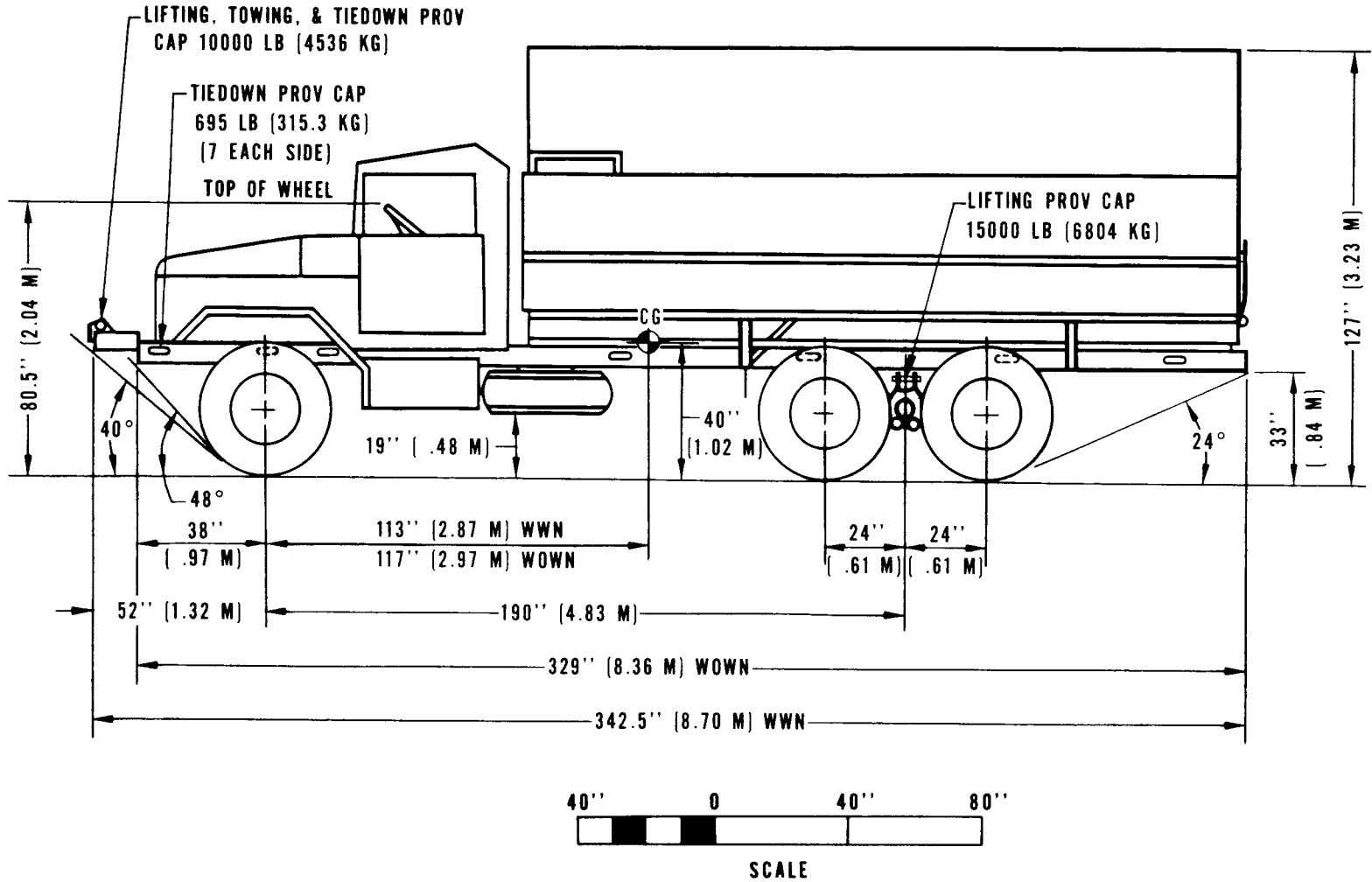


Figure 2-15. Side elevation, truck, cargo, WWN and WOWN, M36A2.

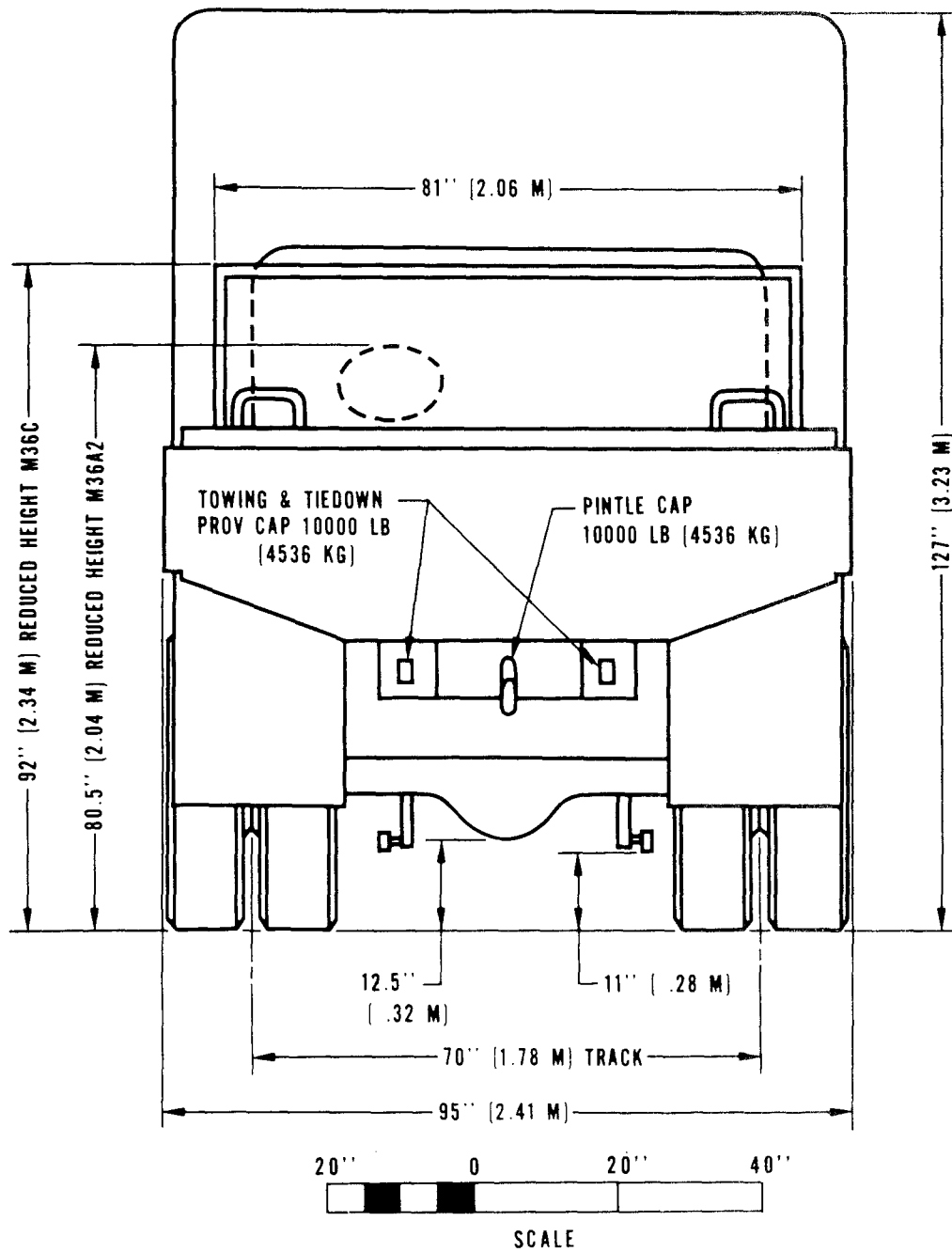


Figure 2-16. Rear elevation, truck, cargo, M36A2.

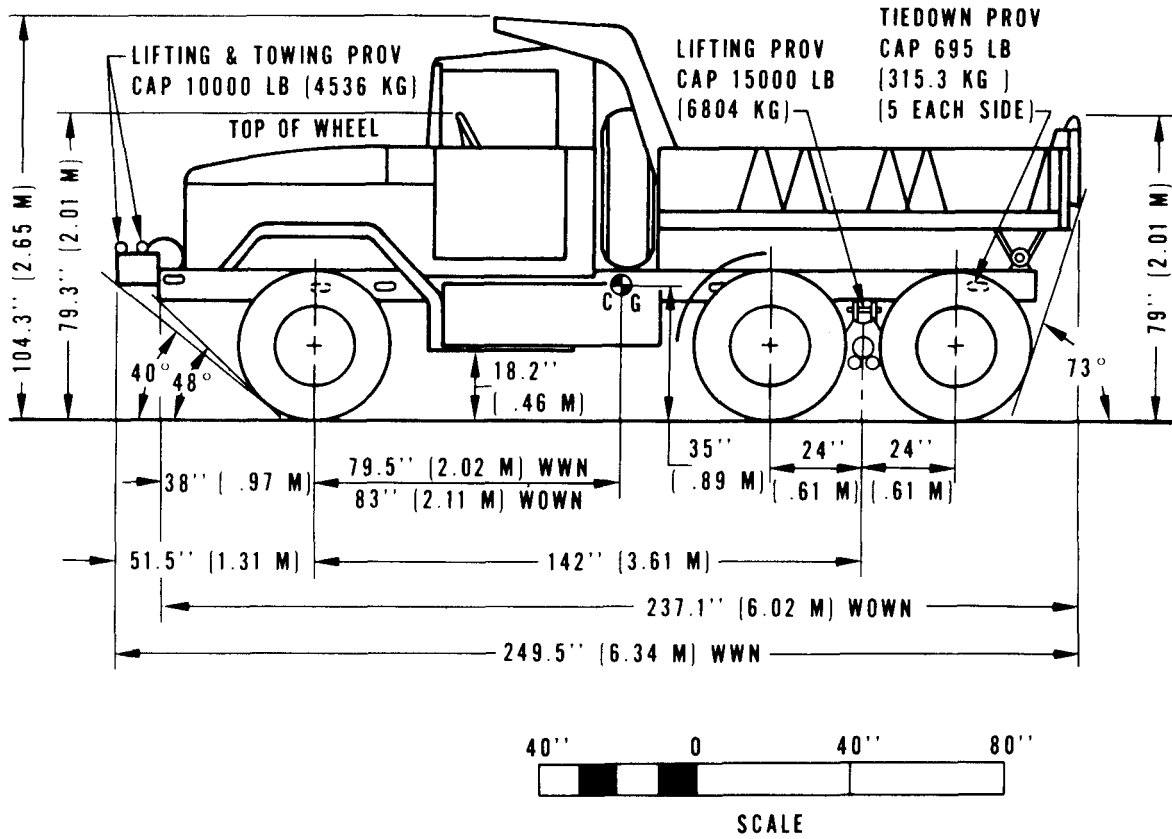


Figure 2-17. Side elevation, truck, dump, WWN and WOWN, M59.

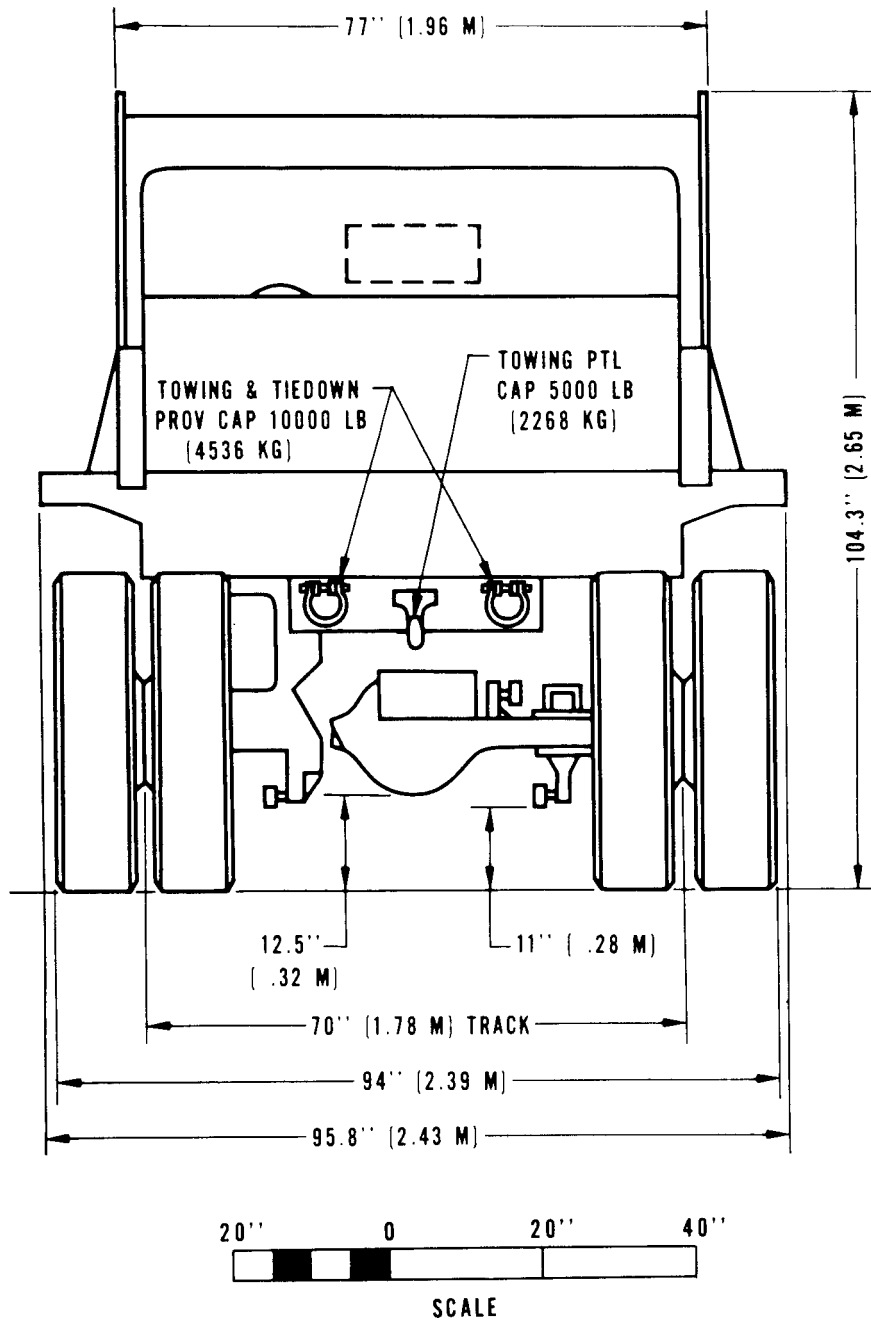


Figure 2-18. Rear elevation, truck, dump, M59.

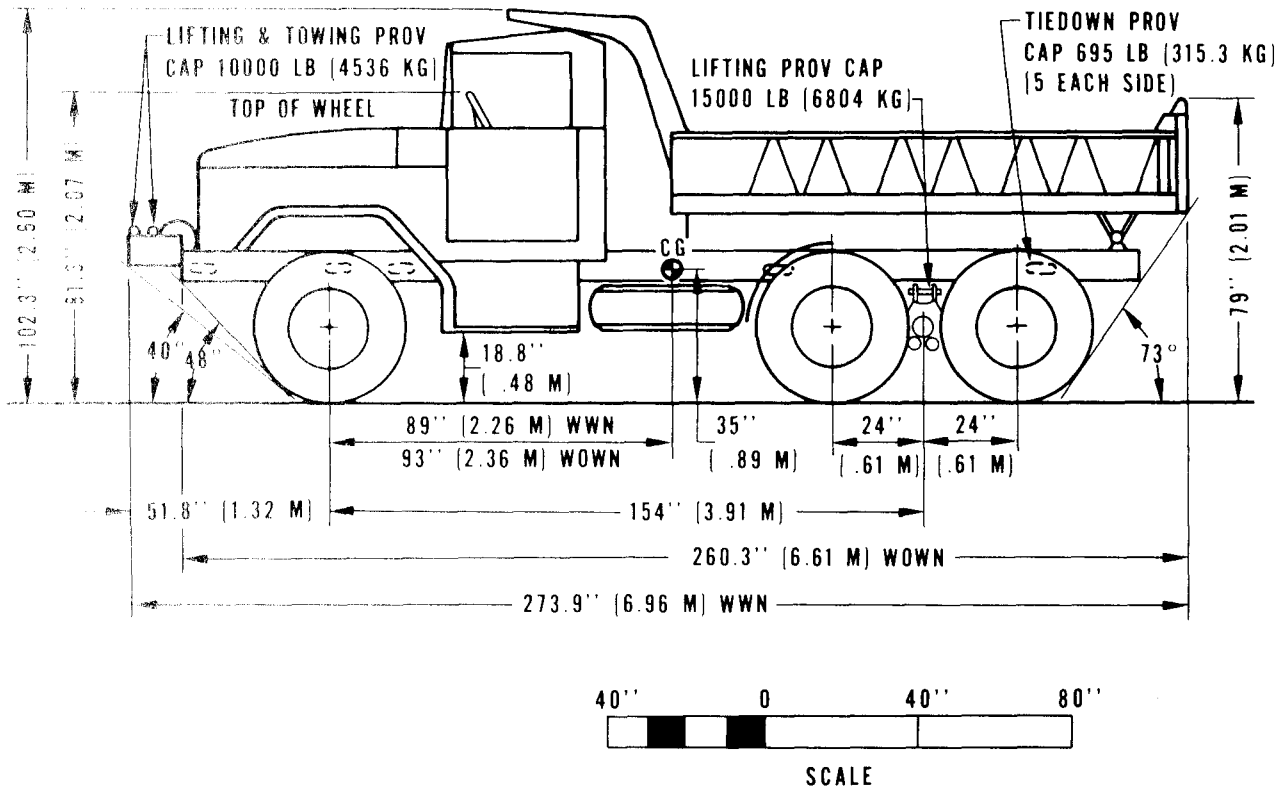


Figure 2-19. Side elevation, truck, dump, WWN and WOWN, M342A2.

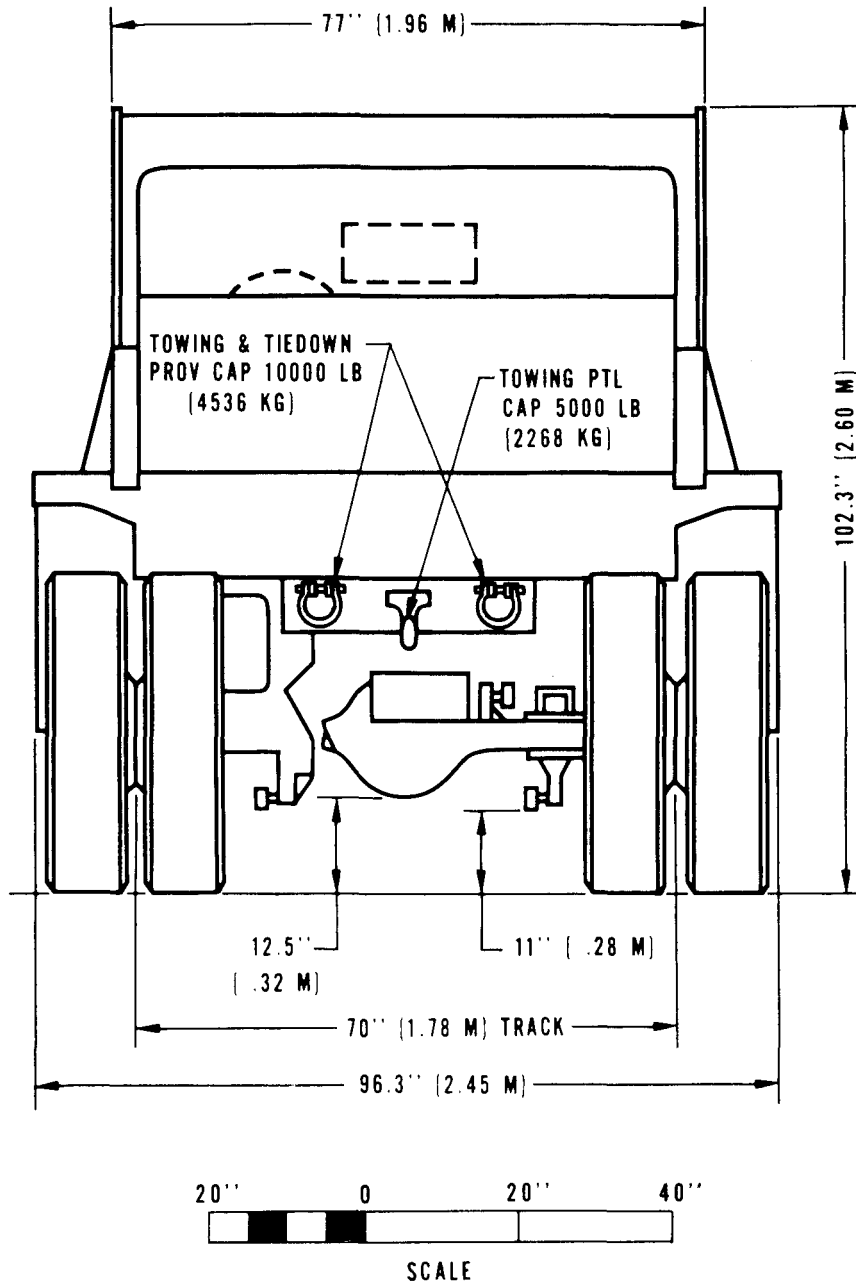


Figure 2-20. Rear elevation, truck, dump, M342A2.

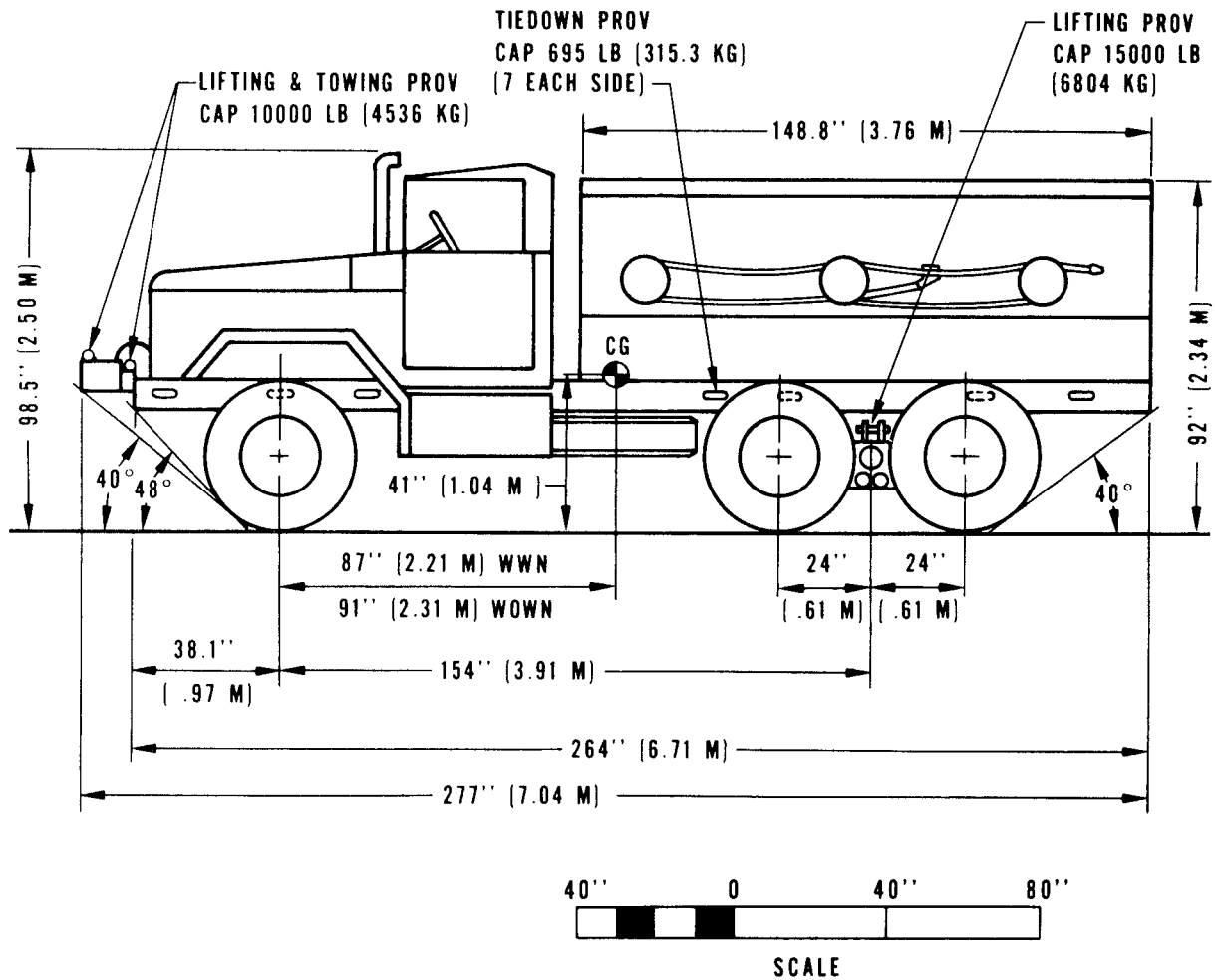


Figure 2-21. Side elevation, truck, tank, FS, WWN and WOWN, M49A2C.

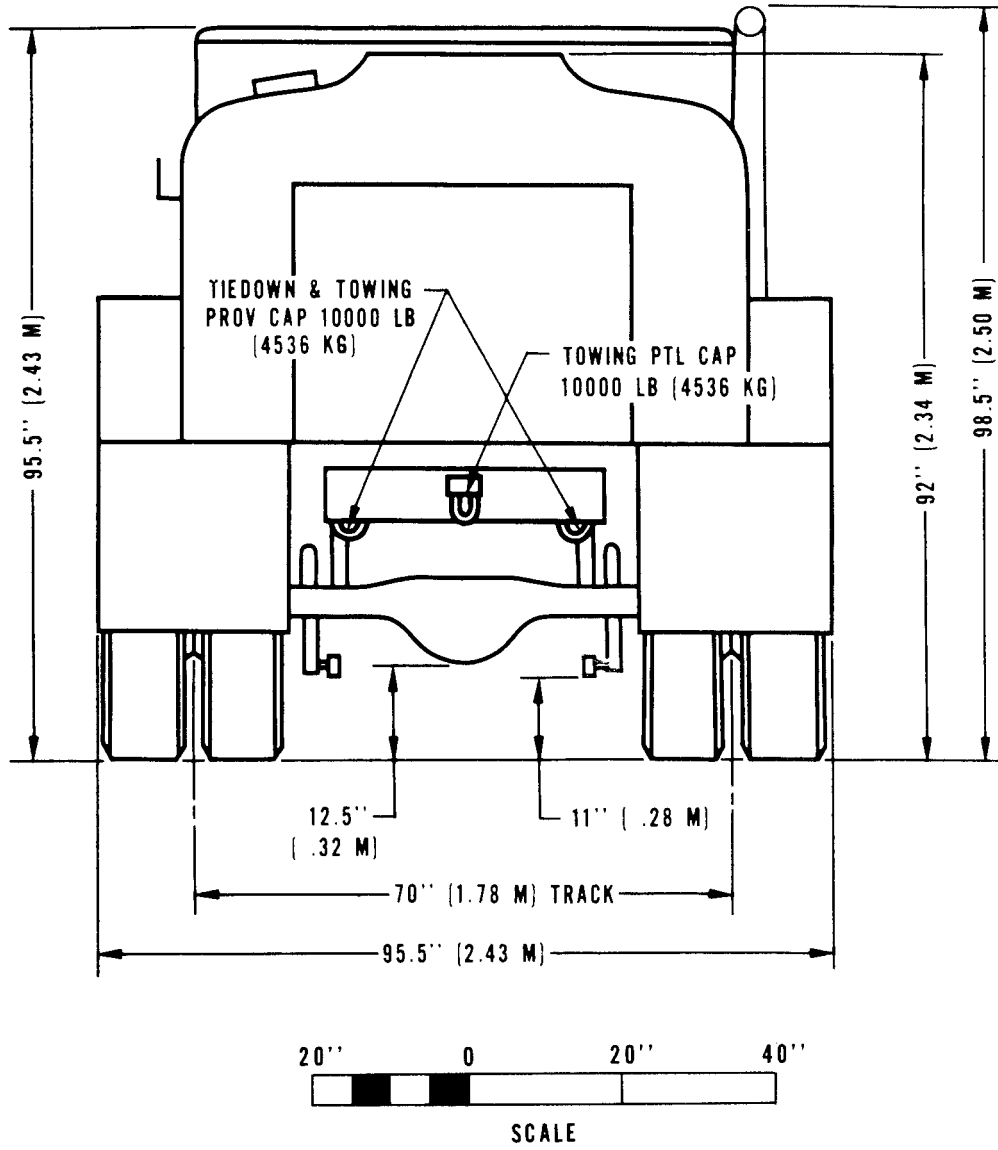


Figure 2-22. Rear elevation, truck, tank, FS. M49A2C.

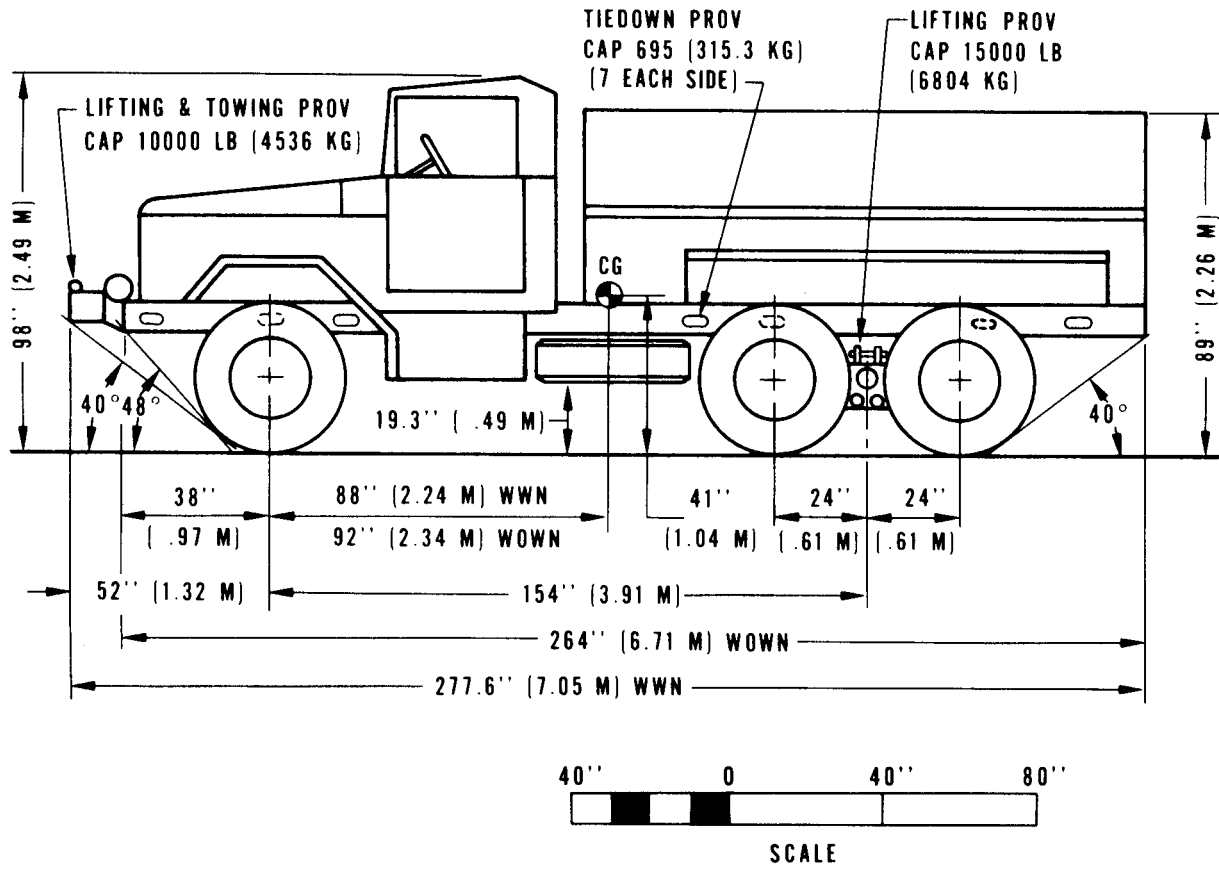


Figure 2-23. Side elevation, truck, tank, water, WWN and WOWN, M50A2.

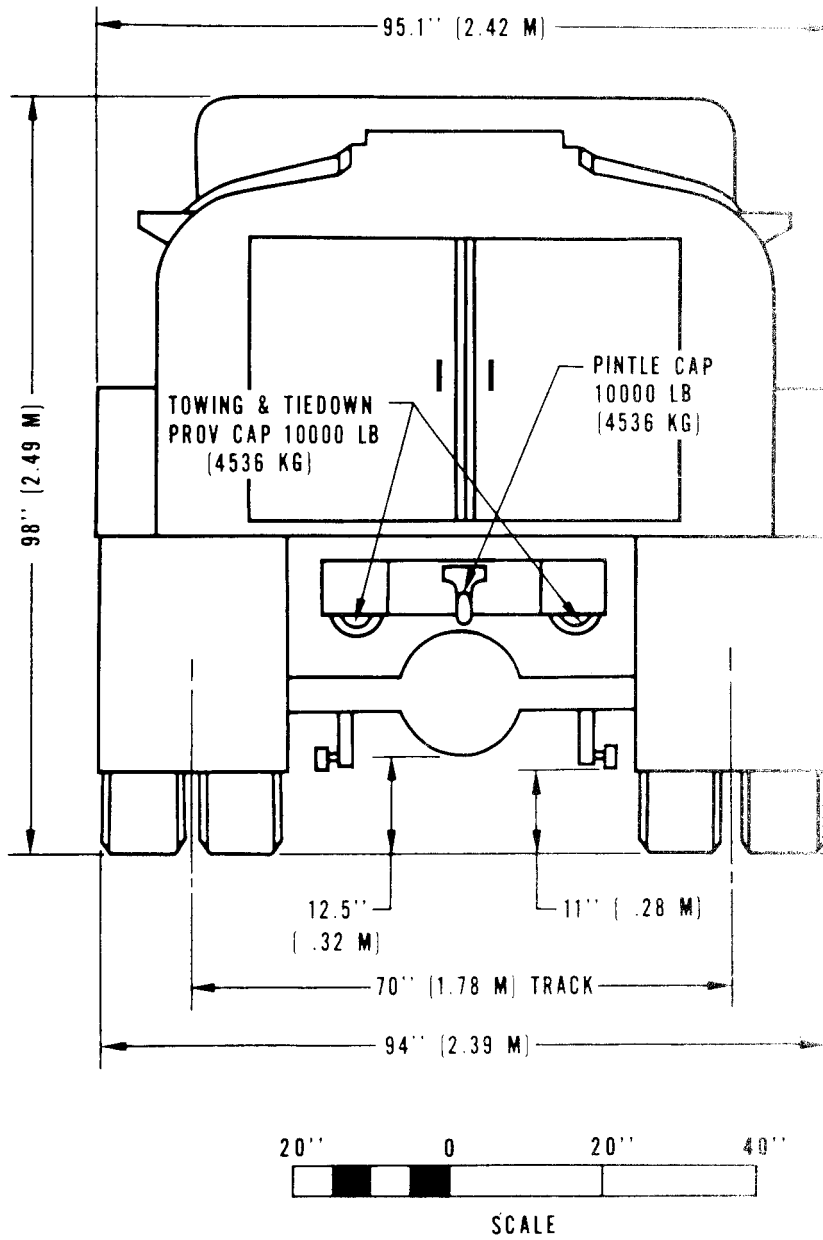


Figure 2-24. Rear elevation, truck, tank, water, M50A2.

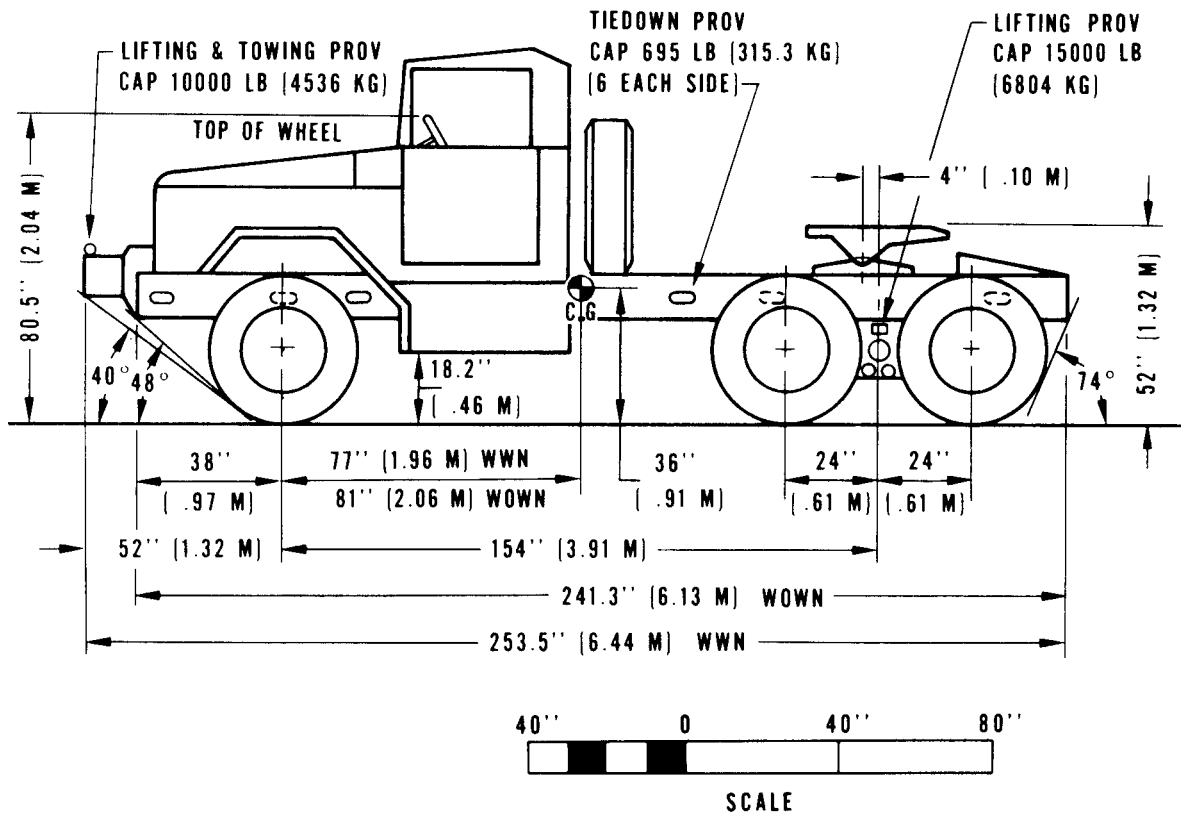


Figure 2-25. Side elevation, truck, tractor, WWN and WOWN, M48.

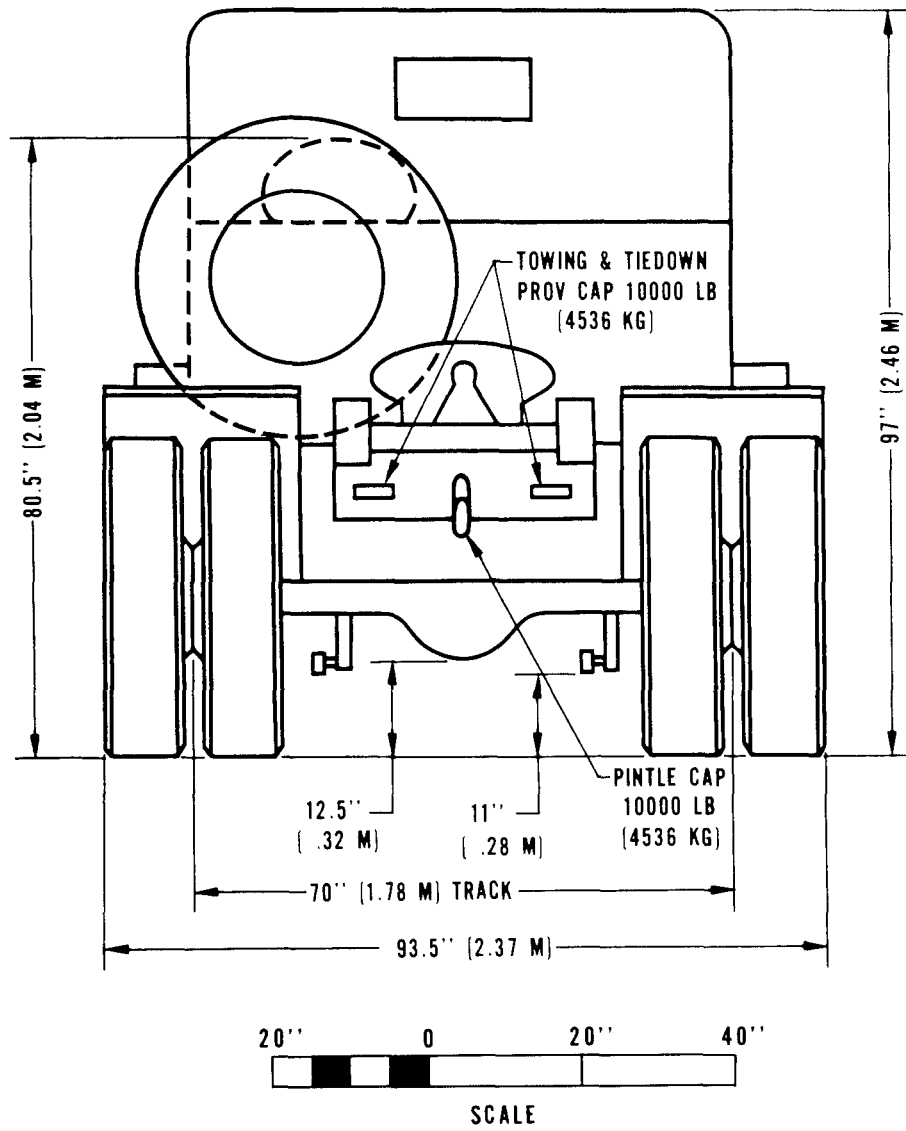


Figure 2-26. Rear elevation, truck, tractor, M48.

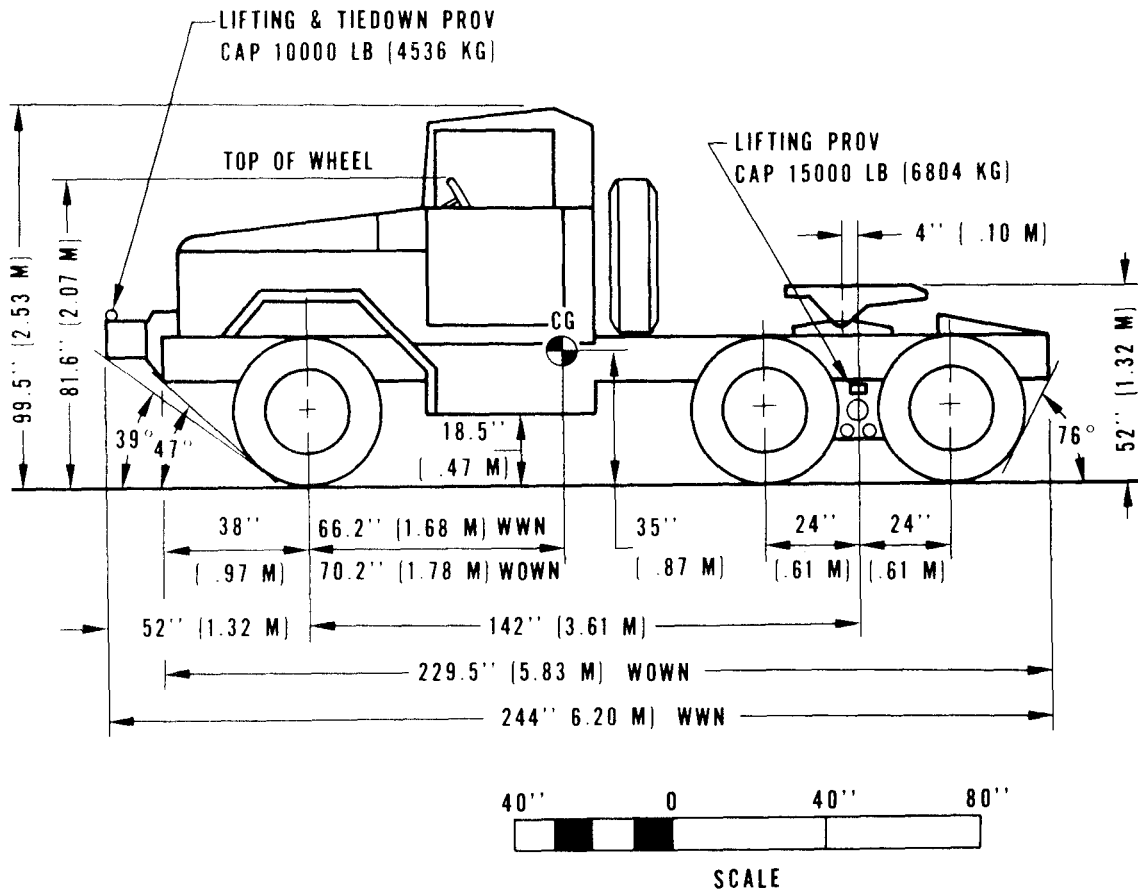


Figure 2-27. Side elevation, truck, tractor, WWN, and WOWN, M275A2.

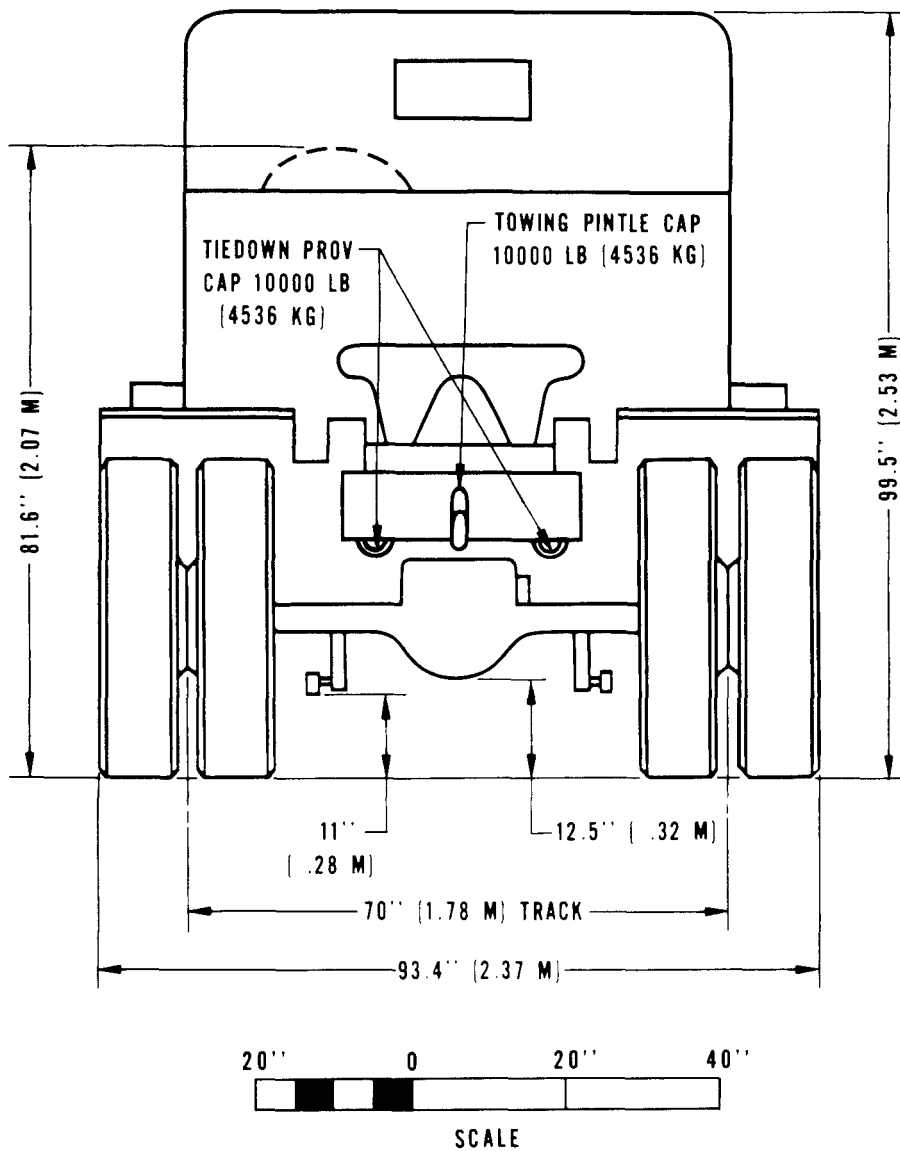


Figure 2-28. Rear elevation, truck, tractor, M275A2.

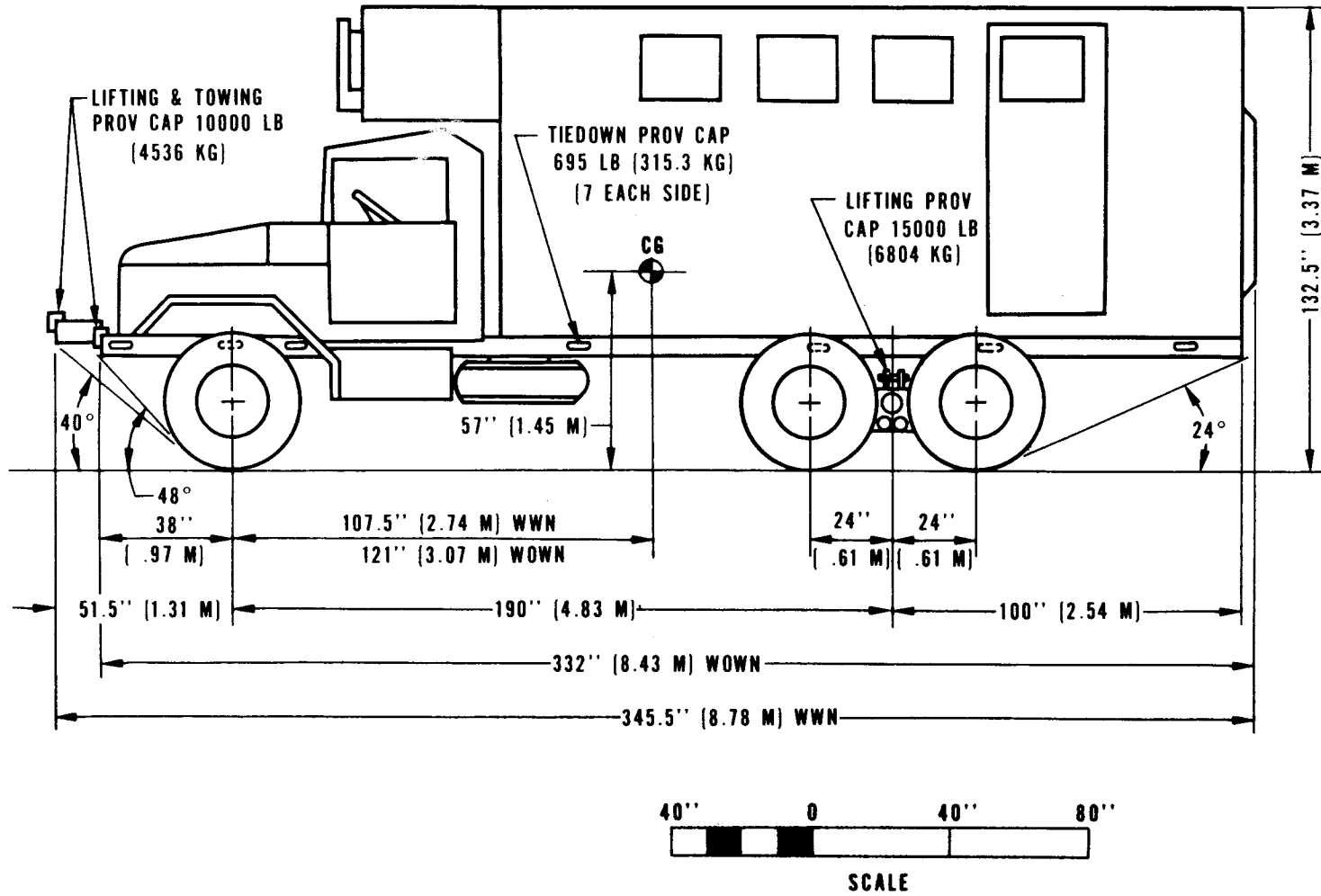


Figure 2-29. Side elevation, truck, van, expansible, WWN and WOWN, M292A2.

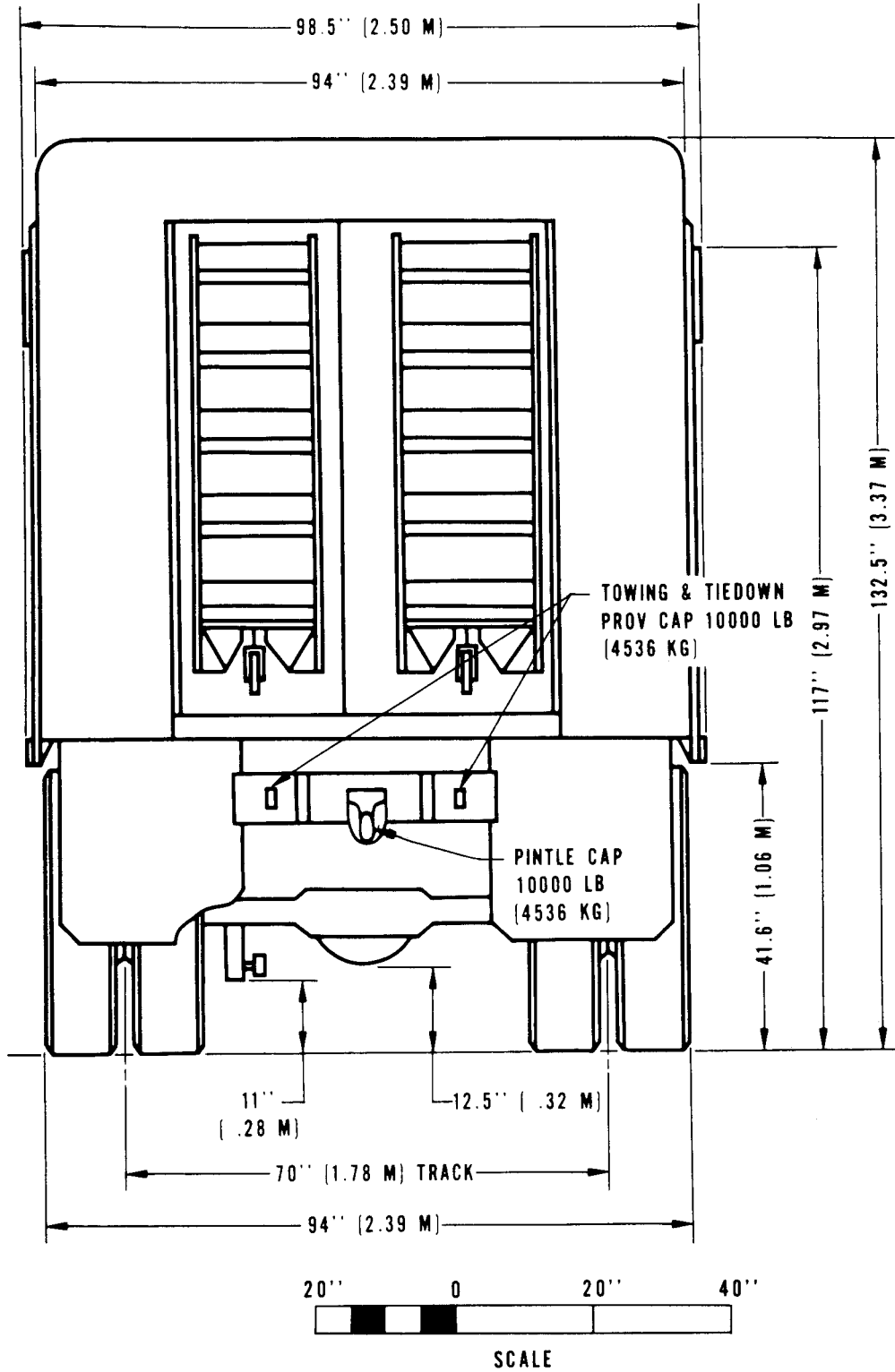


Figure 2-30. Rear elevation, truck, van, expansible, M292A2.

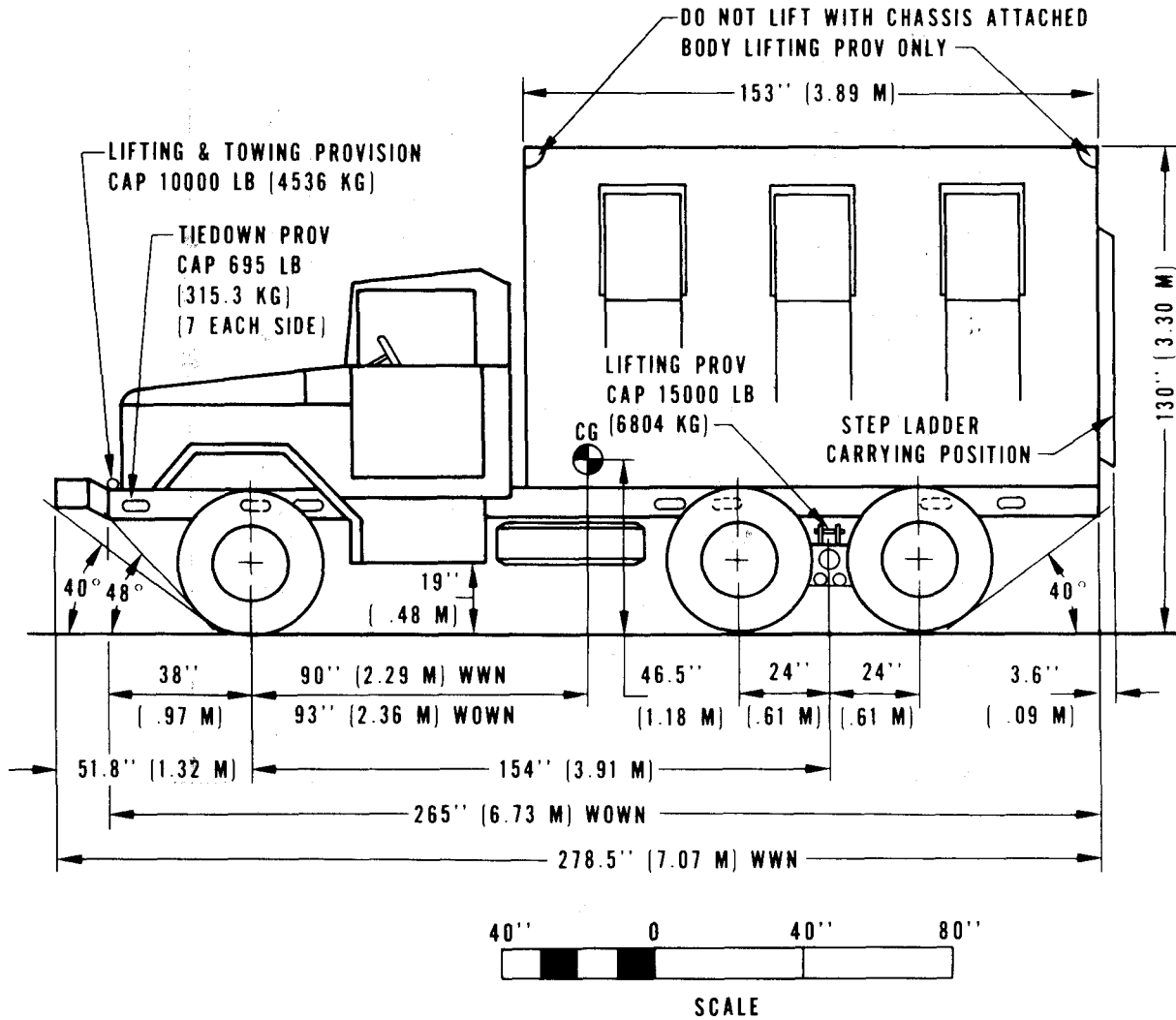


Figure 2-31. Side elevation, truck, van, shop, WWN and WOWN, M109A3.

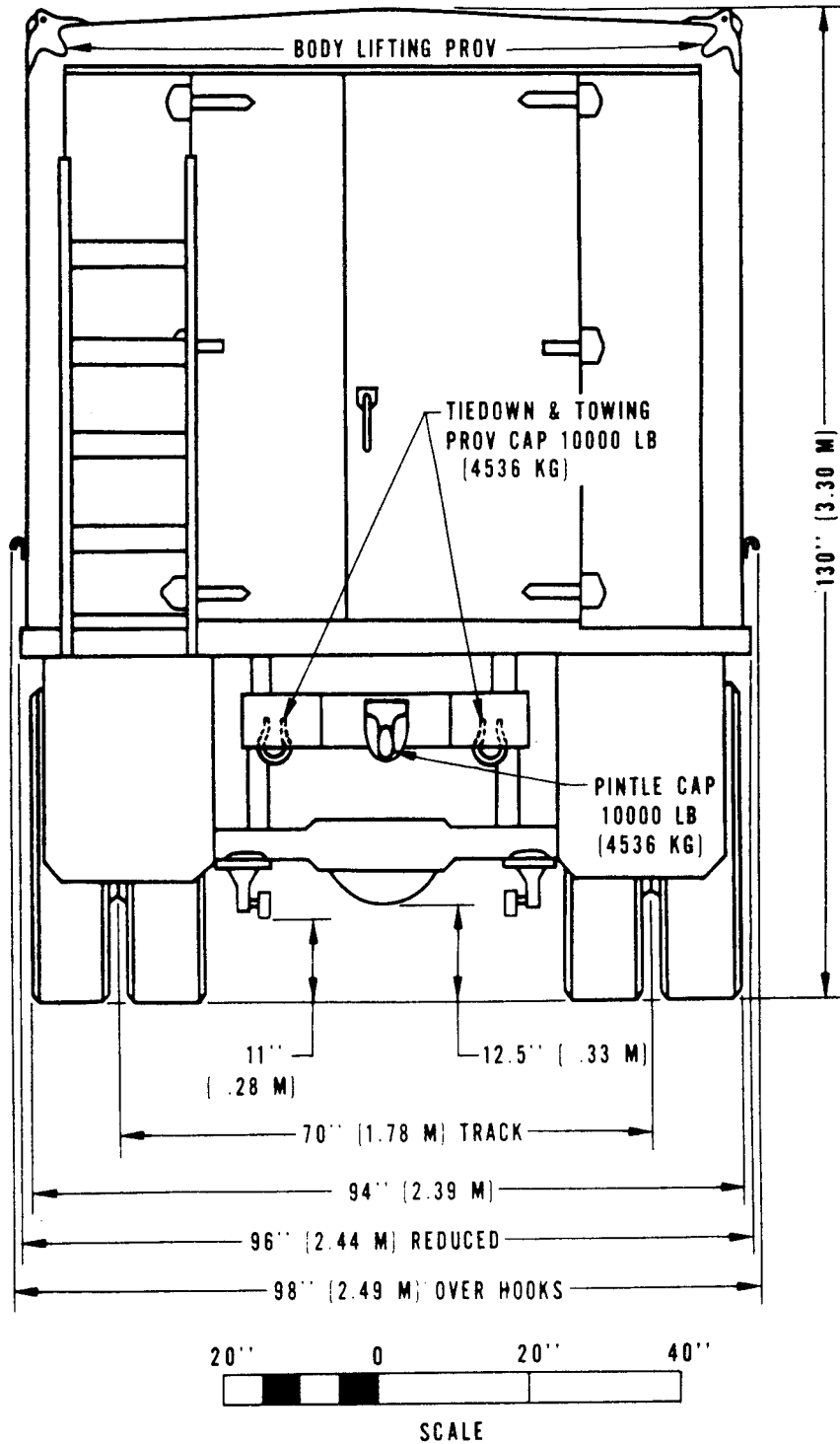


Figure 2-32. Rear elevation, truck, van, shop, M109A3.

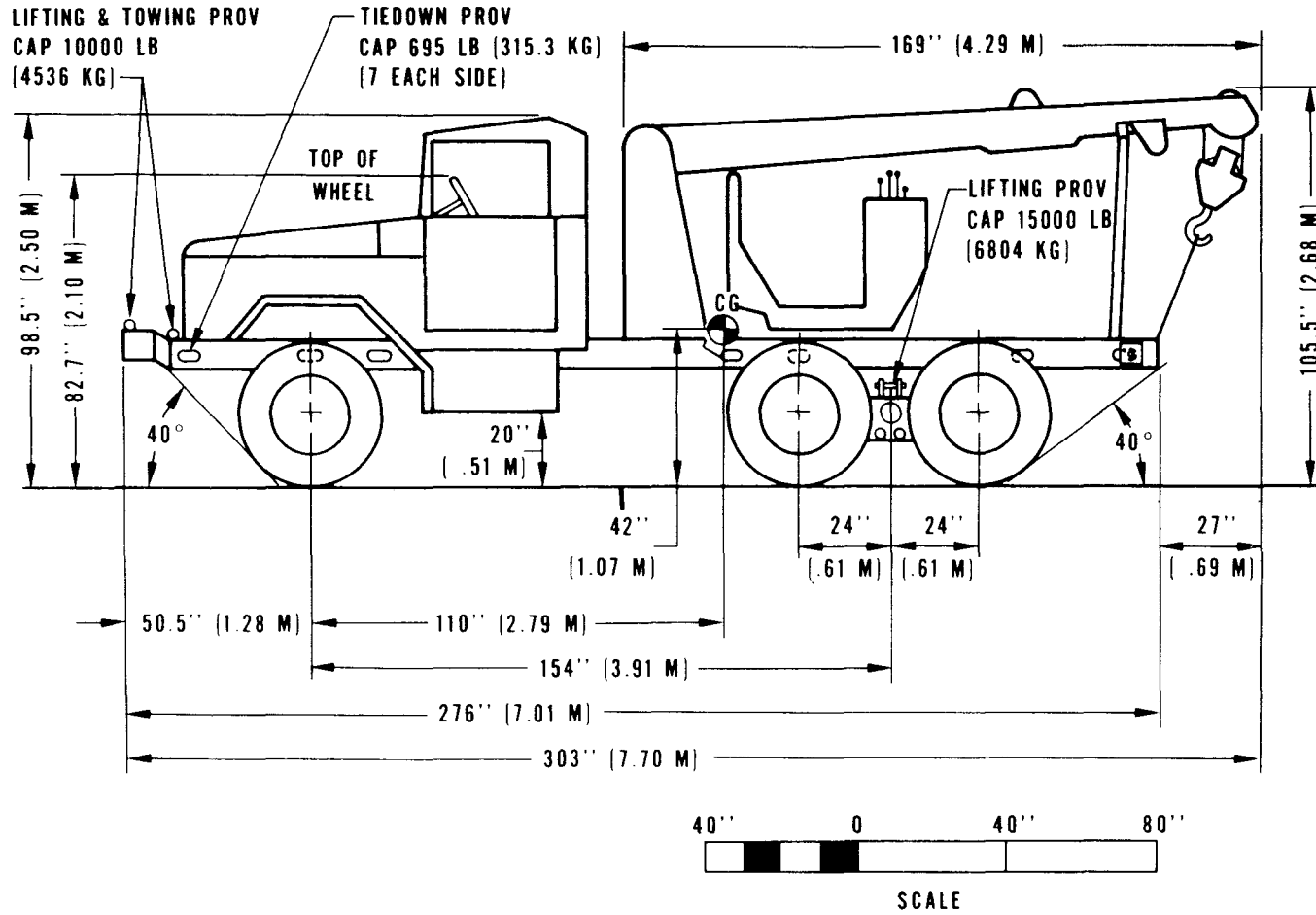


Figure 2-33. Side elevation, truck, wrecker, WWN, M60.

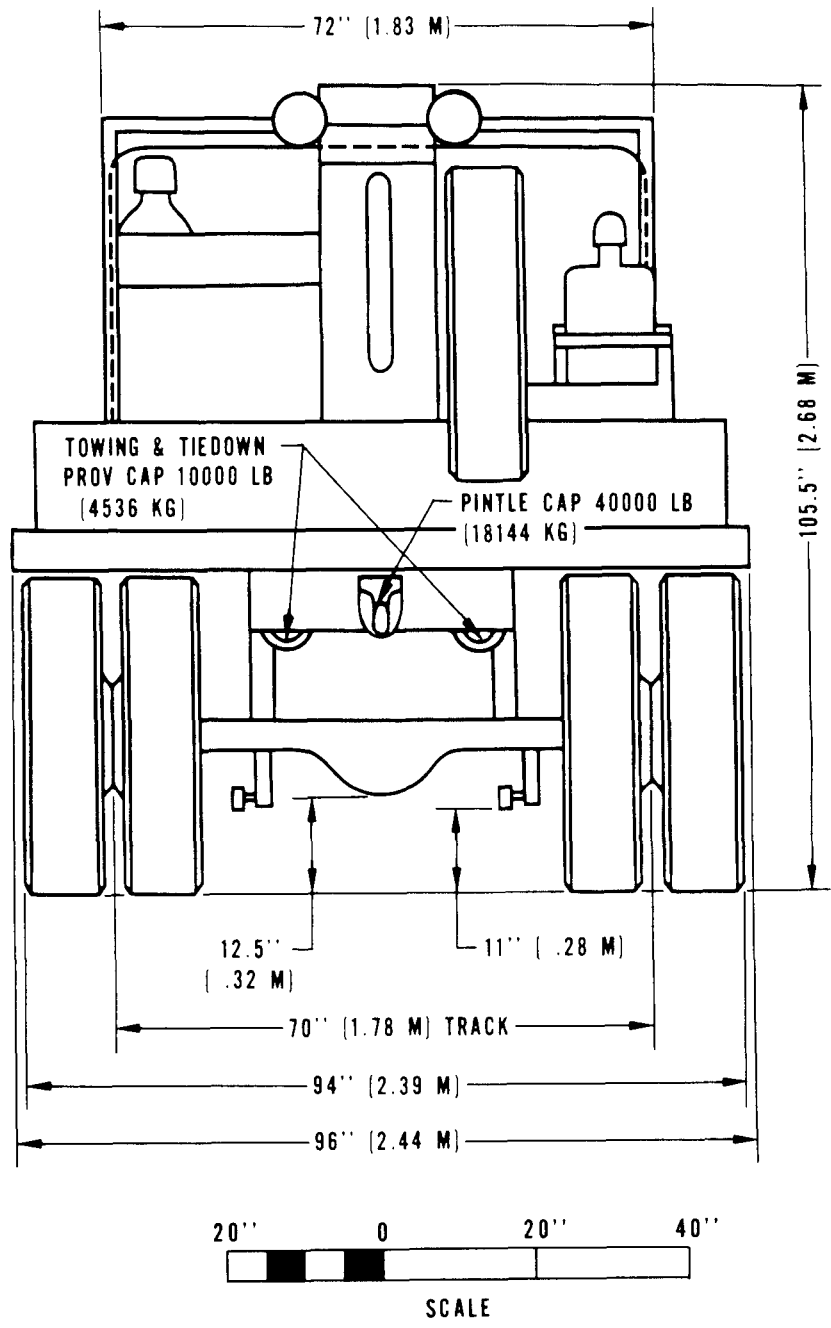


Figure 2-34. Rear elevation, truck, wrecker, M60.

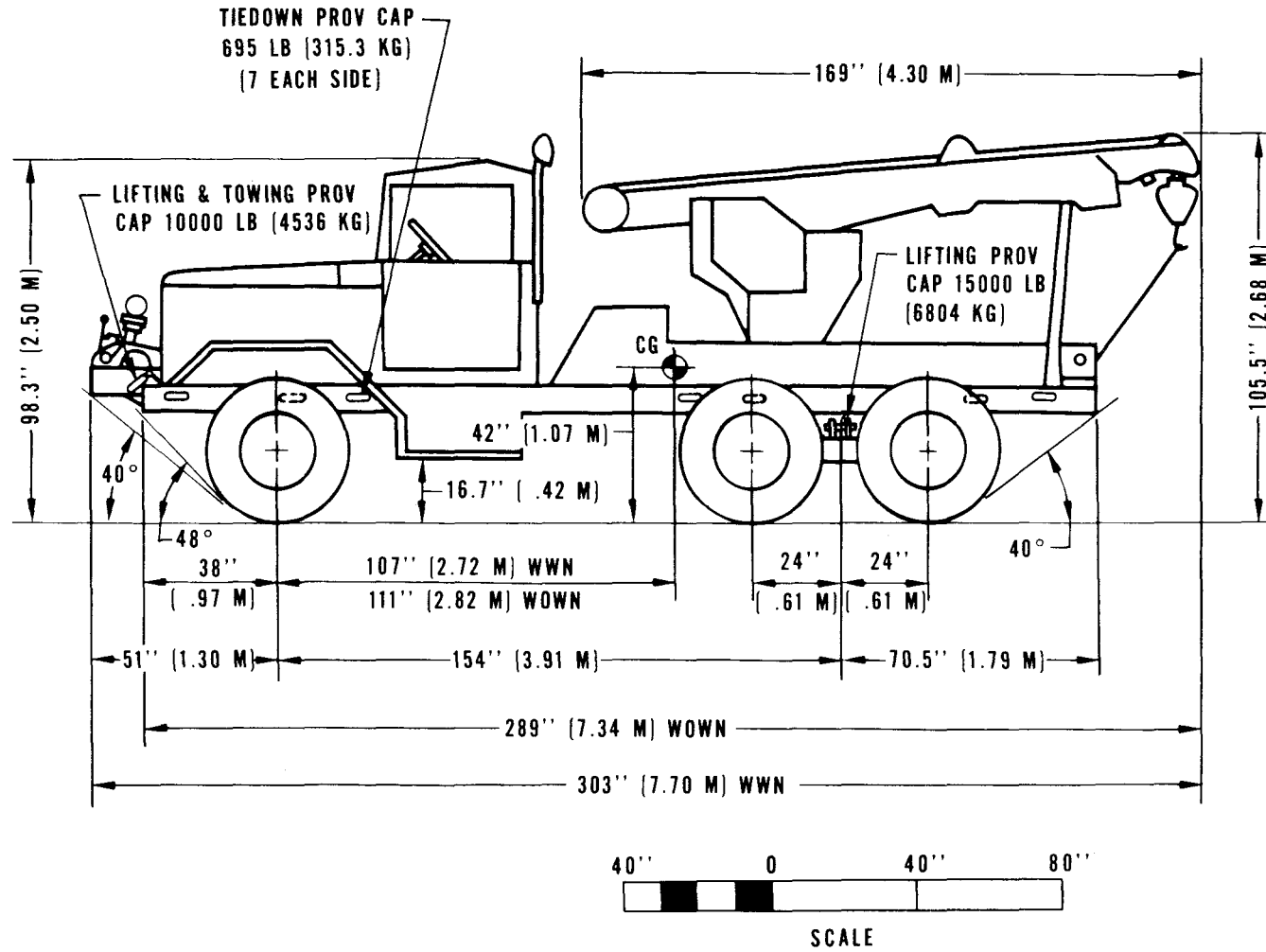


Figure 2-35. Side elevation, truck, wrecker, WWN and WOWN, M108.

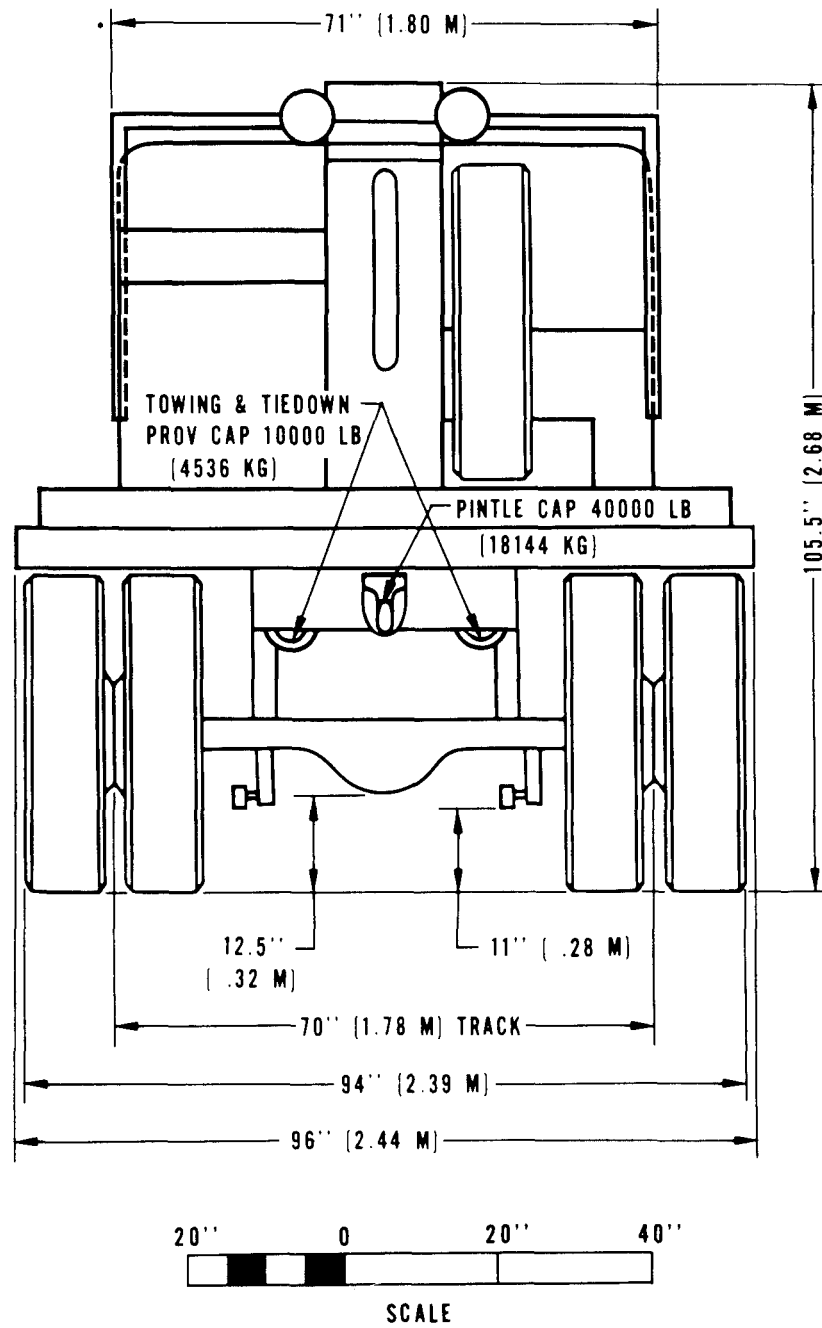


Figure 2-36. Rear elevation, truck, wrecker, M108.

Table 2-1. Characteristics and Related Data

Nomenclature (2 1/2-Ton, 6x6)		TOE LIN	NSN (2320)	Weight, lb (kg)	Volume, cu ft (cu m)		Reduced Dimensions, in (M)				
					Operational	Reduced	Length	Width	Height		
Truck, Cargo											
M35	WWN	X40146	00-835-8464	13,200 (5,988)	1,749.7 (49.52)	1,252.0 (35.43)	278.5 (7.07)	96.5 (2.45)	80.5 (2.04)		
	WOWN	X40009	00-835-8463	12,580 (5,706)	1,663.6 (47.08)	1,190.4 (33.69)	264.8 (6.73)	96.5 (2.45)	80.5 (2.04)		
Truck, Cargo											
M35A1	WWN	X40146	00-542-5634	13,680 (6,205)	1,769.9 (50.09)	1,259.8 (35.65)	278.5 (7.07)	96.5 (2.45)	81.0 (2.06)		
	WOWN	X40009	00-542-5633	13,380 (6,069)	1,682.8 (47.62)	1,197.8 (33.90)	264.8 (6.73)	96.5 (2.45)	81.0 (2.06)		
Truck, Cargo*											
M35A2	WWN	X40146	00-077-1617	13,700 (6,214)	1,780.8 (50.40)	1,264.4 (35.78)	278.5 (7.07)	96.5 (2.45)	81.3 (2.07)		
	WOWN	X40009	00-077-1616	13,060 (5,924)	1,693.2 (47.92)	1,202.2 (34.02)	264.8 (6.93)	96.5 (2.45)	81.3 (2.07)		
Truck, Cargo											
M35A2C	WWN	X40214	00-926-0875	13,700 (6,214)	1,780.8 (50.40)	1,264.4 (35.78)	278.5 (7.07)	96.5 (2.45)	81.3 (2.07)		
	WOWN	X40077	00-926-0873	13,070 (5,929)	1,693.2 (47.92)	1,202.2 (34.02)	264.8 (6.93)	96.5 (2.45)	81.3 (2.07)		
Truck, Cargo											
M36	WWN	X40420	00-647-0505	14,640 (6,641)	2,391.4 (67.68)	1,515.8 (42.90)	342.5 (8.70)	95.0 (2.41)	80.5 (2.04)		
	WOWN	X40283	00-391-0569	14,230 (6,455)	2,297.1 (65.01)	1,456.0 (41.20)	329.0 (8.36)	95.0 (2.41)	80.5 (2.04)		
Truck, Cargo											
M36C	WWN	X40694	00-200-1369	15,440 (7,004)	2,241.0 (63.42)	1,748.7 (44.42)	342.5 (8.70)	95.9 (2.44)	92.0 (2.34)		
	WOWN	X40557	00-200-1368	13,500 (6,124)	1,944.5 (55.03)	1,656.0 (42.06)	324.0 (8.23)	96.0 (2.44)	92.0 (2.34)		
Truck, Cargo*											
M36A2	WWN	X40420	00-077-1619	15,110 (6,854)	2,391.4 (67.68)	1,515.8 (42.90)	342.5 (8.70)	95.0 (2.41)	80.5 (2.04)		
	WOWN	X40283	00-077-1618	14,760 (6,695)	2,297.1 (65.01)	1,456.0 (41.20)	329.0 (8.36)	95.0 (2.41)	80.5 (2.04)		
Truck, Dump*											
M59	WWN	X43434	00-835-8597	14,460 (6,559)	1,442.7 (40.83)	1,096.9 (31.04)	249.5 (6.34)	95.8 (2.43)	79.3 (2.01)		
	WOWN	X43297	00-835-8595	14,060 (6,378)	1,364.4 (38.61)	1,042.4 (29.50)	237.1 (6.02)	95.8 (2.43)	79.3 (2.01)		
Truck, Dump*											
M342A2	WWN	X43434	00-077-1644	15,800 (7,167)	1,561.5 (44.19)	1,241.0 (35.12)	273.9 (6.96)	96.3 (2.45)	81.3 (2.07)		
	WOWN	X43297	00-077-1643	15,230 (6,908)	1,484.0 (42.00)	1,179.4 (33.38)	260.3 (6.61)	96.3 (2.45)	81.3 (2.07)		
Truck, Tank, FS											
M49A1C	WWN	X57408	00-440-3346	15,190 (6,890)	1,456.2 (41.21)	1,367.1 (38.09)	276.5 (7.02)	96.0 (2.44)	89.0 (2.26)		
	WOWN	X57271	00-440-3349	14,390 (6,527)	1,390.4 (39.35)	1,305.3 (36.94)	264.0 (6.71)	96.0 (2.44)	89.0 (2.26)		
Truck, Tank, FS*											
M49A2C	WWN	X57408	00-077-1632	14,600 (6,623)	1,507.9 (42.67)	1,408.4 (39.86)	277.0 (7.04)	95.5 (2.43)	92.0 (2.34)		
	WOWN	X57271	00-077-1631	14,300 (6,486)	1,437.1 (40.67)	1,342.3 (37.99)	264.0 (6.71)	95.5 (2.43)	92.0 (2.34)		
Truck, Tank, FS											
M49C	WWN	X57408	00-141-8237	14,700 (6,668)	1,487.0 (42.08)	1,397.9 (39.56)	276.5 (7.02)	96.0 (2.44)	91.0 (2.31)		
	WOWN	X57271	00-141-8235	14,135 (6,412)	1,412.3 (39.97)	1,327.7 (37.57)	264.0 (6.71)	95.5 (2.43)	91.0 (2.31)		
Truck, Tank, Water											
M50	WWN	X58504	00-174-1601	15,595 (7,074)	1,474.5 (41.73)	1,413.7 (40.00)	276.5 (7.02)	95.0 (2.41)	93.0 (2.36)		
	WOWN	X58367	00-835-8344	13,447 (6,100)	1,413.2 (39.99)	1,369.5 (38.76)	265.0 (6.73)	95.0 (2.41)	94.0 (2.39)		
Truck, Tank, Water											
M50A1	WWN	X58504	00-440-8305	14,620 (6,632)	1,486.9 (42.08)	1,425.5 (40.34)	274.0 (6.96)	95.8 (2.43)	93.0 (2.36)		
	WOWN	X58367	00-440-8307	14,150 (6,418)	1,417.0 (40.10)	1,356.0 (38.37)	263.0 (6.68)	95.8 (2.43)	93.0 (2.36)		
Truck, Tank, Water*											
M50A2	WWN	X58504	00-077-1634	14,620 (6,632)	1,497.2 (42.37)	1,359.7 (38.48)	277.6 (7.05)	95.1 (2.42)	89.0 (2.26)		
	WOWN	X58367	00-077-1633	13,820 (6,269)	1,423.9 (40.30)	1,293.1 (36.59)	264.0 (6.71)	95.1 (2.42)	89.0 (2.26)		

*Identifies trucks illustrated in figures 2-13 through 2-36.

Table 2-1-(Continued)

Nomenclature (2 1/2-Ton, 6x6)	TOE LIN	NSN (2320)	Weight, lb (kg)	Volume, cu ft (cu m)				Reduced Dimensions, in (M)				
				Operational		Reduced		Length	Width	Height		
Truck, Tank, Water												
M50A3	WWN	X58504	00-937-5264	14,620 (6,632)	1,480.3 (41.89)	1,434.6 (40.60)	277.6 (7.05)	95.0 (2.41)	94.0 (2.39)			
	WOWN	X58367	00-937-4036	14,200 (6,441)	1,405.2 (39.77)	1,361.7 (38.54)	263.5 (6.69)	95.0 (2.41)	94.0 (2.39)			
Truck, Tractor*												
M48	WWN	X59189	00-835-8346	11,841 (5,371)	1,330.5 (37.67)	1,104.2 (31.27)	253.5 (6.44)	93.5 (2.37)	80.5 (2.04)			
	WOWN	X59052	00-835-8345	11,430 (5,185)	1,266.5 (35.84)	1,046.7 (29.62)	241.3 (6.13)	93.5 (2.37)	80.5 (2.04)			
Truck, Tractor												
M275	WWN	X59189	00-835-8611	11,590 (5,257)	1,247.8 (35.30)	1,046.3 (29.61)	241.5 (6.13)	93.0 (2.36)	80.5 (2.04)			
	WOWN	X59052	00-835-8609	11,179 (5,071)	1,178.0 (33.34)	981.7 (27.78)	228.0 (5.79)	93.0 (2.36)	80.5 (2.04)			
Truck, Tractor												
M275A1	WWN	Not produced with winch.										
	WOWN	X59052	00-446-2479	11,410 (5,175)	1,178.0 (33.34)	981.7 (27.78)	228.0 (5.79)	93.0 (2.36)	80.0 (2.03)			
Truck, Tractor*												
M275A2	WWN	X59189	00-077-1641	11,980 (5,434)	1,312.2 (37.14)	1,076.2 (30.46)	244.0 (6.20)	93.4 (2.37)	81.6 (2.07)			
	WOWN	X59052	00-077-1640	11,380 (5,162)	1,234.3 (34.93)	1,012.2 (28.65)	229.5 (5.83)	93.4 (2.37)	81.6 (2.07)			
Truck, Van, Exp												
M292	WWN	X62066	00-542-4444	21,858 (9,915)	2,589.1 (73.27)	2,566.4 (72.63)	339.8 (8.63)	98.5 (2.50)	132.5 (3.37)			
	WOWN	X61929	00-325-6574	20,396 (9,252)	2,507.5 (70.96)	2,484.9 (70.32)	329.0 (8.36)	98.5 (2.50)	132.5 (3.37)			
Truck, Van, Exp												
M292A1	WWN	X62066	00-440-8317	21,782 (9,880)	2,609.5 (73.85)	2,586.8 (73.21)	342.5 (8.70)	98.5 (2.50)	132.5 (3.37)			
	WOWN	X61929	00-440-8318	21,350 (9,684)	2,507.5 (70.96)	2,484.9 (70.32)	329.0 (8.36)	98.5 (2.50)	132.5 (3.37)			
Truck, Van, Exp*												
M292A2	WWN	X62066	00-696-0684	21,782 (9,880)	2,609.5 (73.85)	2,586.8 (73.21)	342.5 (8.70)	98.5 (2.50)	132.5 (3.37)			
	WOWN	X61929	00-077-1642	20,020 (9,081)	2,507.5 (70.96)	2,484.9 (70.32)	329.0 (8.36)	98.5 (2.50)	132.5 (3.37)			
Truck, Van, Exp												
M292A3	WWN	Not produced with winch.										
	WOWN	X62203	00-699-3546	21,805 (9,891)	2,507.5 (70.96)	2,484.9 (70.32)	329.0 (8.36)	98.5 (2.50)	132.5 (3.37)			
Truck, Van, Exp												
M292A4	WWN	Not produced with winch.										
	WOWN	X62203	00-699-3593	21,805 (9,891)	2,507.5 (70.96)	2,484.9 (70.32)	332.0 (8.43)	98.5 (2.50)	132.5 (3.37)			
Truck, Van, Exp												
M292A5	WWN	Not produced with winch.										
	WOWN	X62203	00-699-3746	20,020 (9,081)	2,484.9 (70.32)	2,484.9 (70.32)	329.0 (8.43)	98.5 (2.50)	132.5 (3.37)			
Truck, Van, Shop												
M109	WWN	X62477	00-289-6473	15,646 (7,097)	2,075.4 (58.73)	2,011.4 (56.92)	278.5 (7.07)	96.0 (2.44)	130.0 (3.30)			
	WOWN	X62340	00-835-8515	15,231 (6,909)	1,979.6 (56.02)	1,913.9 (54.14)	265.0 (6.73)	96.0 (2.44)	130.0 (3.30)			
Truck, Van, Shop												
M109A1	WWN	X62477	00-706-2224	15,642 (7,095)	2,075.4 (58.73)	2,011.4 (56.92)	278.5 (7.07)	96.0 (2.44)	130.0 (3.30)			
	WOWN	X62340	00-690-8365	15,231 (6,909)	1,979.6 (56.02)	1,913.9 (54.14)	265.0 (6.73)	96.0 (2.44)	130.0 (3.30)			
Truck, Van, Shop												
M109A2	WWN	X62477	00-440-8308	15,530 (7,044)	2,075.4 (58.73)	2,011.4 (56.92)	278.5 (7.07)	96.0 (2.44)	130.0 (3.30)			
	WOWN	X62340	00-440-8313	15,030 (6,818)	1,979.6 (56.02)	1,913.9 (54.14)	265.0 (6.73)	96.0 (2.44)	130.0 (3.30)			
Truck, Van, Shop*												
M109A3	WWN	X62477	00-077-1637	15,530 (7,044)	2,075.4 (58.73)	2,011.4 (56.92)	278.5 (7.07)	96.0 (2.44)	130.0 (3.30)			
	WOWN	X62340	00-077-1636	15,030 (6,818)	1,979.6 (56.02)	1,913.9 (54.14)	265.0 (6.73)	96.0 (2.44)	130.0 (3.30)			

*See footnote on first page of table.

Table 2-1—(continued)

Nomenclature (2 1/2-Ton, 6x6)	TOE LIN	NSN (2320)	Weight, lb (kg)	Volume, cu ft (cu m)		Reduced Dimensions, in (M)		
				Operational	Reduced	Length	Width	Height
Truck, Wrecker* M60	WWN WOWN	X63162 00-835-8343	23,960 (10,869)	1,775.9 (50.26)	1,700.2 (48.11)	303.0 (7.70)	96.0 (2.44)	101.0 (2.57)
		Not produced without winch.						
Truck, Wrecker* M108	WWN WOWN	X63025 00-835-8526 X62888 00-690-7500	19,785 (8,974) 19,375 (8,789)	1,775.9 (50.26) 1,621.6 (45.89)	1,700.2 (48.11) 1,621.6 (45.89)	303.0 (7.70) 289.0 (7.34)	96.0 (2.44) 96.0 (2.44)	101.0 (2.57) 101.0 (2.57)

*See footnote on first page of table.

Table 2-2. Height Reduction of 2 1/2-Ton Trucks

	M35	M36	M59	M342	M49	M50	M48	M275	M292* M109*	M60	M108
Reduced height**	80.5 (2.04)	80.5 (2.04)	79.3 (2.01)	81.3 (2.07)	92.0 (2.34)	93.0 (2.36)	80.5 (2.04)	80.5 (2.04)		101.0 (2.57)	101.0 (2.57)
Cab tarpaulin	X	X	X	X	X	X	X	X		X	X
Pillar post assy	X	X	X	X	X	X	X	X		X	X
Mirrors & arms	X	X	X	X	X	X	X	X		X	X
Cargo tarpaulin	X	X	X	X							
Bows	X	X	X	X							
Spare tire							X				
Lower windshield	X	X	X	X	X	X	X	X		X	X
Gravel shield			X	X							
Cargo body side racks	X	X	X	X							
Acetylene bottle horizontal										X	
Boom at min. height										X	X

*Major sectionalization (removing van body from truck chassis) is necessary to achieve reduced height configuration.

**Dimensions expressed in inches and (meters).

CHAPTER 3

SAFETY

3-1. General

General safety considerations and precautions for movement are as follows:

- a. Check each vehicle to insure that all loose items are appropriately secured.
- b. When backing a vehicle insure that no personnel or obstructions are behind it.

WARNING

Fire extinguishers must be readily available during all loading and unloading.

WARNING

Proper ventilation must be provided when loading and unloading if vehicle engine is used. Prolonged exposure to carbon monoxide fumes will produce adverse effects that may prove fatal.

3-2. Specific Safety Requirements

Pertinent safety requirements by individual mode can be found, where applicable, in the appropriate chapters.

CHAPTER 4

AIR TRANSPORTABILITY GUIDANCE

Section I. GENERAL

4-1. Scope

This chapter provides transportability guidance for air movement of the 2-1/2-ton, 6x6 trucks. It presents examples of tiedown diagrams and tiedown data tables for loading these vehicles in US Air Force C-5, C-130, and C-141 aircraft.

4-2. Maximum Utilization of Aircraft

Additional cargo including nuclear weapons and/or personnel within allowable load limits and restrictions prescribed by pertinent safety regulations can be transported with the 2-1/2-ton, 6x6 trucks in US Air Force aircraft. Nonnuclear cargo may be transported in the cargo trucks as long as none of the cargo protrudes above the solid metal sides of the truck bed. Cargo carried in the bed of a cargo truck must be securely tied down to prevent shifting and possible damage. Cargo must be restrained in the vehicle bed by attachment to either the vehicle or the aircraft floor and must meet the same restraint criteria as required for the vehicle. Cargo to be stowed and secured in the vehicles must not exceed the maximum rated load capacity of 2-1/2-tons (5,000 pounds) or aircraft allowable cargo load (ACL), and cargo items must be compatible. The weight of the vehicle plus the weight of any cargo that it may contain must be accurate. The vehicle and its cargo are considered as one package, and the gross weight is used to determine tiedown requirements in accordance with chapter 4, FM 55-9. If the cargo truck is to carry any cargo when it is in the aircraft, the truck must be loaded and then weighed before it is loaded in the aircraft. The weight of any cargo loaded on vehicles will change the center of gravity (CG) of the vehicles as shown in chapter 2. The new CG should be determined in accordance with chapter 5, FM 55-9. Chapters 4 and 5, FM 55-9, contain detailed instructions for air movement of cargo trucks. Dump trucks should not be air transported with cargo loaded in the dump bed. The structural strength of the fittings that connect the dump bed on the truck frame may not be adequate to withstand the additional stress. When this matter is resolved, guidance will be provided in a change in this manual.

4-3. Safety

In addition to the safety precautions contained in chapter 3, the following should be noted:

- a. The activity offering the vehicles or items for air transport will notify the aircraft commander or his designated representative in the event ammunition or explosives are to be transported within a vehicle.
- b. Vehicle fuel tanks must not be more than three-fourths full.
- c. The required number of tiedowns plus their capacity must be checked, and the criteria for gravity forces, adhered to.
- d. Each item must be checked carefully to ensure that all loose items are properly secured.
- e. Cargo tanks of tank trucks will be emptied and purged before being loaded on aircraft.

NOTE

General cargo loads depicted in this manual for US Air Force C-130 and C-141 aircraft are restrained to the minimum of 8g's forward restraint that is required when passengers or nuclear weapons cargo are carried forward of the general cargo. The 8g's forward restraint may be reduced to a minimum of 3g's forward restraint for general cargo when passengers or nuclear weapons are *not* carried forward of the general cargo.

When passengers or nuclear weapons cargo are carried forward of general cargo, the HBU-8/A (VAN ZELM) barrier net or equivalent net on aircraft so equipped shall be positioned in front of the general cargo to achieve a minimum of 8g's forward restraint.

NOTE

In air loading, the center of gravity of each vehicle must be determined, and where weight and/or measurement is critical, each vehicle should be weighed and/or measured.

Section II. TRANSPORT BY US ARMY AIRCRAFT

4-4. Fixed Wing Aircraft

All 2-1/2-ton, 6x6 trucks are too large and too heavy for transport by US Army fixed-wing aircraft.

4-5. Rotary Wing Aircraft

The M35, M59, and M275 trucks can be externally transported by CH-47B helicopter. In addition to the

above-named trucks, the M36, M49, M50, M109, and M342A2 trucks can be externally transported by CH-47C helicopter. The M35, M48, and M275 trucks can be externally transported by CH-54A helicopter. Also, the M36, M49, M50, M59, and M342A2 trucks can be externally transported by CH-54B helicopter.

Section III. TRANSPORT BY US AIR FORCE AIRCRAFT

4-6. Aircraft Capabilities

All of the 2-1/2-ton, 6x6 trucks can be transported by C-5 aircraft. The M35, M36, M48, M49, M50, M59, M60, M108, M275, and M342A2 trucks can be transported by C-130 and C-141 aircraft. Because of the height limitation, the M109 and M292 trucks cannot be loaded into or transported by C-130 or C-141 aircraft without major sectionalization.

on acceptable methods and can be used as a guide for loading and securing the 2-1/2-ton, 6x6 trucks. Loading is based on empty vehicles in a reduced configuration *without* major sectionalization. Figures show representative patterns. Tables list the type and capacity of tiedown devices required, location points on the trucks, and aircraft fittings to which the devices are secured.

4-7. Typical Loads

The following tiedown diagrams (figs 4-1 through 4-11) and data (tables 4-1 through 4-11) are based

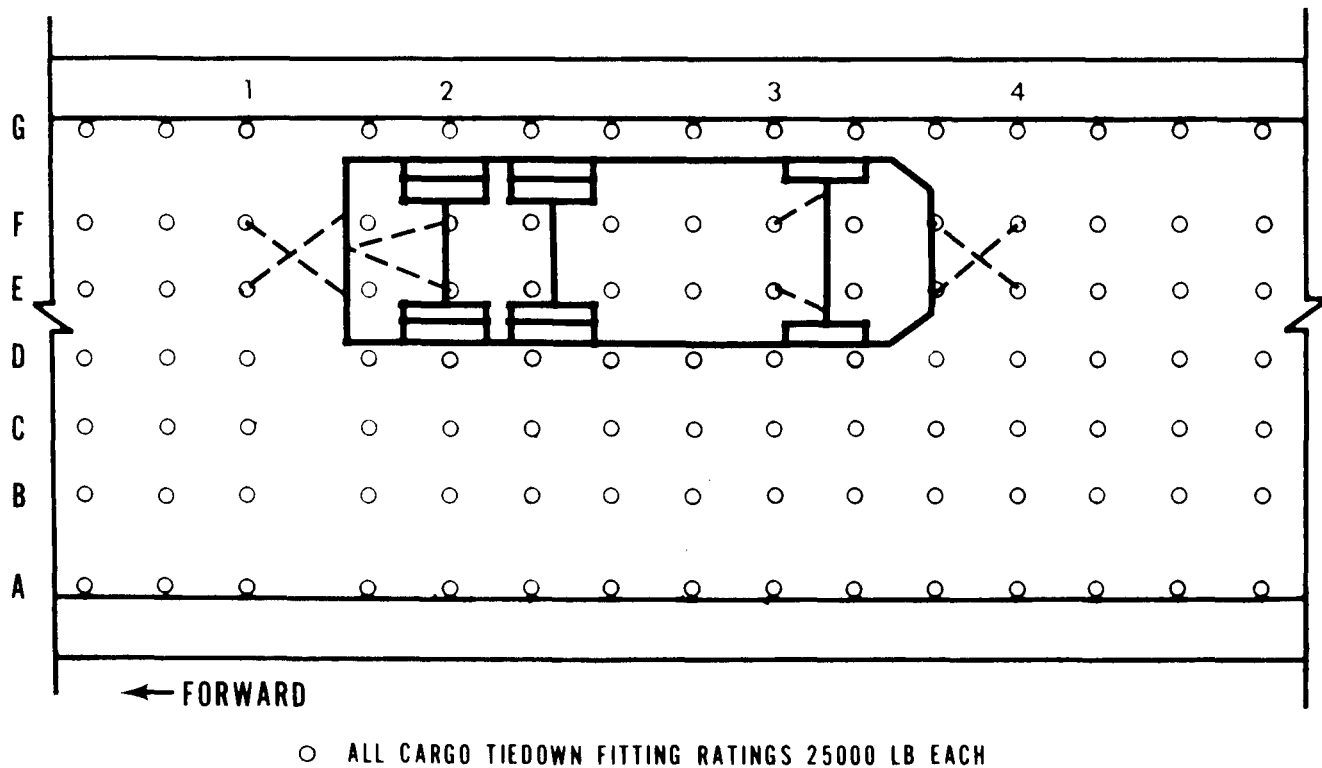
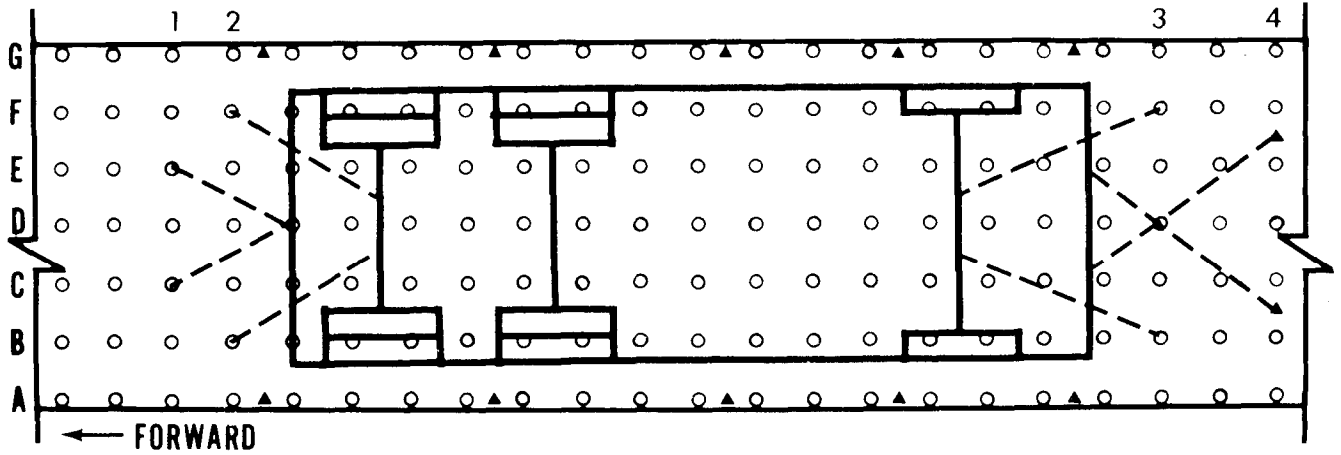
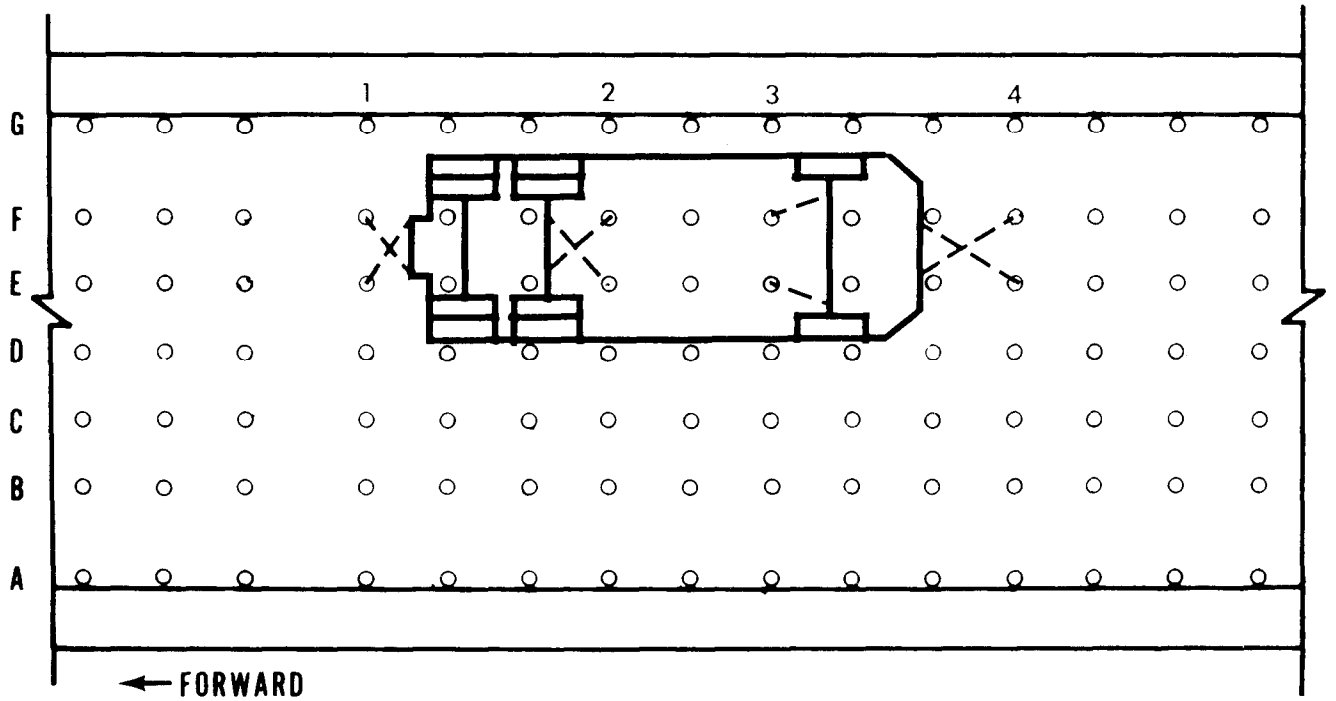


Figure 4-1. Tiedown diagram for M35 truck in C-5 aircraft.



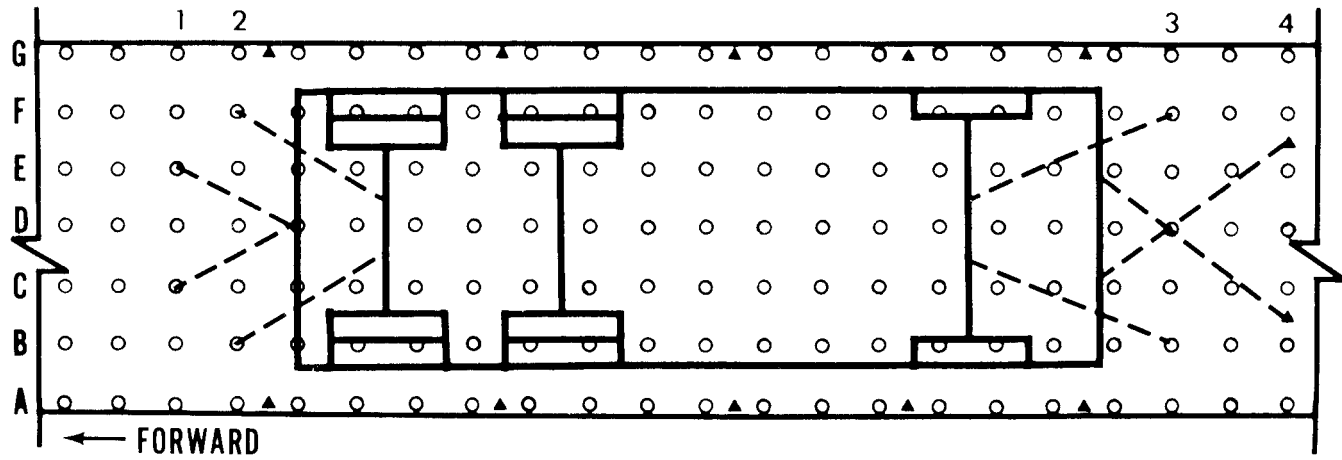
SYMBOL	○	▲
STRENGTH OF FITTING AND BASIC LOAD DIRECTION	10000 LB ANY	25000 LB ANY

Figure 4-2. Tiedown diagram for M35 truck in C-130 and C-141 aircraft.



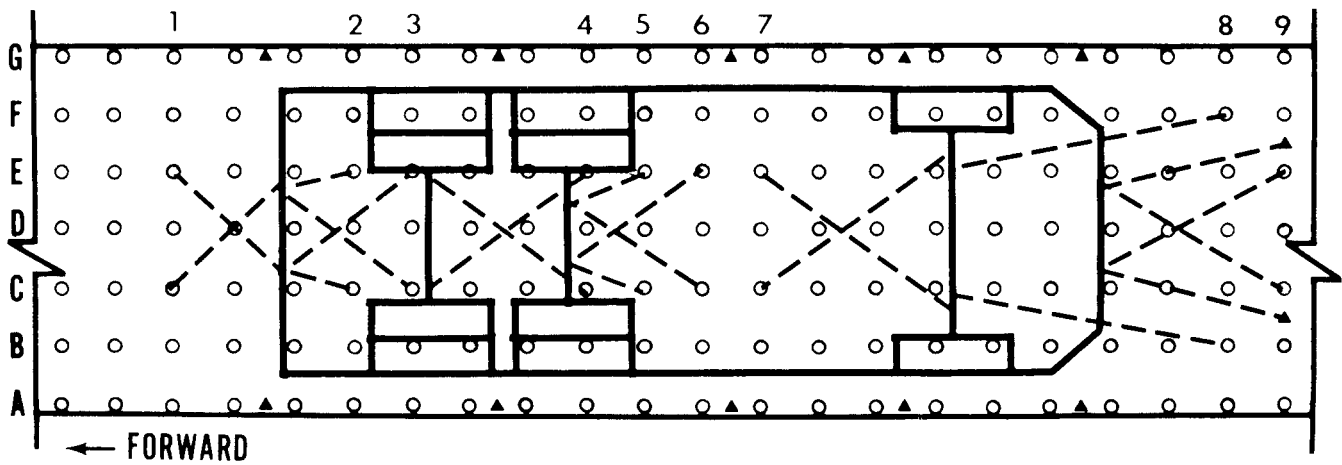
○ ALL CARGO TIEDOWN FITTING RATINGS 25000 LB EACH

Figure 4-3. Tiedown diagram for M48 truck in C-5 aircraft.



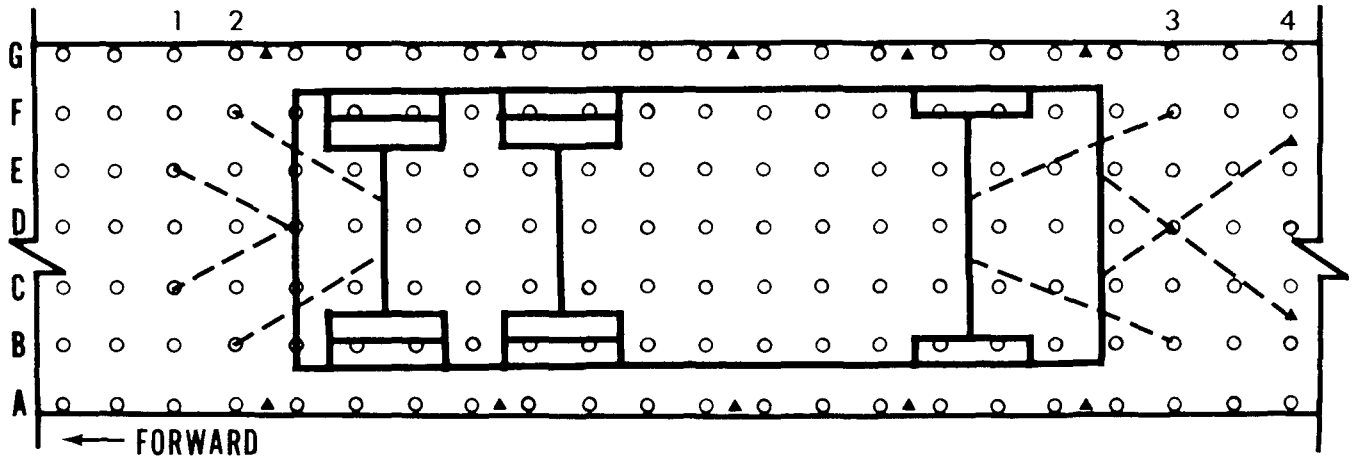
SYMBOL	○	▲
STRENGTH OF FITTING AND BASIC LOAD DIRECTION	10000 LB ANY	25000 LB ANY

Figure 4-4. Tiedown diagram for M48 truck in C-130 and C-141 aircraft.



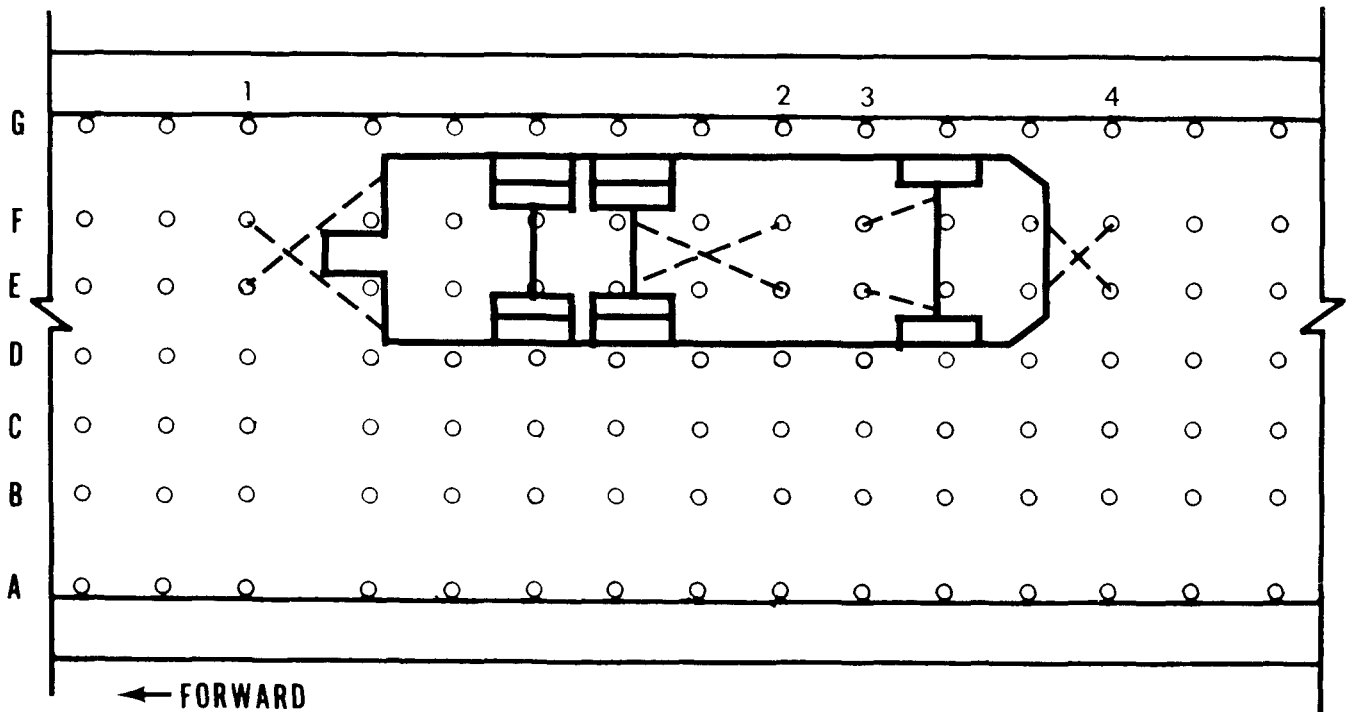
SYMBOL	○	▲
STRENGTH OF FITTING AND BASIC LOAD DIRECTION	10000 LB ANY	25000 LB ANY

Figure 4-5. Tiedown diagram for M49 truck in C-5 aircraft.



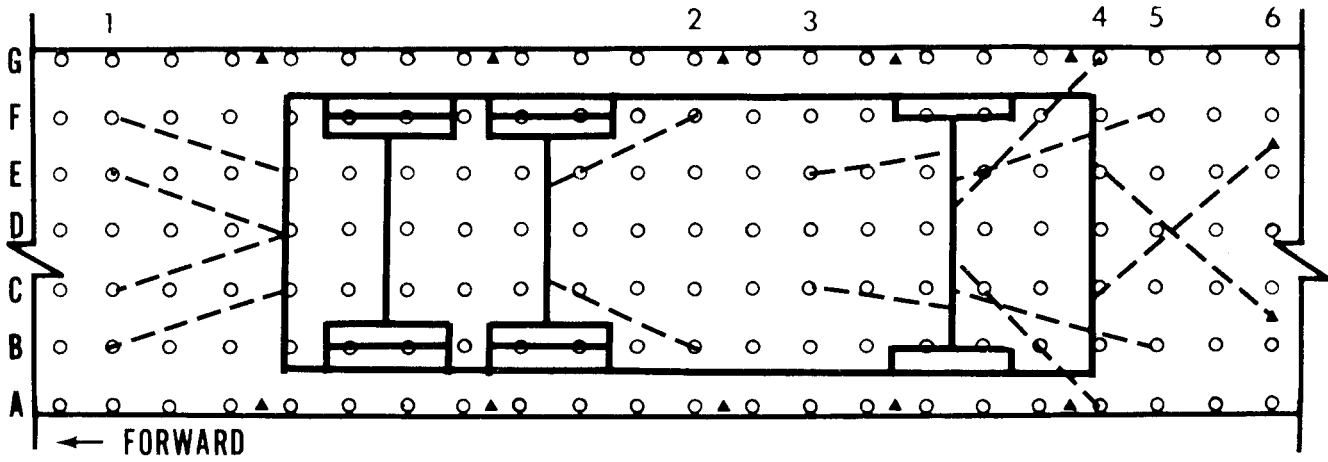
SYMBOL	○	▲
STRENGTH OF FITTING AND BASIC LOAD DIRECTION	10000 LB	25000 LB
	ANY	ANY

Figure 4-6. Tiedown of M49 truck in C-130 and C-141 aircraft.



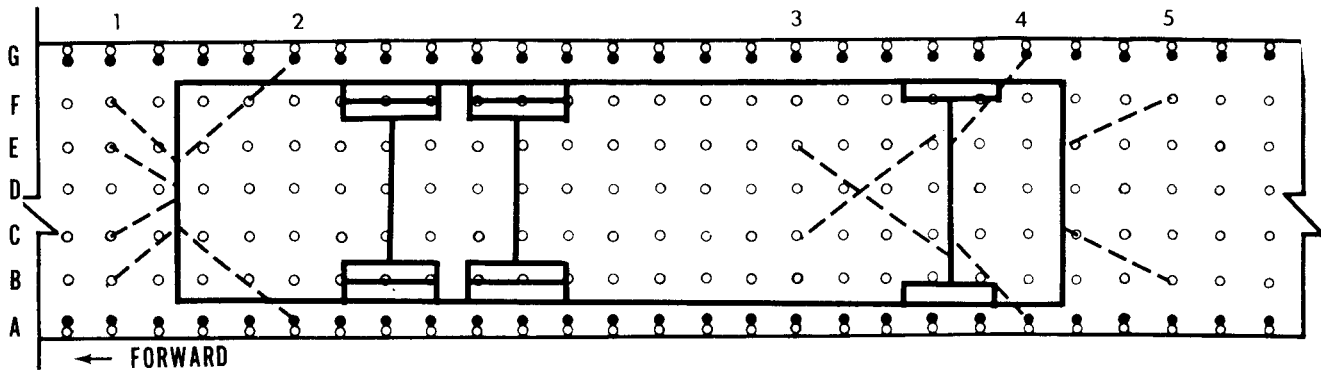
○ ALL CARGO TIEDOWN FITTING RATINGS 25000 LB EACH

Figure 4-7. Tiedown diagram for M108 truck in C-5 aircraft.



SYMBOL	○	▲
STRENGTH OF FITTING AND BASIC LOAD DIRECTION	10000 LB ANY	25000 LB ANY

Figure 4-8. Tiedown diagram for M108 truck in C-130 aircraft.



SYMBOL	○	●
STRENGTH OF FITTING AND BASIC LOAD DIRECTION	10000 LB ANY	25000 LB ANY

Figure 4-9. Tiedown diagram for M108 truck in C-141 aircraft.

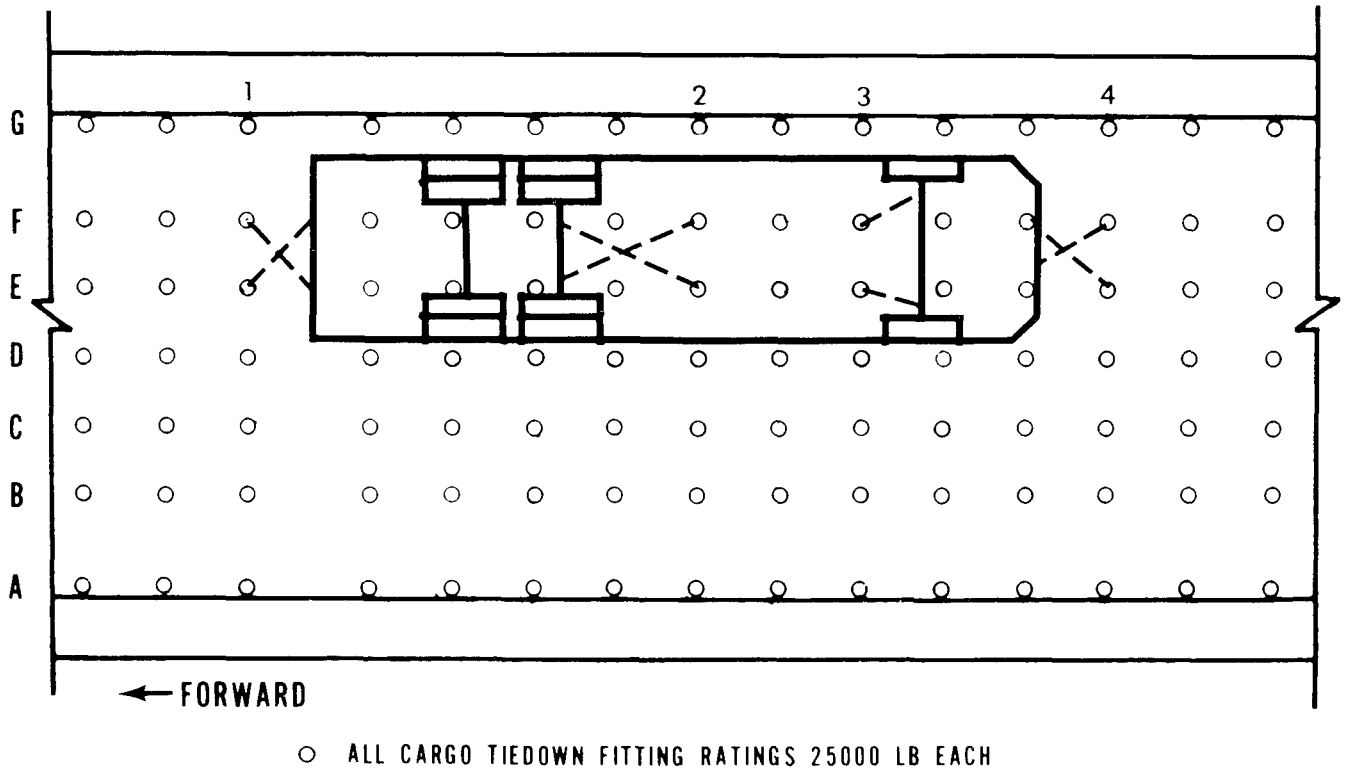


Figure 4-10. Tiedown diagram for M292 truck in C-5 aircraft.

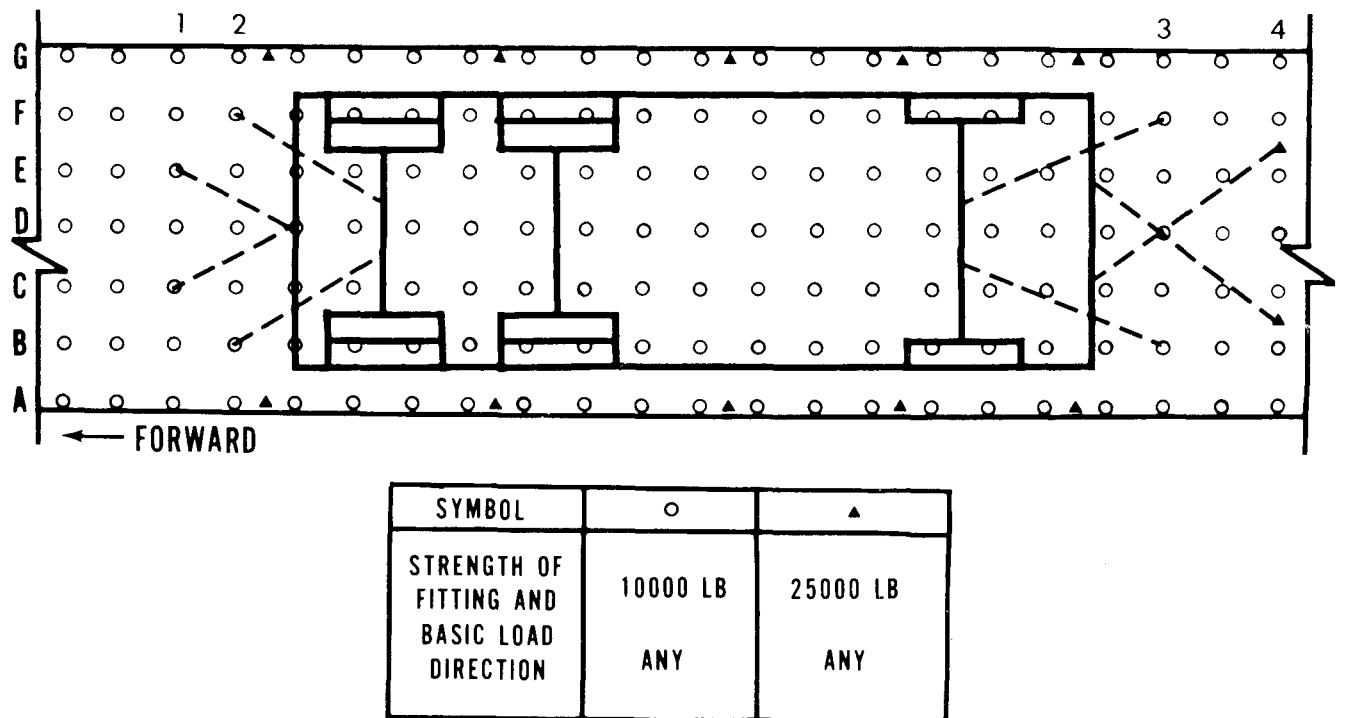


Figure 4-11. Tiedown data for M36 truck in C-130 and C-141 aircraft.

Table 4-1. Tiedown Data for M35 Truck in C-5 Aircraft

Tiedown fitting		Tiedown device		
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
E1	25	MB-2	25	Lifting shackle, right side
F1	25	MB-2	25	Lifting shackle, left side
E2	25	MB-2	25	Pintle
F2	25	MB-2	25	Pintle
E3	25	MB-2	25	Front axle, right side
F3	25	MB-2	25	Front axle, left side
E4	25	MB-2	25	Lifting shackle, left side
F4	25	MB-2	25	Lifting shackle, right side

Table 4-2. Tiedown Data for M35 Truck in C-130 and C-141 Aircraft

Tiedown fitting		Tiedown device		
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
C1	10	MB-1	10	Pintle
E1	10	MB-1	10	Pintle
B2	10	MB-1	10	Rear axle, right side
F2	10	MB-1	10	Rear axle, left side
B3	10	MB-1	10	Front axle, right side
F3	10	MB-1	10	Front axle, left side
B4	25	MB-2	25	Lifting shackle, right side
E4	25	MB-2	25	Lifting shackle, left side

Table 4-3. Tiedown Data for M48 Truck in C-5 Aircraft

Tiedown fitting		Tiedown device		
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
E1	25	MB-2	25	Lift shackle, left side
F1	25	MB-2	25	Lift shackle, right side
E2	25	MB-2	25	Front rear axle, left side
F2	25	MB-2	25	Front rear axle, right side
E3	25	MB-2	25	Front axle, right side
F3	25	MB-2	25	Front axle, left side
E4	25	MB-2	25	Lifting shackle, left side
F4	25	MB-2	25	Lifting shackle, right side

Table 4-4. Tiedown Data for M48 Truck in C-130 and C-141 Aircraft

Tiedown fitting		Tiedown device		
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
C1	10	MB-1	10	Pintle
E1	10	MB-1	10	Pintle
B2	10	MB-1	10	Rear axle, right side
F2	10	MB-1	10	Rear axle, left side
B3	10	MB-1	10	Front axle, right side
F3	10	MB-1	10	Front axle, left side
B4	25	MB-1	25	Lifting shackle, right side
E4	25	MB-1	25	Lifting shackle, left side

Table 4-5. Tiedown Data for M49 Truck in C-130 Aircraft

Tiedown fitting		Tiedown device		
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
E1	10	MB-1	10	Bumperette, left side
C1	10	MB-1	10	Bumperette, right side
E2	10	MB-1	10	Lift shackle, right side
C2	10	MB-1	10	Lift shackle, left side
C3	10	MB-1	10	Bumperette, left side
E3	10	MB-1	10	Bumperette, right side
E4	10	MB-1	10	Rear axle, left side
C4	10	MB-1	10	Rear axle, right side
E5	10	MB-1	10	Front rear axle, right side
C5	10	MB-1	10	Front rear axle, left side
E6	10	MB-1	10	Front rear axle, right side
C6	10	MB-1	10	Front rear axle, left side
E7	10	MB-1	10	Front axle, left side
C7	10	MB-1	10	Front axle, right side
F8	10	MB-1	10	Front axle, right side
B8	10	MB-1	10	Front axle, left side
B9	25	MB-2	25	Lift shackle, left side
F9	25	MB-2	25	Lift shackle, right side
E9	10	MB-1	10	Lift shackle, left side
C9	10	MB-1	10	Lift shackle, right side

Table 4-6. Tiedown Data for M49 Truck in C-130 and C-141 Aircraft

Tiedown fitting		Tiedown device		
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
C1	10	MB-1	10	Pintle
E1	10	MB-1	10	Pintle
B2	10	MB-1	10	Rear axle, right side
F2	10	MB-1	10	Rear axle, left side
B3	10	MB-1	10	Front axle, right side
F3	10	MB-1	10	Front axle, left side
B4	25	MB-2	25	Lifting shackle, right side
E4	25	MB-2	25	Lifting shackle, left side

Table 4-7. Tiedown Data for M108 Truck in C-5 Aircraft

Tiedown fitting		Tiedown device		
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
E1	25	MB-2	25	Lifting shackle, left side
F1	25	MB-2	25	Lifting shackle, right side
E2	25	MB-2	25	Front rear axle, left side
F2	25	MB-2	25	Front rear axle, right side
E3	25	MB-2	25	Front axle, right side
F3	25	MB-2	25	Front axle, left side
E4	25	MB-2	25	Lifting shackle, left side
F4	25	MB-2	25	Lifting shackle, right side

Table 4-8. Tiedown Data for M108 Truck in C-130 Aircraft

Tiedown fitting		Tiedown device		
Desig- nation in 1,000 lb	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
B1	10	MB-1	10	Lifting shackle, right side
F1	10	MB-1	10	Lifting shackle, left side
C1	10	MB-1	10	Pintle
E1	10	MB-1	10	Pintle
B2	10	MB-1	10	Center axle, around right side
F2	10	MB-1	10	Center axle, around left side
C3	10	MB-1	10	Front axle, around right side
E3	10	MB-1	10	Front axle, around left side
A4	10	MB-1	10	Frame, around right side
G4	10	MB-1	10	Frame, around left side
B5	10	MB-1	10	Front axle, around right side
F5	10	MB-1	10	Front axle, around left side
C6	25	MB-2	25	Lifting shackle, left side
E6	25	MB-2	25	Lifting shackle, right side

Table 4-9. Tiedown Data for M108 Truck in C-141 Aircraft

Tiedown fitting		Tiedown device		
Desig- nation in 1,000 lb	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
B1	10	MB-1	10	Right rear shackle
F1	10	MB-1	10	Left rear shackle
C1	10	MB-1	10	Pintle
E1	10	MB-1	10	Pintle
A2	25	MB-2	25	Bumperette, right side
G2	25	MB-2	25	Bumperette, left side
C3	10	MB-1	10	Front axle, around right side
E3	10	MB-1	10	Front axle, around left side
A4	25	MB-2	25	Front axle, around right side
G4	25	MB-2	25	Front axle, around left side
B5	10	MB-1	10	Lifting shackle, right side
F5	10	MB-1	10	Lifting shackle, left side

Table 4-10. Tiedown Data for M292 Truck in C-5 Aircraft

Tiedown fitting		Tiedown device		
Desig- nation in 1,000 lb	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
E1	25	MB-2	25	Lifting shackle, left side
F1	25	MB-2	25	Lifting shackle, right side
E2	25	MB-2	25	Front rear axle, left side
F2	25	MB-2	25	Front rear axle, right side
E3	25	MB-2	25	Front axle, right side
F3	25	MB-2	25	Front axle, left side
E4	25	MB-2	25	Lifting shackle, left side
F4	25	MB-2	25	Lifting shackle, right side

Table 4-11. Tiedown Data for M36 Truck in C-130 Aircraft

Tiedown fitting		Tiedown device		
Desig- nation in 1,000 lb	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	Attach to item
C1	10	MB-1	10	Pintle
E1	10	MB-1	10	Pintle
B2	10	MB-1	10	Rear axle, right side
F2	10	MB-1	10	Rear axle, left side
B3	10	MB-1	10	Front axle, right side
F3	10	MB-1	10	Front axle, left side
B4	25	MB-2	25	Lifting shackle, right side
E4	25	MB-2	25	Lifting shackle, left side

CHAPTER 5

OFF-ROAD AND HIGHWAY TRANSPORTABILITY GUIDANCE

Section I. GENERAL

5-1. Scope

This chapter provides transportability guidance for highway and off-road movement of the 2 1/2-ton, 6x6 trucks. It covers significant technical and physical characteristics and safety considerations and prescribes the material and guidance required to prepare, load, and tie down

the vehicles.

5-2. Safety

In addition to the safety precautions contained in chapter 3, the vehicles are subject to all the safety laws, rules, and regulations applicable to commercial carriers when moving over public highway in CONUS.

Section II. MOVEMENT ON OWN WHEELS

5-3. General

The 2 1/2-ton, 6x6 trucks are transportable under their own power for highway movement. Except as noted in table 2-1, chapter 2, dimensions and weight of the trucks are within legal limitations for highway movement in CONUS and recommended highway limitations in overseas areas. Vehicles exceeding the legal width limitations in CONUS of 96 inches may require special permits. The M292-series vans exceed the recommended height limitation in overseas areas by 1/2 inch, and special routing may be required. The procedures for obtaining special permits in

CONUS are outlined in AR 55-162. Legal limitations of overseas areas are identified in "Limits of Motor Vehicle Sizes and Weights," *International Road Federation*, 1023 Washington Building, Washington, D.C. 20005.

5-4. Preparation of Trucks

No special preparation of the trucks is required for movement under their own power. However, all loose items should be secured within the vehicles. Any cargo transported in the trucks should be secured so that it does not extend beyond the end and side limits of the cargo body.

Section III. TRANSPORT BY SEMITRAILER

5-5. General

The 2 1/2-ton, 6x6 trucks can be transported over highway by semitrailers of adequate capacity and size. Both in CONUS and overseas, permits will be required if width of the transported item exceeds highway limitations. In addition, depending upon the tractor-trailer combination used for transport, overall length and/or height limitations may be exceeded and permits will be required.

ramp. After placement at the tiedown position, the items will be secured in accordance with figures 5-1, 5-2, and 5-3. Figure 5-4 shows the tracking diagram of the M127 semitrailer pulled by M818 truck, tractor. Figure 5-5 gives typical 2 1/2-ton, 6x6 truck blocking and tiedown details. Figure 5-6 is the tracking diagram for the M270 semitrailer pulled by M818 truck, tractor. Tables 5-1 and 5-2, bill of and application of materials for blocking and tiedown, are used in conjunction with figures 5-1, 5-2, and 5-3. Tables 5-3 and 5-4, the bill of and application of materials for blocking and tiedown, are used in conjunction with figures 5-3 and 5-5.

5-6. Loading on Flatbed Semitrailers

The trucks may be placed in the tiedown position on the semitrailers by a crane or from a loading

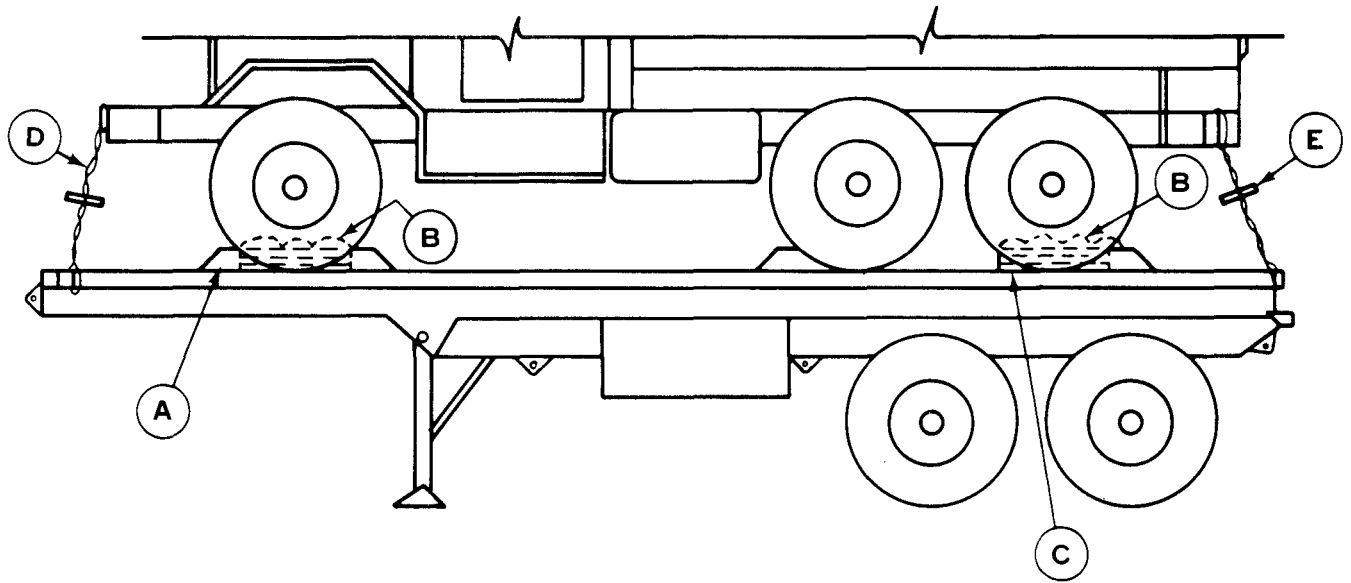


Figure 5-1. Blocking and tiedown of typical 2 1/2-ton, 6x6 truck on M127-series 12-ton or larger semitrailer.

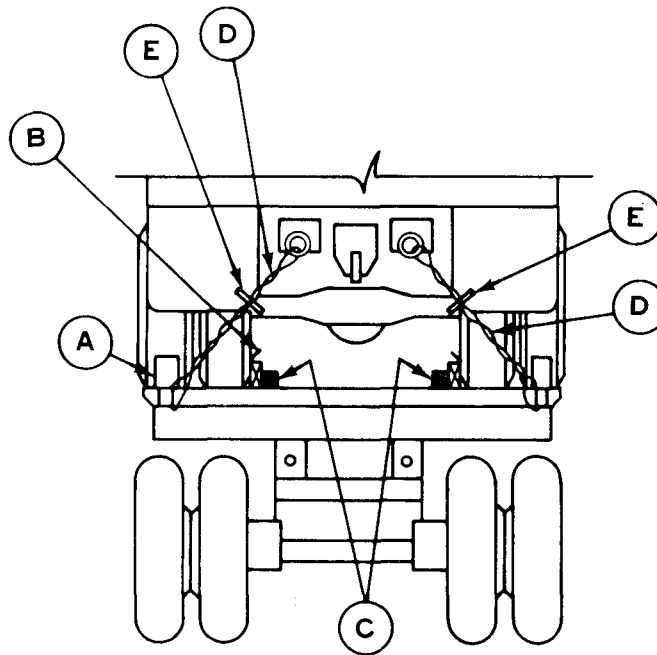
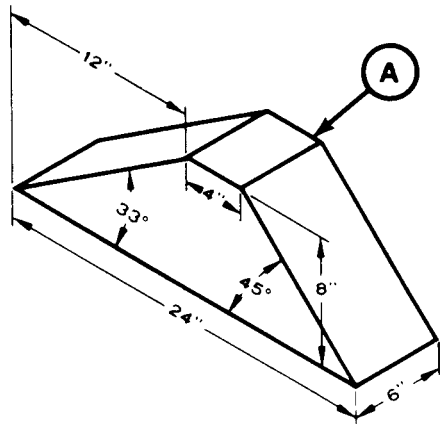
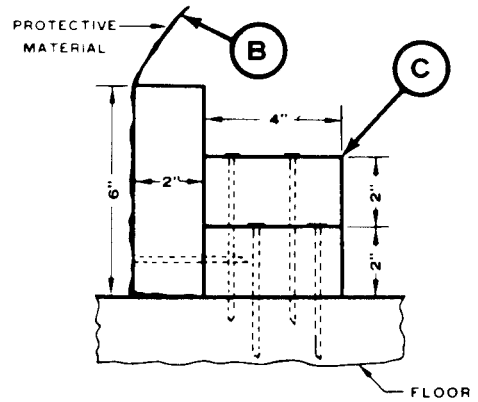


Figure 5-2. Rear view of blocking and tiedown of typical 2 1/2-ton, 6x6 truck on M127-series 12-ton or larger semitrailer.



DETAIL 1



DETAIL 2

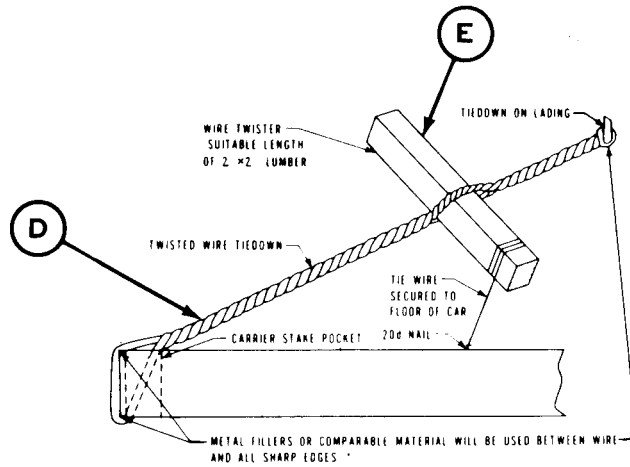


Figure 5-3. Blocking and tiedown details.

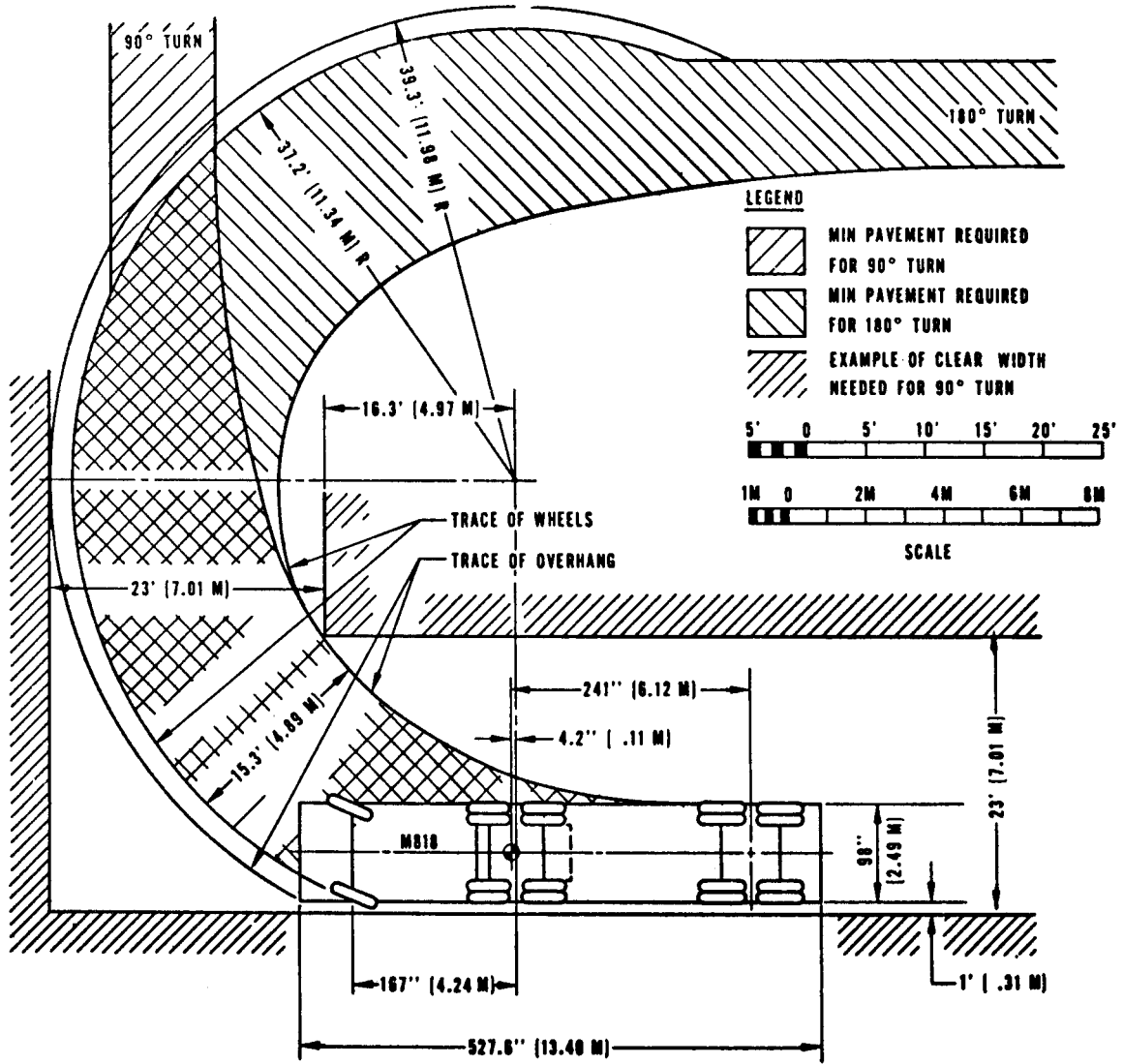


Figure 5-4. Tracking diagram for semitrailer, M127A1, and truck, tractor, M818

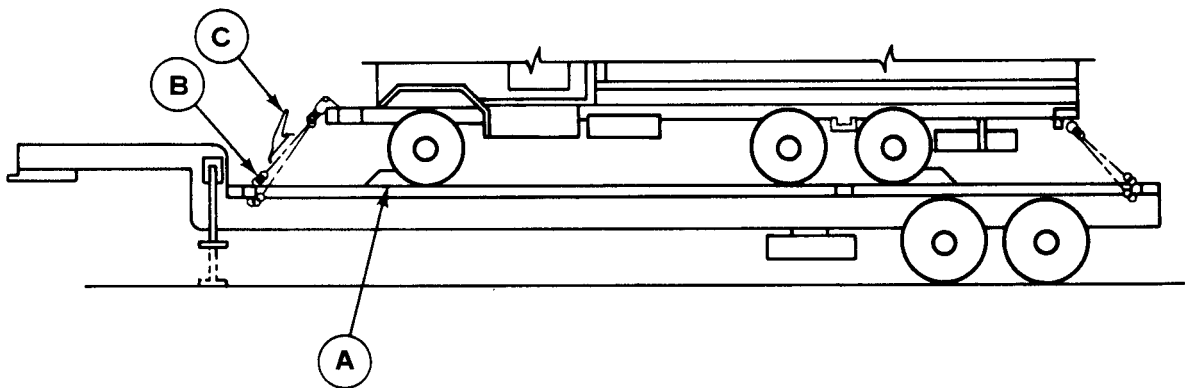


Figure 5-5. Blocking and tiedown of typical 2 1/2-ton, 6x6 truck on semitrailer, M270A1.

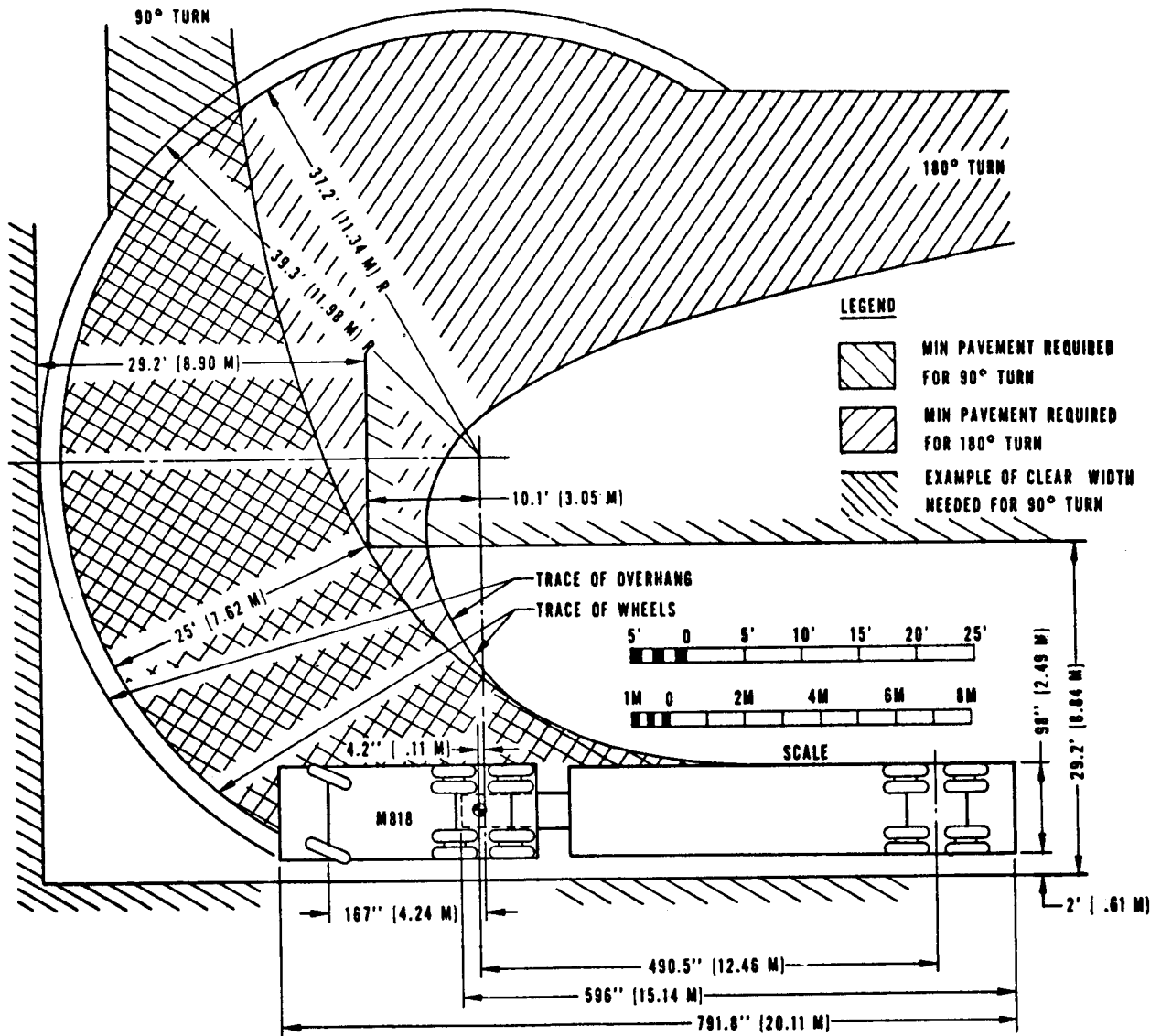


Figure 5-6. Tracking diagram for semitrailer, M4270A1, and truck, tractor, M818.

Table 5-1. Bill of Materials for Blocking and Tiedown of Typical 2 1/2-Ton, 6x6 Truck on M127-Series 12-Ton or Larger Semitrailer (Fig. 5-1, 5-2, and 5-3)

Item	Description	Approximate quantity
Lumber	Douglas-fir, or comparable, straight-grain, free from material defects; Fed Spec: MM-L-751H: 2- x 4-in. 2- x 6-in. 6- x 8-in.	24 linear ft 12 linear ft 16 linear ft
Nails	Common, steel; flathead; bright or cement-coated; table X1-b; Fed Spec FF-N-105a: 20d 30d 40d	48 52 16
Wire	No. 8 gage, black annealed; Fed Spec QQ-W-461f	200 ft
Cushioning Material	Waterproof paper, or suitable material	as required

Table 5-2. Application of Materials for Blocking and Tiedown of Typical 2 1/2-Ton, 6x6 Truck on M127-Series 12-Ton or Larger Semitrailer (Fig 5-1, 5-2, and 5-3)

Item	No. required	Application
A	8	Chock block (detail 1, fig. 5-3). Locate 33° portion against front of front and intermediate wheels and against rear of front and rear wheels. Toenail heel of block (near bottom edge) to semitrailer floor with one 20d nail. Additionally, drive two 40d nails into heel of block, perpendicular to semitrailer floor. Toenail each side of block to semitrailer floor with two 30d nails on each side.
B	as required	Protective material (detail 2, item B, fig 5-3) such as waterproof paper or burlap, should be located under bottom edge of 2- x 4- x 36-in. piece and between tire and 2- x 6- x 36-in. piece to extend 2 in. above blocking.
C	4	Side blocking (detail 2, item C, fig 5-3). Each to consist of one piece of 2- x 6- x 36-in. lumber and two pieces of 2- x 4- x 36-in. lumber. Nail 2- x 6- x 36-in. piece of edge of lower 2- x 4- x 36-in. piece with five 20d nails. Place 2- x 6- x 36-in. piece against tire and nail to semitrailer floor through 2- x 4- x 36-in. piece with five 20d nails in staggered pattern. Nail other 2- x 4- x 36-in. piece to one below in like manner with five 30d nails.
D	4	Eight strands of No. 8 gage black annealed wire. Attach to front and rear tiedown provisions on vehicles and semitrailer as indicated (fig 5-1 and 5-2). Substitute, if desired, 1/2- or 5/8-in. IWRC wire rope in a complete loop, and secure with four cable clips spaced approximately 4 in. apart.
E	4	Wire twisters (fig. 5-3). Use 2- x 2-in. lumber by length-to-suit (metal rod or bolt may be used in lieu of lumber). After twisting wire taut, rod, bolt or lumber should be left in place and secured to prevent unwinding.

Table 5-3. Bill of Materials for Blocking and Tiedown of Typical 2 1/2-Ton, 6x6 Truck on M270 Semitrailer(Fig 5-5)

Item	Description	Approximate quantity
Lumber	Douglas-fir, or comparable, straight-grain, free from material defects; Fed Spec MM-L-751c: 6- x 8-in.	6 linear ft
Chain	General service, S-leg, alloy steel, 1/4- to 1/2-in. size, 10-ft length, with two grabhooks.	6
Load Binder	Lever operated, 4-in. takeup, with two grabhooks designed for 1/4- to 1/2-in. chain. 18 1/2-in. lever, large, 4-ton (NSN 3990-00-274-6746).	6

Table 5-4. Application of Materials for Blocking and Tiedown of Typical 2 1/2-Ton, 6x6 Truck on Semitrailer (Fig 5-3 and 5-5)

Item	No. required	Application
A	4	Chock block (detail 1, item A, fig 5-3). Locate 33 ° portion against front of wheels and against rear of rear outside wheels. Drive block securely under wheels with sledge hammer.
B	4	Chain, general service, S-leg, alloy steel, 1/4- to 1/2-in. size, 10-ft length, with two grabhooks. Pass one end of chain through tiedown shackles at each end of vehicle and engage grabhooks on convenient chain link. Pass other end of chains through stake pockets on same side of semitrailer forming a 45 ° angle.
C	6	Load binder, lever operated, 4-in. takeup, with two grabhooks designed for 1/4- or 1/2-in. chain. Engage one grabhook into link of chain coming from vehicle securement points. Pull chain through stake pocket and engage other grabhook into a convenient link. Pull lever down, and lock into secured position. A piece of pipe may be required to depress lever in locking position to insure sufficient depression on vehicle tires.

CHAPTER 6

MARINE AND TERMINAL TRANSPORTABILITY GUIDANCE

6-1. Scope

This chapter provides transportability guidance for marine and terminal movement of the 2-1/2-ton, 6x6 trucks. It covers significant technical and physical characteristics and safety considerations; prescribes blocking materials; and provides guidance required to prepare, lift, tie down, and discharge the vehicles.

6-2. Safety

In addition to the safety precautions contained in chapter 3, the following precautions should be taken as applicable:

- a. All vessel equipment and gear should be inspected prior to use.
- b. All stevedore slings and other items used in the loading and unloading operations should be inspected for condition and adequate capacity.
- c. All personnel should be cautioned not to walk under vehicles being lifted.
- d. Lifting rings and shackles on each vehicle should be inspected to ensure that they are complete and not damaged.
- e. All lifts should have at least two tag lines attached to control the swing of the vehicle while suspended.

6-3. General

Whenever possible, vehicles should receive the protection of below-deck stowage. In general, good stowage of vehicles means having them placed fore and aft as close together as practical, with minimum spacing between outer vehicles and the sweatboards (about 4 to 6 inches); breakable parts protected; spare parts stowed in or near the parent vehicle; brakes on with brake lever wire-tied; transmission in neutral with control lever wire-tied, battery terminals disconnected and taped; and fuel drained. To secure vehicles, the wheels should be blocked in front, in rear, and on both sides; also, the vehicles should be lashed with wire rope or chains to bulkhead, stanchions, or padeyes.

NOTES

1. When trucks are loaded on vessels that are adequately ventilated by power blowers, such

as roll-on/roll-off vessels, fuel need not be drained and battery terminals may remain connected.

2. The methods described in this chapter for lifting and securing vehicles are suggested procedures. Other methods of handling and stowage may be used provided they will ensure safe delivery without damage.

a. Lifting.

(1) The lifting shackles on the front bumper of 2-1/2-ton, 6x6 trucks should not be used. Instead, a 6-foot-length assembly of 3/4-inch diameter or larger 6 X 19 IWRC wire rope with a loop in each end should be used. Each loop will have a thimble. The loop with thimble may be made with a splice or a swage fitting. Zinc-poured fittings with an eye large enough to fit sling leg hook or shackle may be used in lieu of loop with thimble. One loop will be placed in the sling hook or shackle. The wire rope will be passed down the front side, under the bumper, up and over the frame, and under and up the front side of the bumper. The loop will be placed in sling hook or will be shackled with first, loop. To use the existing lifting shackle as a cable guide, the pin will be removed, the wires will be placed in the shackle, and the pin will be reinstalled, as shown in isolated view of figures 6-1 through 6-4. These instructions will be repeated for the opposite front-lifting attachment. Malleable sheet metal or hard cushioning strips will be used at sharp corners and edges to prevent the wire rope from being cut or frame edges from being bent.

NOTE

Other methods such as chains of adequate size and strength may be substituted if they will not damage vehicle components and can be readily adapted to sling leg. A lifting bar of adequate size and strength also may be substituted if it does not contact any component of the vehicle beneath the frame, such as the winch, engine, or steering gear, or so forth.

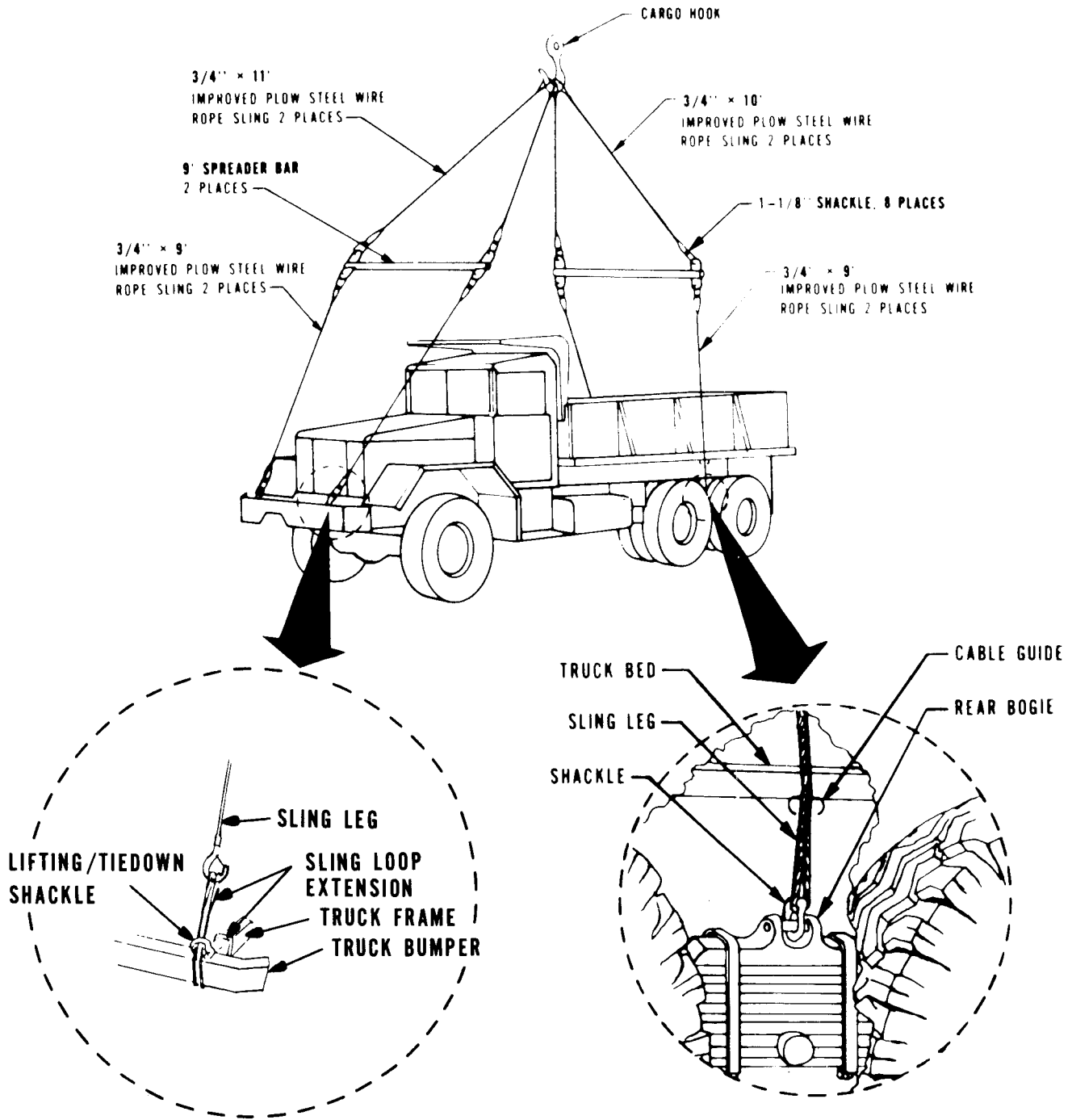


Figure 6-1. Lifting diagram for M59 using eight-wire sling and two spreader bars.

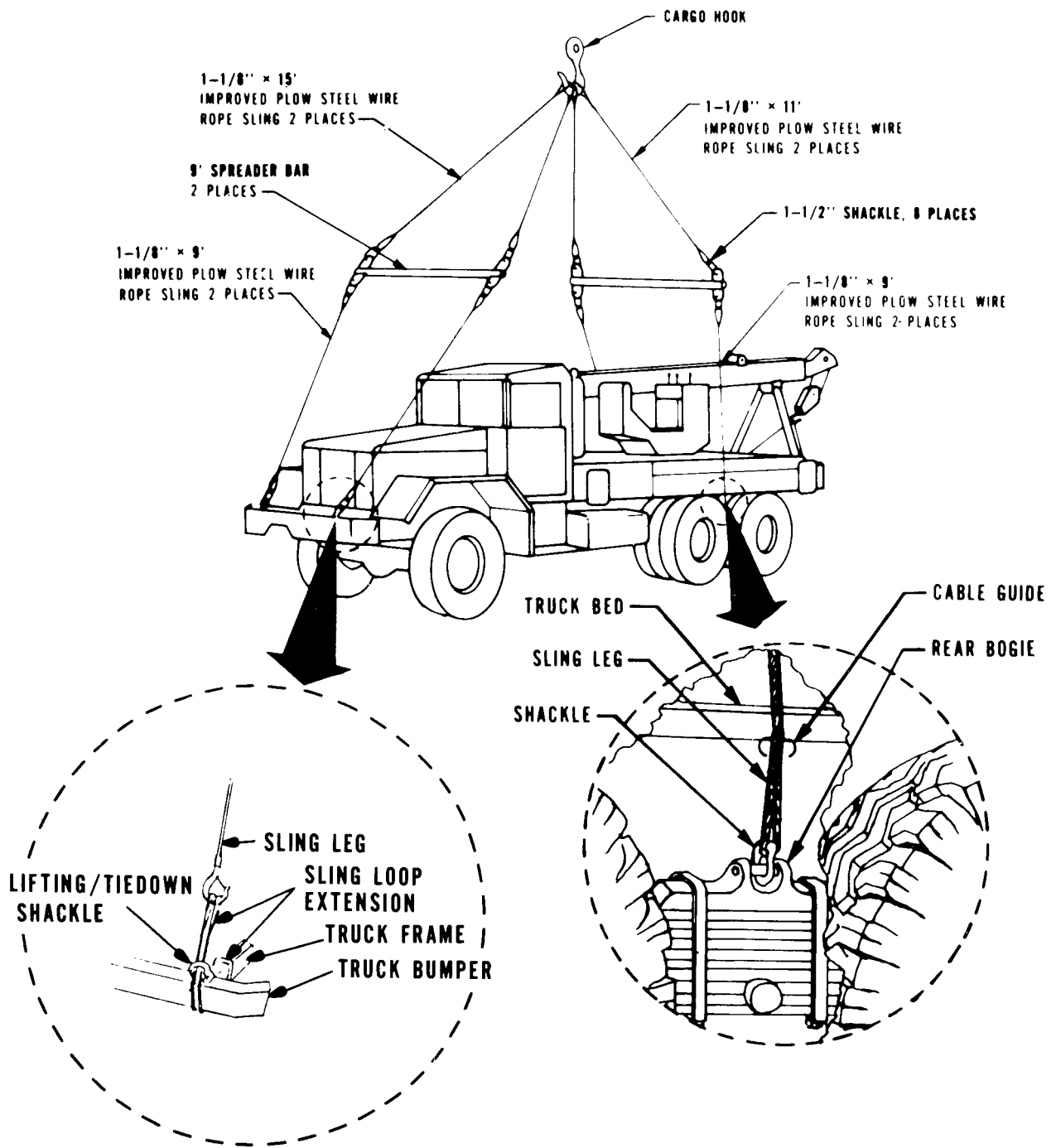


Figure 6-2. Lifting diagram for M108 using eight-wire sling and two spreader bars.

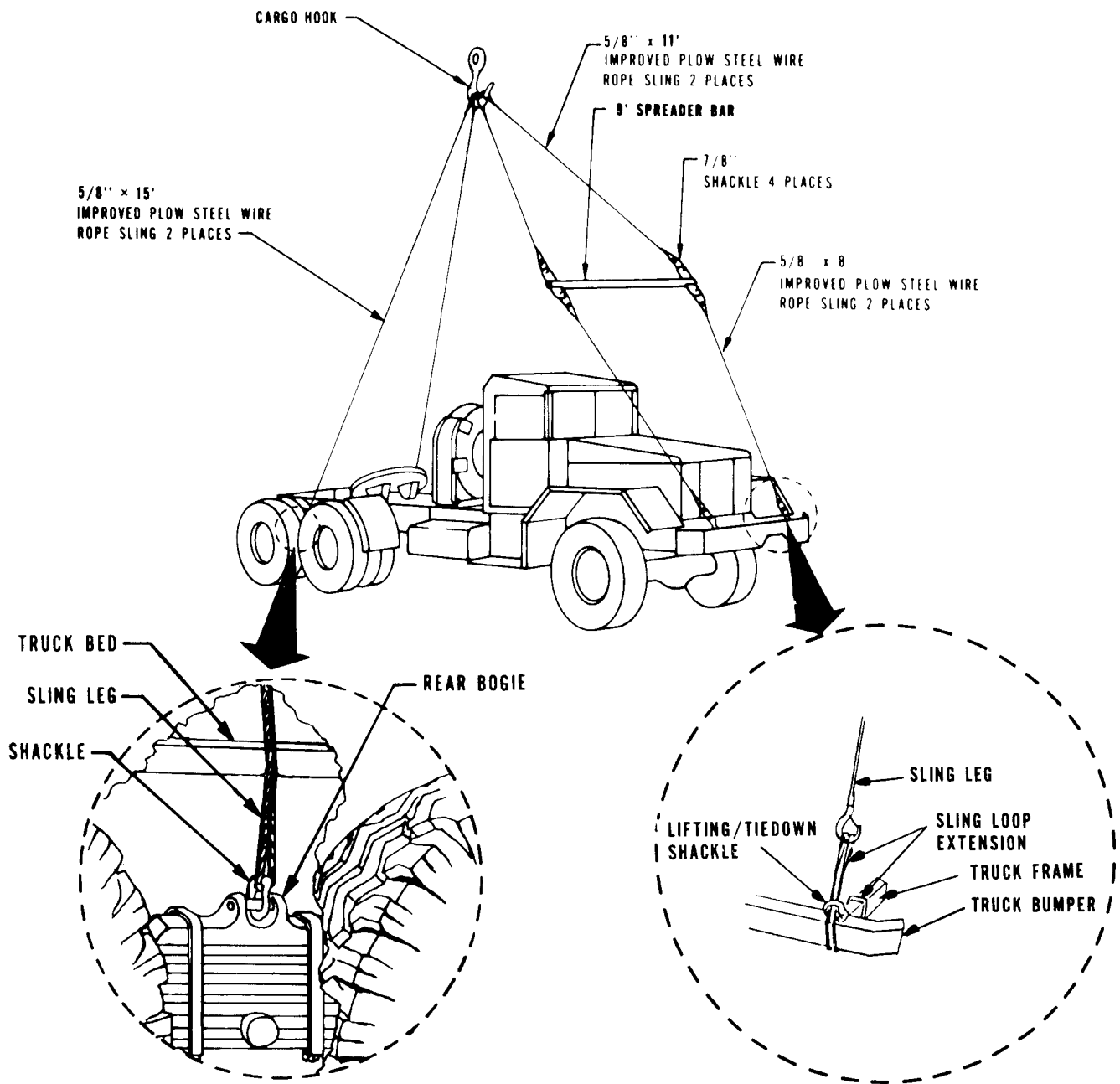


Figure 6-3. Lifting diagram for M48 using six-wire sling and one spreader bar.

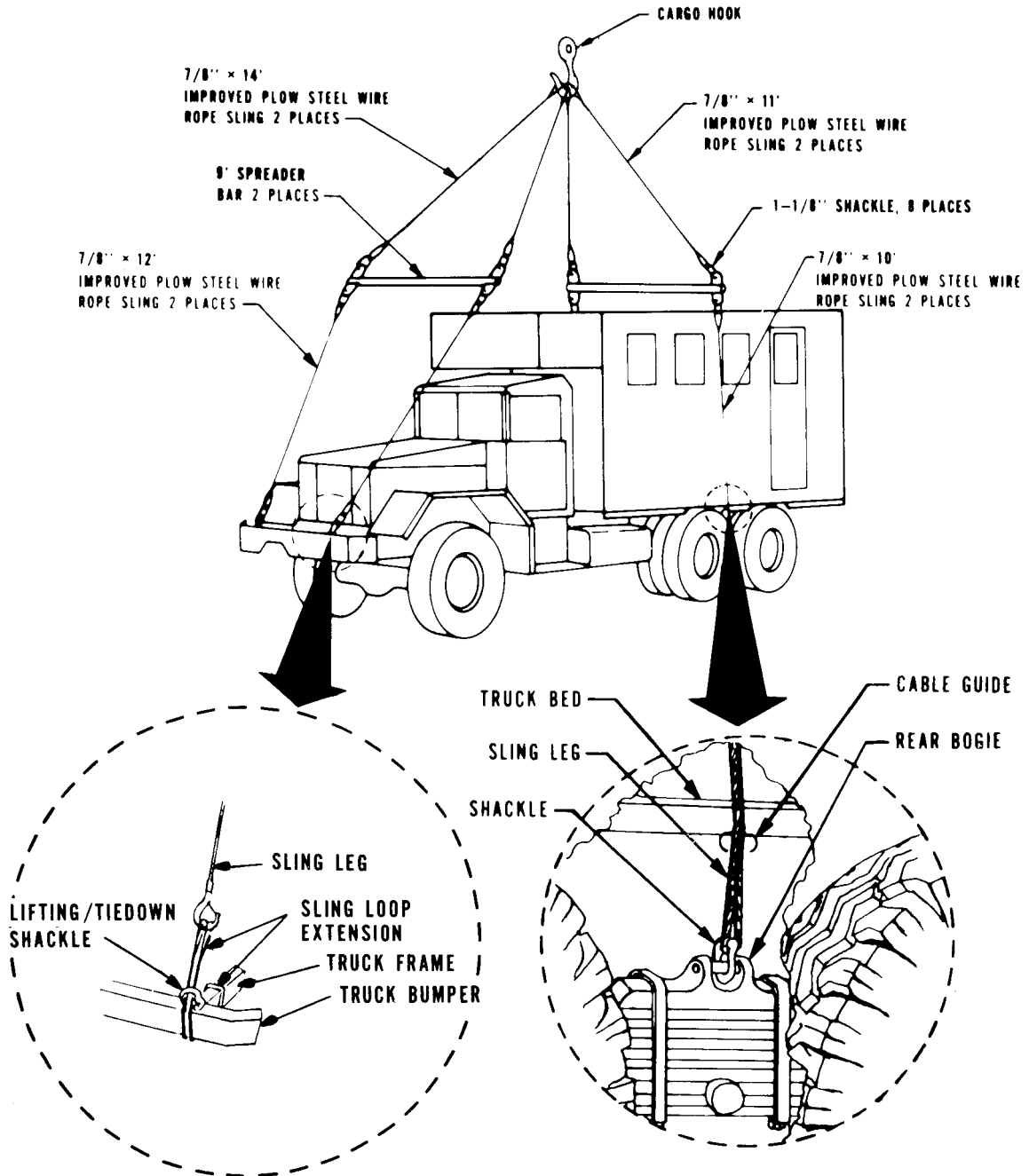


Figure 6-4. Lifting diagram for M292 using eight-wire sling and two spreader bars.

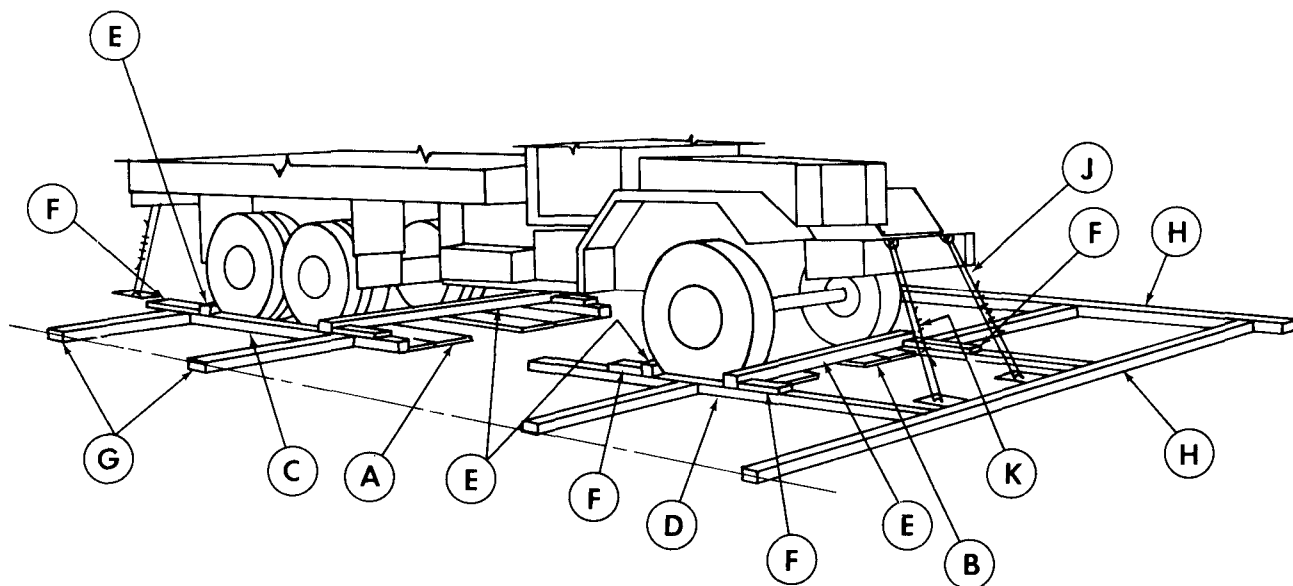


Figure 6-5. Typical blocking and tiedown of 2-1/2-ton truck in general cargo vessel.

NOTE

Nylon slings of adequate capacity may be substituted for the wire rope looped around the frame and bumper. A rubber hose, such as a used fire hose, should be used as cushioning between the nylon sling and the truck frame.

CAUTION

The two front shackles on top of the bumper must not be used for lifting.

(2) The rear lifting points are located on the spring saddle and pin assembly located on top of the rear springs. Bodies are reinforced near the spring and pin assembly. The lifting sling leg is passed through the cable guides that are attached to the bottom side of the cargo truck beds, to ensure that the lifting slings do not shift during lifting operations. Also, the rear sling eye is shackled into a lifting bogie bar that is engaged in the saddle pin on top of the spring assembly. For typical diagrams, see figures 6-1 through 6-4.

b. Loading. Vehicles are always loaded onto vessels in their minimum configuration—that is, reduced height, with or without cargo, and side view mirrors folded back or removed to reduce the width of the vehicles. They can be loaded over the beach or from piers onto landing craft, beach discharge and amphibious lighters, landing ship tanks (LST), and landing ship docks (LSD) under their own-power or by crane. Also, the vehicles can be loaded under their own power onto the deck of barges from a pier when tidal conditions are suitable and ramps are available. The vehicles can be loaded onto seagoing vessels by shoreside or floating cranes. Jumbo booms and heavy-lift ship's gear may be used in loading vehicles on vessels. The vehicles can also be loaded on roll-on/roll-off vessels either under their own power or by towing. Figure 6-5 shows typical blocking and tiedown details of a representative 5-ton truck in the hold of a general cargo vessel.

c. Materials. Table 6-1 is the approximate bill of materials for blocking and tiedown. Table 6-2 provides data concerning application of materials required to restrain the vehicle.

Table 6-1. Bill of Materials for Blocking and Tiedown of Typical 2-1/2-Ton, 6x6 Truck in Hold of General Cargo Vessel (Fig 6-5)

Item	Description	Approximate quantity
Lumber	Douglas-fir, or comparable lumber, straight-grain, free from material defects; Fed Spec MM-L-751H:	
	2- × 4-in.	16 linear ft
	2- × 12-in.	72 linear ft
	4- × 6-in.	90 linear ft
Nails	Common, steel; flathead, bright or cement-coated; para 3.6.11.2, Fed Spec FF-N-105B:	
	12d	40
	30d	50
	60d	16
Wire rope	Type I, general purpose; class 2, 6 × 19, improved plow steel, wire strand core or IWRC; Fed Spec RR-W-410C:	
	5/8-in.	100 ft
Clamps	Wire rope, U-bolt clips, saddled, single grip, forged steel, Crosby heavy-duty, or equal; Fed Spec FF-C-450D:	
	5/8-in.	16

Table 6-2. Application of Materials for Blocking and Tiedown of Typical 2-1/2-Ton, 6x6 Truck in Hold of General Cargo Vessel (Fig 6-5)

Item	No. Required	Application
A	6	Flooring, 2- × 12- × 96-in. lumber. Locate under rear wheels.
B	4	Flooring, 2- × 12- × 72-in. lumber. Locate under front wheels.
C	2	Side blocking for rear wheels, 4- × 6- × 108-in. lumber. Locate at side of rear wheels.
D	2	Side blocking for front wheels, 4- × 6- × 54-in. lumber. Locate at side of front wheels.
E	4	Blocks, 4- × 6- × 108-in. lumber. Locate one in front of front and intermediate wheels and in back of front and rear wheels. Toenail each end to side blocking with two 60d nails.
F	8	Cleats, 2- × 4- × 24-in. lumber. Locate against blocks (item E) as indicated in figure 6-5, and secure each to side blocking (item D) with five 12d nails.
G	as required	Bracing, 4- × 6-in. × random-length lumber, cut-to-fit. Place ends against side blocking and blocking of other cargo, side of ship, or other ship's structure, and secure each end with four 30d nails.
H	as required	Blocking, 4- × 6-in. × random-length lumber. Place around truck and against other blocking, side of vessel, or other ship's structure to assist in holding bracing in place.
J	4	Wire rope, 5/8-in. Each cable will form a complete loop between vehicle tiedown shackle and deck padeye.
K	16	Clamps, 5/8-in. Place four clamps over each cable loop at the overlap area and space 3-1/2 in. apart, with a minimum of 6 in. from ends of cable. See sketch 1, figure 7-2.

6-4. Special Design Vessels

Seatrains/trailer vessels, roll-on/roll-off ships, landing ships, and attack-cargo vessels are equipped with patented lashing gear and prepositioned fittings on the deck. When vehicles are to be transported aboard such vessels, use of the on-board restraint equipment is adequate, and no further blocking or bracing is required. For movement by barge or similar lighterage,

the vehicles must be blocked and braced. When vehicles loaded aboard landing craft and amphibious lighters are to be transported extended distances on rough water, the vehicles should be lashed, blocked, and braced.

CHAPTER 7

RAIL TRANSPORTABILITY GUIDANCE

Section I. GENERAL

7-1. Scope

This chapter provides transportability guidance for rail movement of the 2-1/2-ton, 6x6 trucks. It covers significant technical and physical characteristics and safety considerations and prescribes the materials and guidance to prepare, load, tie down, and unload the vehicles.

7-2. Maximum Utilization of Railcars

Additional cargo, as approved by the activity offering the trucks for transport, may be transported with the vehicles.

7-3. General

The transportability guidance contained in this section is applicable when the trucks are transported on CONUS railways. Consideration is given to single and multiple movements on the types of railcars normally used for the movement of these vehicles. The vehicles, when loaded on suitable railcars, can be transported without sectionalization or major disassembly. When at their respective reduced heights, the 2-1/2-ton, 6x6 trucks are transportable

within the Association of American Railroads' Outline Diagram for Single Loads, Without End Overhang, on Open-Top Cars as shown in both the *Railway Line Clearance Publication* and the *Official Railway Equipment Register*.

7-4. Preparation of Vehicles

The degree of preparation of the vehicles before being transported by railcar is dependent upon the operational commitment.

7-5. Loading Trucks on General Purpose Flatcars

a. Trucks may be placed in the tiedown position on the railcar by a crane, or they may be driven or towed onto the railcar provided a suitable ramp or bridge is available.

b. The load shown in figure 7-1 is based on flatcar minimum width of 9 feet 6 inches. Figure 7-2 is a detailed blocking and bracing diagram for figure 7-1. Table 7-1 is a bill of materials, and table 7-2 presents application of materials for securing vehicles on general purpose flatcars.

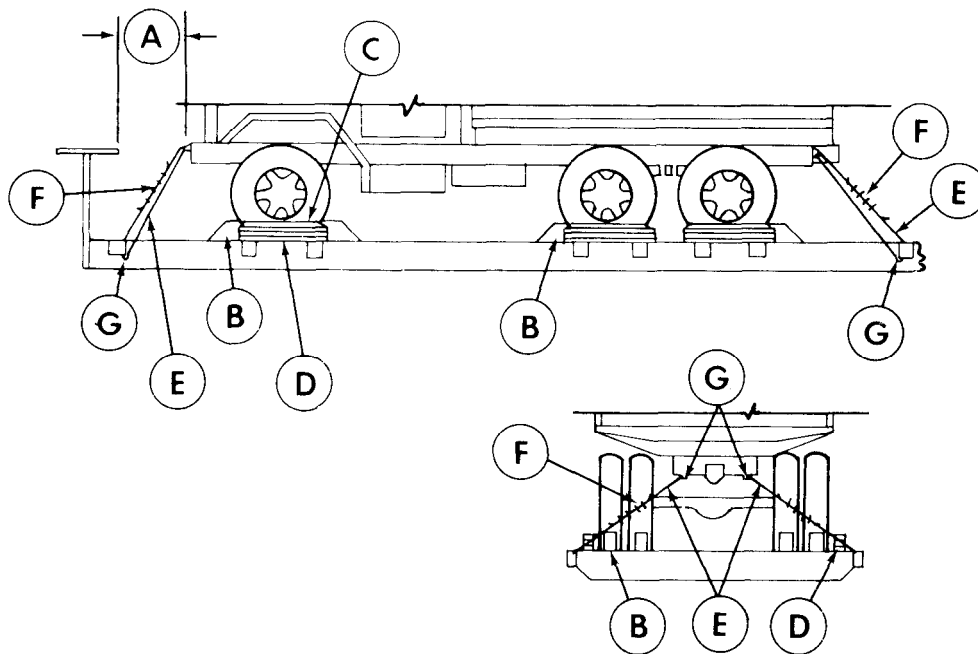


Figure 7-1. Blocking and tiedown diagram of 5-ton, 6x6 truck on CONUS general purpose flatcar.

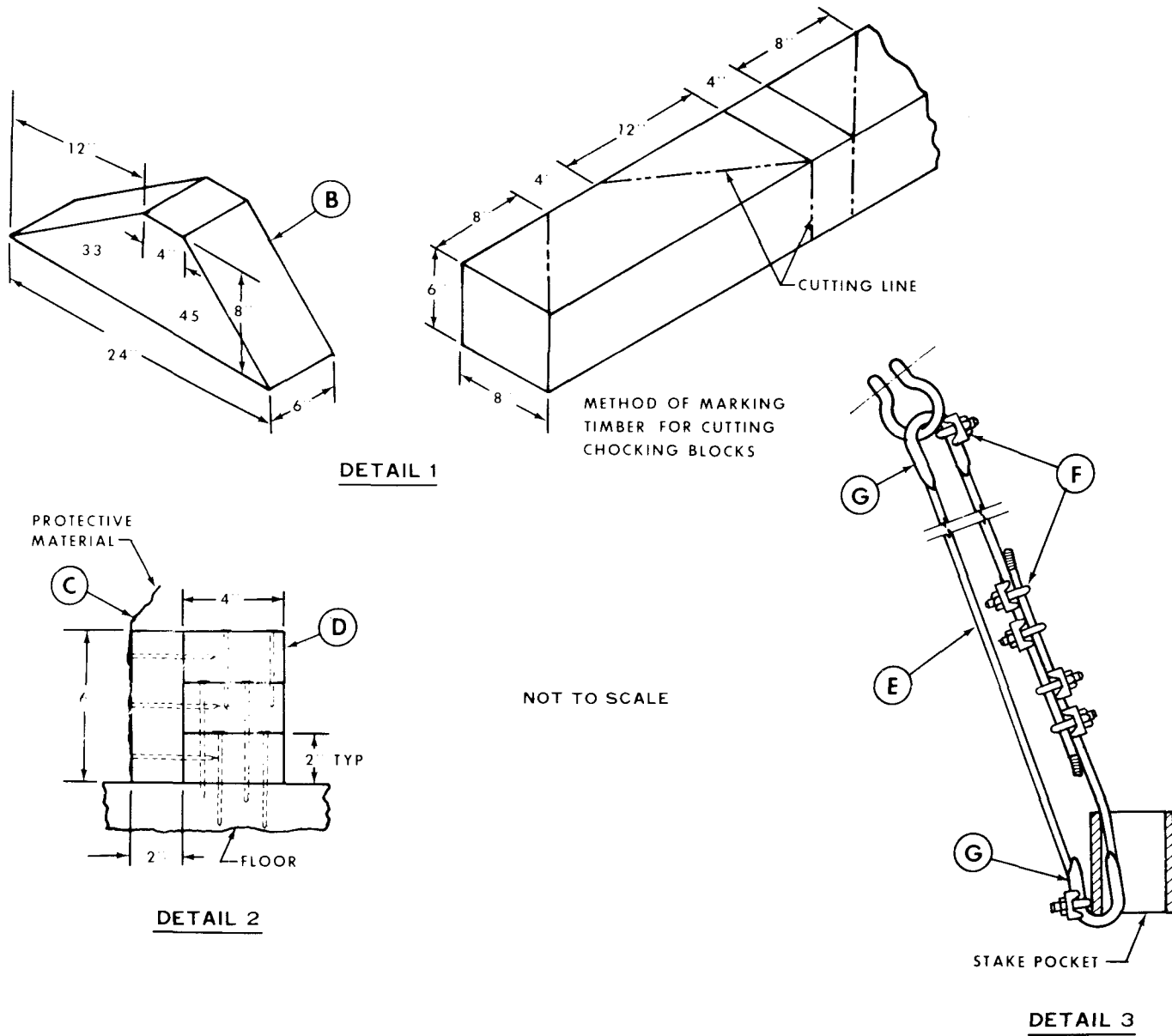


Figure 7-2. Blocking and tiedown details.

NOTE

A staggered nailing pattern should be used when lumber or laminated lumber is nailed to the floor of the railcar. Additionally, the nailing pattern for an upper piece of laminated lumber will be adjusted as required so that a nail for that piece will not be driven through, onto, or right beside a nail to the lower piece of lumber.

7-6. Loading Trucks on Special Purpose Flatcars

a. Trucks may be placed in the tiedown position on the railcar by a crane, or they may be driven or towed

onto the railcar provided a suitable ramp or bridge is available.

b. Figure 7-3 shows trucks loaded on a center tiedown rail-equipped flatcar. Table 7-3 presents the application of chain tiedowns for securing vehicles on center tiedown flatcars. Table 7-4 gives the quantity of trucks that can be loaded on cars with center tiedown rails.

c. Figure 7-4 shows trucks loaded on a cushioned rub-rail flatcar. Table 7-5 presents the application of chain tiedowns for securing vehicles on cushioned rub-rail flatcars.

d. Figure 7-5 shows trucks loaded on a bilevel rack car. Table 7-6 presents the application of chain tiedowns for securing vehicles on bilevel cars.

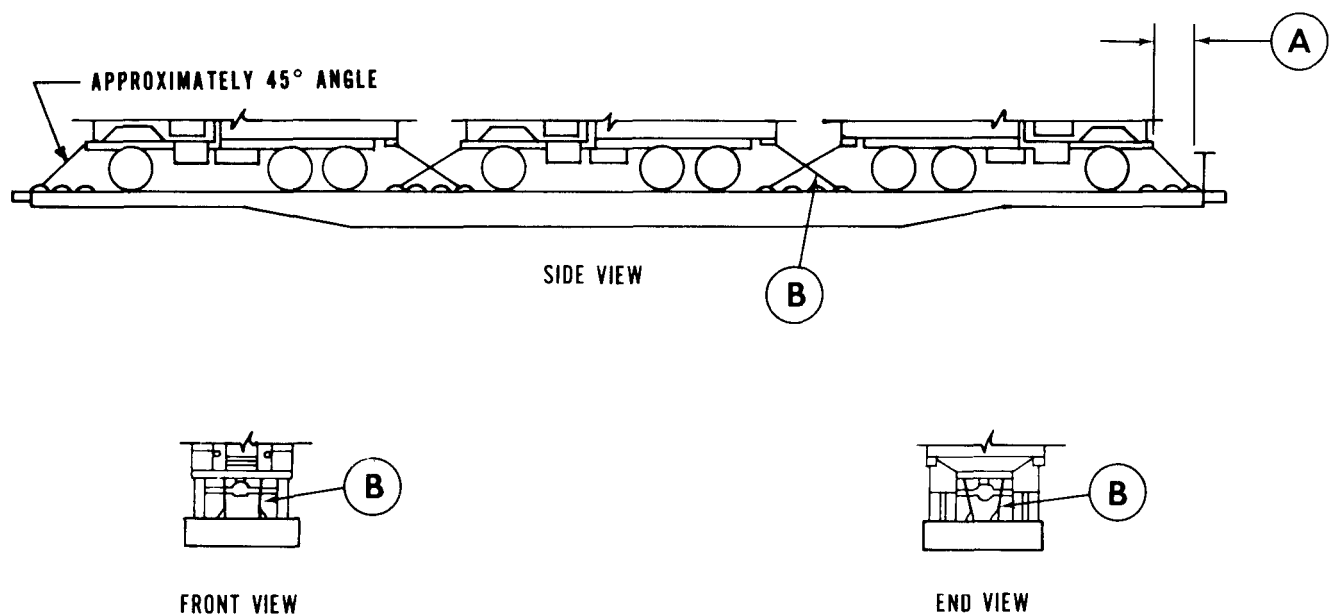


Figure 7-3. Securing 2-1/2-ton, 6x6 trucks on a flatcar equipped with center tiedown rails.

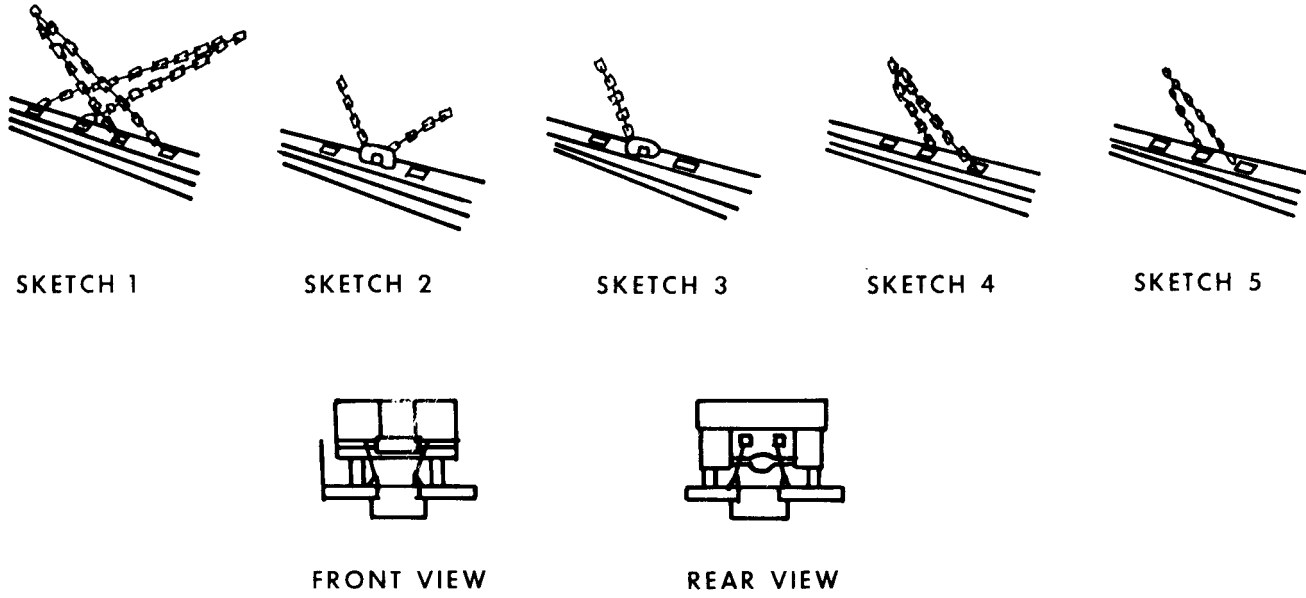


Figure 7-4. Securing 2-1/2-ton, 6x6 trucks on cushioned rub-rail flatcars.

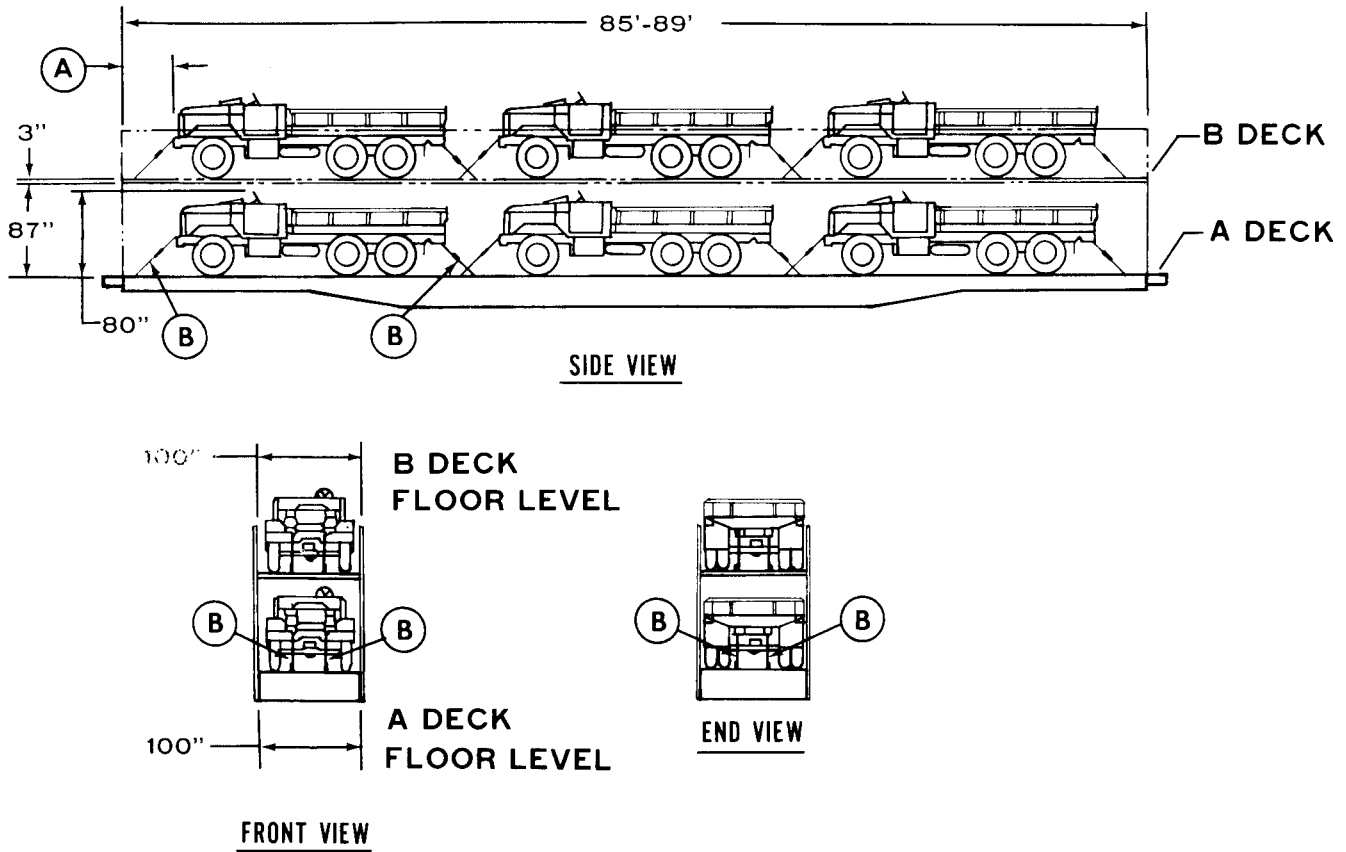


Figure 7-5. Securing 2-1/2-ton, 6x6 trucks on bilevel rack cars.

Table 7-1. Bill of Materials for Blocking and Tiedown of Typical 2-1/2-Ton, 6x6 Truck on CONUS General Purpose Flatcars (Figs 7-1 and 7-2)

Item	Description	Approximate quantity
Lumber	Douglas-fir, or comparable lumber, straight-grain, free from material defects; Fed Spec MM-L-751H:	
	2- x 4-in.	54 ft
	2- x 6-in.	18 ft
	6- x 8-in.	18 ft
Nails	Common, steel; flathead, bright, or cement-coated; para 3.6.11.2, Fed Spec FF-N-105B:	
	12d	30
	20d	72
	40d	60
Wire rope	Type I, general purpose; class 2, 6x19, improved plow steel, wire strand core or IWRC; Fed Spec RR-W-410C: 1/2-in.	100 ft
Clamps	Wire rope, U-bolt clips, saddled, single-grip, forged steel, Crosby heavy-duty, or equal; Fed Spec FF-C-450D:	
	1/2-in.	24
Thimbles	Standard, open-type: 1/2-in.	8
Cushioning material	Waterproof paper, or suitable material	as required
Blocks	Chock block; see detail 1, figure 7-2	12

Table 7-2. Application of Materials for Blocking and Tiedown of Typical 2-1/2-Ton, 6x6 Truck on CONUS General Purpose Flatcar (Figs 7-1 and 7-2)

Item	No. Required	Application
A		Brake-wheel clearance. Minimum clearance required is 6 in. above, in back of, and on both sides of and 4 in. underneath wheel (fig 7-1).
B	12	Chock blocks (detail 1, fig 7-2). Locate 45° portion of block against front and rear of front wheels, in front of inside and outside intermediate wheels, and in back of inside and outside rear wheels. Nail heel of block to car floor with three 40d nails, and toenail that portion of block under tire to car floor with two 40d nails before items C and D are applied.
C	1 ea per Item D	Suitable material such as waterproof paper or burlap. Locate bottom portion under item D. The top portion should extend 2 in. above item D (detail 2, fig 7-2).
D	6	Blocks. Each consists of one piece of 2- x 6- x 36-in. lumber and three pieces of 2- x 4- x 36-in. lumber (detail 2, fig 7-2). Nail one 2- x 6- x 36-in. piece to the edge of one of the 2- x 4- x 36-in. pieces with five 12d nails. Place against tire, with item C in place, and nail to car floor through 2- x 4- x 36-in. piece, with four 20d nails. Nail other two 2- x 4- x 36-in. pieces to one below in like manner (detail 2, fig 7-2).
E	4	Wire rope, 1/2-in. Attach through the vehicle tiedown shackle, in a complete loop, through the stake pocket on the same side of the car (sketch 1, item E, fig 7-2). A thimble is to be placed at the bottom of each stake pocket and secured to wire rope with cable clip (clamp) (sketch 1, item G, fig 7-2).
F	24	Clamps, 1/2-in. Secure the ends of the wire rope, at the overlap area, with four clamps each, and space 3-1/2-in. apart with a minimum of 6 in. from ends of cable. Place one additional clamp to secure thimble and wire rope together at each tiedown shackle and stake pocket (sketch 1, item F, fig 7-2).
G	8	Thimble, open-type, 1/2-in. Place one at bottom of each stake pocket and through each vehicle tiedown device (sketch 1, item G, fig 7-2).

General Instructions

1. All handbrakes are to be firmly set with the hand levers wired or blocked. Gearshift levers for automatic or conventional transmissions must be placed and wire-tied in neutral position.
2. Tires are to be inflated to 10 psi above highway operating pressures.
3. See General Rules 2, 3, 4, 5, 7, 9, 10, 14, 15, 19A and 19B appearing in section I of the *General Rules Governing the Loading of Commodities on Open Top Cars and Trailers* published by the Association of American Railroads for further details.

Table 7-3. Application of Chain Tiedown for Securing 2-1/2-Ton, 6x6 Trucks on Flatcars Equipped With Center Tiedown Rails (Fig 7-3)

Item	No. Required	Application
A		Brake-wheel clearance. Minimum clearance required is 6 in. above, in back of, and on both sides of and 4 in. underneath wheel.
B	4 ea unit	1/2-in. dia. alloy steel chain proof-tested to minimum of 22,500 lb for vehicles over 16,000 lb and up to 25,000 lb, inclusive. 1/2-in. dia. alloy steel chain, extra strength, proof-tested to minimum of 27,500 lb for vehicles over 25,000 lb and up to 40,000 lb, inclusive.

General Instructions

1. Shippers should specify cars equipped with tiedown devices in the quantity shown in Item B when ordering specialized railway equipment. When carriers furnish cars that do not have built-in chains and tensioning devices, chains and turnbuckles of appropriate size and strength will be used for securement of vehicles. Load binders are not be used in lieu of turnbuckles to tension tiedown chains.
2. Vehicles must face in the same direction and be uniformly spaced along the length of the car to allow sufficient space at each end of the car and between the vehicles for securement. Apply tiedowns parallel to each other at the same end of the vehicle and from the vehicle tiedown point to the car tiedown facility. The angle of the tiedown should be as close to 45° as possible. The length of vehicles loaded on a 75-ft car precludes facing all in the same direction, one vehicle should be reversed to insure application of tiedown at a floor angle of 45°.
3. Handbrakes must be set.
4. Gearshift levers on vehicles equipped with automatic or standard transmissions must have the gearshift lever wire-tied in neutral position.
5. Open hooks must be secured with wire over the opening to prevent the hook from becoming disengaged from chain link to which it is secured.
6. Turnbuckles used to tighten chains must be wired or locked to prevent them from turning during transit unless turnbuckles are equipped with self-locking devices.
7. When vehicles are shipped in a loaded configuration, the gross weight of the vehicle and cargo combined must be determined in order to assure that the proper size and/or number of tiedowns are used to secure the vehicles to the railcar. The "weight" column of table 2-1 may be used as a base figure to determine the new restraint requirements imposed by the additional weight of the cargo.
8. Method of loading as shown is applicable to vehicles weighing up to 40,000 lb each. Vehicles in the quantity shown in table 7-4 can be loaded on 60-ft, and 89-ft cars.

Table 7-4. Quantity of 2-1/2-Ton, 6x6 Trucks That Can Be Loaded on Railroad Cars With Center Tiedown Rails

Model	Description (2-1/2-Ton, 6x6)	Quantity per car				Approximate weight (lb)*
		60-ft	75-ft	85-ft	89-ft	
M48	Tractor, WWN	2	3	3	3	11,841
M275	Tractor, WWN	2	3	3	3	11,590
M35	Cargo, WWN	2	2	3	3	13,700
M36	Cargo, WWN	2	2	3	3	15,440
M49	Tank, WWN	2	2	3	3	15,190
M50	Tank, WWN	2	2	3	3	15,595
M59	Dump, WWN	2	2	3	3	14,460
M342A2	Dump, WWN	2	2	3	3	15,800
M292	Van, Expansible, WWN	2	2	2	3	21,858
M109	Van, Shop, WWN	2	2	3	3	15,646
M60	Wrecker, WWN	2	2	3	3	23,960
M108	Wrecker, WWN	2	2	3	3	19,785

*Weights are for the heaviest model in each series.

Table 7-5. Application of Chain Tiedown For Securing 2-1/2-Ton, 6x6 Trucks on Flatcars Equipped With Cushioned Rub-Rail (Fig 7-4)

Item	No. Required	Application
A		Brake-wheel clearance. Minimum clearance required is 6 in. above, in back of, and on both sides of and 4 in. underneath wheel.
B	As required	Double chain tiedown device, 1/2-in.-dia. Excelloy or similar chain, proof-tested to 27,500 lb. Attach one chain through each of front tiedown shackles of one vehicle and the other chains through each of tiedown shackles located at rear of the other vehicle (fig 7-4). 1/2-in.-dia. chain with grabhook and turnbuckle equipped with a safety-lock device, proof-tested to a minimum of 22,500 lb, may be substituted. When length of vehicle does not provide sufficient space to permit application of tiedowns at an angle not to exceed 45°, use conventional chain tiedowns (sketches 4 and 5, fig 7-4) proof-tested to a minimum of 22,500 lb, crossed as shown in sketch 1, fig 7-4. Attach one end of chain to rub-rail of car by looping chain through slots in rub-rail. Attach other end of chain to vehicles by looping the chain through the tiedown shackles. Single Brandon tiedown device shown in sketch 4 may be substituted if desired.
C	4 per railcar	Single chain tiedown device, 1/2-in.-dia. Excelloy or similar chain, proof-tested to a minimum of 27,500 lb (sketch 3, fig 7-4). Locate as shown. Attach one chain device through each of the two front tiedown shackles of first vehicle and through each of the two rear tiedown shackles of last vehicle. 1/2-in.-dia. chain with grabhook and turnbuckle equipped with a safety-lock device, proof-tested to a minimum of 22,500 lb may be substituted. Attach the same as described for item B above.

General Instructions

1. Shippers should specify cars equipped with tiedown devices in the quantity required for items B and C when ordering specialized railroad freight equipment. In the event that conventional chain tiedowns are supplied in lieu of devices specified, two of the four tiedowns required for each vehicle must have an adjustable turnbuckle equipped with a safety-lock device located in the chain for tensioning purposes. The chains must be applied in the following manner:

a. Attach the two chain tiedowns without the turnbuckle to one end of the vehicle and to the car tiedown facility. Pull as tight as possible by hand, and attach the hook into the appropriate link of the chain.

b. Attach the two chains with the adjustable turnbuckles to the opposite end of the vehicle and to the car tiedown facility. All four chain tiedowns should then be made taut by tightening the turnbuckles. Load binders are not to be used in lieu of turnbuckles to tension tiedown chains.

2. Vehicles must face in the same direction and be uniformly spaced along the length of the car to allow sufficient space at each end of the car and between the vehicles for securement. Apply tiedowns parallel to each other at the same end of the vehicle and down from the vehicle point of attachment to the tiedown facility. The angle of tiedown must not be greater than 45°.

3. Tiedowns *are not* to be secured to axles of vehicles.

4. Handbrakes on vehicles *must not* be set.

5. Gearshift levers must be wire-tied in the neutral position.

6. Open hooks must be secured with wire over the opening to prevent the hook from becoming disengaged from the chain link to which it is secured.

7. Turnbuckles used to tighten chains must be wired or locked to prevent them from turning during transit, unless the turnbuckles are equipped with self-locking devices.

8. When conventional chains are tensioned, care should be taken to avoid tightening to such an extent that the rub-rail may start to rise. Tiedown devices, when attached to vehicle tiedown shackles, should not be tensioned beyond the point where the springs of the vehicle start to compress. After chains are tightened, they should be struck with a hammer or bar to eliminate any possible misalignment of links. Further tightening may be required to take up any slack that develops due to link alignment.

9. Tiedown devices are not to be attached to the slots in the cushioned rub-rail adjacent to the position of the recessed trailer hitches. This is to preclude the flange edge of the device, which rests over the inner side of the car's center sill, from coming in contact with any portion of the trailer hitch when in recessed position and thereby restricting the action of the cushioned rub-rail. When placement of vehicles on cars determines that securement points to the car would fall in this area, conventional chain tiedowns (with or without turnbuckles) attached through the rub-rail slots will be used.

10. When vehicles are shipped in a loaded configuration, the gross weight of the vehicle and cargo combined must be determined in order to assure that the proper size and/or number of tiedowns are used to secure the vehicles to the railcar. The "approximate weight" column of table 7-4 may be used to determine the new restraint requirements imposed by the additional weight of the cargo.

11. Method of loading as shown is applicable to vehicles weighing up to 25,000 lb. Vehicles in the quantity shown in table 7-4 can be loaded on 85-ft. or longer cushioned rub-rail cars.

Table 7-6. Application of Chain Tiedown for Securing 2-1/2-Ton, 6x6 Trucks on Bi-Level Rack Cars (Fig 7-5)

<i>Item</i>	<i>No. Required</i>	<i>Application</i>
A		Brake-wheel clearance. Minimum required is 6 in. above, in back of, on both sides of and 4 in. underneath wheel.
B	4 each vehicle	Chain tiedown device with a minimum proof-test of 22,500 lb. Attach one tiedown chain over and around each front and rear lifting shackle, and attach hook into an appropriately located link of each chain. Care must be exercised to ensure that tiedowns are properly tensioned and that all slack is removed from the tiedown devices.

General Instructions

1. Shippers should specify cars with normal complement of tiedown chains when ordering rail equipment.
2. Load binders are not to be used as tensioning devices.
3. Vehicles must face in the same direction and be uniformly spaced along the length of the car to allow sufficient space at each end of the car and between the vehicles for securement. Apply chain tiedowns parallel to each other at the same end of the vehicle. The angle of tiedown shall not exceed 45°.
4. Tiedowns, when installed, shall not come in contact with electrical wiring, vehicle controls, and other appurtenances.
5. Handbrakes and/or parking brakes on vehicles must be set in ON position.
6. Gearshift levers must be secured with a wire tie in a neutral position.
7. Open hooks must be secured with wire over the openings to prevent the hook from becoming disengaged from the chain link to which it is secured.
8. Turnbuckles, when used to tighten chains, must be of the same or higher proof-test as the chains and must be wired or locked to prevent them from turning during transit unless the turnbuckles are equipped with self-locking devices.
9. A and B deck car floors must have a 100-in. clear span width, maintained to a height of 80 in. above A deck car floor.
10. Vehicles must be centered on car floors to maintain a 1-1/2-in. minimum clearance between vehicle and rack framework.
11. On 85-ft. railcars, three vehicles not exceeding 304 in. in length may be loaded on each deck. On 89-ft. railcars, three vehicles not exceeding 320-in. in length may be loaded on each deck.
12. Weight of vehicles loaded on either A or B deck shall not exceed 50,000 lb or the load limit of the individual decks, whichever is less. When car and rack are both equipped with cushioning devices, 18,000-pound proof-test chain may be used to secure the vehicle.

Section III. TRANSPORT ON FOREIGN RAILWAYS

7-7. General

The transportability guidance contained in this section is applicable when the 2-1/2-ton, 6x6 trucks are transported on foreign railways. Consideration is given to single and multiple vehicle movements on the types of railcars normally used for the movement of these types of vehicles. The vehicles, when loaded on a suitable railcar, can be transported in their reduced height configuration *with restrictions* within European countries complying with the Passe-Partout International (PPI); in most of the countries in the Middle East; and in South America, Australia, India, and Pakistan. In the Middle East and South America, the clearances vary by country and each will require a separate check. In Australia, India, and Pakistan, wide- or broad-gauge railways provide greater clearances and fewer restrictions. Because of

the various designation systems used by different countries, foreign railcars are not easily classified. In addition, clearances vary, in many cases, from one country to the next and within one country; consequently, evaluation of transportability capability must be made on an individual basis.

7-8. Transport on Foreign Service Flatcars

a. General. The vehicles can be transported on a number of foreign service flatcars.

b. Materials. The materials required for blocking and tiedown of the vehicles on foreign service flatcars are essentially the same as those used within CONUS. For general guidance, refer to figures 7-1 and 7-2 and tables 7-1 and 7-2. Detailed guidance is contained in the 4th Transportation Command Pamphlet 55-2, *Tiedown Guide for Rail Movements*.

APPENDIX A

CONVERSION TABLES

1. Common Metric Abbreviations.

m = meter
dm = decimeter
cm = centimeter
mm = millimeter

kg = kilogram
km = kilometer
MT = metric ton

2. Linear Measure.

1 mi = 1,609.35 m
1 yd = 0.9144 m
1 ft = 0.3048 m
1 in. = 0.0254 m

1 km = 0.6214 mi
1 m = 1.0936 yd
1 m = 3.2808 ft
1 m = 39.3700 in.

1 m = 10 dm = 100 cm = 1000 mm

3. Surface Measure.

1 sq yd = 0.8361 sq m
1 sq ft = 0.0929 sq m
1 sq in. = 0.00065 sq m

1 sq m = 1.196 sq yd
1 sq m = 10.764 sq ft
1 sq m = 1,550 sq in.

4. Cubic Measure.

1 cu yd = 0.76455 cu m
1 cu ft = 0.02831 cu m
1 cu in. = 0.000016 cu m

1 cu m = 1.31 cu yd
1 cu m = 35.30 cu ft
1 cu m = 61,023 cu in.

5. Weight.

1 STON = 907.185 kg
1 lb = 0.45359 kg

1 kg = 2.2046 lb
1 MT = 1,000 kg
1 MT = 2,204.62 lb

6. The following simplified conversion factors are accurate to within 2 percent for quick computations:

- a. *Inches to centimeters*—Multiply in. by 10 and divide by 4.
- b. *Yards to meters*—Multiply yd by 9 and divide by 10.
- c. *Miles to kilometers*—Multiply mi by 8 and divide by 5.
- d. *Pounds to kilograms*—Multiply lb by 5 and divide by 11.

Paragraph 7-37, FM 55-15 and paragraph 2-15, TM 55-450-15 contain additional detailed conversion factors.

7. The following conversions are provided for guidance when procuring lumber, wire rope, or wire in areas that use the metric system. Lumber sizes are rounded off to nearest 1/2 cm.

a. Lumber.

2-in. x 4-in. x desired length = 5-cm x 10-cm x desired length
1-in. x 6-in. x desired length = 2.5-cm x 15-cm x desired length
6-in. x 8-in. x desired length = 15-cm x 20-cm x desired length
1-in. x 12-in. x desired length = 2.5-cm x 30-cm x desired length
(length normally expressed in ft or m.)

b. Wire rope.

3/8-in. dia = 9.5-mm dia
1/2-in. dia = 12.7-mm dia

5/8-in. dia = 15.8-mm dia

3/4-in. dia = 19.0-mm dia

7/8-in. dia = 22.2-mm dia

1-in. dia = 25.4-mm dia

1 1/4-in. dia = 31.7-mm dia

1 1/2-in. dia = 38.1-mm dia

Round off to next higher whole mm of available wire rope sizes.

c. *Wire.*

No. 8 gauge annealed (11/64-in. dia) = 4.37-mm dia. Round off as in *b* above.

APPENDIX B

REFERENCES

1. Army Regulations (AR)
 - 55-29 Military Convoy Operations in CONUS
 - 55-162 Permits for Oversize, Overweight, or Other Special Military Movements on Public Highways in the United States
 - 55-355 Military Traffic Management Regulations
 - 70-39 Criteria for Air Transport and Airdrop of Material
 - 95-16 Weight and Balance-Army Aircraft
 - 385-40 Accident Reporting and Records
2. Field Manuals (FM)
 - 1-100 Army Aviation Utilization
 - 5-36 Route Reconnaissance and Classification
 - 55-9 Unit Air Movement Plan
 - 55-13 Air Transport of Supplies and Equipment: Standard Loads in Air Force C-5 Aircraft
 - 55-15 Transportation Reference Data
3. Supply Bulletins (SB)
 - 700-20 Army Adopted/Other Items Selected for Authorization/List of Reportable Items
4. Technical Manuals (TM)
 - 5-330 Planning and Design of Roads, Airbases and Heliports in Theater of Operations
 - 5-725 Rigging
 - 9-2320-209-10 Operator's Manual, 2-1/2-Ton, 6x6 Trucks
 - 55-405-9 Army Aviation Maintenance Engineering Manual: Weight and Balance
 - 55-450-10/1 Air Transport of Supplies and Equipment Standard Loads in US Air Force C-130E Aircraft
 - 55-450-10/2 Air Transport of Supplies and Equipment Standard Loads in Air Force C-141 Aircraft
 - 55-500 Marine Equipment Characteristics and Data
 - 55-513 Military Stevedoring
5. Air Force Manuals
 - 1-1B-40 Handbook of Weight and Balance Data
 - 1C-5A-9 Loading Instructions USAF Series C-5 Aircraft
 - 1C-130-9 Loading Instructions USAF Series C-130 Aircraft
 - 1C-141A-9 Loading USAF Series C-141 Aircraft

NOTE

Air Force Technical Orders that have not been integrated into the Department of the Army publications system may be requisitioned through The Adjutant General Office in accordance with AR 310-71.

6. Other Publications and Source of Procurement

Rail and Highway Shipment

Code of Federal Regulations

Title 49-Transportation, Parts 170-179

Available from: Superintendent of Documents
US Government Printing Office
Washington, DC 20402

Association of American Railroads Rules Governing the Loading of Commodities on Open-Top Cars

Section No. 1-General Rules

Section No. 6-Rules Governing the Loading of Department of Defense Material

Available from: Secretary, Mechanical Division
Association of American Railroads
ATTN: J. H. Bean
59 E. Van Buren St.
Chicago, IL 60605

R. M. Graziano's Tariff No. 29 (or reissues thereof). Hazardous Materials Regulations of the Department of Transportation, including Specifications for Shipping Containers

Available from: R. M. Graziano, Agent
1920 L Street NW
Washington, DC 20036

American Trucking Association, Inc., Agent

Publication ICC ATA 111-A/FMC F-1-15 (or reissues thereof).

Department of Transportation Regulations Governing Transportation of Hazardous Materials by Motor, Rail and Water, Including Specifications for Shipping Containers

Available from: Richard H. Hinchcliff, Issuing Officer
1616 P Street NW
Washington, DC 20036.

Water Shipment

Code of Federal Regulations

Title 46-Shipping, Part 146

Available from: Superintendent of Documents
US Government Printing Office
Washington, DC 20402

Agent R. M. Graziano's Water Carrier Tariff No. 28 (or reissues thereof).

Regulations Governing the Transportation or Storage of Explosives or Other Dangerous Articles or Substances, and Combustible Liquids on Board Vessels

Available from: R. M. Graziano, Agent
1920 L Street NW
Washington, DC 20036

7. Department of Transportation

Special Permit No. 3498
Military Traffic Management Command
ATTN: MTMC-SS
Washington, DC 20315

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