

TB 9-2320-279-12-1

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

OPERATOR'S

LIFT AND TOW PROCEDURES

USING THE

MULTI-USE ADAPTER (MUA)

**M977 SERIES, 8X8 HEAVY EXPANDED MOBILITY
TACTICAL TRUCKS (HEMTT)**

**TRUCK, WRECKER-RECOVERY, M984A2
TRUCK, WRECKER-RECOVERY, M984A2R1**

**NSN 2320-01-492-8224
NSN 2320-01-492-8233**

Approved for public release; distribution is unlimited

**Headquarters, Department of the Army, Washington, DC
FEBRUARY 2006**

TB 9-2320-279-12-1

WARNING

Hold cross tube when removing springs. Cross tube may swing and cause adapters to slide resulting in personal injury.

WARNING

When end caps are removed from cross tube, adapters may slide off causing personal injury.

WARNING

MUAs are heavy, handle carefully or serious personal injury may result.

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

WARNING

Keep out from under retrieval system and disabled vehicle when raised off the ground.

WARNING

The M984A1 should not be operated at speeds over 15 MPH (24 km/hr) except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. Excessive speeds can result in loss of control, serious injury or death

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground or serious personal injury or death can result.

WARNING

If disabled vehicle is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

WARNING

As springs and caps are removed, cross tube can swing in all directions and adapters may slid off and cause personal injury.

WARNING

Do not allow MUAs to swing around, personal injury may result.

LIST OF EFFECTIVE PAGES / WORK PACKAGES

NOTE: Zero in the "change No." column indicates an original page or work package

Date of issue for original manual is:

Original 17 February 2006

**TOTAL NUMBER OF PAGES FOR FRONT AND READ MATTER IS 8 AND TOTAL
NUMBER OF PAGES IS 134 CONSISTING OF THE FOLLOWING.**

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WP 0001-1	0				
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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., 17 February 2006

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OPERATOR'S
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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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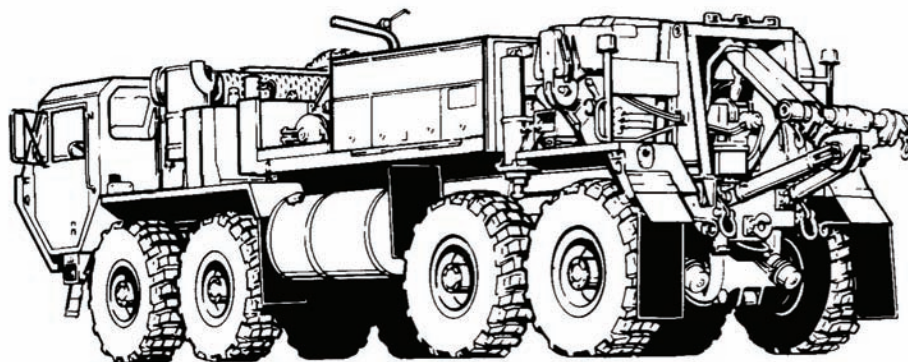
TABLE OF CONTENTS

<u>Work Package</u>	<u>Page</u>
0001 General Information.....	0001-1
0002 Front Lift and Tow of FMTV.....	0002-1
0003 Front Lift and Tow of MTRV.....	0003-1
0004 Rear Lift and Tow of MTRV.....	0004-1
0005 Front Lift and Tow of M939.....	0005-1
0006 Front Lift and Tow of M35.....	0006-1
0007 Front Lift and Tow of M1008.....	0007-1
0008 COEI Additions.....	0008-1
0009 Illustrated List of Assembled Parts.....	0009-1

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OPERATOR MAINTENANCE

GENERAL INFORMATION



INTRODUCTION

This document presents procedures for the HEMTT wrecker using the Multi-Use Adapters (MUAs) to lift and tow the following vehicles; FMTV (front tow only), MTRV (front and rear tow), M939 (front tow only), M35 (front tow only), and the M1008 (front tow only). This manual is to be used as a supplement to the lift and tow procedures in TM 9-2320-279-10-2 and in conjunction with the operator's manual for the disabled vehicle. These procedures do not replace or override any safety procedures, warnings, cautions, or notes in the existing manuals.

ITEMS TO BE REMOVED

To allow the addition of the MUAs, spacers, and pins necessary for these procedures, the following equipment is deleted from the Components of End Item (COEI) of the HEMTT wrecker:

Table 1. Components of End Item to be Removed.

Part Number	National Stock Number (NSN)	Description	Qty.
1481890W	2590-01-226-3351	LIFT ADAPTER ASSY, LH	1
1481880W	2540-01-226-3350	LIFT ADAPTER ASSY, RH	1

ITEMS TO BE ADDED

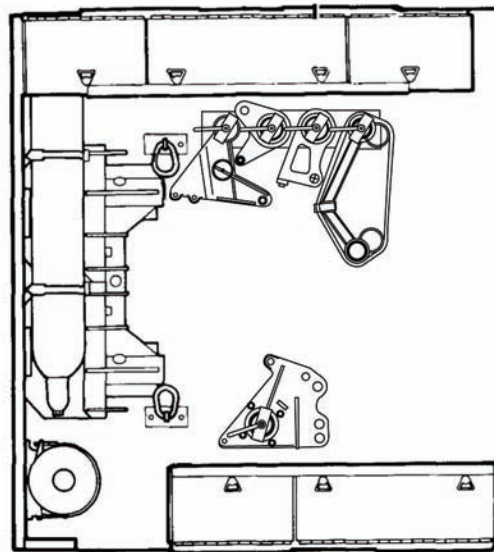
The following items are added to the COEI of the HEMTT wrecker:

Table 2. Components of End Items to be Added.

Part Number	National Stock Number (NSN)	Description	Qty.
3483699	5340-01-516-2058	ADAPTER, MULTI-USE, LH, WELDMENT	1
3484856	5340-01-516-2059	ADAPTER, MULTI-USE, RH, WELDMENT	1
3483739	5315-01-515-6847	PIN, FMTV M/U ADAPTER UPPER	2
3483740	5315-01-515-6846	PIN, FMTV/HMMV M/U ADPTR, LWR	2
3483735	5315-01-516-2062	PIN, MTRV/939 M/U ADAPTER	4
3406240	5315-01-490-7325	PIN, QUICK	8
1KK602		SPACER, 1.5W, MULTI-USE	2
1KK601		SPACER, 3.0W, MULTI-USE	2

EQUIPMENT BODY

This is the configuration of the equipment that is to be secured on the equipment body floor of the HEMTT wrecker after the addition of the MUAs;



REFERENCES

HEMTT (paper manual) TM 9-2320-279-10-2
 HEMTT (IETM) TM 9-2320-315-14&P
 FMTV TM 9-2320-366-10
 MTVR TM 10629-10
 M939 TM 9-2320-272-10
 M35 TM 9-2320-361-10
 M1008 TM 9-2320-289-10

ACRONYMS AND ABBREVIATIONS**Table 3. Acronyms and Abbreviations**

cm	Centimeters
COEI	Components of End letm
FMTV	Family of Medium Tactical Vehicles
ft.	Feet
HEMTT	Heavy Extended Mobility Tactical Truck
in.	Inches
kg	Kilograms
km/hr	Kilometers per Hour
lbs	Pounds
m	Meter
mm	Millimeters
mph	Miles per Hour
MTVR	Medium Tactical Vehicle Replacement
MUA	Multi-Use Adapter
PTO	Power Take-Off
TM	Technical Manual
WP	Work Package

END OF WORK PACKAGE

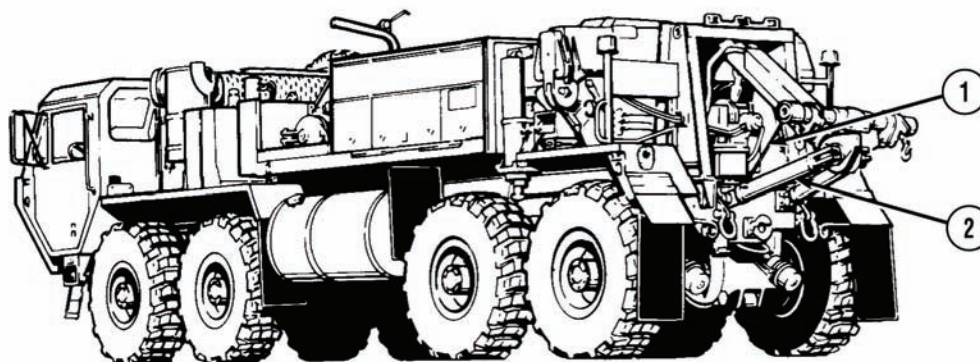
OPERATOR MAINTENANCE
FRONT LIFT AND TOW OF FMTV

FRONT HOOKUP

NOTE

This is a two-soldier task.

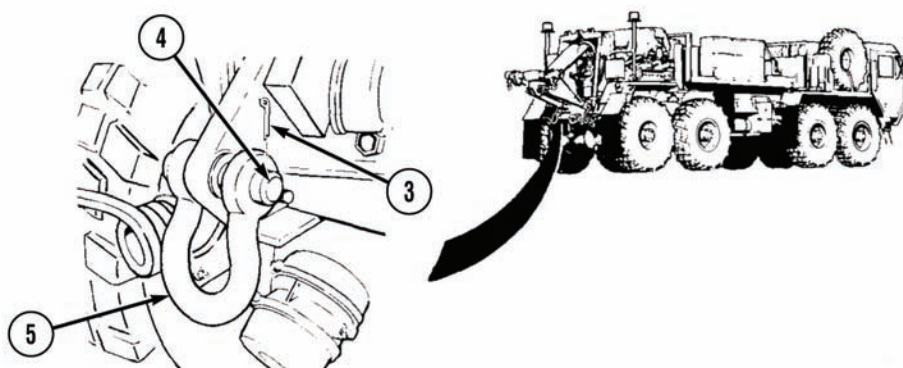
1. Prepare retrieval system for operation (TM 2320-279-10-2).



WARNING

Hold crosstube when removing springs. Crosstube may swing and cause adapters to slide resulting in personal injury.

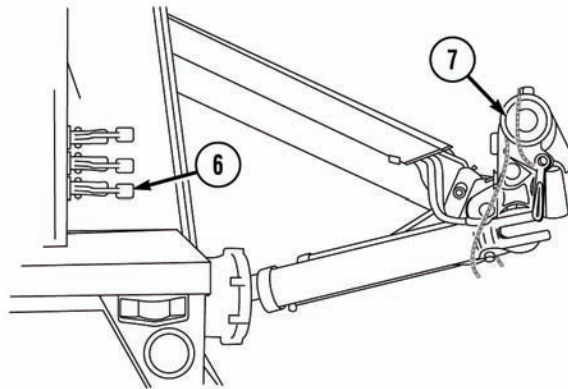
2. Disconnect two springs (1) from tow cylinders (2).



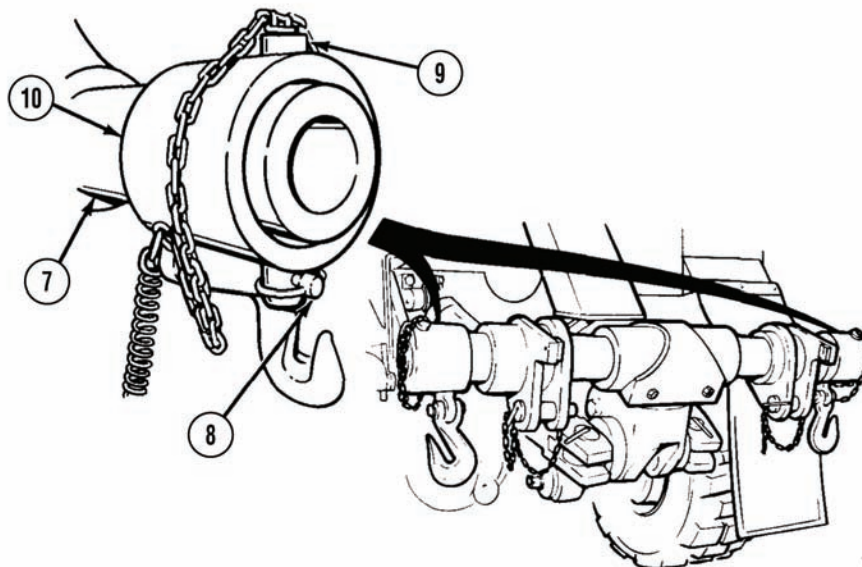
NOTE

Right and left towing shackles are removed the same way.

3. Remove two cotter pins (3), pins (4), and towing shackles (5).



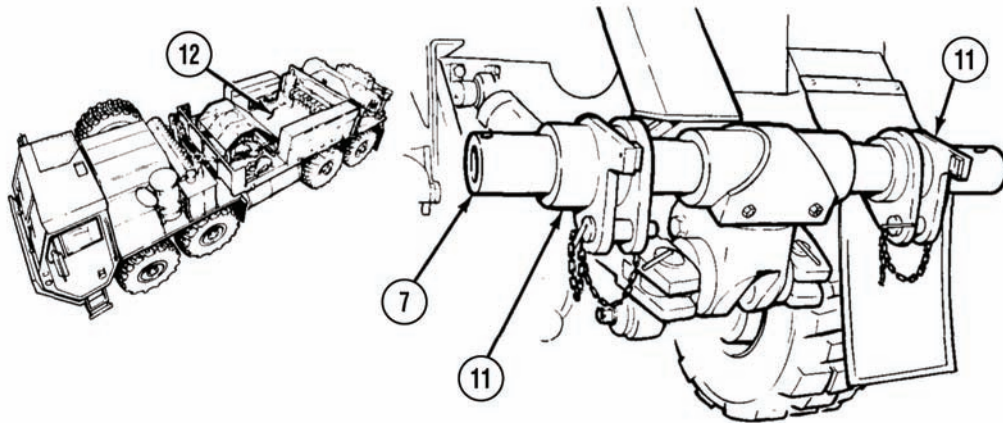
4. Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft. (1 m) above the ground.
5. Position wrecker so that crosstube (7) is approximately 1 ft. (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



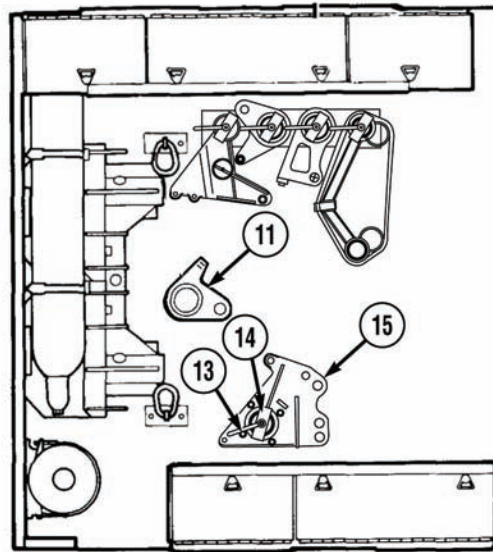
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

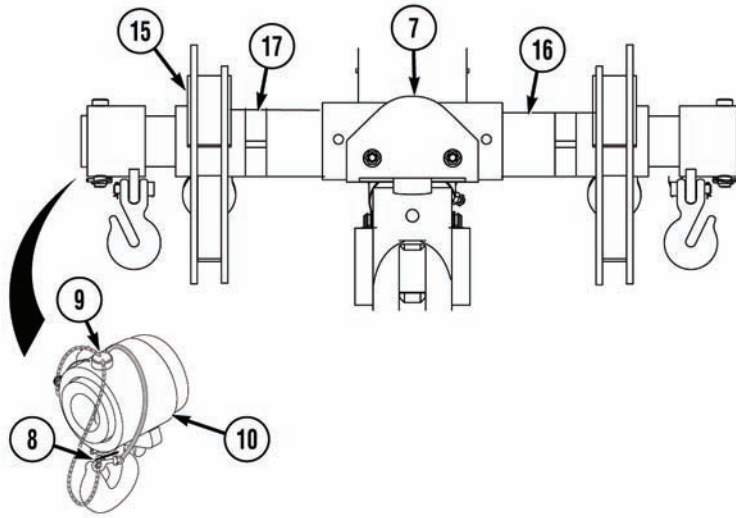
6. Remove two quick pins (8) and pins (9) from end caps (10).
7. Remove two end caps (10) from crosstube (7).



8. Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



9. Remove lock handle (13), lock plate (14), and two Multi-Use Adapters (MUAs) (15).
10. Install two M977 front adapters (11), lock plate (14), and lock handle (13).
11. Remove two 4 in. (102 mm) spacers and two 1.5 in. (38 mm) spacers from stowage.



12. Install two 4 in. (102 mm) spacers (16) on crosstube (7).
13. Install two 1.5 in. (38 mm) spacers (17) on crosstube (7).

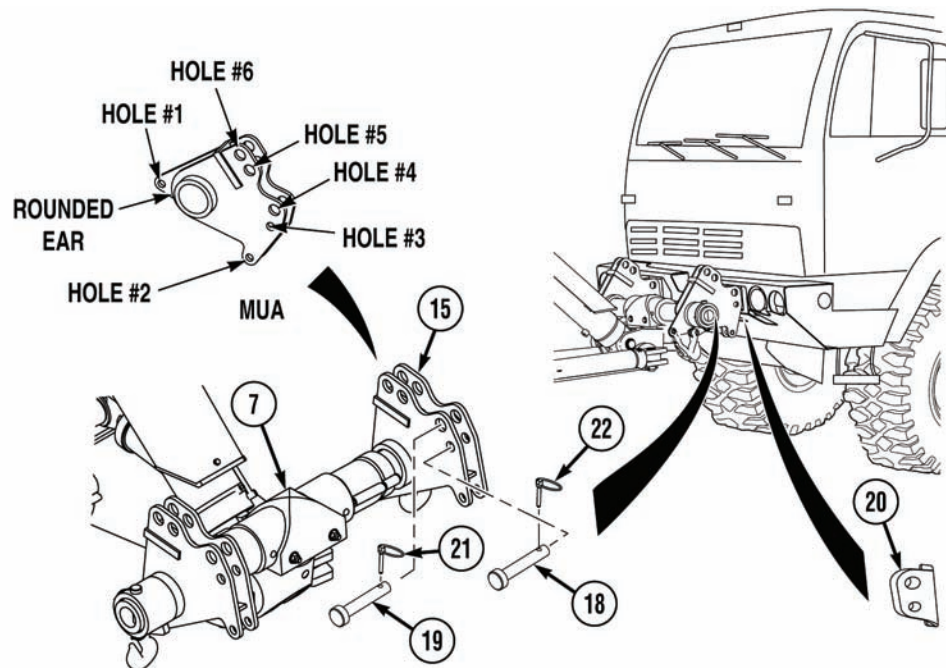
WARNING

- **MUAs are heavy, handle carefully or serious personal injury may result.**
- **Adapters and end caps may slide off when installing and may cause personal injury.**

NOTE

MUAs must be positioned on crosstube with rounded ear of MUA toward center of crosstube.

14. Install two MUAs (15) on crosstube (7) with holes facing tow eyes of disabled vehicle.
15. Install two end caps (10) on crosstube (7).
16. Install two pins (9) and quick pins (8).
17. Attach two springs (1) on tow cylinders (2).



18. Remove two pins (3483740) (18) and two pins (3483739) (19) from stowage.

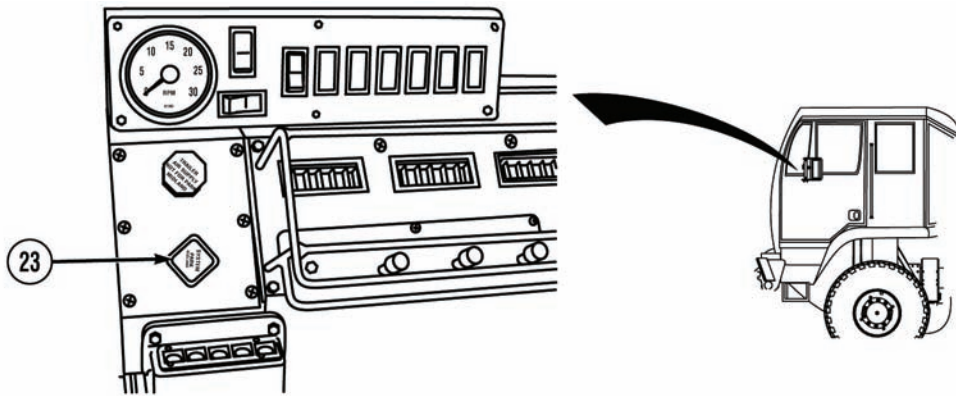
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

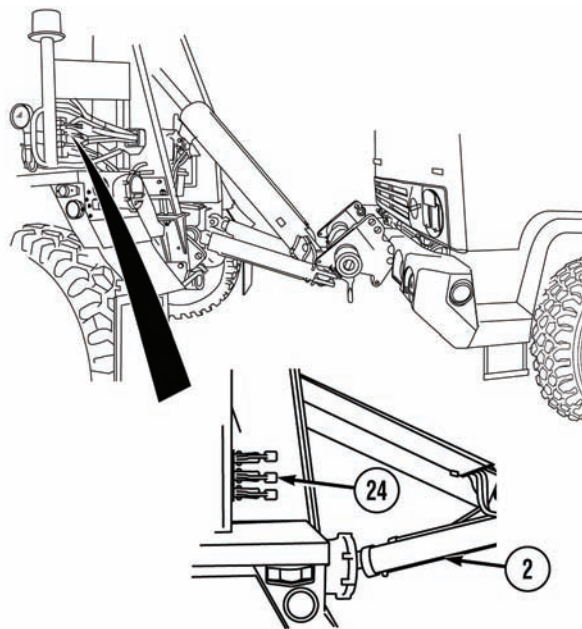
NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

19. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #4 on MUAs (15) align with front tow eyes (20).
20. Insert two pins (19) through MUAs (15) and front tow eyes (20). Install quick pins (21) in pins (19).
21. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #3 on MUAs (15) align with front tow eyes (20).
22. Insert two pins (18) through MUAs (15) and front tow eyes (20). Install quick pins (22) in pins (18).



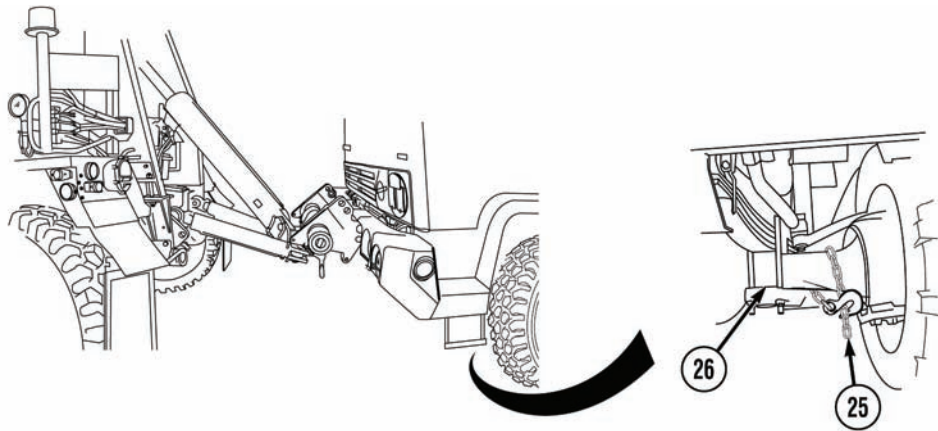
23. Push in PARKING BRAKE (23) on disabled vehicle and remove chocks.



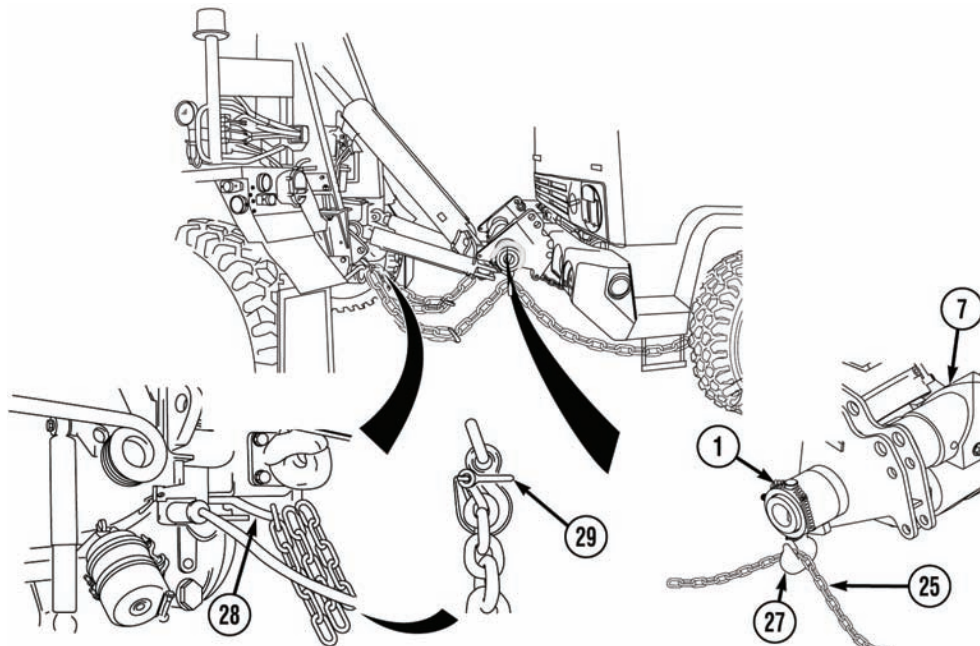
NOTE

Do not lift vehicle off ground when performing step (24).

24. Alternately push in TOW and LIFT CYLINDER control levers (24) until tow cylinders (2) are fully retracted.

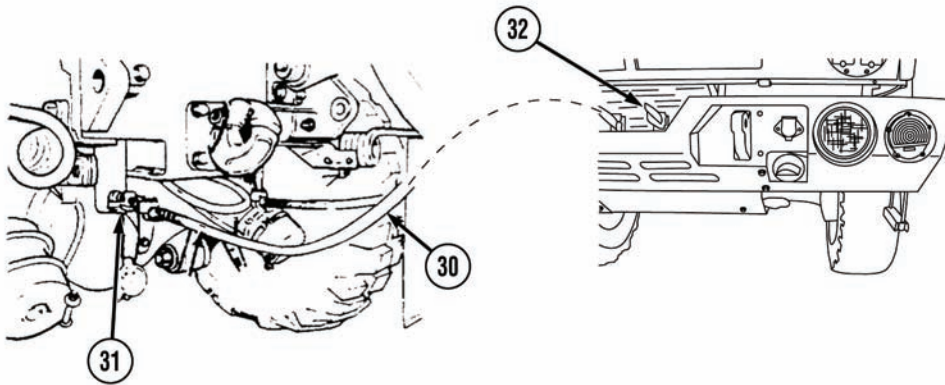


25. Remove two 16 ft. (4.9 m) safety chains (25) from stowage.
26. Route one end of 16 ft. (4.9 m) safety chain (25) over front axle (26) of disabled vehicle.
27. Hook safety chain (25) together in front of axle (26).
28. Repeat steps (26) and (27) for other side of disabled vehicle.



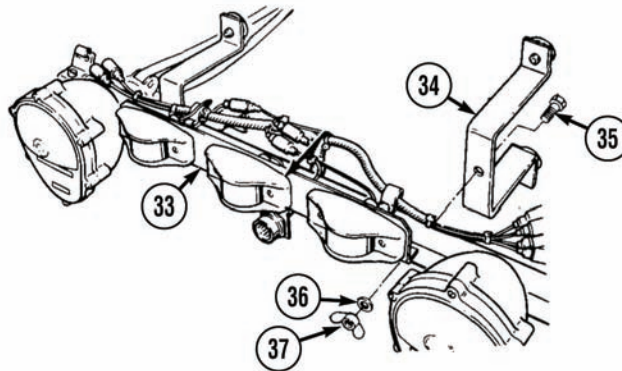
NOTE

- Safety chains can be routed to safety chain hoop or towing shackles. Towing shackles can be used only after towing cylinders are extended.
 - Adjust chain slack so safety chains do not touch the ground.
29. Route two 16 ft. (4.9 m) safety chains (25) to end cap hooks (27) and through safety chain hoop (28) on wrecker, and secure with safety shackles (29).
 30. Wrap two springs (1) around crosstube (7) and secure.

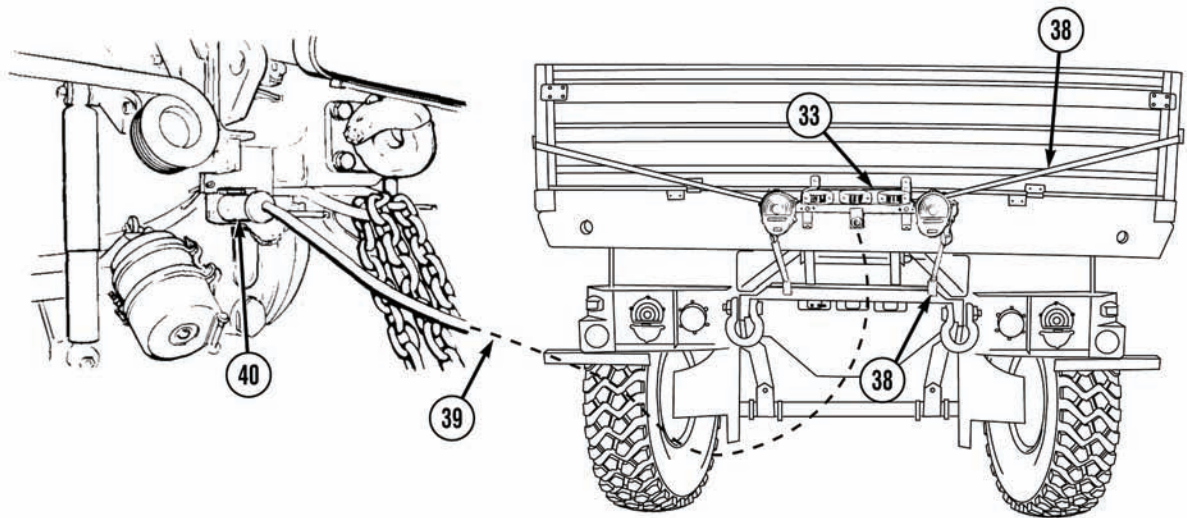
**NOTE**

Rear emergency air hose from wrecker must be connected to the front emergency glad hand on the disabled vehicle. Rear service air hose from wrecker must be connected to the front service glad hand on the disabled vehicle.

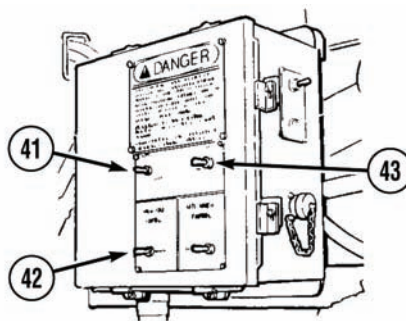
31. Prepare disabled vehicle for towing (refer to FMTV operator's manual).
32. Remove two air lines (30) from stowage and attach to rear glad hands (31) of wrecker.
33. Route two air lines (30) over crosstube and attach to front glad hands (32) of disabled vehicle.



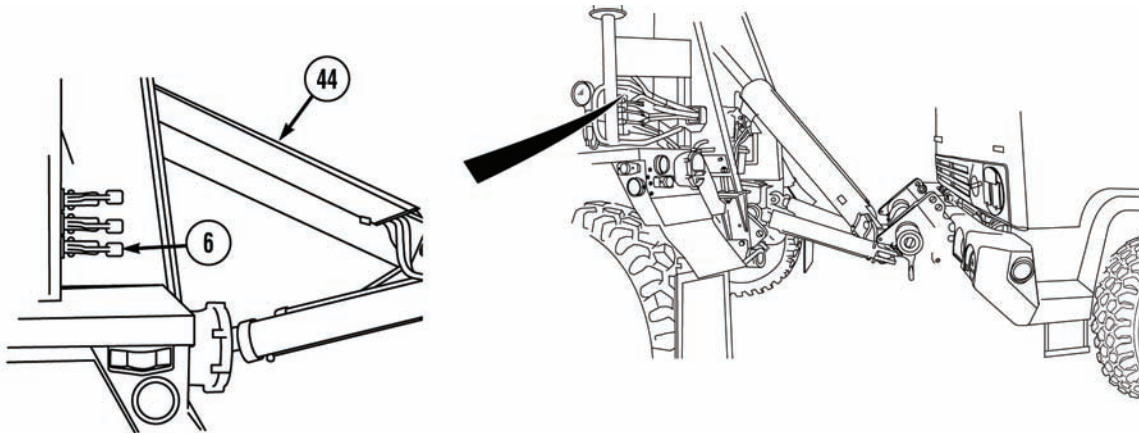
34. Remove emergency tow lights (33) and two brackets (34) from stowage.
35. Install two brackets (34) in center holes of emergency tow lights (33) with two screws (35), washers (36), and nuts (37).



36. Install emergency tow lights (33) on rear of FMTV and fasten securely with straps (38).
37. Remove tow light cable (39) from stowage and connect to emergency tow lights (33).
38. Route other end of tow light cable (39) along disabled vehicle and connect to rear electrical connector (40) on wrecker.
39. Lock disabled vehicle's steering (refer to FMTV operator's manual).



40. Set POWER switch (41) to ON position.
41. Set HIGH IDLE switch (42) to CONTINUOUS.
42. Push and release LATCH switch (43). Engine speed will increase to approximately 1500 rpm.



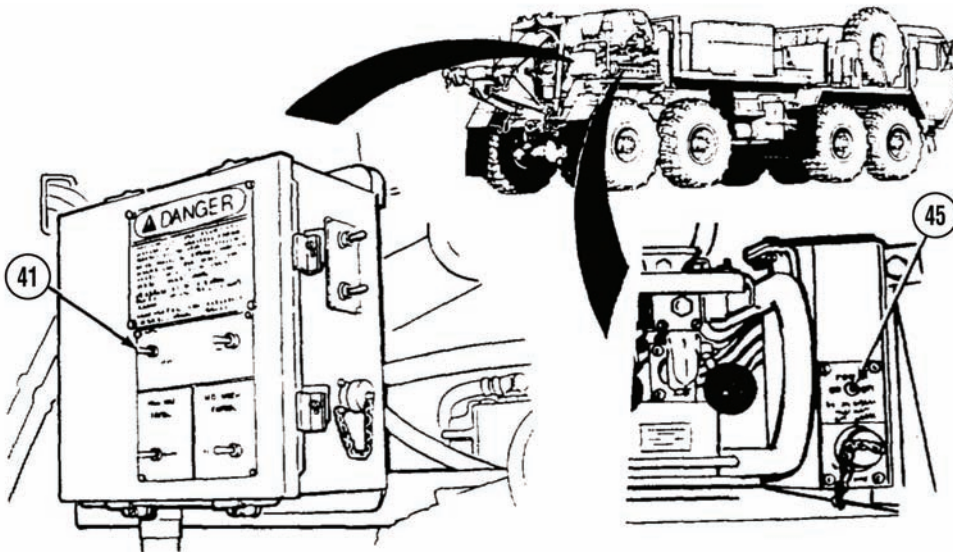
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

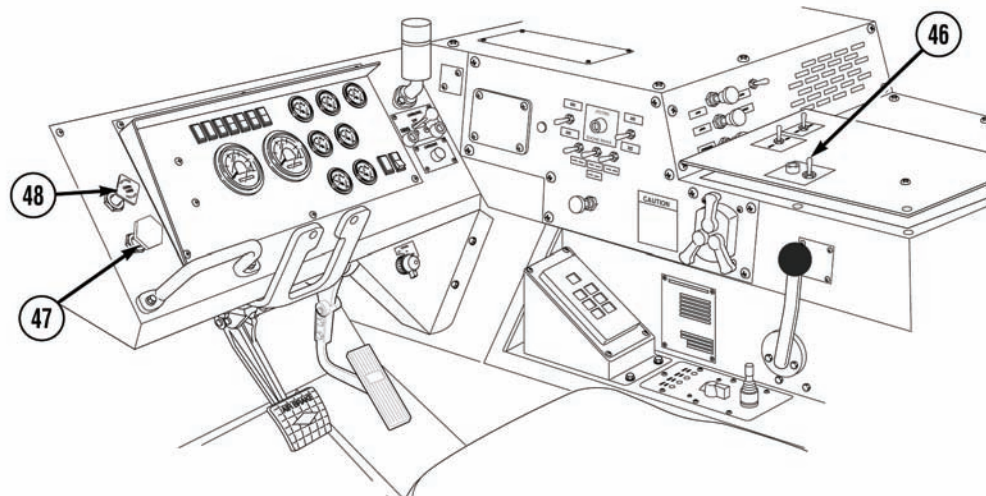
CAUTION

- Make sure all rigging is secure. Loose rigging can become entangled and cause equipment damage.
- Fully retract two tow cylinders before lifting disabled vehicle or damage to equipment may result.

43. Push in LIFT CYLINDER control lever (6) to retract lift cylinder (44) to raise disabled vehicle approximately 1 ft. (30 cm) off ground.
44. Adjust slack in two 16 ft. (4.9 m) safety chains so chains between crosstube and wrecker are approximately 1 ft. (30 cm) off ground.



45. Set POWER switch (41) to OFF position.
46. Set POWER switch (45) to OFF position.



47. Set PTO ENGAGE switch (46) to OFF position.
48. Push in TRAILER AIR SUPPLY control (47).
49. Turn on service drive lights (TM 9-2320-279-10-2).
50. Turn on emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle (refer to FMTV operator's manual).
51. Push in PARKING BRAKE control (48) and select desired gear (TM 9-2320-279-10-2).

WARNING

The M984A1 should not be operated at speeds over 15 MPH (24 km/hr) except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain condition	Maximum speed towed load up to 50,000 lbs (22,700 kg)	Maximum speed towed load above 50,000 lbs (22,700 kg)
On road-level	35 mph (56.3 km/hr)	30 mph (47.3 km/hr)
On road-hilly	30 mph (47.3 km/hr)	20 mph (32.2 km/hr)
Off road	15 mph (24.2 km/hr)	15 mph (24.2 km/hr)

WARNING

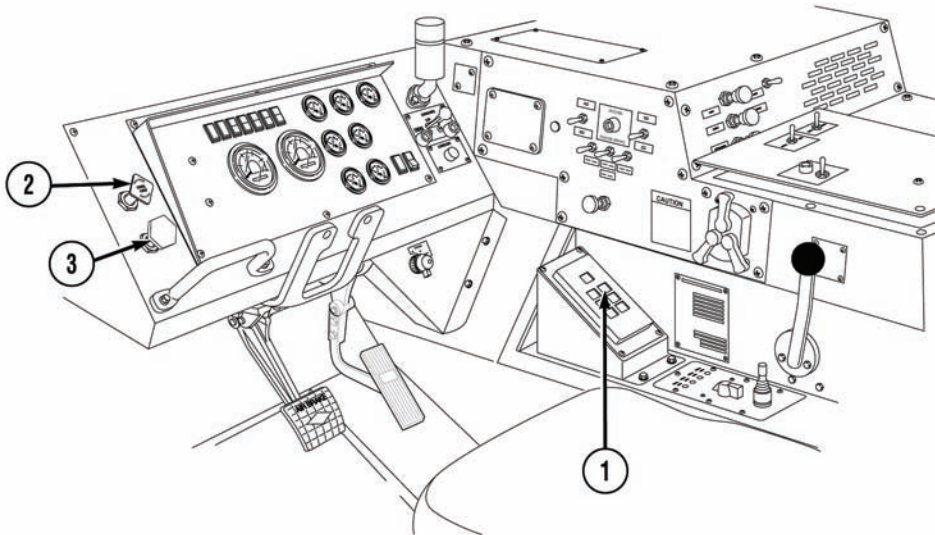
Speeds in excess of the above can result in loss of control, serious injury, or death.

52. Transport disabled vehicle.

END OF TASK

FRONT DISCONNECT**NOTE**

This is a two-soldier task.

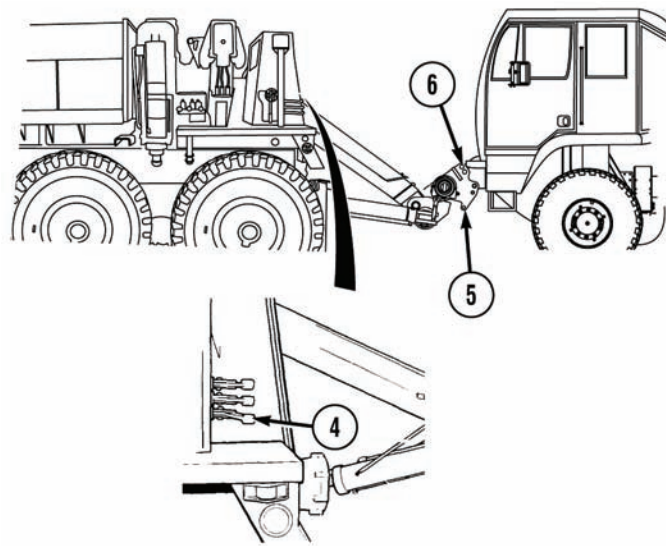


1. Set transmission range selector (1) to N (neutral).
2. Pull PARKING BRAKE control (2).
3. Pull TRAILER AIR SUPPLY control (3).

WARNING

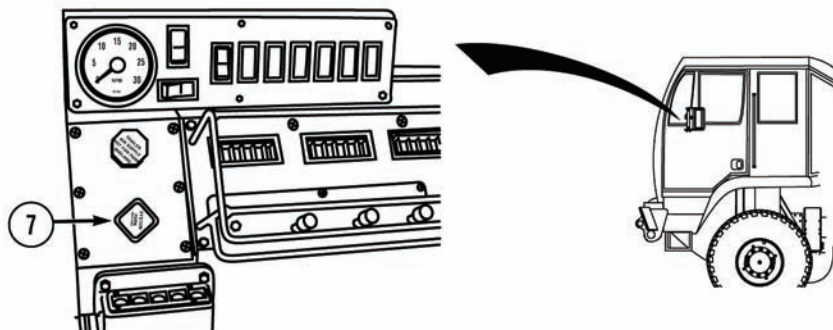
Do not stand between vehicles while disabled vehicle is raised off ground or serious personal injury or death can result.

4. Prepare retrieval system for operation (TM 9-2320-279-10-2).

**NOTE**

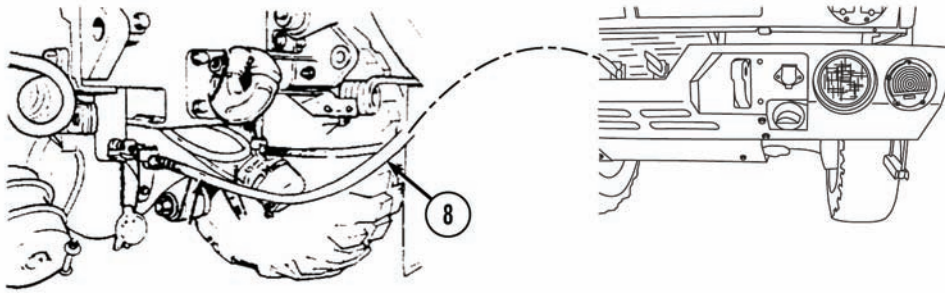
After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (51 to 102 mm) to allow for adjustment when removing adapters.

5. Pull LIFT CYLINDER control lever (4) to extend lift cylinder and lower disabled vehicle to the ground to release tension on MUAs (5) on tow eyes (6).

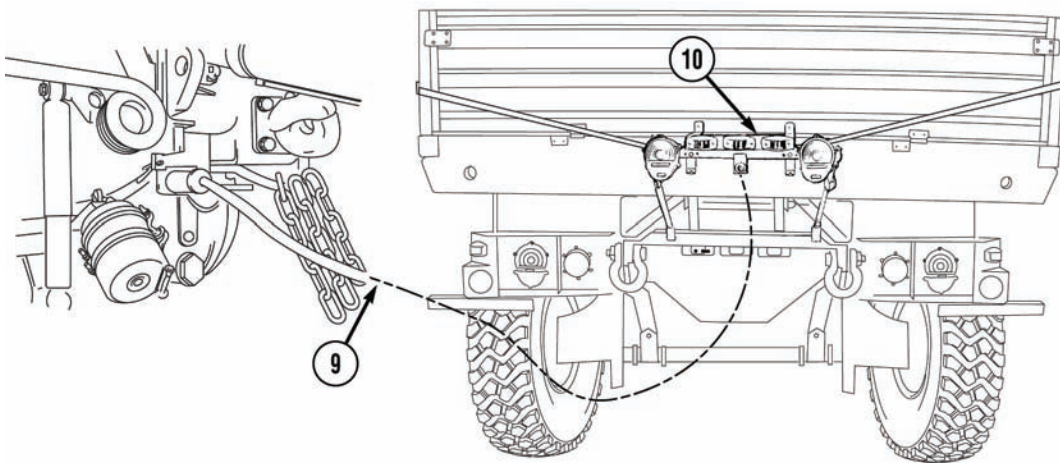
**WARNING**

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

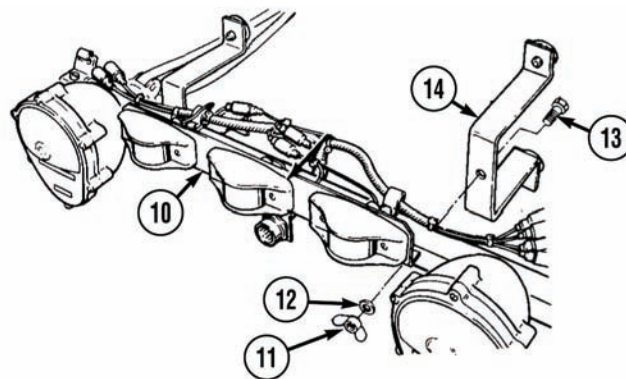
6. Pull PARKING BRAKE control (7) on disabled vehicle. If parking brake is inoperative, chock wheels on disabled vehicle.



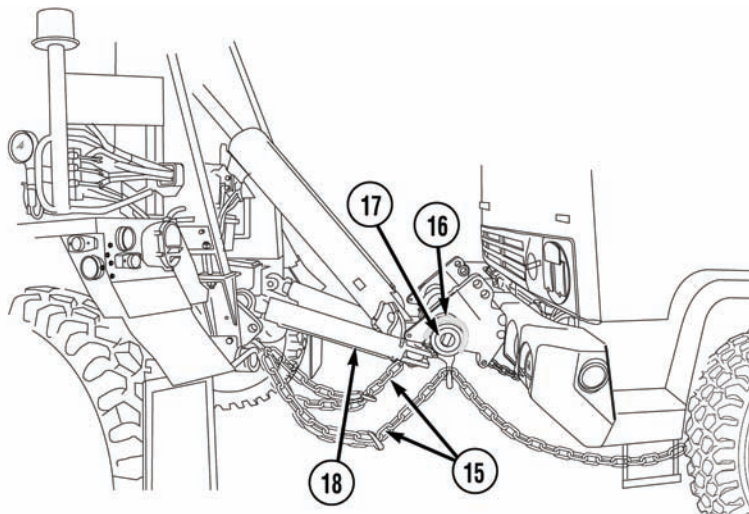
7. Remove and stow air lines (8).



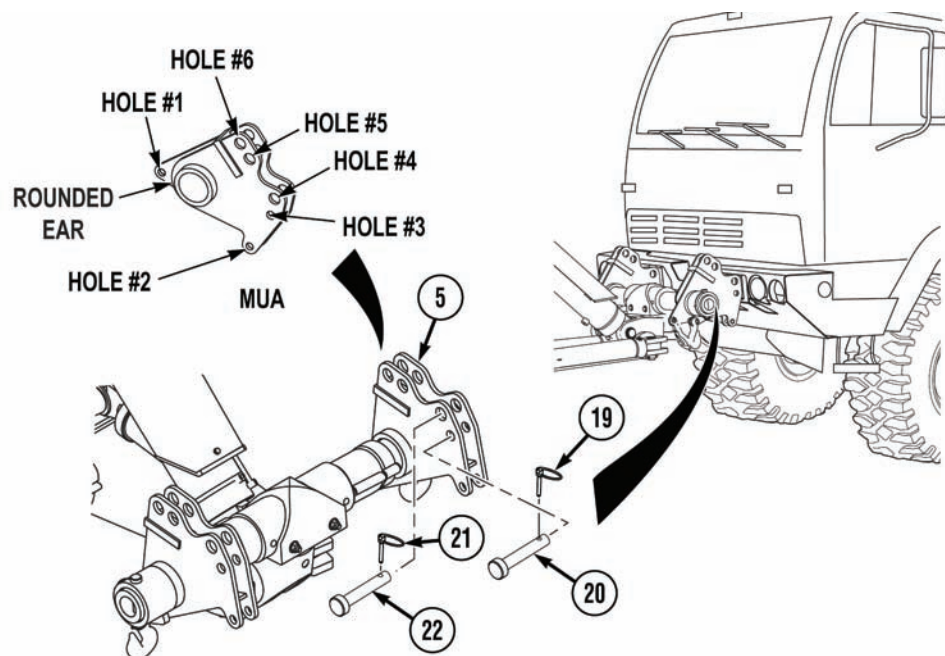
8. Remove tow light cable (9) from wrecker.
9. Remove tow light cable (9) from emergency tow lights (10) and stow.
10. Remove emergency tow lights (10) from disabled vehicle.



11. Remove two nuts (11), washers (12), screws (13), and brackets (14) from emergency tow lights (10). Stow emergency tow lights (10) and brackets (14).



12. Remove and stow two 16 ft. (4.9 m) safety chains (15).
13. Unwrap two springs (16) from crosstube (17) and connect to tow cylinders (18).



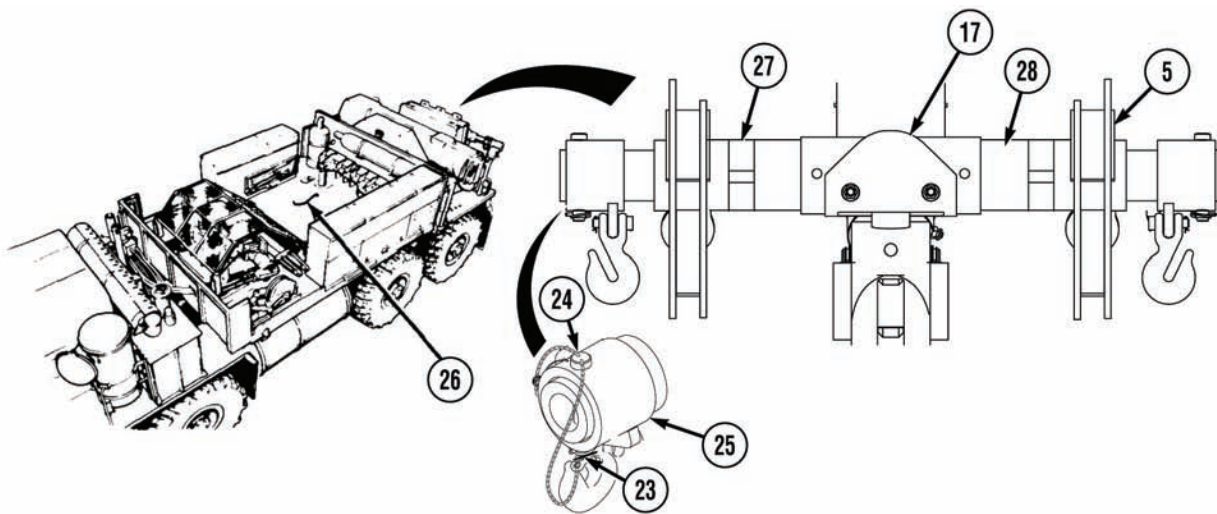
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

14. Remove two quick pins (19) and pins (20) from hole #3 on MUAs (5).
15. Remove two quick pins (21) and pins (22) from hole #4 on MUAs (5).



16. Drive wrecker forward a few feet and park (TM 9-2320-279-10-2).

WARNING

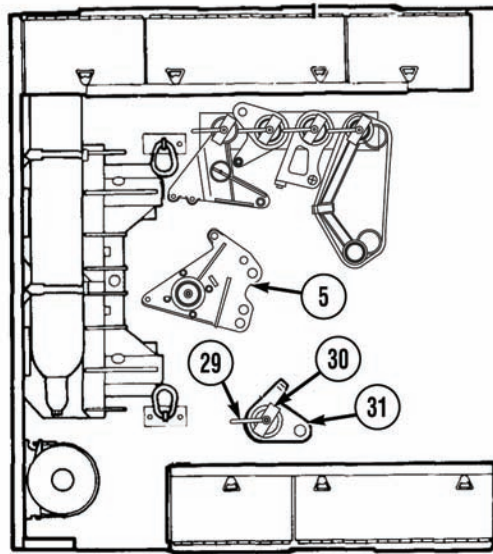
As springs and end caps are removed, crosstube can swing in all directions and adapters may slide off and can cause personal injury.

17. Remove two springs (16) from tow cylinders (18).
18. Remove two quick pins (23) and pins (24) from end caps (25).
19. Remove two end caps (25) from crosstube (17).

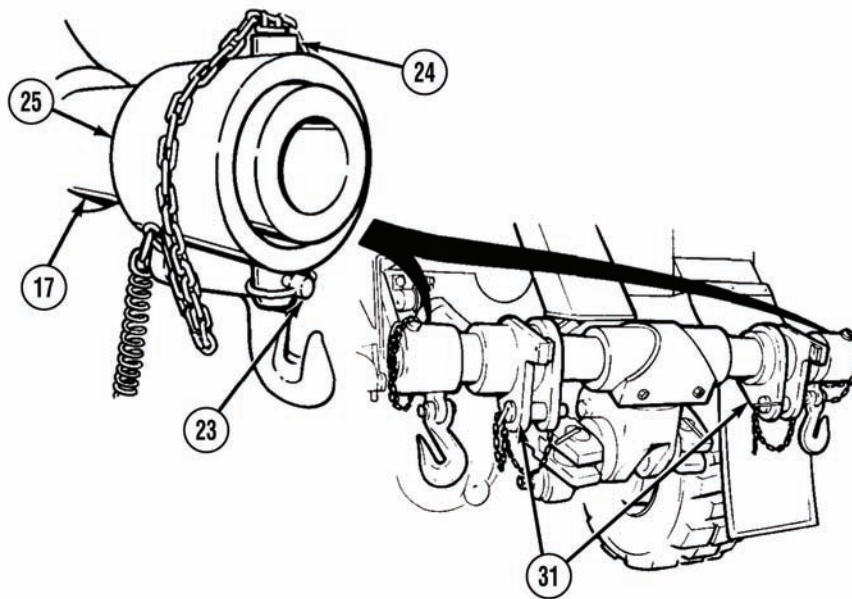
WARNING

MUAs are heavy, handle carefully or serious personal injury may result.

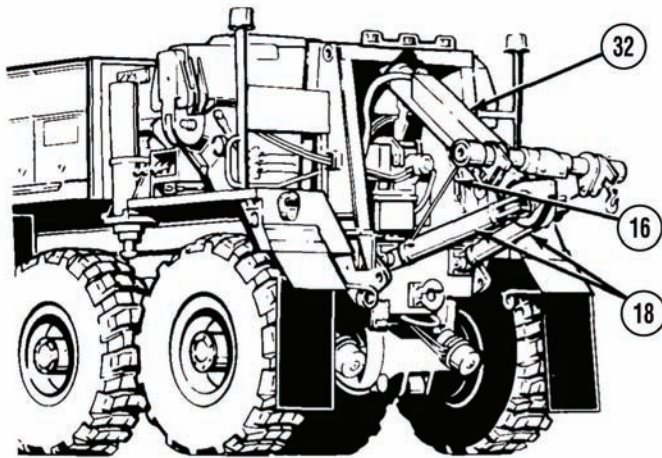
20. Remove two MUAs (5) from crosstube (17) and place on equipment body floor (26).
21. Remove and stow two 1.5 in. (38 mm) spacers (27).
22. Remove and stow two 4 in. (102 mm) spacers (28).



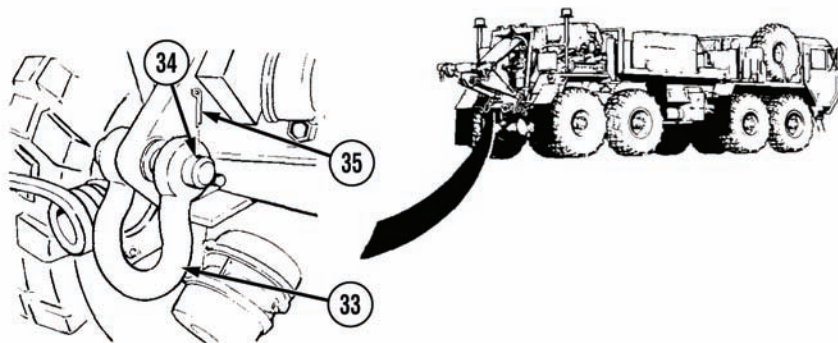
23. Remove lock handle (29), lock plate (30), and M977 front adapters (31).
24. Install two MUAs (5) removed from crosstube (17), with lock plate (30), and lock handle (29).



25. Install two M977 front adapters (31) on crosstube (17).
26. Install two end caps (25) on crosstube (17).
27. Install two pins (24) and quick pins (23).



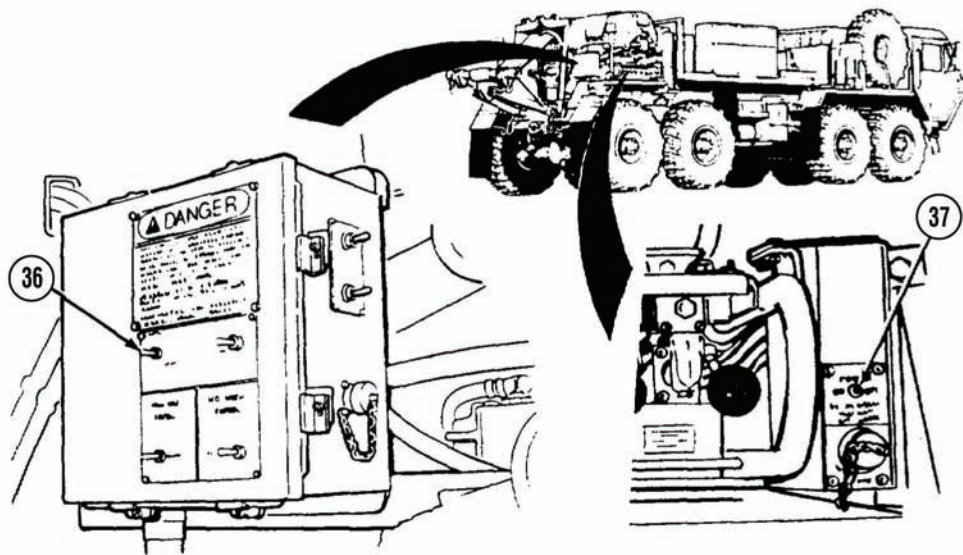
28. Install two springs (16) on tow cylinders (18).
29. Operate retrieval controls and fully retract lift cylinders (32) and tow cylinders (18).



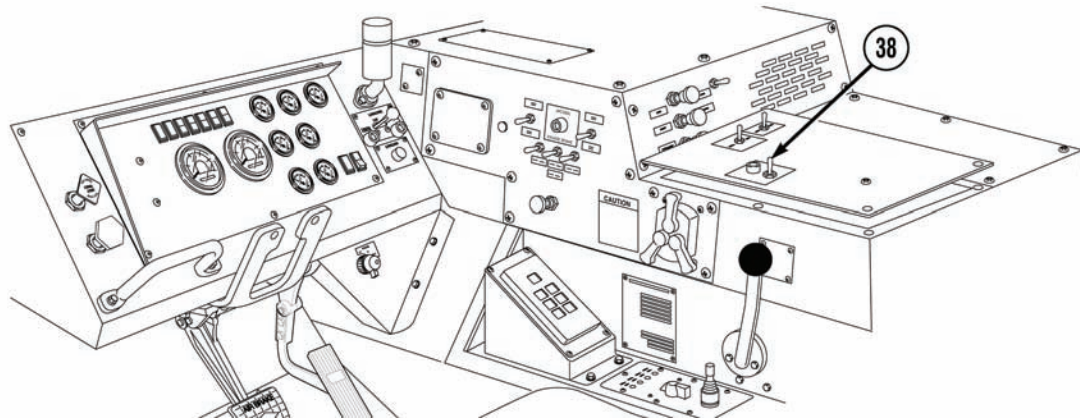
NOTE

Right and left towing shackles are installed the same way.

30. Install two towing shackles (33), pins (34), and cotter pins (35).



31. Set POWER switch (36) to OFF position.
32. Set POWER switch (37) to OFF position.



33. Turn off emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle.
34. Turn off service drive lights (TM 9-2320-279-10-2).
35. Set PTO ENGAGE switch (38) to OFF position.
36. Remove and stow beacon lights (TM 9-2320-279-10-2).
37. Shut off engine (TM 9-2320-279-10-2).
38. Unlock disabled vehicle's steering (refer to FMTV operator's manual).

END OF TASK

END OF WORK PACKAGE

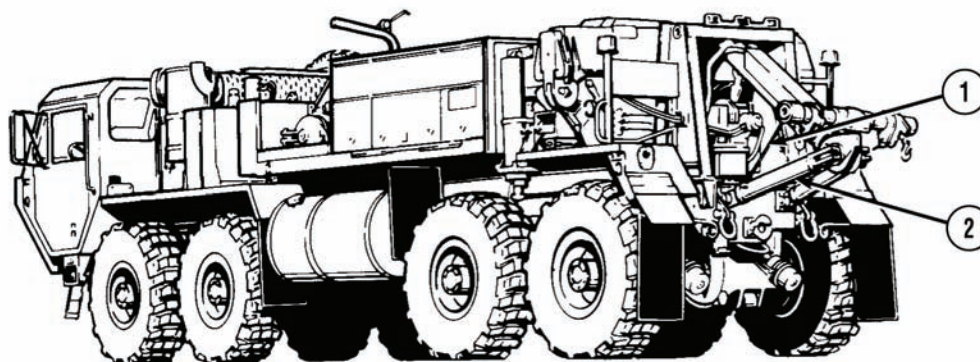
OPERATOR MAINTENANCE
FRONT LIFT AND TOW OF MTVR

FRONT HOOKUP

NOTE

This is a two-soldier task.

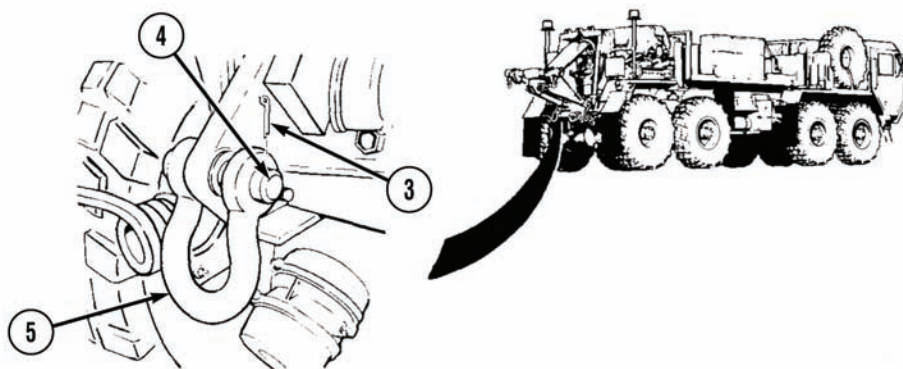
1. Prepare retrieval system for operation (TM 2320-279-10-2).



WARNING

Hold crosstube when removing springs. Crosstube may swing and cause adapters to slide resulting in personal injury.

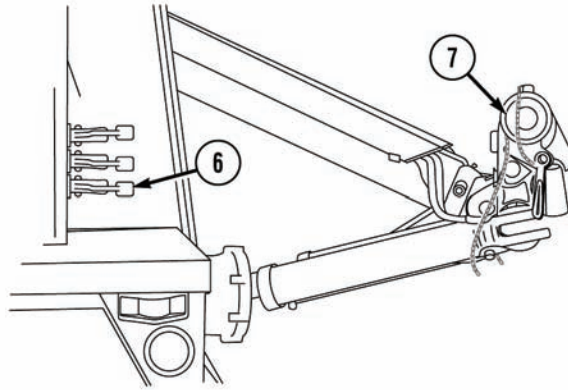
2. Disconnect two springs (1) from tow cylinders (2).



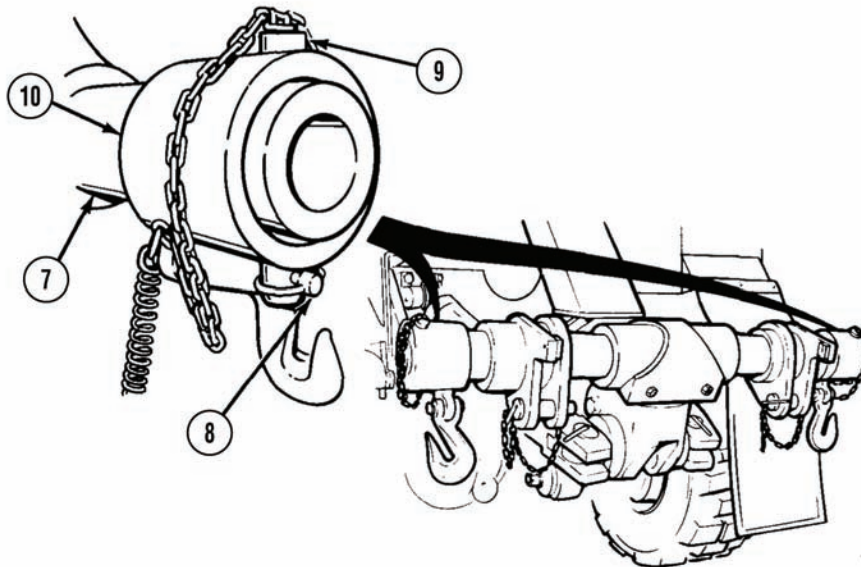
NOTE

Right and left towing shackles are removed the same way.

3. Remove two cotter pins (3), pins (4), and towing shackles (5).



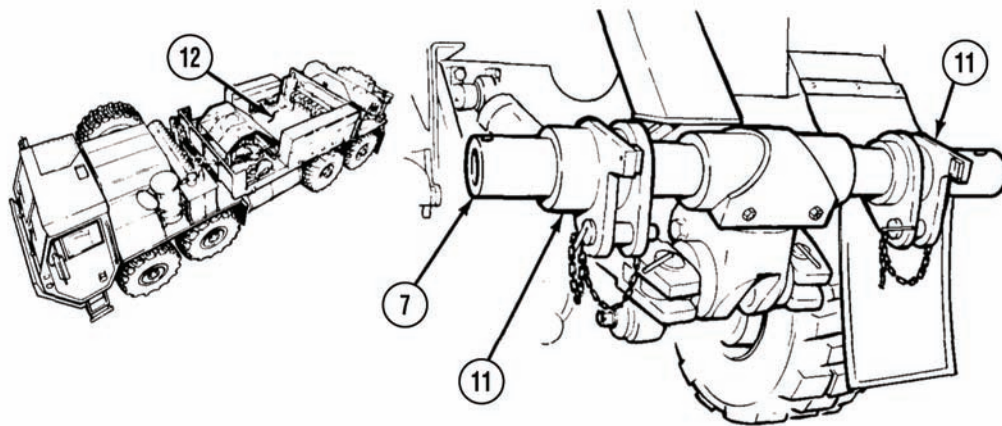
4. Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft. (1 m) above the ground.
5. Position wrecker so that crosstube (7) is approximately 1 ft. (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



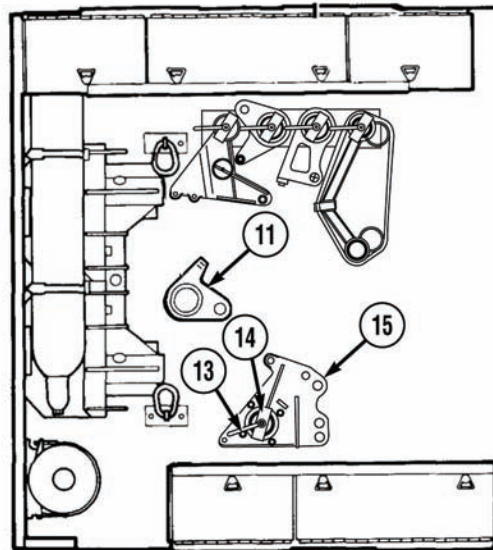
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

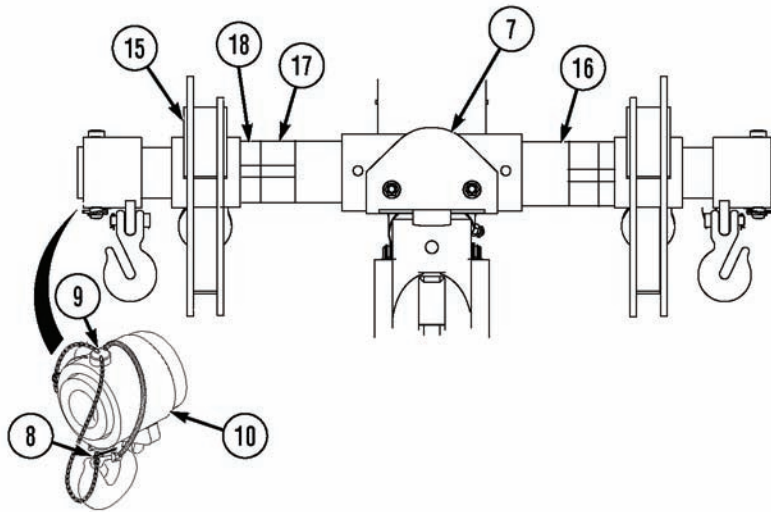
6. Remove two quick pins (8) and pins (9) from end caps (10).
7. Remove two end caps (10) from crosstube (7).



8. Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



9. Remove lock handle (13), lock plate (14), and two Multi-Use Adapters (MUAs) (15).
10. Install two M977 front adapters (11), lock plate (14), and lock handle (13).



11. Remove two 4 in. (102 mm) spacers (16), two 3 in. (76 mm) spacers (17), and two 1.5 in. (38 mm) spacers (18) from stowage.
12. Install two 4 in. (102 mm) spacers (16) on crosstube (7).
13. Install two 3 in. (76 mm) spacers (17) on crosstube (7).
14. Install two 1.5 in. (38 mm) spacers (18) on crosstube (7).

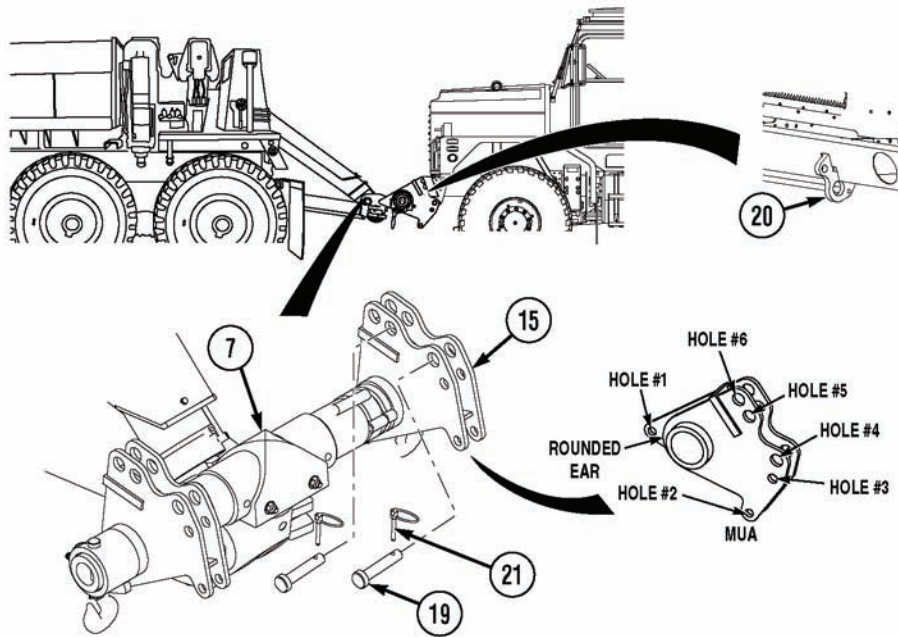
WARNING

- **Adapters and end caps may slide off when installing and may cause personal injury.**
- **MUAs are heavy, handle carefully or serious personal injury will result.**

NOTE

MUAs must be positioned on crosstube with rounded ear of MUA toward center of crosstube.

15. Install two MUAs (15) on crosstube (7) with holes facing tow eyes of disabled vehicle.
16. Install two end caps (10) on crosstube (7).
17. Install two pins (9) and quick pins (8).
18. Attach two springs (1) on tow cylinders (2).



19. Remove four pins (3483735) (19) from stowage.

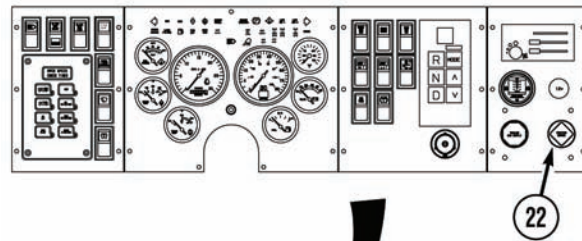
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

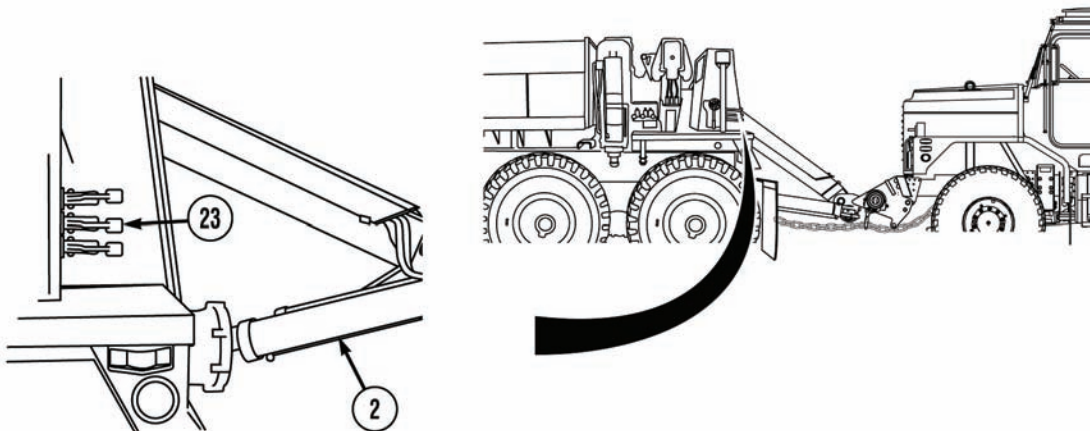
NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

20. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #5 on MUAs (15) align with front tow eyes (20).
21. Insert two pins (19) through MUAs (15) and front tow eyes (20). Install quick pins (21) in pins (19).
22. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #4 on MUAs (15) align with front tow eyes (20).
23. Insert two pins (19) through MUAs (15) and front tow eyes (20). Install quick pins (21) in pins (19).



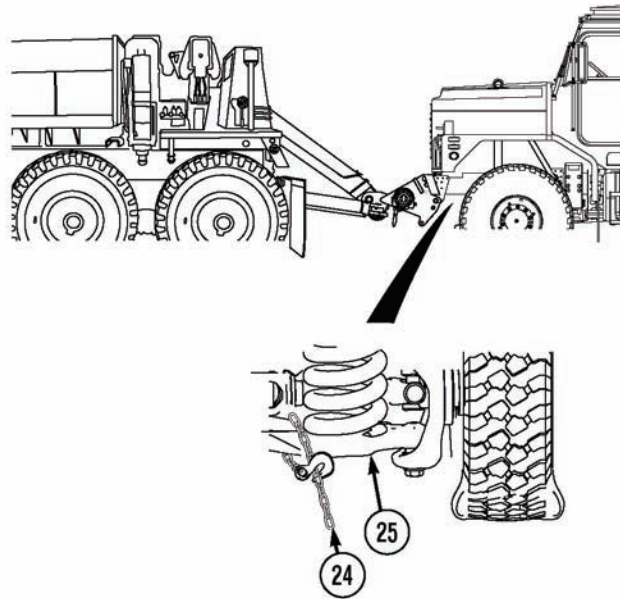
24. Push in PARKING BRAKE (22) on disabled vehicle and remove chocks.



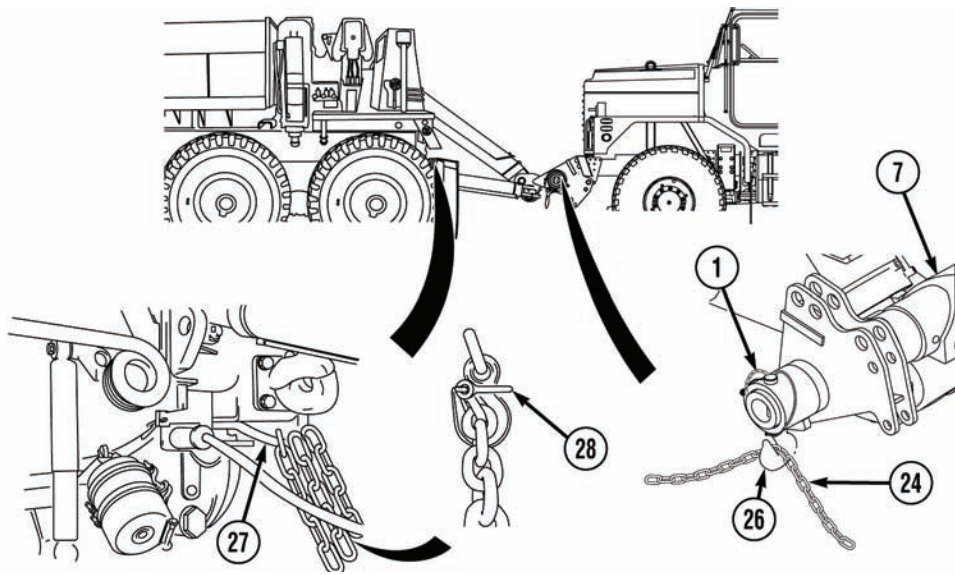
NOTE

Do not lift vehicle off ground when performing step (25).

25. Alternately push in TOW and LIFT CYLINDER control levers (23) until tow cylinders (2) are fully retracted.

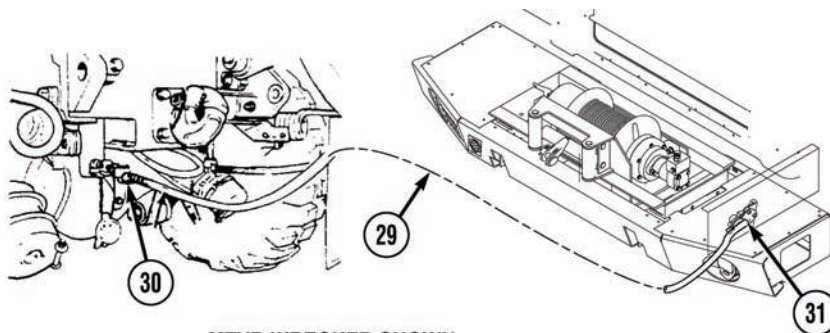


26. Remove two 16 ft. (4.9 m) safety chains (24) from stowage.
27. Route one end of 16 ft. (4.9 m) safety chain (24) over left lower control arm (25) of disabled vehicle.
28. Hook safety chain (24) together in front of lower control arm (25).
29. Repeat steps (27) and (28) for other side of disabled vehicle.

**NOTE**

- Safety chains can be routed to safety chain hoop or towing shackles. Towing shackles can be used only after towing cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.

30. Route two 16 ft. (4.9 m) safety chains (24) to end cap hooks (26) and through safety chain hoop (27) on wrecker and secure with safety shackles (28).
31. Wrap two springs (1) around crosstube (7) and secure.

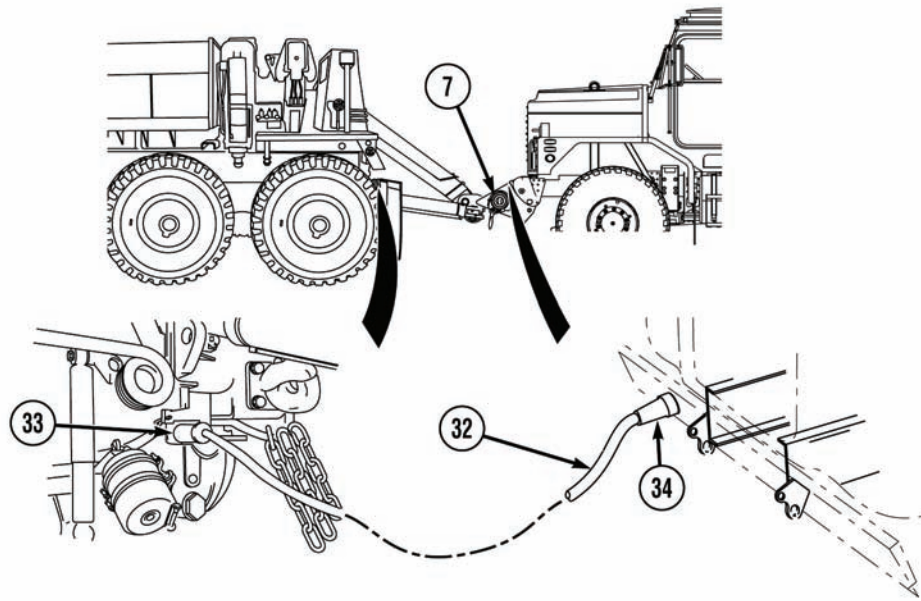


**MTVR WRECKER SHOWN
OTHERS SIMILAR**

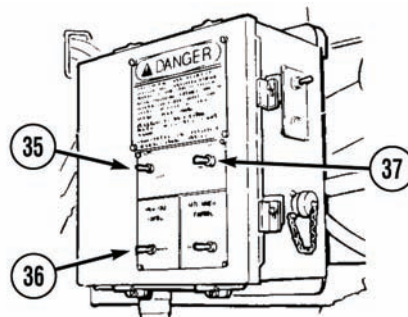
NOTE

Rear emergency air hose from wrecker must be connected to the front emergency glad hand on the disabled vehicle. Rear service air hose from wrecker must be connected to the front service glad hand on the disabled vehicle.

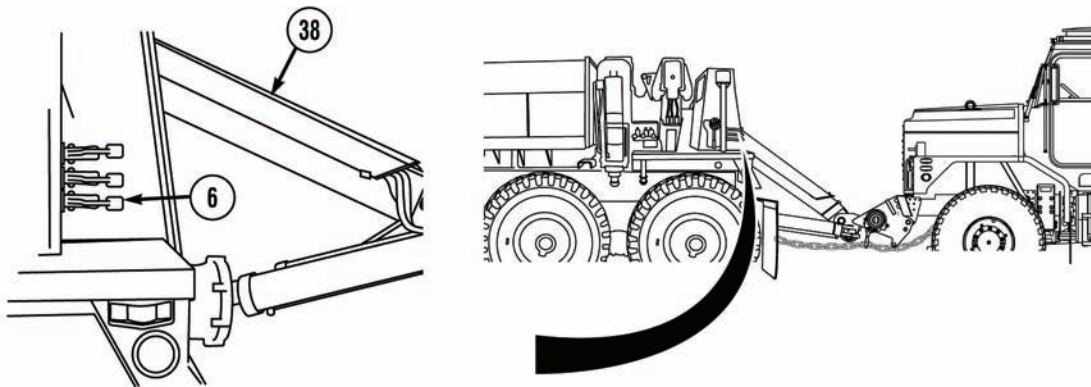
32. Prepare disabled vehicle for towing (refer to MTVR operator's manual).
33. Remove two air lines (29) from stowage and attach to rear glad hands (30) of wrecker.
34. Route two air lines (29) over crosstube (7) and attach to front glad hands (31) of disabled vehicle.



35. Remove electrical cable (32) from stowage and attach to rear electrical connector (33) on wrecker.
36. Route electrical cable (32) over crosstube (7) to electrical connector (34) on the front of the disabled vehicle.
37. Lock disabled vehicle's steering (refer to MTRV operator's manual).



38. Set POWER switch (35) to ON position.
39. Set HIGH IDLE switch (36) to CONTINUOUS.
40. Push and release LATCH switch (37). Engine speed will increase to approximately 1500 rpm.



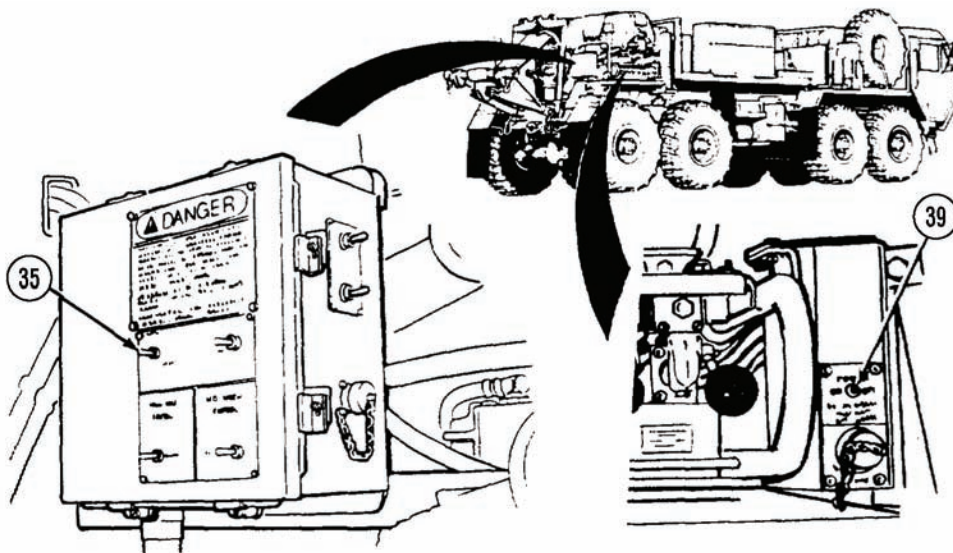
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

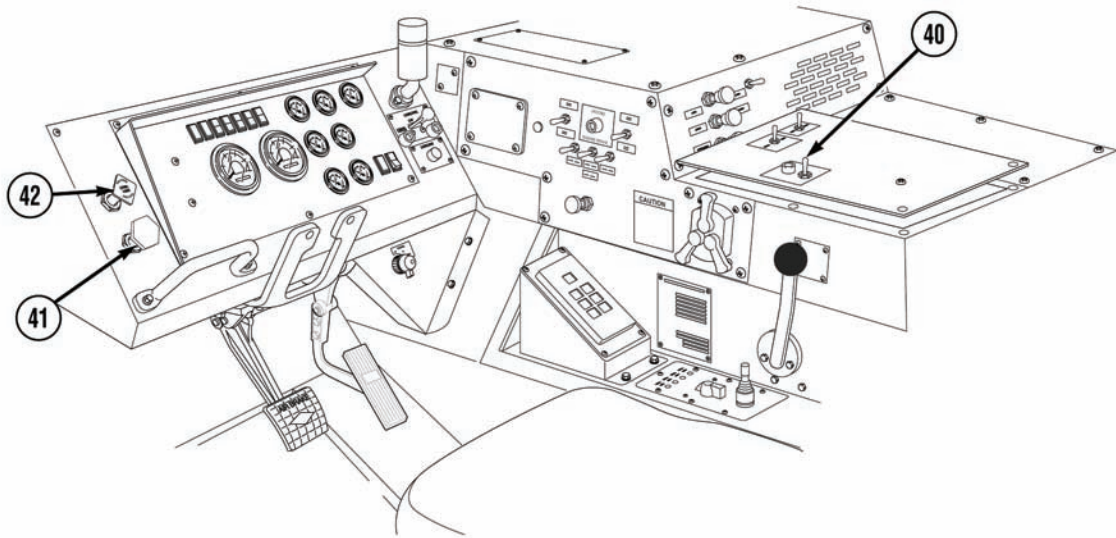
CAUTION

- Make sure all rigging is secure. Loose rigging can become entangled and cause equipment damage.
- Fully retract two tow cylinders before lifting disabled vehicle or damage to equipment may result.

41. Push in LIFT CYLINDER control lever (6) to retract lift cylinder (38) to raise disabled vehicle approximately 1 ft. (30 cm) off ground.
42. Adjust slack in two 16 ft. (4.9 m) safety chains so chains between crosstube (7) and wrecker are approximately 1 ft. (30 cm) off ground.



43. Set POWER switch (35) to OFF position.
44. Set POWER switch (39) to OFF position.



45. Set PTO ENGAGE switch (40) to OFF position.
46. Push in TRAILER AIR SUPPLY control (41).
47. Turn on service drive lights (TM 9-2320-279-10-2).
48. Turn on emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle (refer to MTRV operator's manual).
49. Push in PARKING BRAKE control (42) and select desired gear (TM 9-2320-279-10-2).

WARNING

The M984A1 should not be operated at speeds over 15 MPH (24 km/hr) except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain condition	Maximum speed towed load up to 50,000 lbs (22,700 kg)	Maximum speed towed load above 50,000 lbs (22,700 kg)
On road-level	35 mph (56.3 km/hr)	30 mph (47.3 km/hr)
On road-hilly	30 mph (47.3 km/hr)	20 mph (32.2 km/hr)
Off road	15 mph (24.2 km/hr)	15 mph (24.2 km/hr)

WARNING

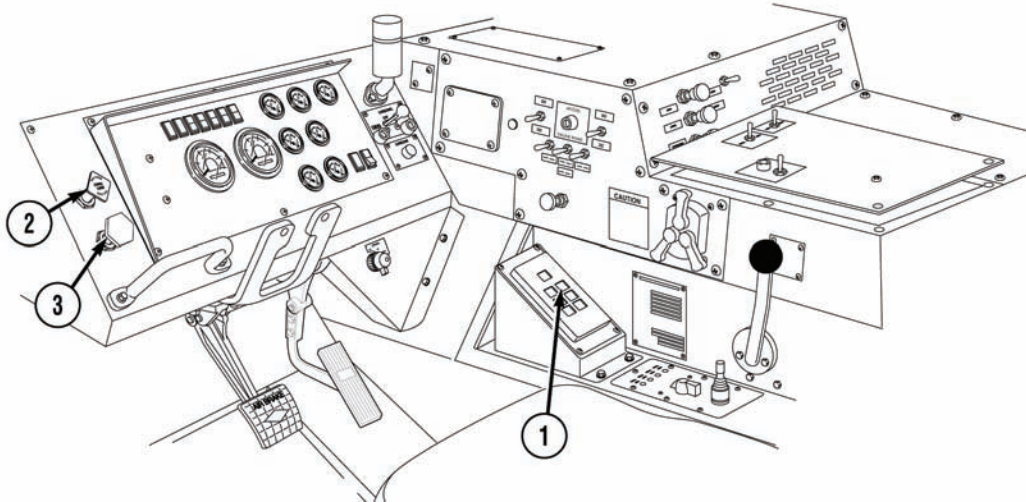
Speeds in excess of the above can result in loss of control, serious injury, or death.

50. Transport disabled vehicle.

END OF TASK

FRONT DISCONNECT**NOTE**

This is a two-soldier task.

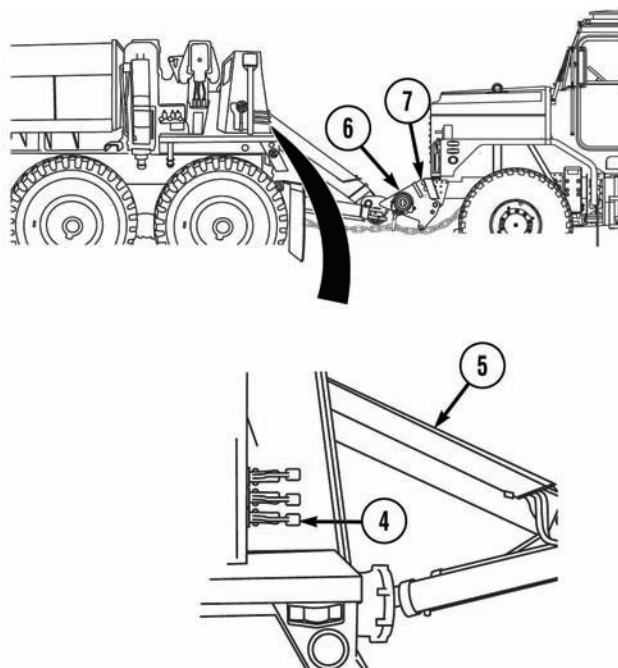


1. Set transmission range selector (1) to N (neutral).
2. Pull PARKING BRAKE control (2).
3. Pull TRAILER AIR SUPPLY control (3).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground or serious injury or death can result.

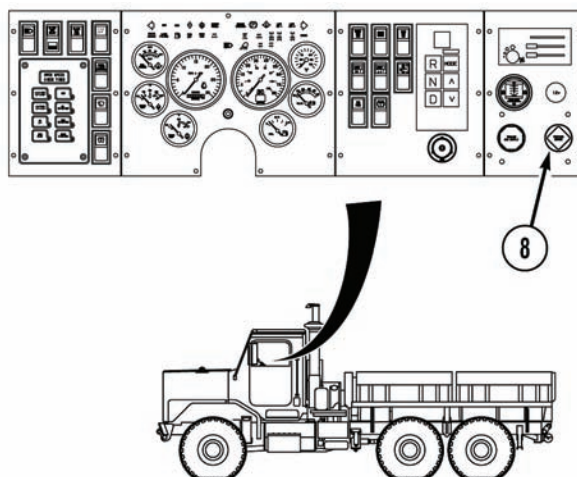
4. Prepare retrieval system for operation (TM 9-2320-279-10-2).



NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (51 to 102 mm) to allow for adjustment when removing adapters.

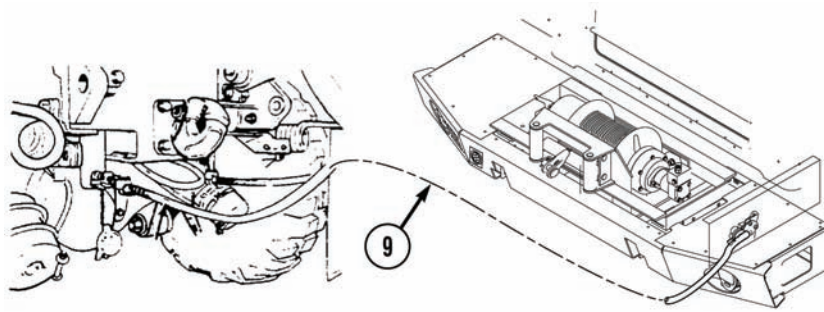
5. Pull LIFT CYLINDER control lever (4) to extend lift cylinder (5) and lower disabled vehicle to the ground to release tension on MUAs (6) on tow eyes (7).



WARNING

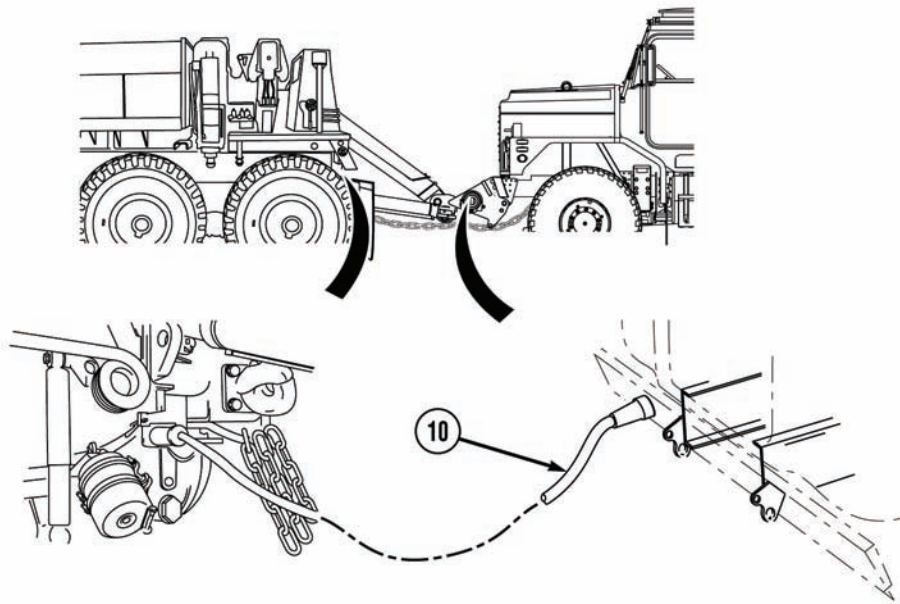
If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in injury to personnel.

6. Apply PARKING BRAKE control (8) on disabled vehicle. If parking brake is inoperative, chock wheels on disabled vehicle (refer to MTRV operator's manual).

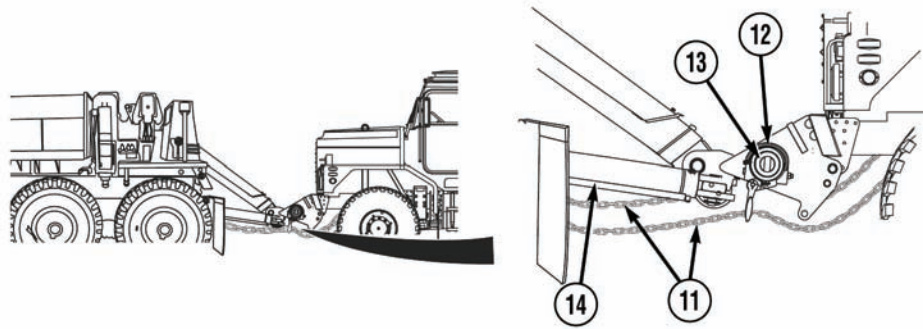


MTVR WRECKER SHOWN
OTHERS SIMILAR

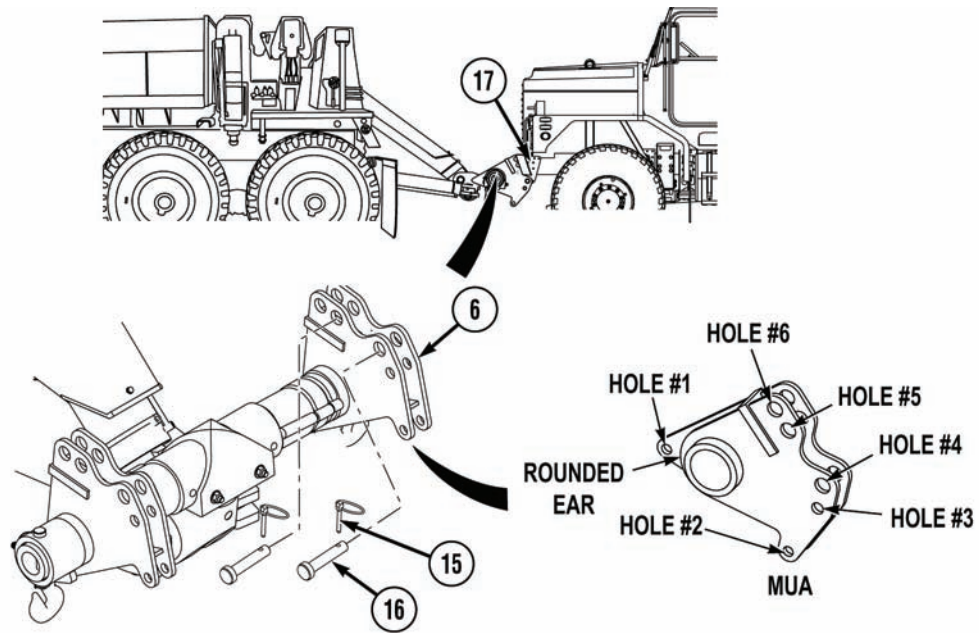
7. Remove and stow air lines (9).



8. Remove and stow electrical cable (10).



9. Remove and stow two 16 ft. (4.9 m) safety chains (11).
10. Unwrap two springs (12) from crosstube (13) and connect to tow cylinders (14).



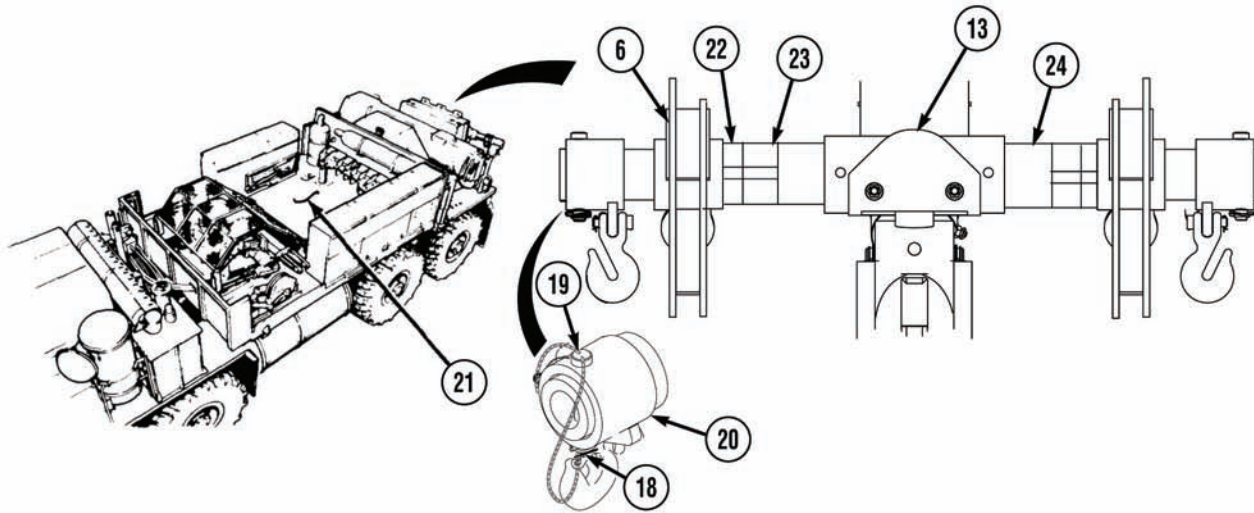
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

11. Remove two quick pins (15) and pins (16) from hole #4 on MUAs (6).
12. Remove two quick pins (15) and pins (16) from hole #5 on MUAs (6).
13. Remove MUAs (6) from tow eyes (17) on disabled vehicle.



14. Drive wrecker forward a few feet and park (TM 9-2320-279-10-2).

WARNING

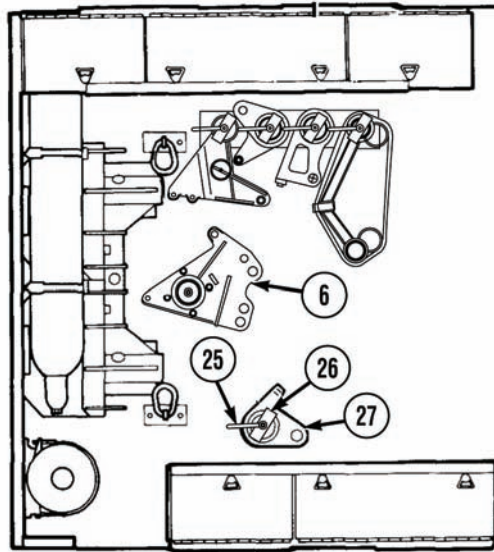
As springs and end caps are removed, crosstube can swing in all directions and adapters may slide off and can cause personal injury.

15. Remove two springs (12) from tow cylinders (14).
16. Remove two quick pins (18) and pins (19) from end caps (20).
17. Remove two end caps (20) from crosstube (13).

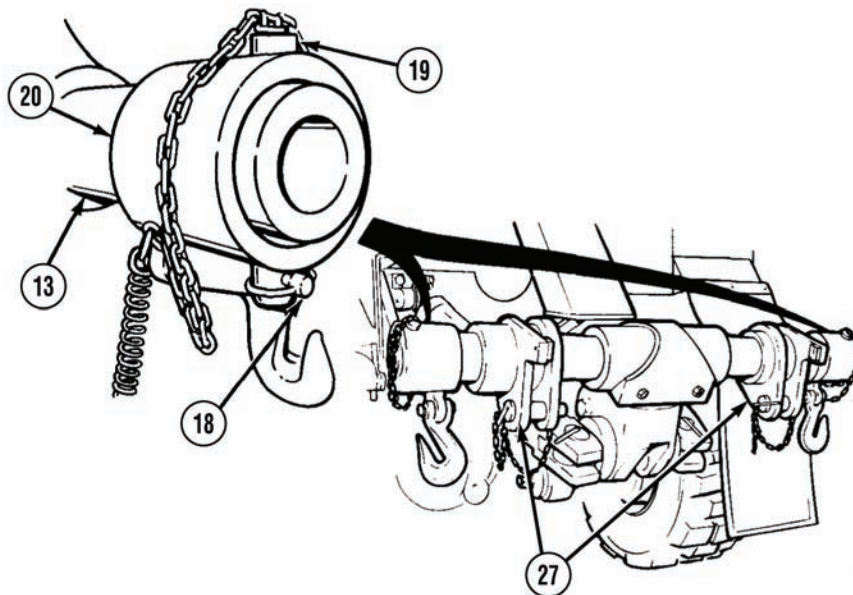
WARNING

MUAs are heavy, handle carefully or serious personal injury may result.

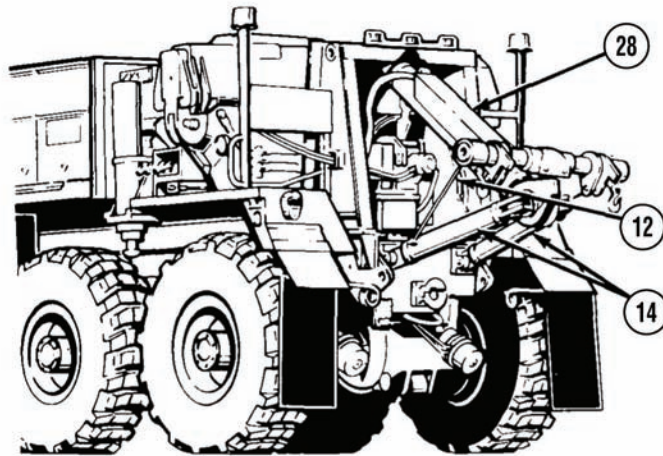
18. Remove two MUAs (6) from crosstube (13) and place on equipment body floor (21).
19. Remove and stow two 1.5 in. (38 mm) spacers (22).
20. Remove and stow two 3 in. (76 mm) spacers (23).
21. Remove and stow two 4 in. (102 mm) spacers (24).



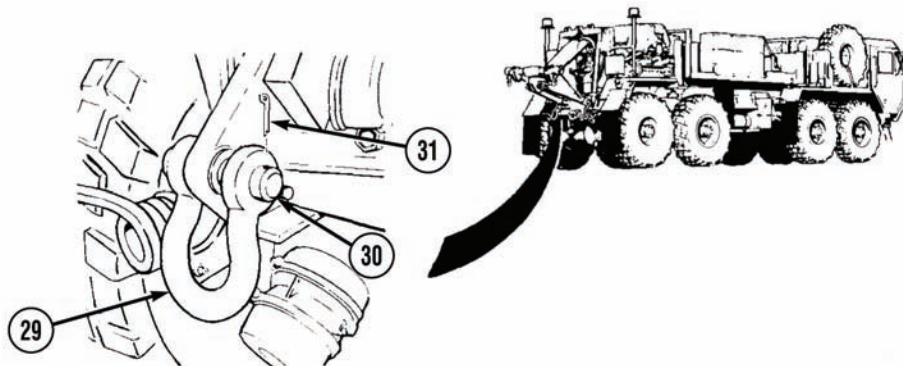
22. Remove lock handle (25), lock plate (26), and M977 front adapters (27).
23. Install two MUAs (6) removed from crosstube (13), with lock plate (26), and lock handle (25).



24. Install two M977 front adapters (27) on crosstube (13).
25. Install two end caps (20) on crosstube (13). Install two pins (19) and quick pins (18).



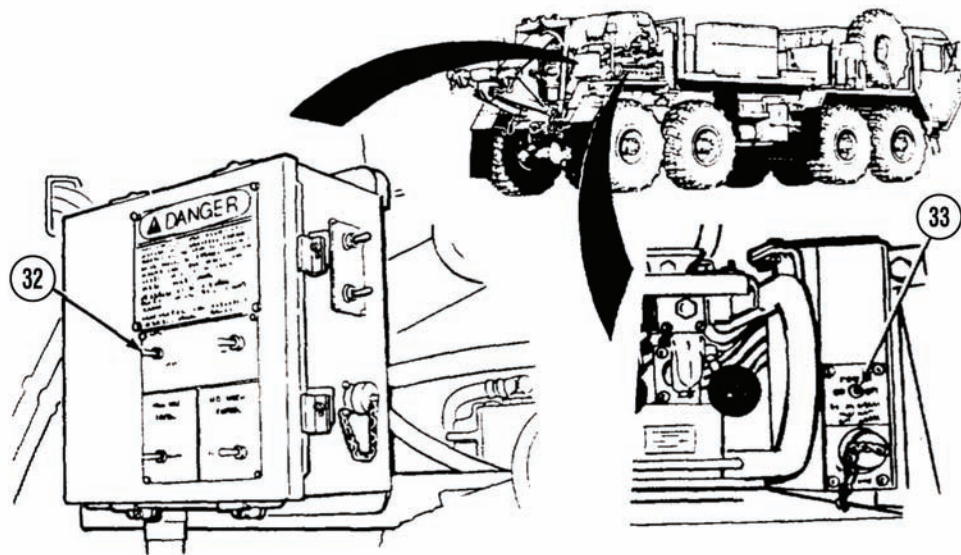
26. Install two springs (12) on tow cylinders (14).
27. Operate retrieval controls and fully retract lift cylinders (28) and tow cylinders (14).



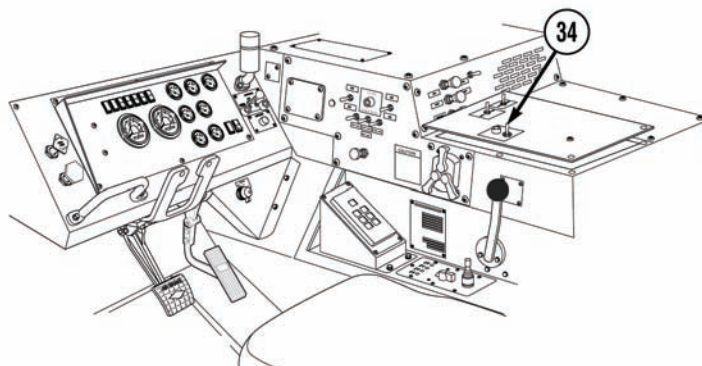
NOTE

Right and left towing shackles are installed the same way.

28. Install two towing shackles (29), pins (30), and cotter pins (31).



- 29. Set POWER switch (32) to OFF position.
- 30. Set POWER switch (33) to OFF position.



- 31. Turn off emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle.
- 32. Turn off service drive lights (TM 9-2320-279-10-2).
- 33. Set PTO ENGAGE switch (34) to OFF position.
- 34. Remove and stow beacon lights (TM 9-2320-279-10-2).
- 35. Shut off engine (TM 9-2320-279-10-2).
- 36. Unlock disabled vehicle's steering (refer to MTRV operator's manual).

END OF TASK

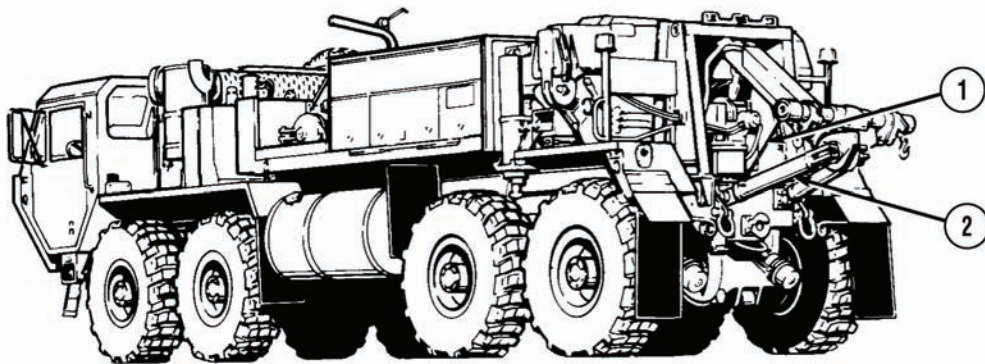
END OF WORK PACKAGE

OPERATOR MAINTENANCE**REAR LIFT AND TOW OF MTVR**

REAR HOOKUP**NOTE**

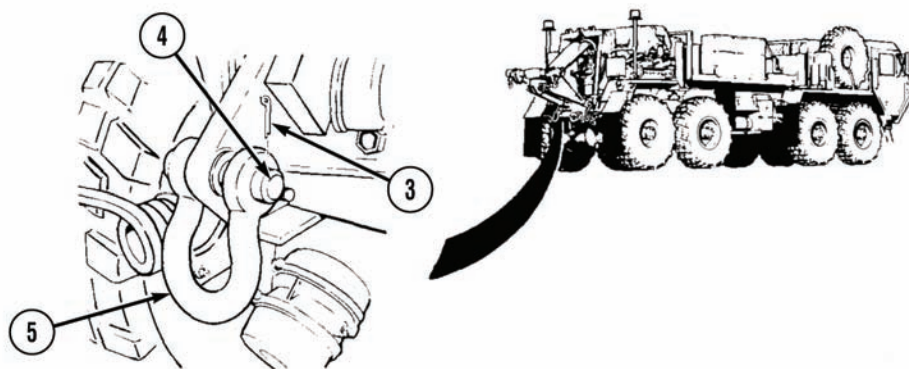
This is a two-soldier task.

1. Prepare retrieval system for operation (TM 2320-279-10-2).

**WARNING**

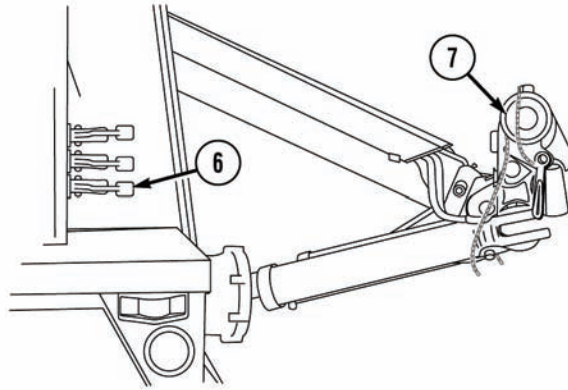
Hold crosstube when removing springs. Crosstube may swing and cause adapters to slide resulting in personal injury.

2. Disconnect two springs (1) from tow cylinders (2).

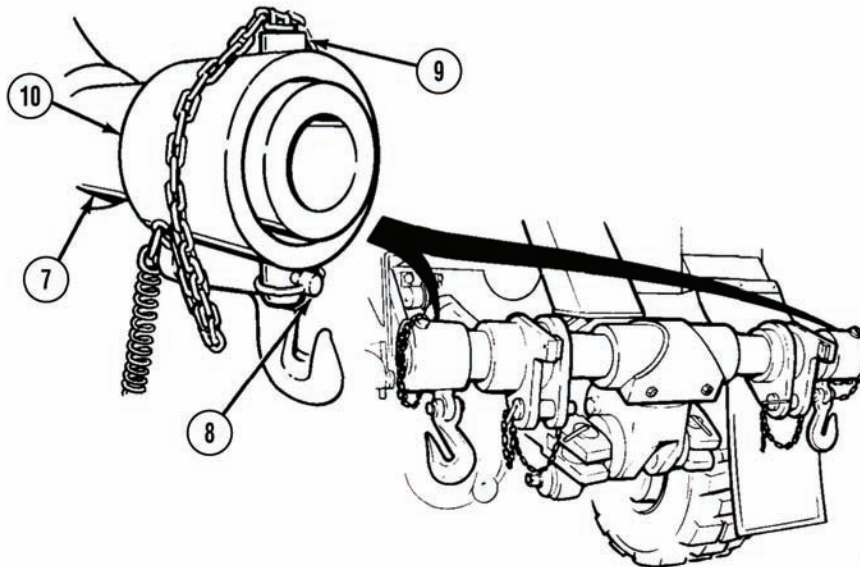
**NOTE**

Right and left towing shackles are removed the same way.

3. Remove two cotter pins (3), pins (4), and towing shackles (5).



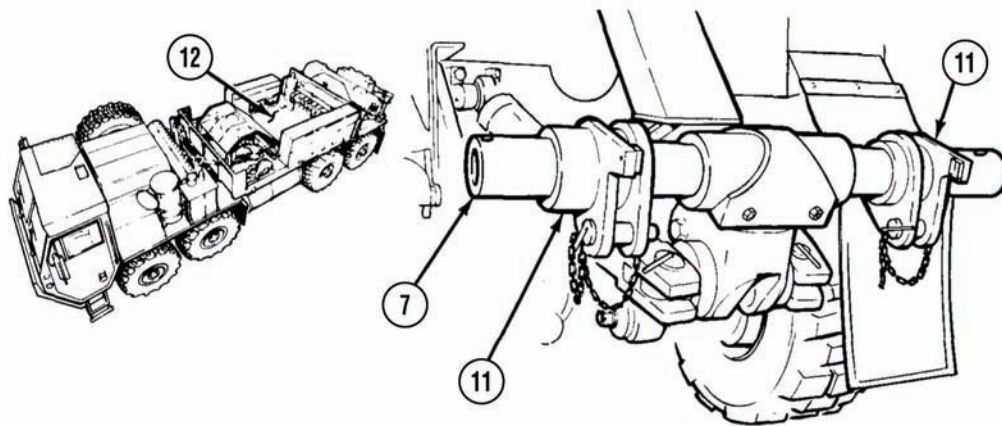
4. Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft. (1 m) above the ground.
5. Position wrecker so that crosstube (7) is approximately 1 ft. (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



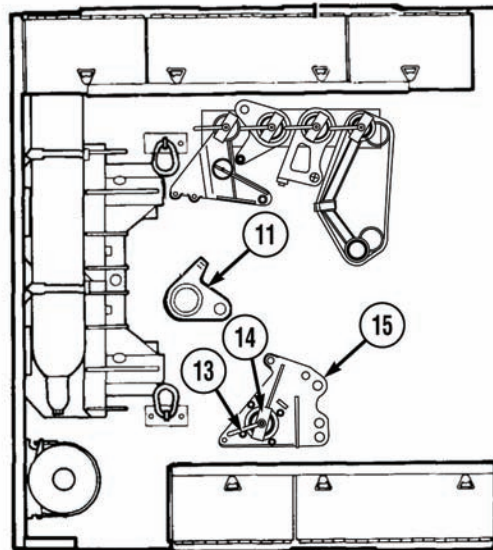
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

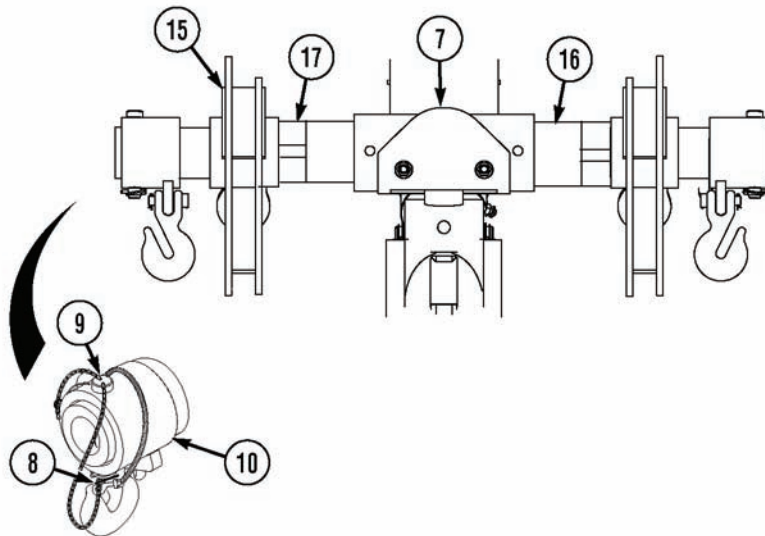
6. Remove two quick pins (8) and pins (9) from end caps (10).
7. Remove two end caps (10) from crosstube (7).



8. Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



9. Remove lock handle (13), lock plate (14), and two Multi-Use Adapters (MUAs) (15).
10. Install two M977 front adapters (11), lock plate (14), and lock handle (13).



11. Remove two 4 in. (102 mm) spacers (16) and two 3 in. (76 mm) spacers (17) from stowage.
12. Install two 4 in. (102 mm) spacers (16) on crosstube (7).
13. Install two 3 in. (76 mm) spacers (17) on crosstube (7).

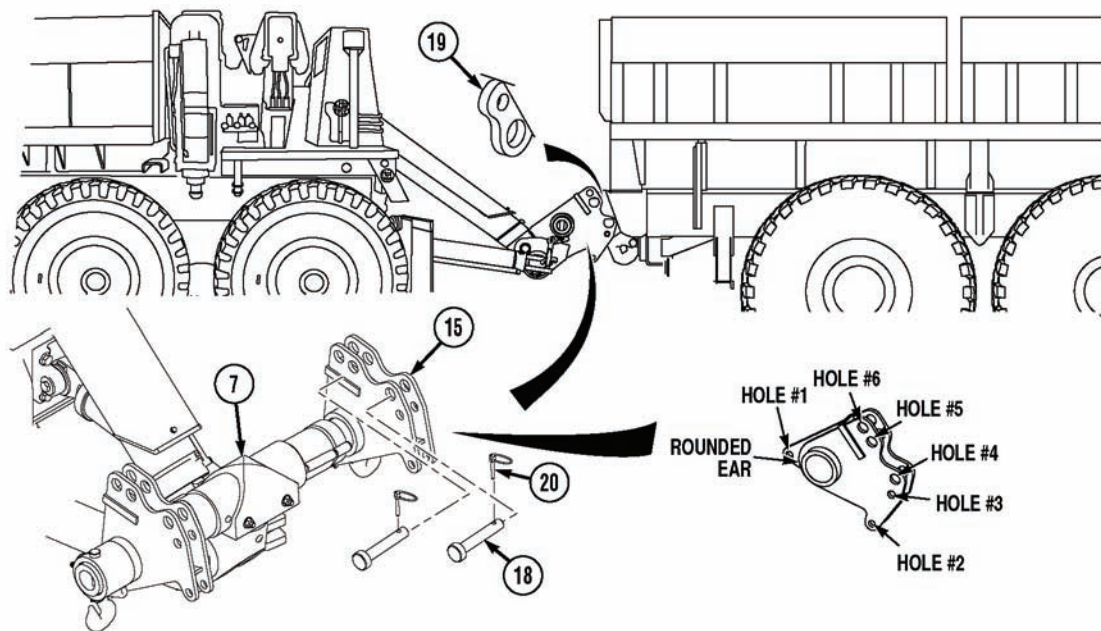
WARNING

- **Adapters and end caps may slide off when installing and may cause personal injury.**
- **MUAs are heavy, handle carefully or serious personal injury will result.**

NOTE

MUAs must be positioned on crosstube with rounded ear of MUA toward center of crosstube.

14. Install two MUAs (15) on crosstube (7) with holes facing tow eyes of disabled vehicle.
15. Install two end caps (10) on crosstube (7).
16. Install two pins (9) and quick pins (8).
17. Attach two springs (1) on tow cylinders (2).



18. Remove four pins (3483735) (18) from stowage.

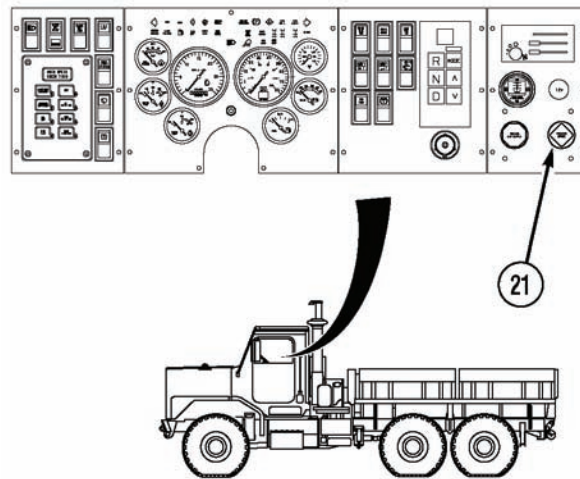
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

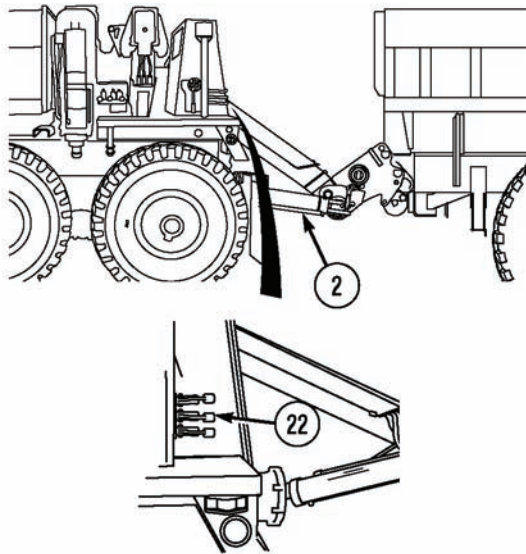
NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

19. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #5 on MUAs (15) align with front tow eyes (19).
20. Insert two pins (18) through MUAs (15) and front tow eyes (19). Install quick pins (20) in pins (18).
21. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #4 on MUAs (15) align with front tow eyes (19).
22. Insert two pins (18) through MUAs (15) and front tow eyes (19). Install quick pins (20) in pins (18).



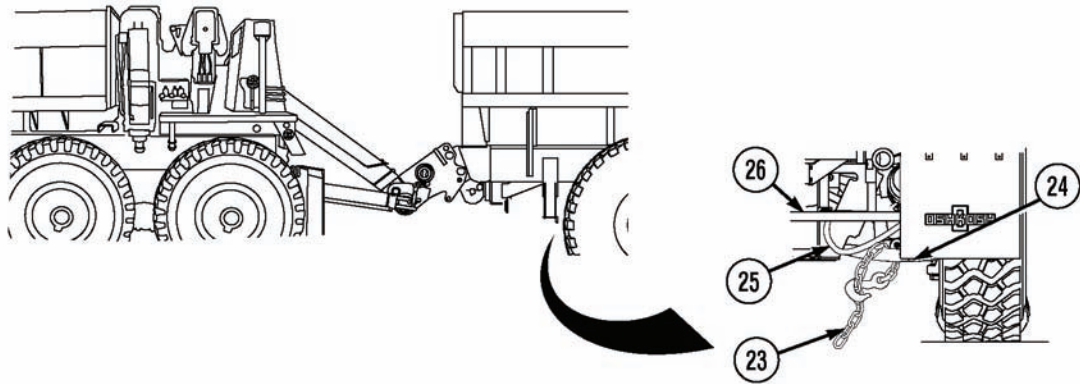
23. Push in PARKING BRAKE (21) on disabled vehicle and remove chocks.



NOTE

Do not lift vehicle off ground when performing step (24).

24. Alternately push in TOW and LIFT CYLINDER control levers (22) until tow cylinders (2) are fully retracted.

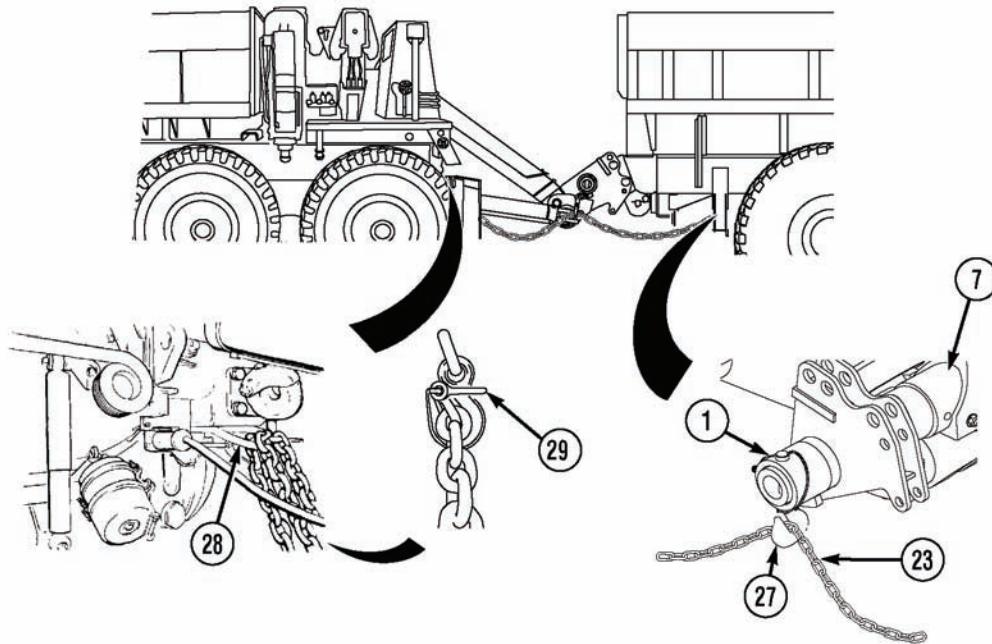


25. Remove two 16 ft. (4.9 m) safety chains (23) from stowage.

CAUTION

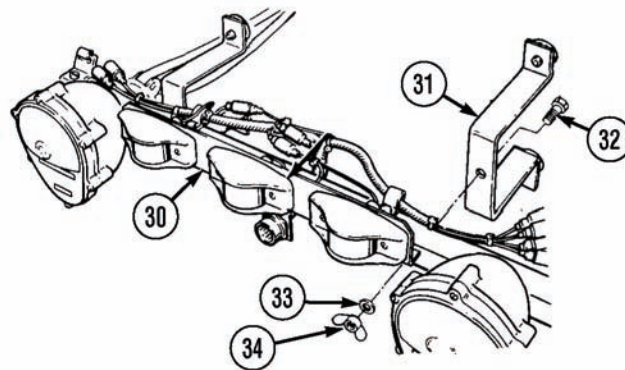
Ensure safety chain is routed below CTI air line and below underride bar of disabled vehicle or damage to equipment may result.

26. Route one end of 16 ft. (4.9 m) safety chain (23) over right lower control arm (24) of disabled vehicle, below CTI air line (25) and underride (26) of disabled vehicle.
27. Hook safety chain (23) together under right lower control arm (24).
28. Repeat steps (26) and (27) for other side of disabled vehicle.

**NOTE**

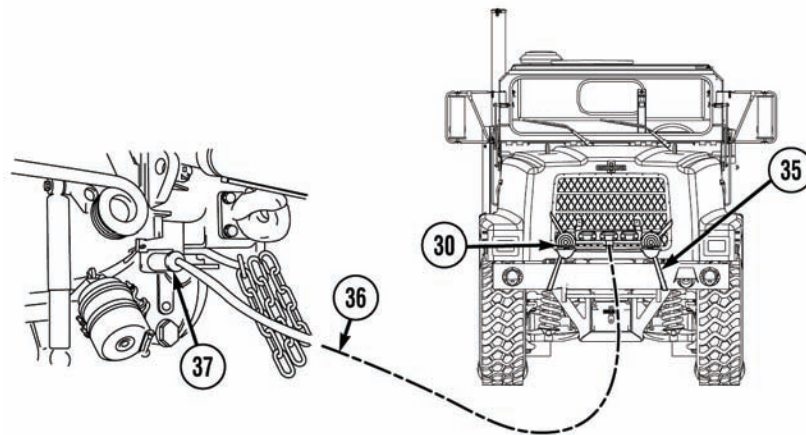
- Safety chains can be routed to safety chain hoop or towing shackles. Towing shackles can be used only after towing cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.

29. Route two 16 ft. (4.9 m) safety chains (23) to end cap hooks (27) and through safety chain hoop (28) on wrecker and secure with safety shackles (29).
30. Wrap two springs (1) around crosstube (7) and secure.

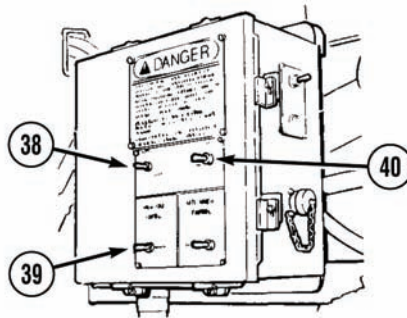
**NOTE**

Rear emergency air hose from wrecker must be connected to the front emergency glad hand on the disabled vehicle. Rear service air hose from wrecker must be connected to the front service glad hand on the disabled vehicle.

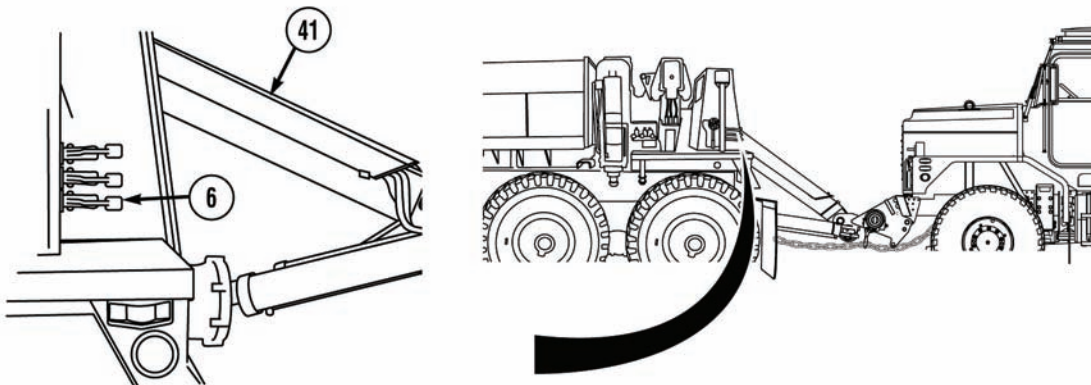
31. Prepare disabled vehicle for towing (refer to MTRV operator's manual).
32. Remove emergency tow lights (30) and two brackets (31) from stowage.
33. Install two brackets (31) in center holes of emergency tow lights (30) with two screws (32), washers (33), and nuts (34).



34. Install emergency tow lights (30) on front of MTRV and fasten securely with straps (35).
35. Remove tow light cable (36) from stowage and connect to emergency tow lights (30).
36. Route other end of tow light cable (36) along disabled vehicle and connect to rear electrical connector (37) on wrecker.
37. Lock disabled vehicle's steering (refer to MTRV operator's manual).



38. Set POWER switch (38) to ON position.
39. Set HIGH IDLE switch (39) to CONTINUOUS.
40. Push and release LATCH switch (40). Engine speed will increase to approximately 1500 rpm.

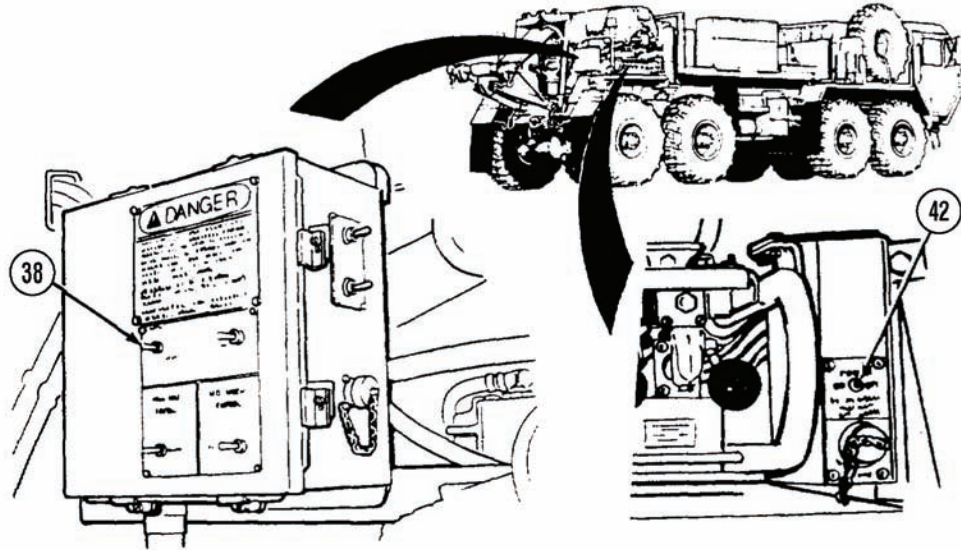


WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

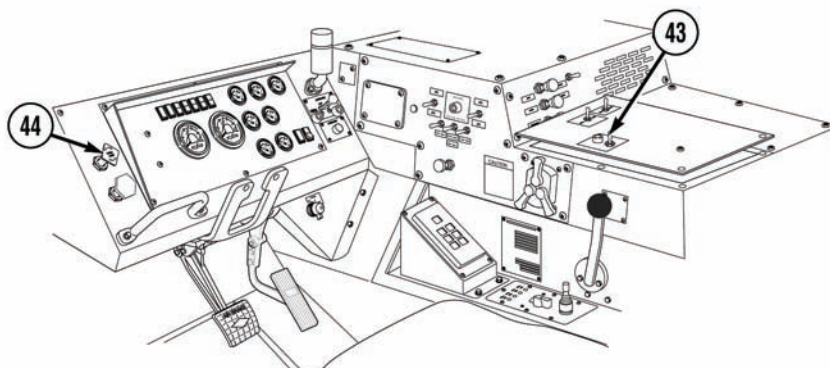
CAUTION

- Make sure all rigging is secure. Loose rigging can become entangled and cause equipment damage.
 - Fully retract two tow cylinders before lifting disabled vehicle or damage to equipment may result.
41. Push in LIFT CYLINDER control lever (6) to retract lift cylinder (41) to raise disabled vehicle approximately 1 ft. (30 cm) off ground.
 42. Adjust slack in two 16 ft. (4.9 m) safety chains so chains between crosstube (7) and wrecker are approximately 1 ft. (30 cm) off ground.



43. Set POWER switch (38) to OFF position.

44. Set POWER switch (42) to OFF position.



45. Set PTO ENGAGE switch (43) to OFF position.
46. Turn on service drive lights (TM 9-2320-279-10-2).
47. Turn on emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle (refer to MTRV operator's manual).
48. Push in PARKING BRAKE control (44) and select desired gear (TM 9-2320-279-10-2).

WARNING

The M984A1 should not be operated at speeds over 15 MPH (24 km/hr) except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain condition	Maximum speed towed load up to 50,000 lbs (22,700 kg)	Maximum speed towed load above 50,000 lbs (22,700 kg)
On road-level	35 mph (56.3 km/hr)	30 mph (47.3 km/hr)
On road-hilly	30 mph (47.3 km/hr)	20 mph (32.2 km/hr)
Off road	15 mph (24.2 km/hr)	15 mph (24.2 km/hr)

WARNING

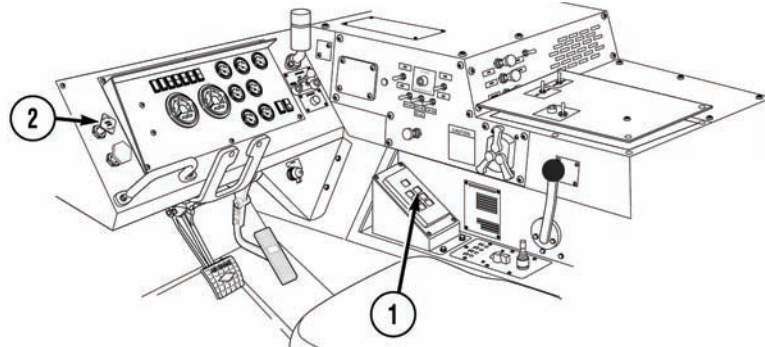
Speeds in excess of the above can result in loss of control, serious injury, or death.

49. Transport disabled vehicle.

END OF TASK

REAR DISCONNECT**NOTE**

This is a two-soldier task.

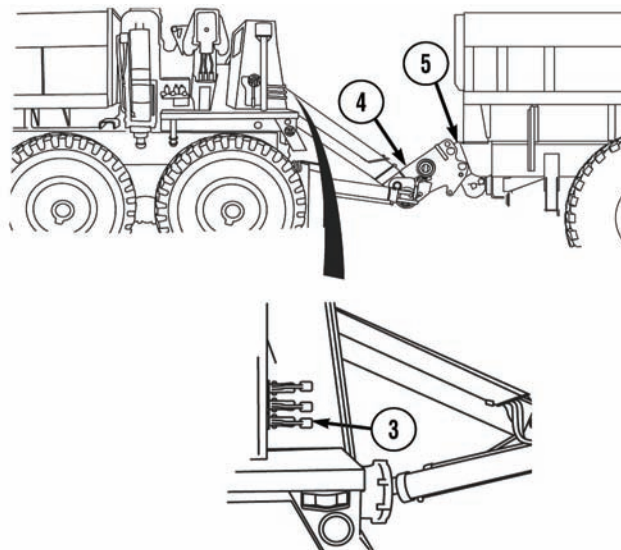


1. Set transmission range selector (1) to N (neutral).
2. Pull PARKING BRAKE control (2).

WARNING

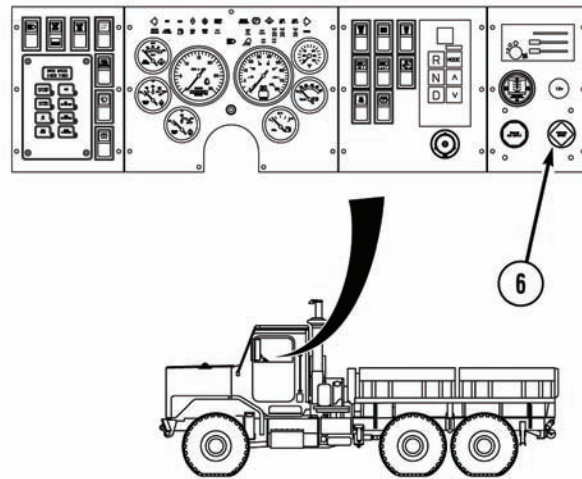
Do not stand between vehicles while disabled vehicle is raised off ground or serious injury or death can result.

3. Prepare retrieval system for operation (TM 9-2320-279-10-2).

**NOTE**

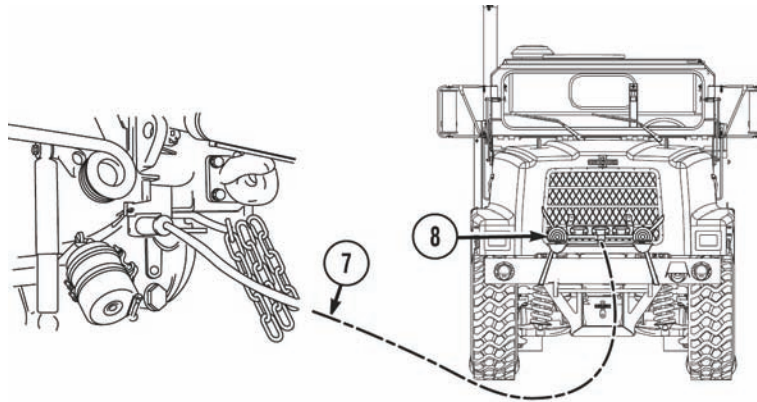
After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (51 to 102 mm) to allow for adjustment when removing adapters.

4. Pull LIFT CYLINDER control lever (3) to extend lift cylinder and lower disabled vehicle to the ground to release tension on MUAs (4) on tow eyes (5).

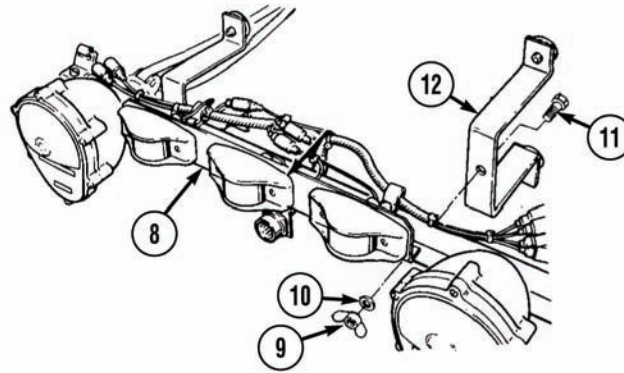
**WARNING**

**If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle.
Failure to chock wheels may result in injury to personnel.**

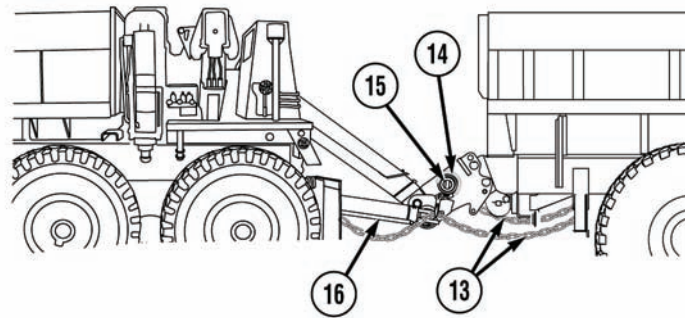
5. Apply PARKING BRAKE control (6) on disabled vehicle. If parking brake is inoperative, chock wheels on disabled vehicle (refer to MTRV operator's manual).



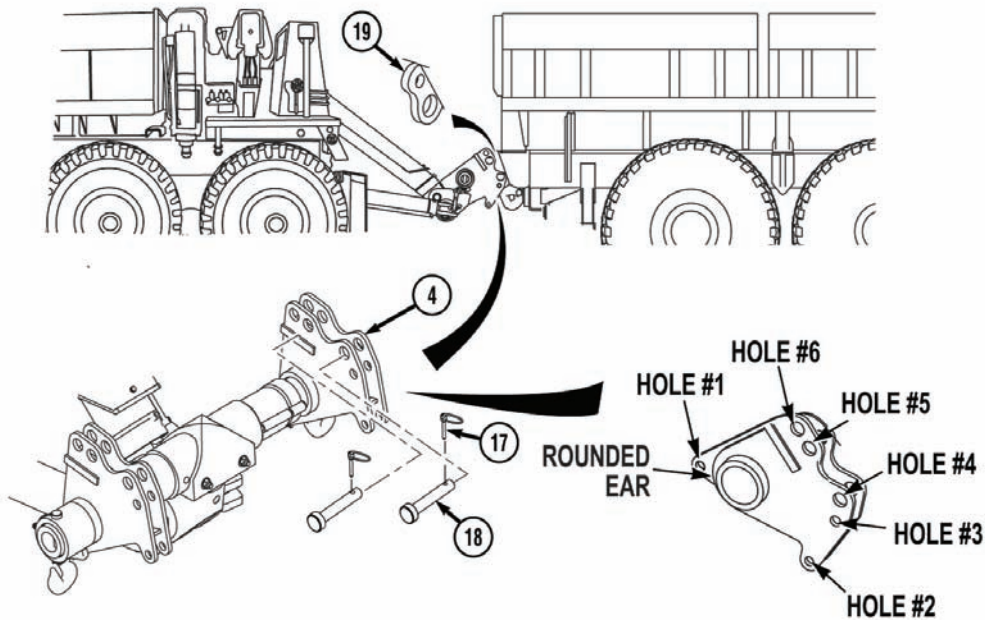
6. Remove tow light cable (7) from wrecker.
7. Remove tow light cable (7) from emergency tow lights (8) and stow.
8. Remove emergency tow lights (8) from disabled vehicle.



9. Remove two nuts (9), washers (10), screws (11), and brackets (12) from emergency tow lights (8). Stow emergency tow lights (8) and brackets (12).



10. Remove and stow two 16 ft. (4.9 m) safety chains (13).
11. Unwrap two springs (14) from crosstube (15) and connect to tow cylinders (16).

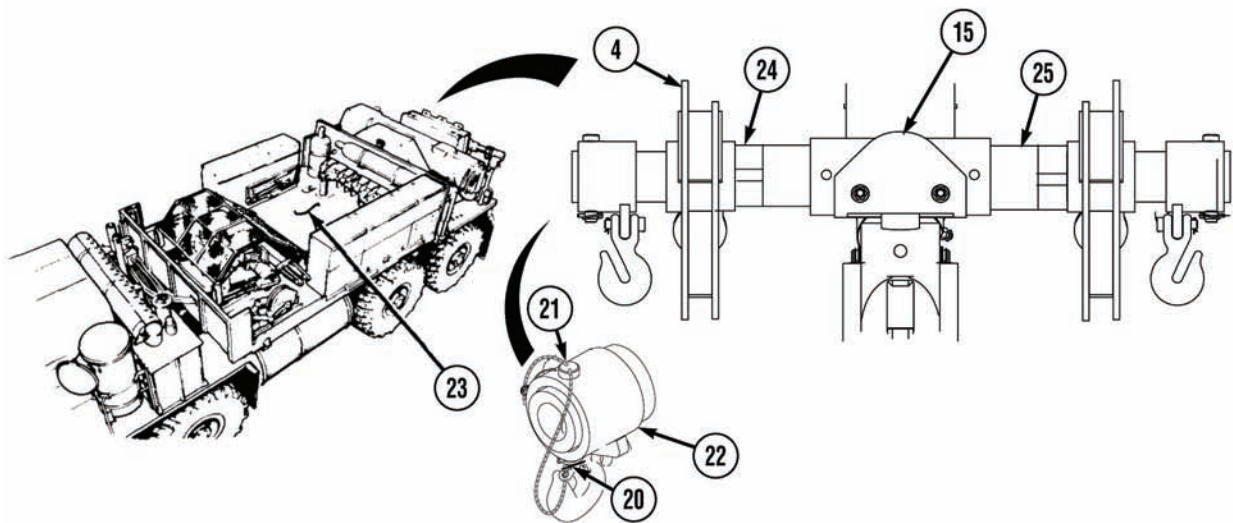
**WARNING**

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

12. Remove two quick pins (17) and pins (18) from hole #4 on MUAs (4).
13. Remove two quick pins (17) and pins (18) from hole #5 on MUAs (4).
14. Remove MUAs (4) from tow eyes (19) on disabled vehicle.



15. Drive wrecker forward a few feet and park (TM 9-2320-279-10-2).

WARNING

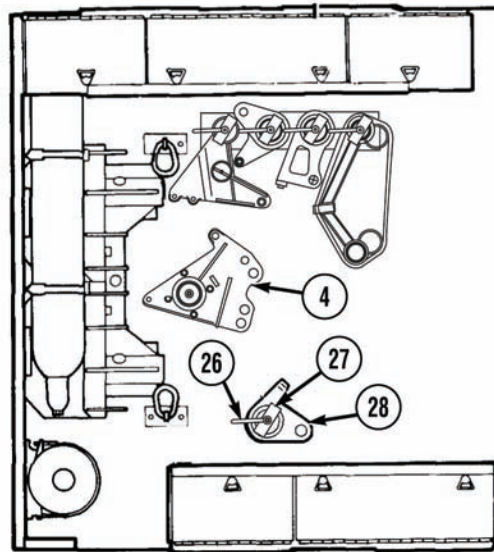
As springs and end caps are removed, crosstube can swing in all directions and adapters may slide off and can cause personal injury.

16. Remove two springs (14) from tow cylinders (16).
17. Remove two quick pins (20) and pins (21) from end caps (22).
18. Remove two end caps (22) from crosstube (15).

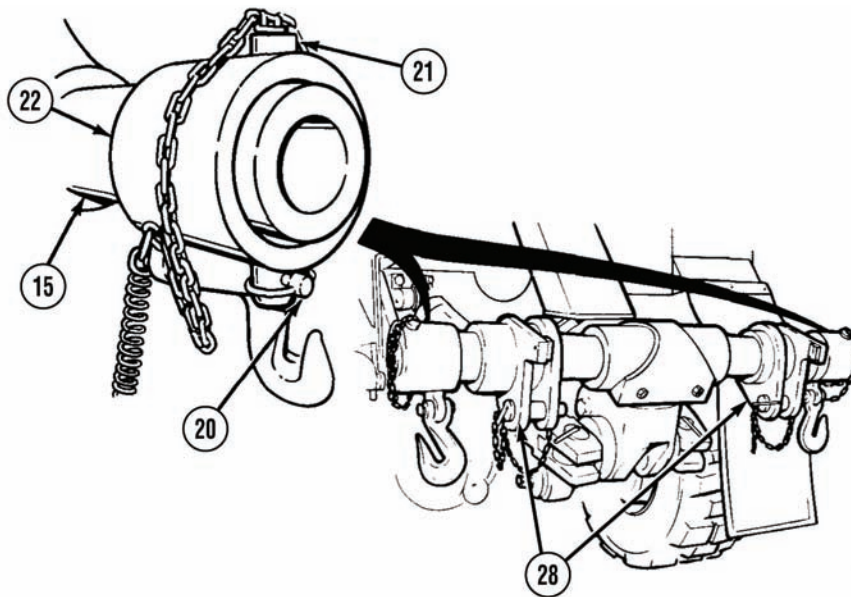
WARNING

MUAs are heavy, handle carefully or serious personal injury may result.

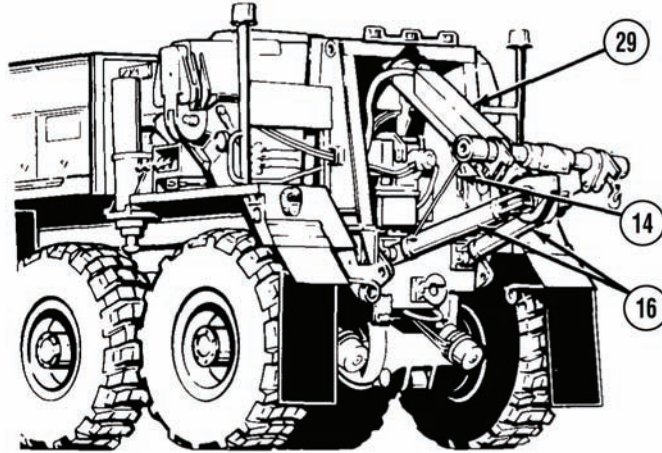
19. Remove two MUAs (4) from crosstube (15) and place on equipment body floor (23).
20. Remove and stow two 3 in. (76 mm) spacers (24).
21. Remove and stow two 4 in. (102 mm) spacers (25).



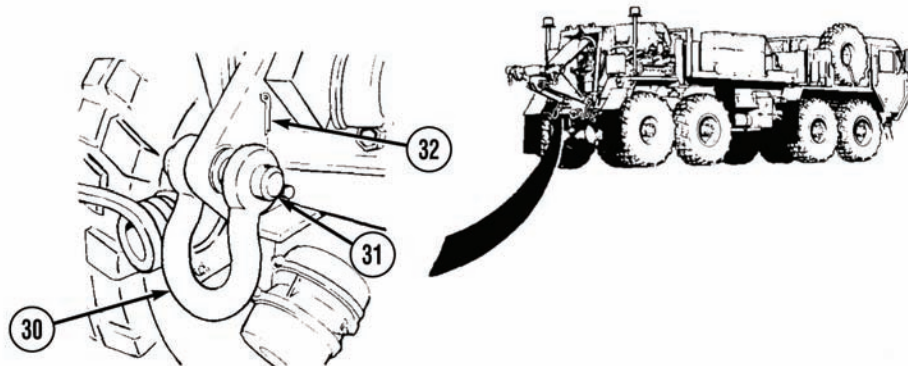
22. Remove lock handle (26), lock plate (27), and M977 front adapters (28).
23. Install two MUAs (4) removed from crosstube (15), with lock plate (27), and lock handle (26).



24. Install two M977 front adapters (28) on crosstube (15).
25. Install two end caps (22) on crosstube (15). Install two pins (21) and quick pins (20).



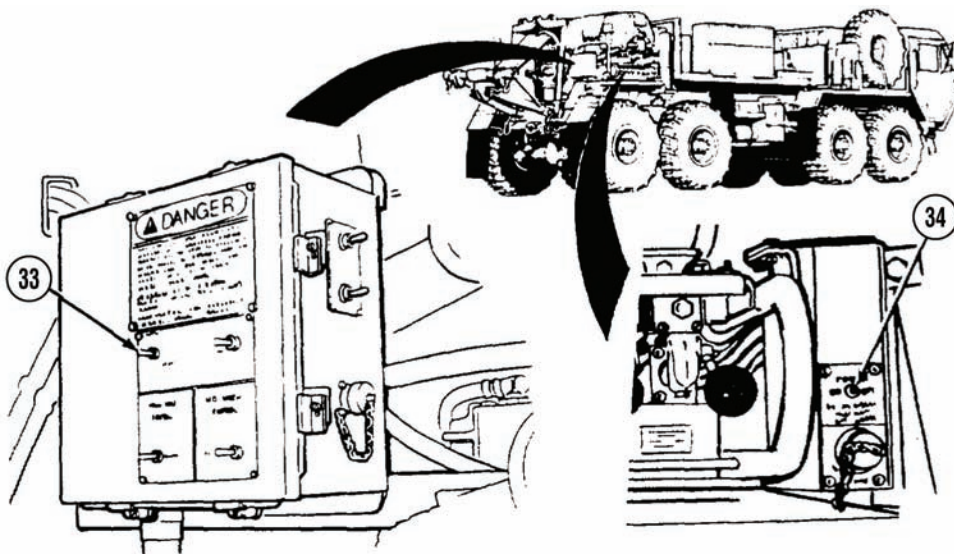
26. Install two springs (14) on tow cylinders (16).
27. Operate retrieval controls and fully retract lift cylinders (29) and tow cylinders (16).



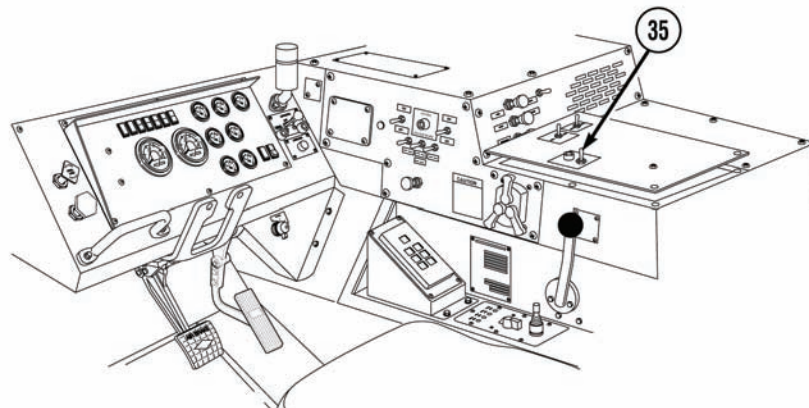
NOTE

Right and left towing shackles are installed the same way.

28. Install two towing shackles (30), pins (31), and cotter pins (32).



29. Set POWER switch (33) to OFF position.
30. Set POWER switch (34) to OFF position.



31. Turn off emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle.
32. Turn off service drive lights (TM 9-2320-279-10-2).
33. Set PTO ENGAGE switch (35) to OFF position.
34. Remove and stow beacon lights (TM 9-2320-279-10-2).
35. Shut off engine (TM 9-2320-279-10-2).
36. Unlock disabled vehicle's steering (refer to MTRV operator's manual).

END OF TASK

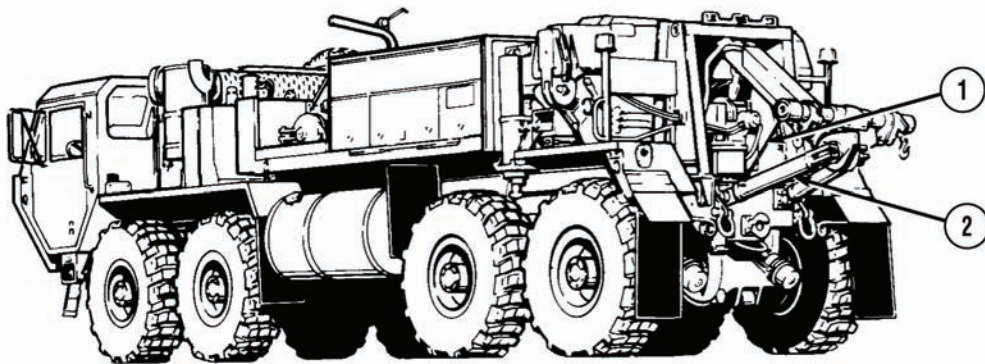
END OF WORK PACKAGE

OPERATOR MAINTENANCE**FRONT LIFT AND TOW OF M939**

FRONT HOOKUP**NOTE**

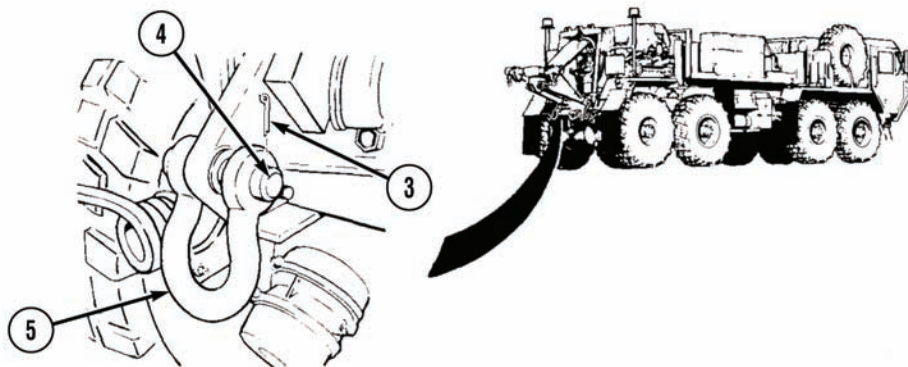
This is a two-soldier task.

1. Prepare retrieval system for operation (TM 2320-279-10-2).

**WARNING**

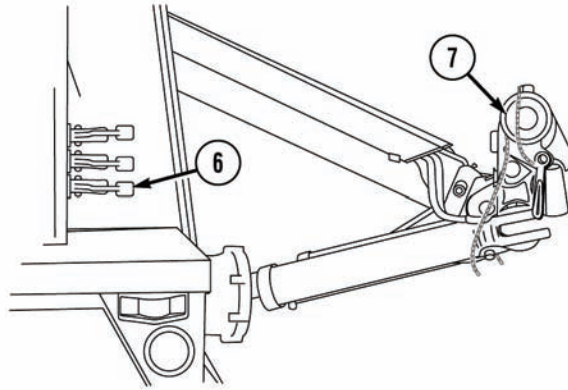
Hold crosstube when removing springs. Crosstube may swing and cause adapters to slide, resulting in personal injury.

2. Disconnect two springs (1) from tow cylinders (2).

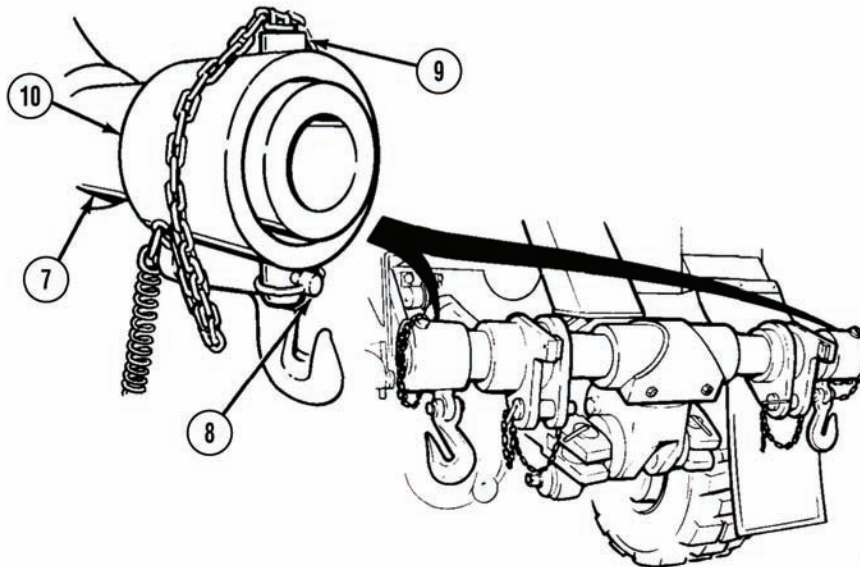
**NOTE**

Right and left towing shackles are removed the same way.

3. Remove two cotter pins (3), pins (4), and towing shackles (5) and stow on equipment body floor.



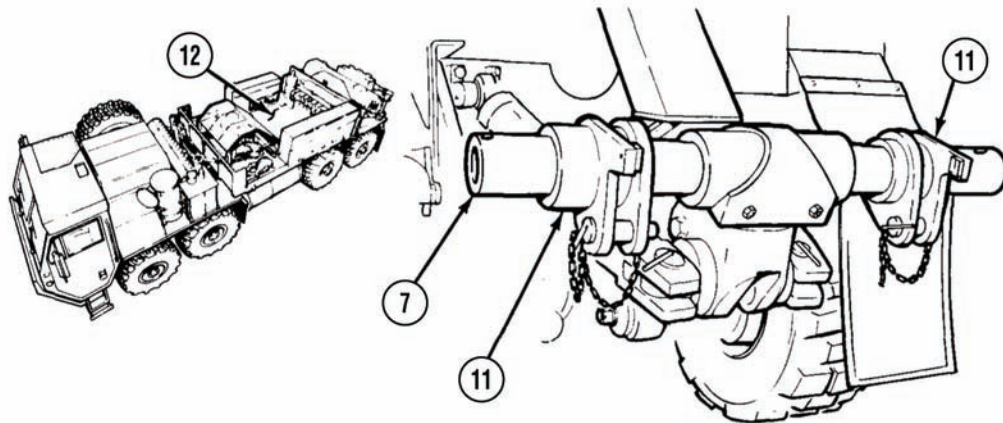
4. Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 4 ft. (1.2 m) above the ground.
5. Position wrecker so that crosstube (7) is approximately 1 ft. (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



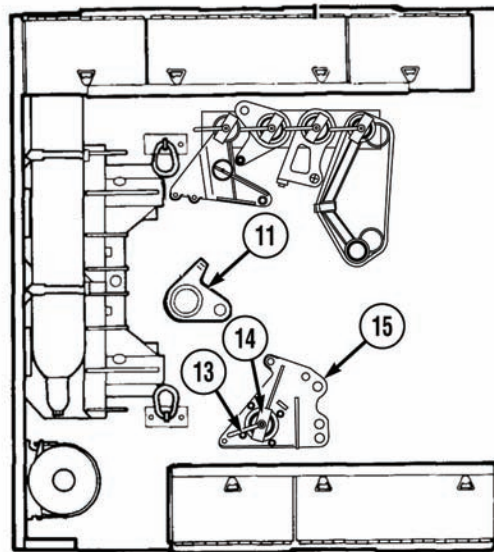
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

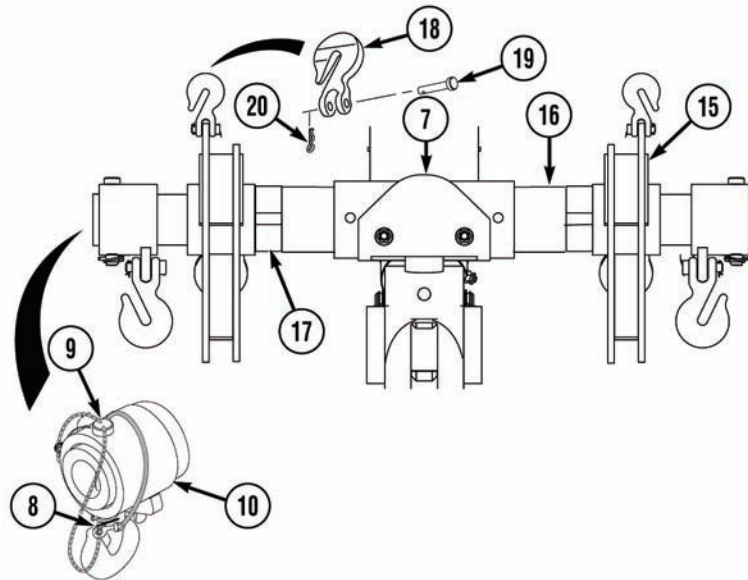
6. Remove two quick pins (8) and pins (9) from end caps (10).
7. Remove two end caps (10) from crosstube (7).



8. Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



9. Remove lock handle (13), lock plate (14), and two Multi-Use Adapters (MUAs) (15).
10. Install two M977 front adapters (11), lock plate (14), and lock handle (13).



11. Remove two 4 in. (102 mm) spacers (16) and two 1.5 in. (38 mm) spacers (17) from stowage.
12. Install two 4 in. (102 mm) spacers (16) on crosstube (7).
13. Install two 1.5 in. (38 mm) spacers (17) on crosstube (7).

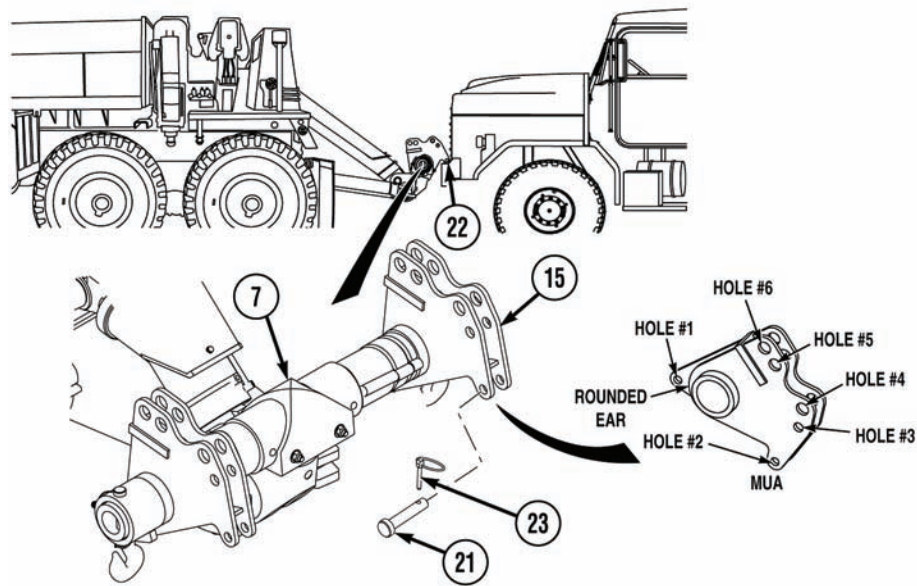
WARNING

- **MUAs are heavy, handle carefully or serious personal injury will result.**
- **Adapters and end caps may slide off when installing, and may cause personal injury.**

NOTE

MUAs must be positioned on crosstube with rounded ear of MUA toward center of crosstube.

14. Install two MUAs (15) on crosstube (7) with holes facing tow eyes of disabled vehicle.
15. Install two end caps (10) on crosstube (7).
16. Install two pins (9) and quick pins (8).
17. Install two lift clevises (18) in hole #1 of MUAs (15) with pins (19) and cotter pins (20).
18. Attach two springs (1) on tow cylinders (2).



19. Remove two pins (3483740) (21) from stowage.

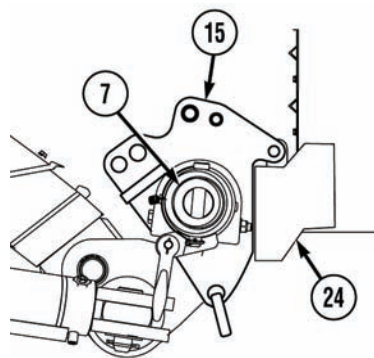
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

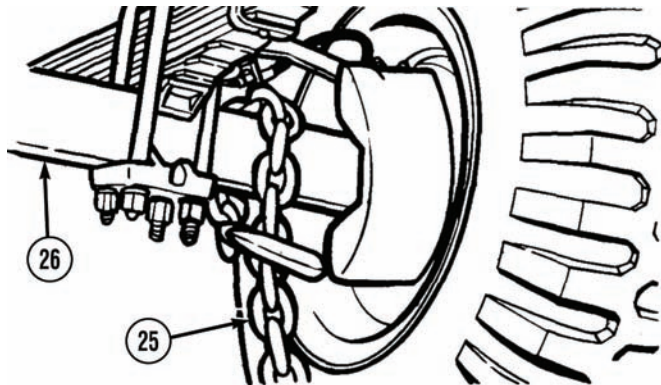
NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

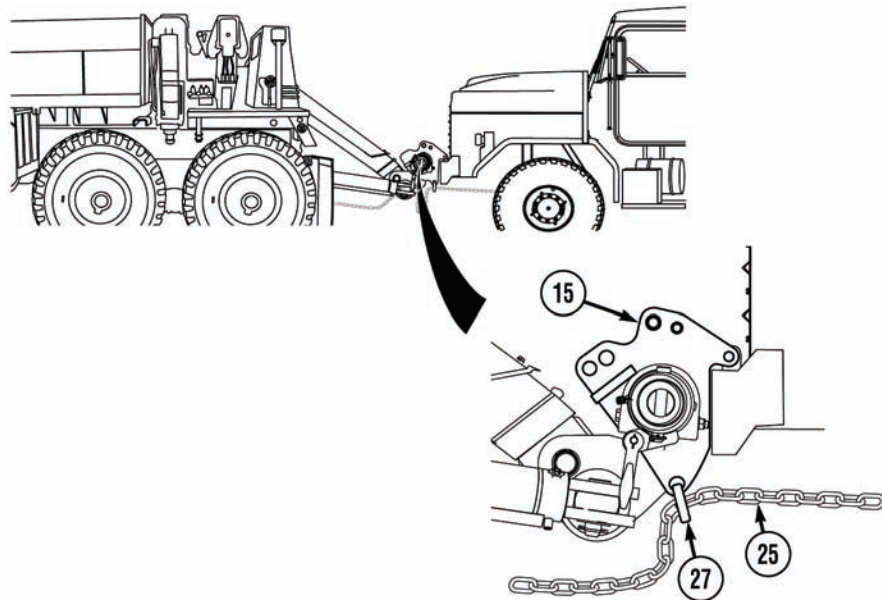
20. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #2 on MUAs (15) align with front tow eyes (22).
21. Insert two pins (21) through MUAs (15) and front tow eyes (22). Install quick pins (23) in pins (21).



22. Lower crosstube (7) until MUAs (15) contact front bumper (24).



23. Remove two 16 ft. (4.9 m) safety chains (25) from stowage.
24. Route one end of 16 ft. (4.9 m) safety chain (25) over front axle (26) on disabled vehicle.
25. Hook safety chain (25) together in front of axle (26).
26. Repeat steps (24) and (25) for other side of disabled vehicle.



CAUTION

- If chains between axle and lift clevis are loose, then MUAs will rotate during transport and damage to equipment may result.
- When routing safety chain through lift clevis, keep chain as taut as possible between axle of disabled vehicle and lift clevis, or equipment damage may result.

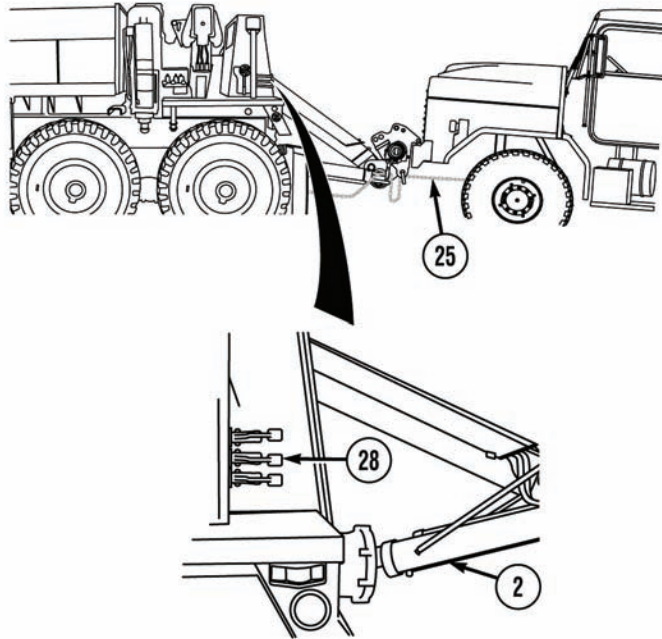
27. Pull safety chain (25) tight and install chain on lift clevis (27) on MUA (15).

28. Repeat step (27) for other side of disabled vehicle.

NOTE

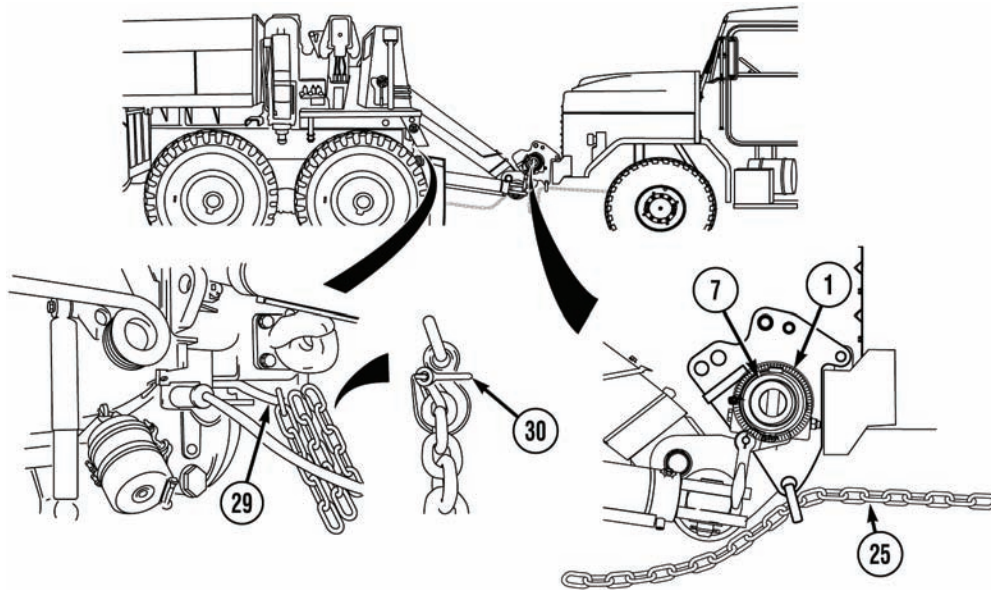
If disabled vehicle parking brakes do not release, cage brake chambers.

29. Release PARKING BRAKE on disabled vehicle (refer to M939 operator's manual).

**NOTE**

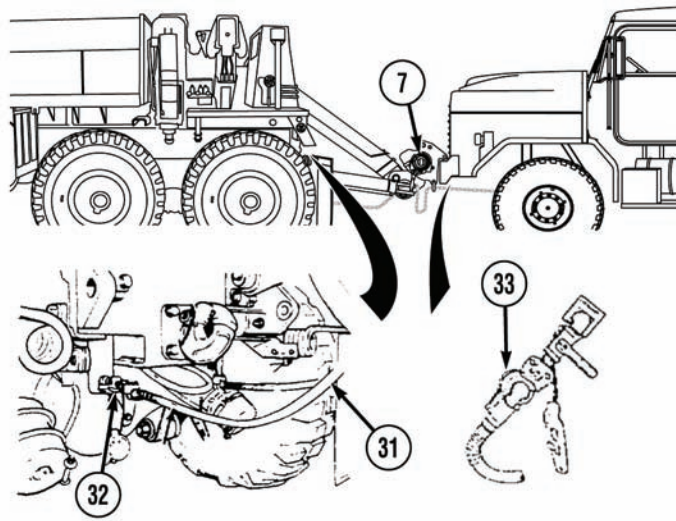
Do not lift vehicle off ground when performing step (30).

30. Operate retrieval control levers (28) (TM 9-2320-279-10-2) until tow cylinders (2) are fully retracted.
31. Push in LIFT CYLINDER control lever (6) to retract lift cylinder until slack is removed from safety chains (25).

**NOTE**

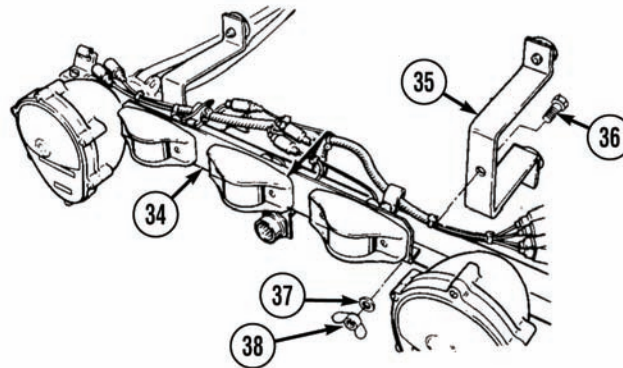
- Safety chains can be routed to safety chain hoop or towing shackles. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.

32. Route two safety chains (25) through safety chain hoop (29) on wrecker and secure with safety shackle (30).
33. Wrap two springs (1) around crosstube (7) and secure.

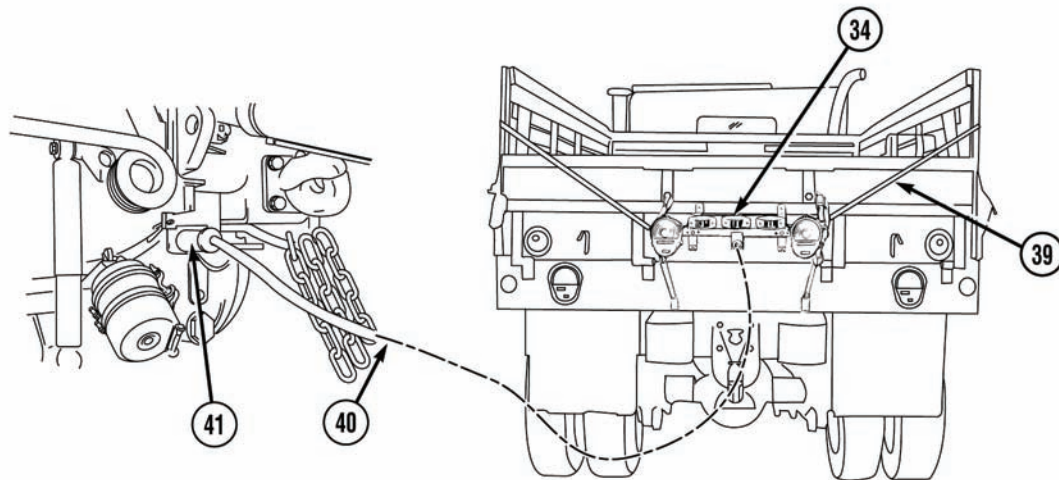
**NOTE**

Rear emergency air hose from wrecker must be connected to the front emergency glad hand on the disabled vehicle. Rear service air hose from wrecker must be connected to the front service glad hand on the disabled vehicle.

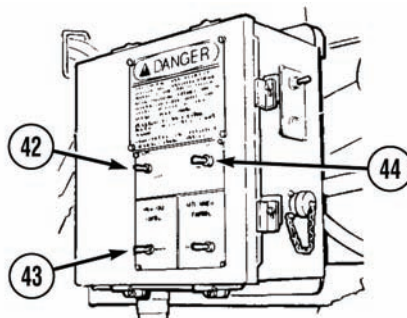
34. Prepare disabled vehicle for towing (refer to M939 operator's manual).
35. Remove two air lines (31) from stowage and attach to rear glad hands (32) of wrecker.
36. Route two air lines (31) over crosstube (7) and attach to front glad hands (33) of disabled vehicle.



37. Remove emergency tow lights (34) and two brackets (35) from stowage.
38. Install two brackets (35) in center holes of emergency tow lights (34) with two screws (36), washers (37), and nuts (38).



39. Install emergency tow lights (34) on rear of M939 and fasten securely with straps (39).
40. Remove tow light cable (40) from stowage and connect to emergency tow lights (34).
41. Route other end of tow light cable (40) along disabled vehicle and connect to rear electrical connector (41) on wrecker.
42. Lock disabled vehicle's steering (refer to M939 operator's manual).



43. Set POWER switch (42) to ON position.
44. Set HIGH IDLE switch (43) to CONTINUOUS.
45. Push and release LATCH switch (44). Engine speed will increase to approximately 1500 rpm.



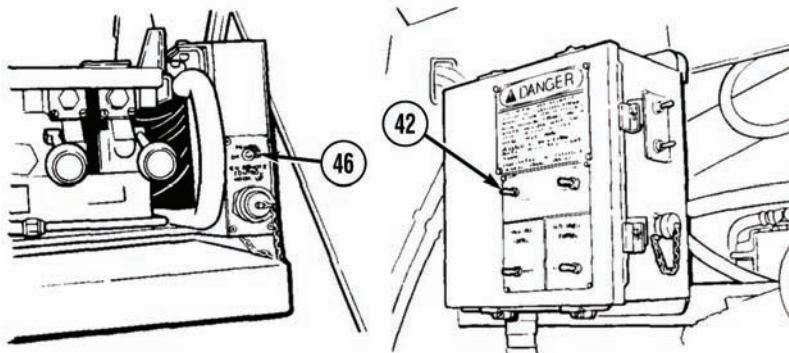
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

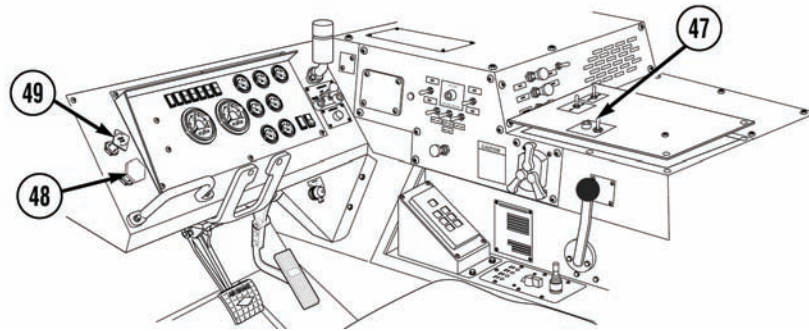
CAUTION

- **Fully retract two tow cylinders before lifting disabled vehicle or damage to equipment may result.**
- **Make sure all rigging is secure. Loose rigging can become entangled and cause equipment damage.**

46. Push in LIFT CYLINDER control lever (6) to retract lift cylinder (45) to raise disabled vehicle approximately 1 ft. (30 cm) off ground.
47. Adjust slack in two 16 ft. (4.9 m) safety chains so chains between crosstube and wrecker are approximately 1 ft. (30 cm) off ground.



48. Set POWER switch (42) to OFF position.
49. Set POWER switch (46) to OFF position.



50. Set PTO ENGAGE switch (47) to OFF position.
51. Push in TRAILER AIR SUPPLY control (48).
52. Turn on service drive lights (TM 9-2320-279-10-2).
53. Turn on emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle (refer to M939 operator's manual).
54. Push in PARKING BRAKE control (49) and select desired gear (TM 9-2320-279-10-2).

WARNING

The M984A1 should not be operated at speeds over 15 MPH (24 km/hr) except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain condition	Maximum speed towed load up to 50,000 lbs (22,700 kg)	Maximum speed towed load above 50,000 lbs (22,700 kg)
On road-level	35 mph (56.3 km/hr)	30 mph (47.3 km/hr)
On road-hilly	30 mph (47.3 km/hr)	20 mph (32.2 km/hr)
Off road	15 mph (24.2 km/hr)	15 mph (24.2 km/hr)

WARNING

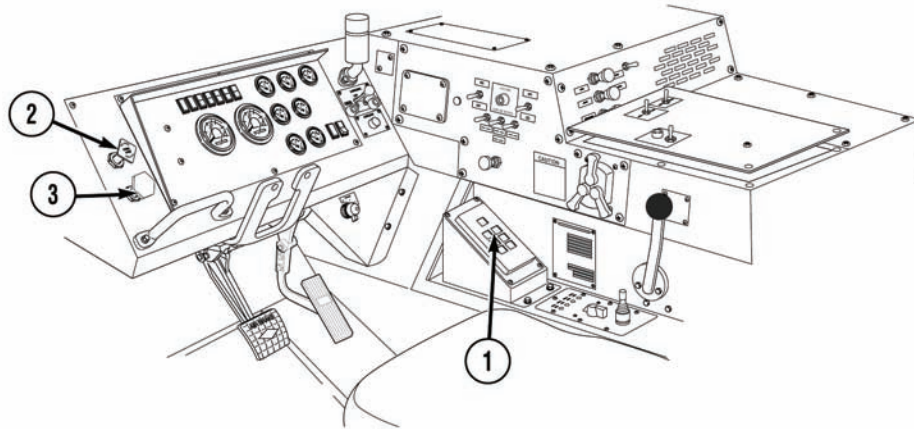
Speeds in excess of the above can result in loss of control, serious injury, or death.

55. Transport disabled vehicle.

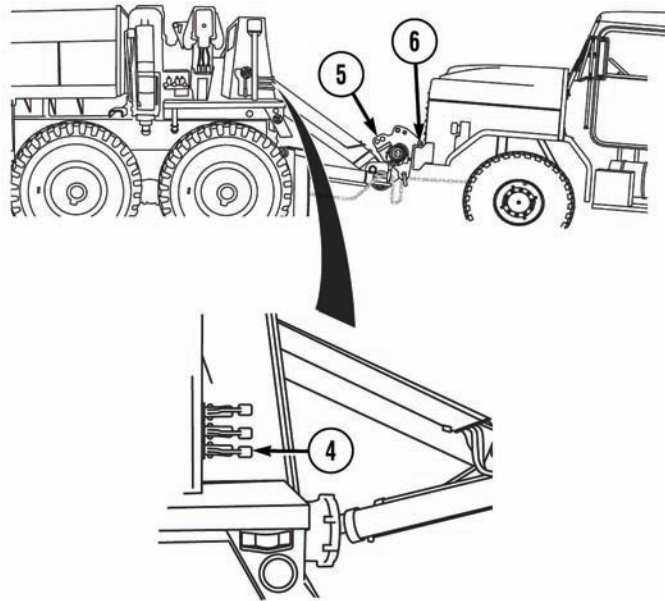
END OF TASK

FRONT DISCONNECT**NOTE**

This is a two-soldier task.



1. Set transmission range selector (1) to N (neutral).
2. Pull PARKING BRAKE control (2).
3. Pull TRAILER AIR SUPPLY control (3).

**WARNING**

Do not stand between vehicles while disabled vehicle is raised off ground or serious personal injury or death can result.

4. Prepare retrieval system for operation (TM 9-2320-279-10-2).

NOTE

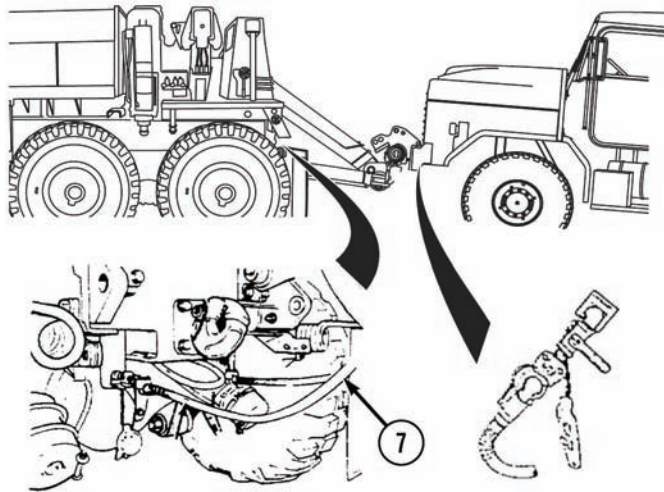
After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (51 to 102 mm) to allow for adjustment when removing adapters.

5. Pull LIFT CYLINDER control lever (4) to extend lift cylinder and lower disabled vehicle to the ground to release tension on MUAs (5) on tow eyes (6).

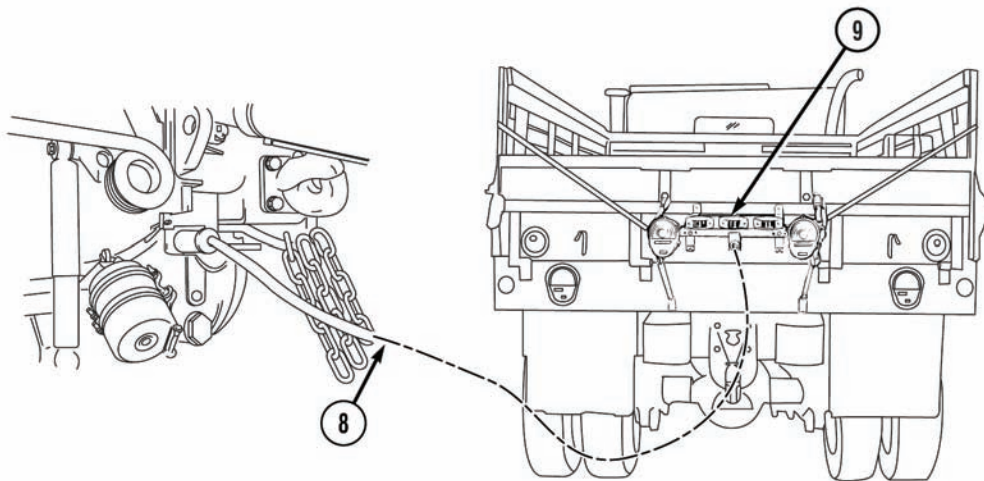
WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may results in personal injury.

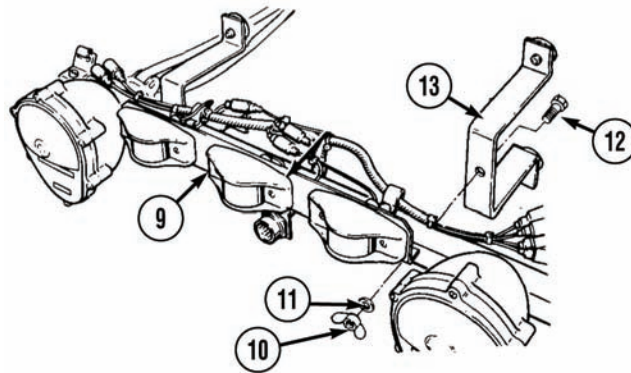
6. Apply PARKING BRAKE on disabled vehicle (refer to M939 operator's manual).



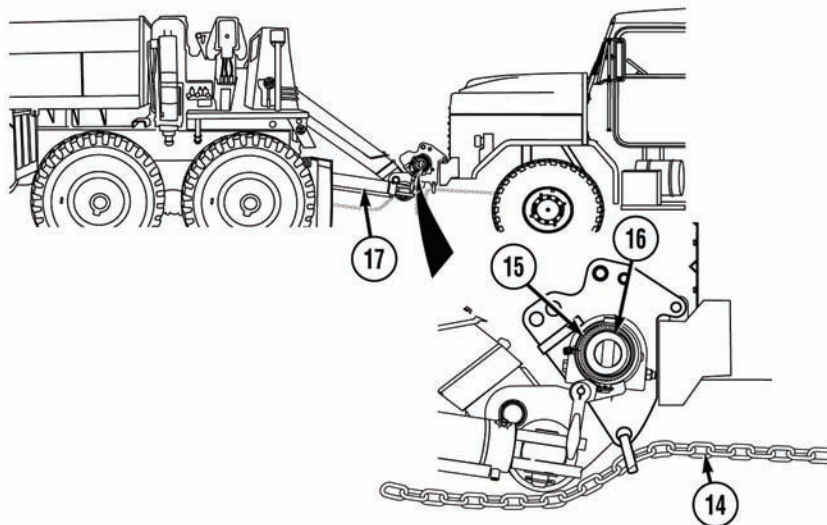
7. Remove and stow air lines (7).



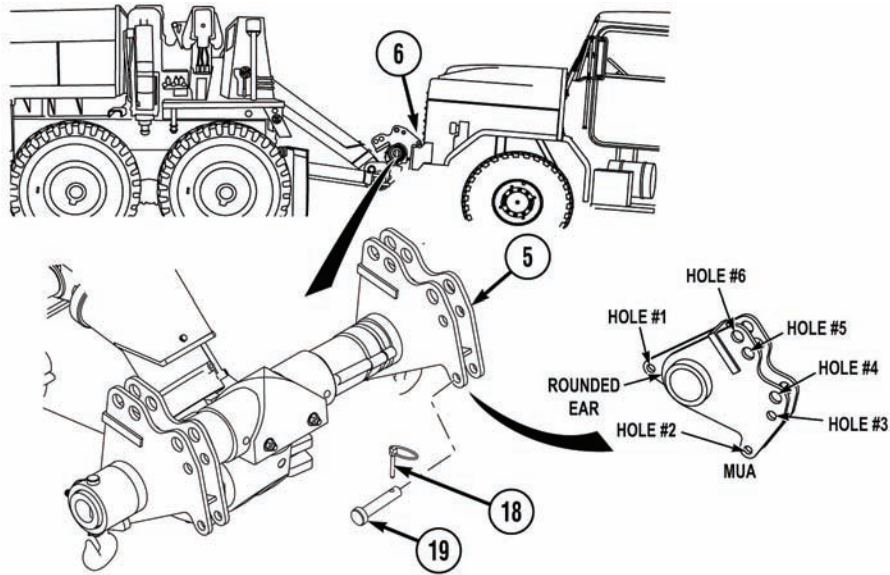
8. Remove tow light cable (8) from wrecker.
9. Remove tow light cable (8) from emergency tow lights (9) and stow.
10. Remove emergency tow lights (9) from disabled vehicle.



11. Remove two nuts (10), washers (11), screws (12), and brackets (13) from emergency tow lights (9). Stow emergency tow lights (9) and brackets (13).



12. Remove and stow two 16 ft. (4.9 m) safety chains (14).
13. Unwrap two springs (15) from crosstube (16) and connect to tow cylinders (17).

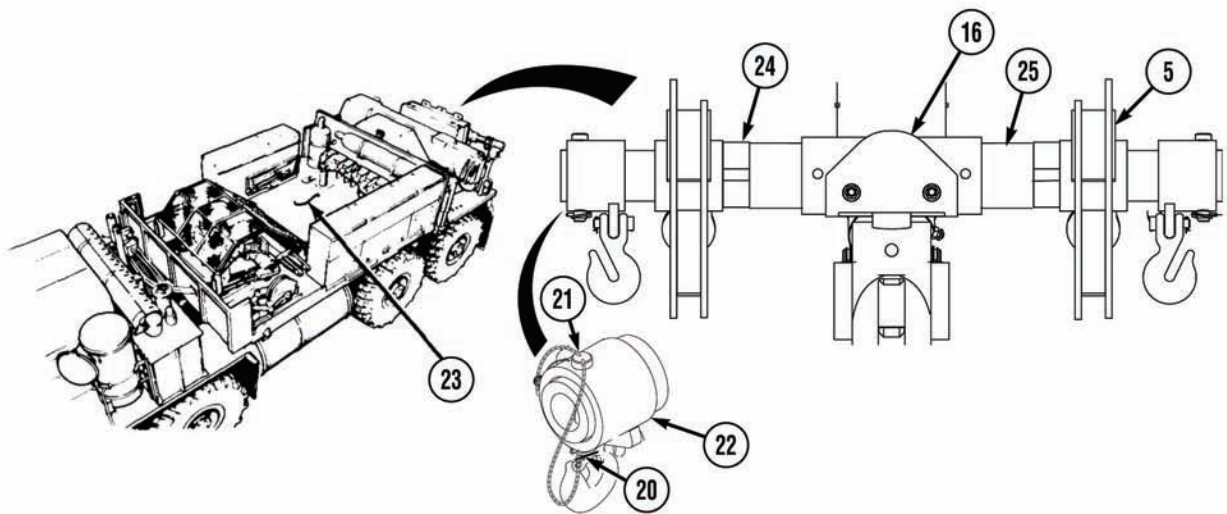
**WARNING**

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

14. Remove two quick pins (18) and pins (19) from hole #2 on MUAs (5).
15. Remove MUAs (5) from tow eyes (6) on disabled vehicle.
16. Operate retrieval controls (TM 9-2320-279-10-2) to extend lift cylinder and lower crosstube (16) until MUAs are no longer supported by bumper of disabled vehicle.



17. Drive wrecker forward a few feet and park (TM 9-2320-279-10-2).

WARNING

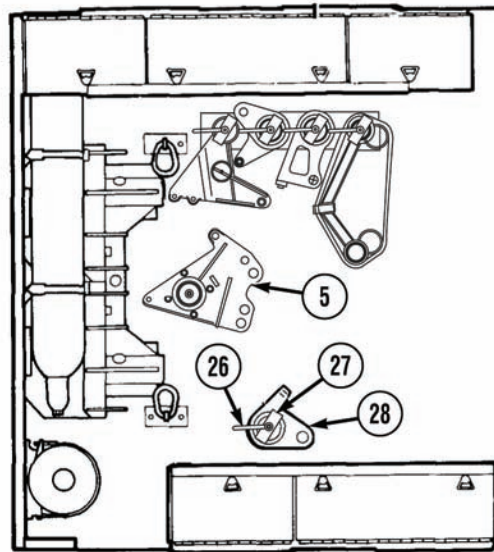
As springs and end caps are removed, crosstube can swing in all directions and adapters may slide off and can cause personal injury.

18. Remove two springs (15) from tow cylinders (17).
19. Remove two quick pins (20) and pins (21) from end caps (22).
20. Remove two end caps (22) from crosstube (16).

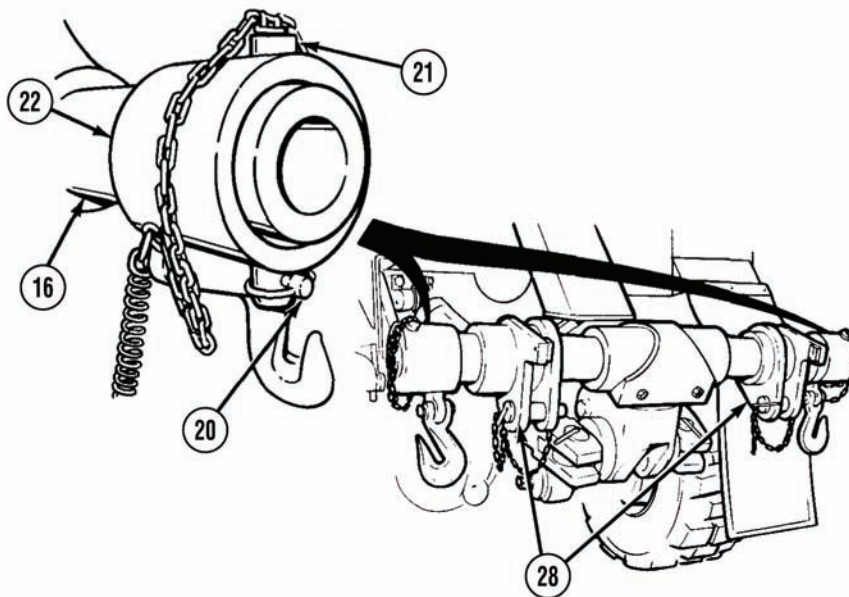
WARNING

MUAs are heavy handle carefully or serious personal injury may result.

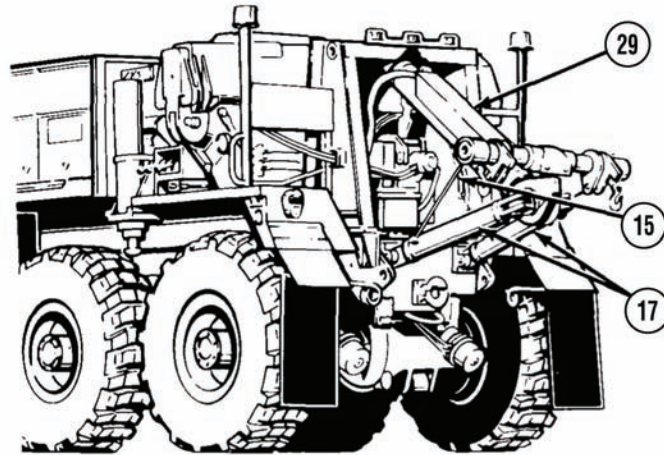
21. Remove two MUAs (5) from crosstube (16) and place on equipment body floor (23).
22. Remove and stow two 1.5 in. (38 mm) spacers (24).
23. Remove and stow two 4 in. (102 mm) spacers (25).



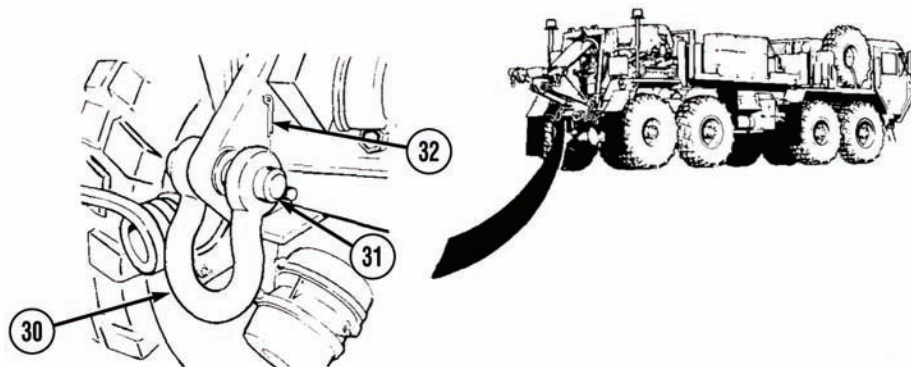
24. Remove lock handle (26), lock plate (27), and M977 front adapters (28).
25. Install two MUAs (5) removed from crosstube (16), with lock plate (27), and lock handle (26).



26. Install two M977 front adapters (28) on crosstube (16).
27. Install two end caps (22) on crosstube (16). Install two pins (21) and quick pins (20).



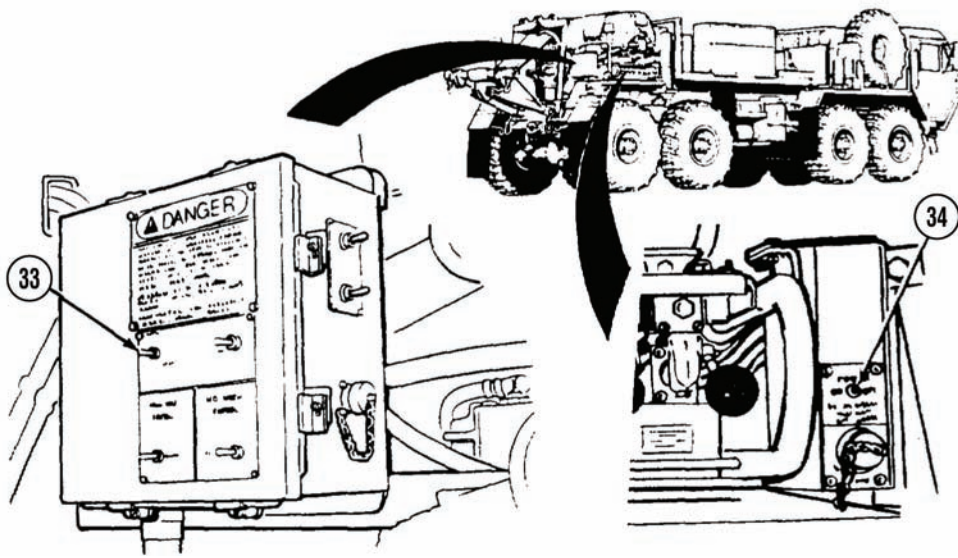
28. Install two springs (15) on tow cylinders (17).
29. Operate retrieval controls and fully retract lift cylinder (29) and tow cylinders (17).



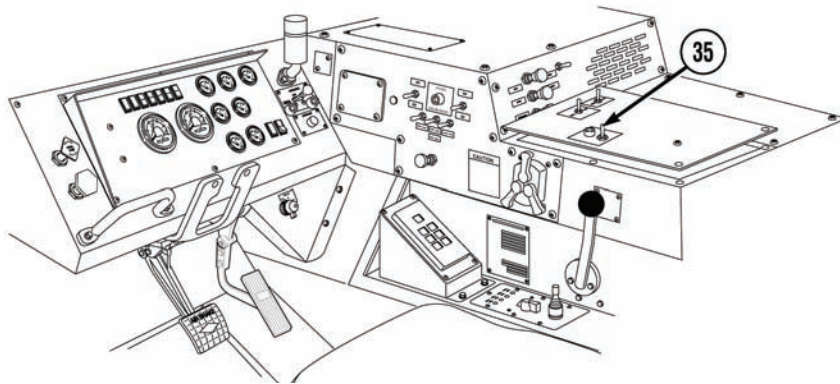
NOTE

Right and left towing shackles are installed the same way.

30. Install two towing shackles (30), pins (31), and cotter pins (32).



31. Set POWER switch (33) to OFF position.
32. Set POWER switch (34) to OFF position.



33. Turn off emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle.
34. Turn off service drive lights (TM 9-2320-279-10-2).
35. Set PTO ENGAGE switch (35) to OFF position.
36. Remove and stow beacon lights (TM 9-2320-279-10-2).
37. Shut off engine (TM 9-2320-279-10-2).
38. Unlock disabled vehicle's steering (refer to M939 operator's manual).

END OF TASK

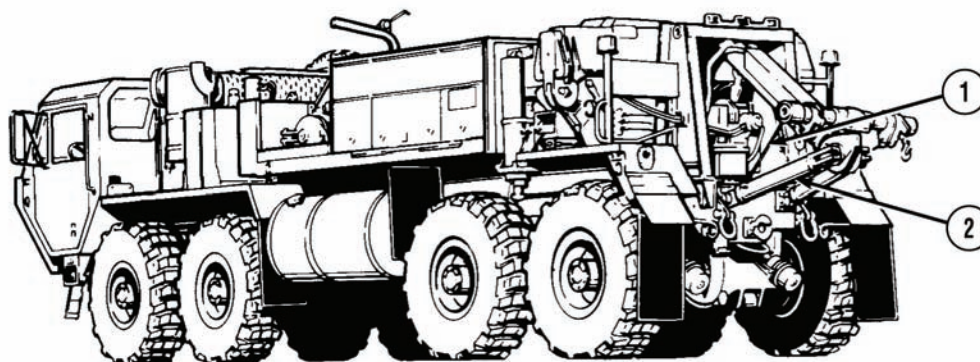
END OF WORK PACKAGE

OPERATOR MAINTENANCE**FRONT LIFT AND TOW OF M35**

FRONT HOOKUP**NOTE**

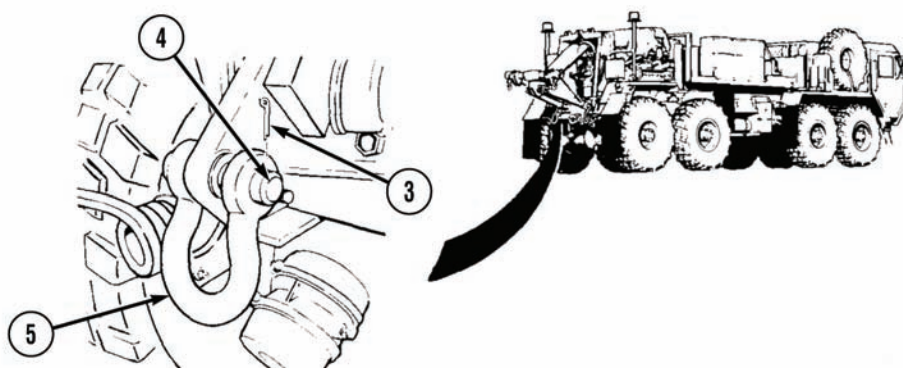
This is a two-soldier task.

1. Prepare retrieval system for operation (TM 2320-279-10-2).

**WARNING**

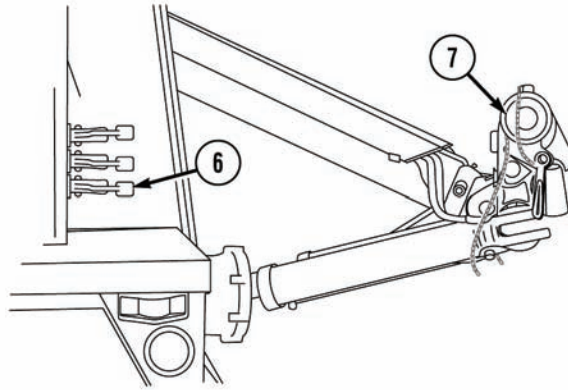
Hold crosstube when removing springs. Crosstube may swing and cause adapters to slide resulting in personal injury.

2. Disconnect two springs (1) from tow cylinders (2).

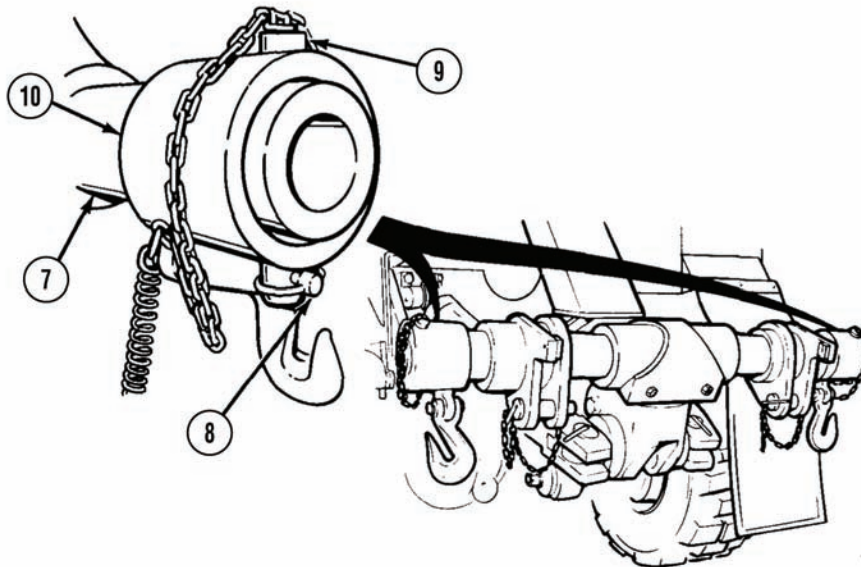
**NOTE**

Right and left towing shackles are removed the same way.

3. Remove two cotter pins (3), pins (4), and towing shackles (5).



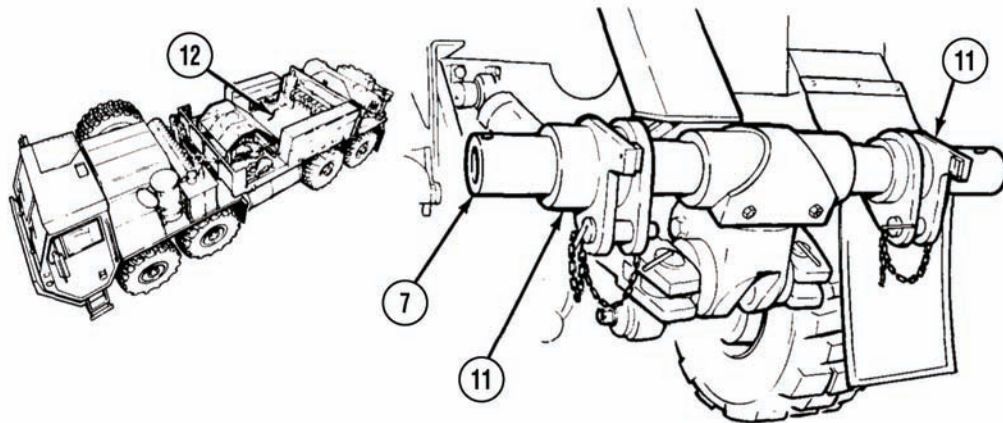
4. Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft. (1 m) above the ground.
5. Position wrecker so that crosstube (7) is approximately 1 ft. (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



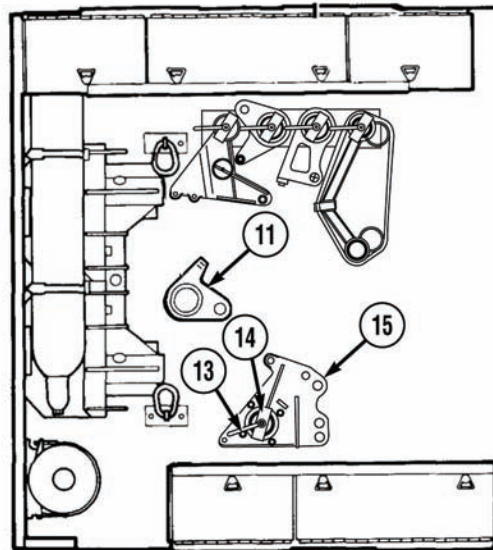
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

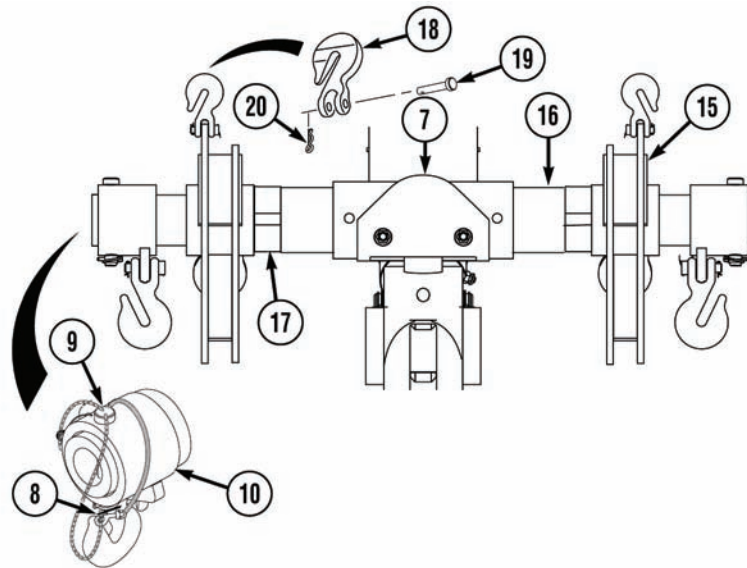
6. Remove two quick pins (8) and pins (9) from end caps (10).
7. Remove two end caps (10) from crosstube (7).



8. Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



9. Remove lock handle (13), lock plate (14), and two Multi-Use Adapters (MUAs) (15).
10. Install two M977 front adapters (11), lock plate (14), and lock handle (13).



11. Remove two 4 in. (102 mm) spacers (16) and two 1.5 in. (38 mm) spacers (17) from stowage.
12. Install two 4 in. (102 mm) spacers (16) on crosstube (7).
13. Install two 1.5 in. (38 mm) spacers (17) on crosstube (7).

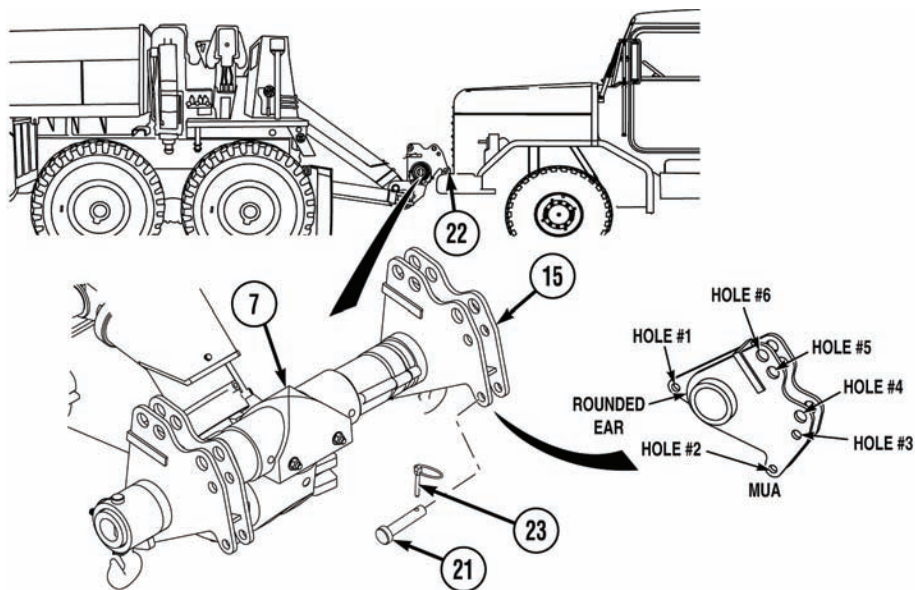
WARNING

- **MUAs are heavy, handle carefully or serious personal injury will result.**
- **Adapters and end caps may slide off when installing and may cause personal injury.**

NOTE

MUAs must be positioned on crosstube with rounded ear of MUA toward center of crosstube.

14. Install two MUAs (15) on crosstube (7) with holes facing tow eyes of disabled vehicle.
15. Install two end caps (10) on crosstube (7).
16. Install two pins (9) and quick pins (8).
17. Install two lift clevises (18) in hole #1 of MUAs (15) with pins (19) and cotter pins (20).
18. Attach two springs (1) on tow cylinders (2).



19. Remove two pins (3483740) (21) from stowage.

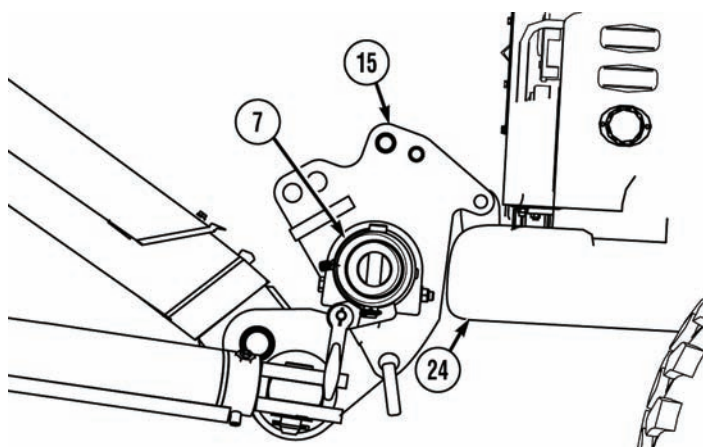
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

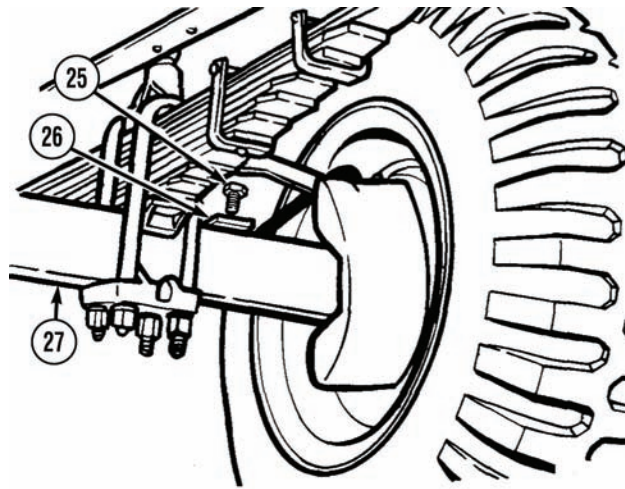
NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

20. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #2 on MUAs (15) align with front tow eyes (22).
21. Insert two pins (21) through MUAs (15) and front tow eyes (22). Install quick pins (23) in pins (21).



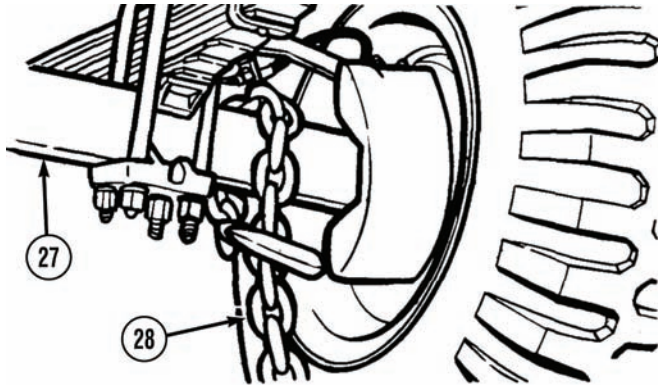
22. Alternately operate lift and tow cylinders to lower crosstube (7) until MUAs (15) contact front bumper (24).

**NOTE**

- Left side shown.
- Brake line bracket is located on top rear of axle.

23. Remove screw (25), move brake line bracket (26) away from axle (27) and replace screw (25) in axle (27).

24. Repeat step (23) for other side of disabled vehicle.



25. Remove two 16 ft. (4.9 m) safety chains (28) from stowage.

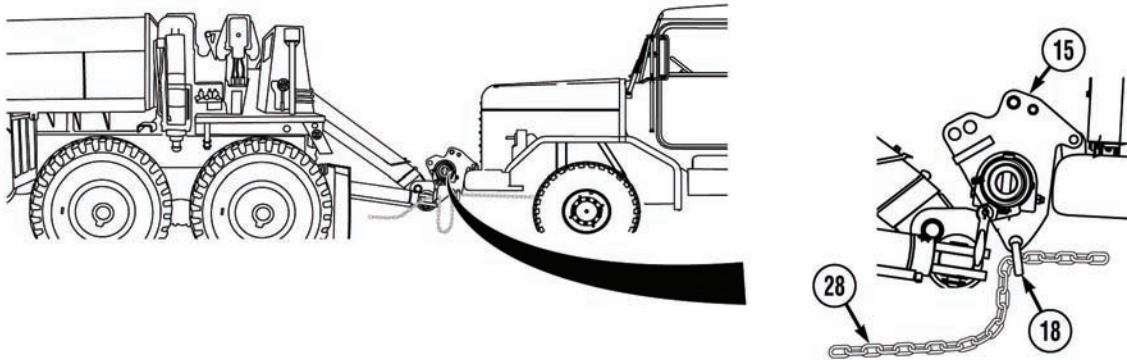
CAUTION

Route chain between brake line and axle or damage to brake line will result.

26. Route one end of 16 ft. (4.9 m) safety chain (28) over front axle (27) of disabled vehicle.

27. Hook safety chain (28) together in front of axle (27).

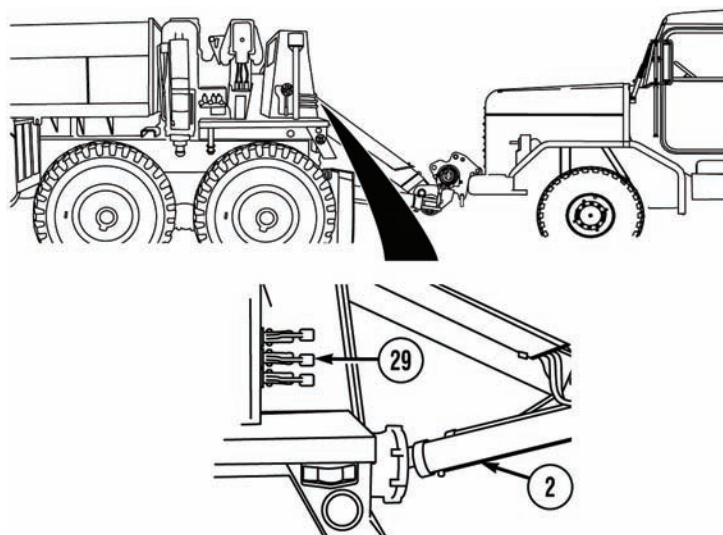
28. Repeat steps (26) and (27) for other side of disabled vehicle.



CAUTION

- If chains between axle and lift clevis are loose, then MUAs will rotate during transport and damage to equipment may result.
- When routing safety chain through lift clevis, keep chain as taut as possible between axle of disabled vehicle and lift clevis, or equipment damage may result.

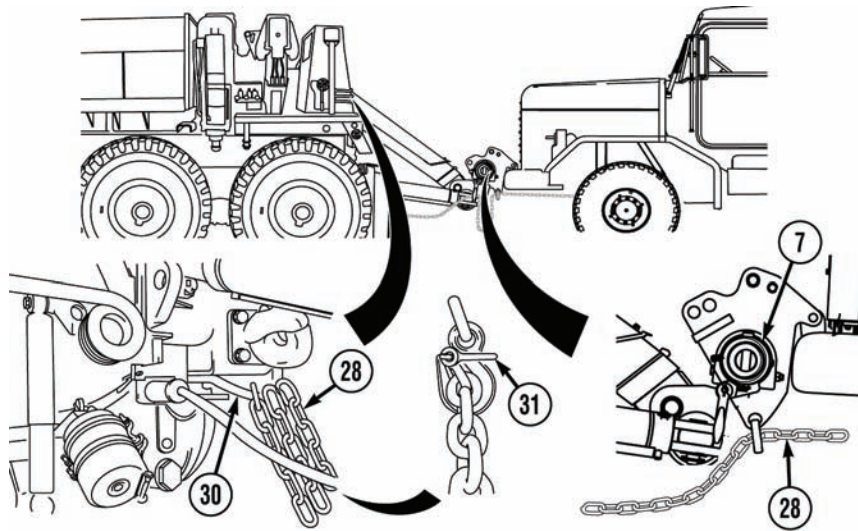
29. Pull safety chain (28) tight and install chain on lift clevis (18) on MUA (15).
30. Repeat step (29) for other side of disabled vehicle.
31. Release PARKING BRAKE on disabled vehicle (refer to M35 operator's manual).



NOTE

Do not lift vehicle off ground when performing step (32).

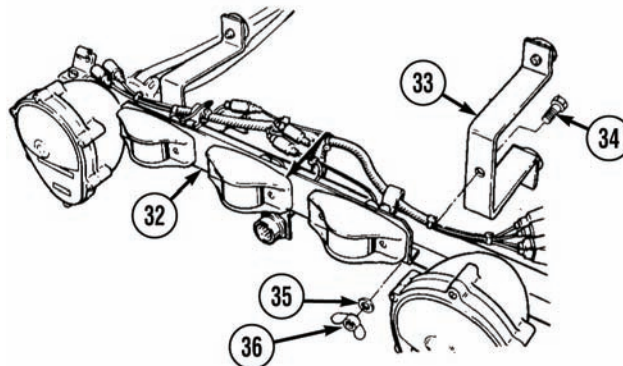
32. Alternately push in TOW and LIFT CYLINDER control levers (29) until tow cylinders (2) are fully retracted.
33. Push in LIFT CYLINDER control lever to retract lift cylinder until slack is removed from safety chains (28).



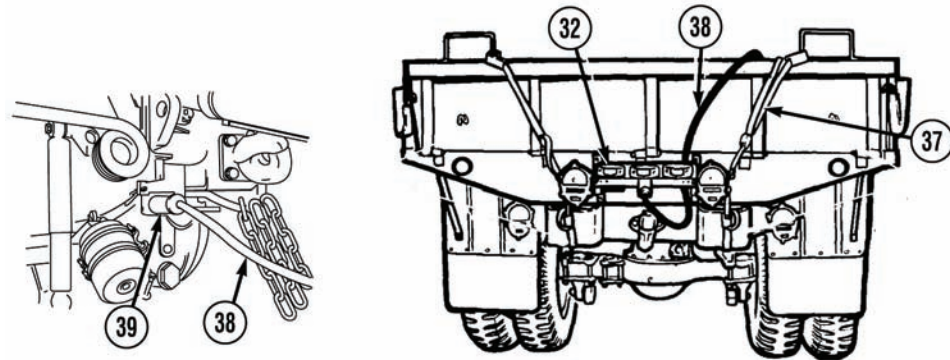
NOTE

- Safety chains can be routed to safety chain hoop or towing shackles. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.

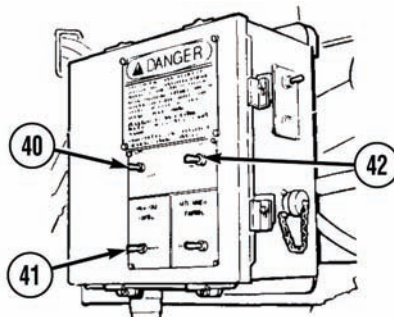
34. Route two safety chains (28) through safety chain hoop (30) on wrecker and secure with safety shackle (31).
35. Wrap two springs (1) around crosstube (7) and secure.



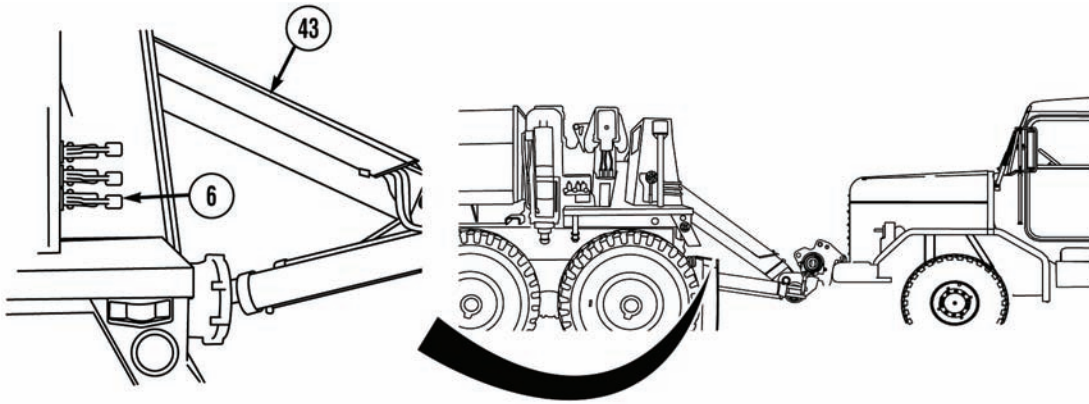
36. Prepare disabled vehicle for towing (refer to M35 operator's manual).
37. Remove emergency tow lights (32) and two brackets (33) from stowage.
38. Install two brackets (33) in center holes of emergency tow lights (32) with two screws (34), washers (35), and nuts (36).



39. Install emergency tow lights (32) on rear of M35 and fasten securely with straps (37).
40. Remove tow light cable (38) from stowage and connect to emergency tow lights (32).
41. Route other end of tow light cable (38) along disabled vehicle and connect to rear electrical connector (39) on wrecker.
42. Lock disabled vehicle's steering (refer to M35 operator's manual).



43. Set POWER switch (40) to ON position.
44. Ensure HIGH IDLE switch (41) is set to CONTINUOUS.
45. Push and release LATCH switch (42). Engine speed will increase to approximately 1500 rpm.



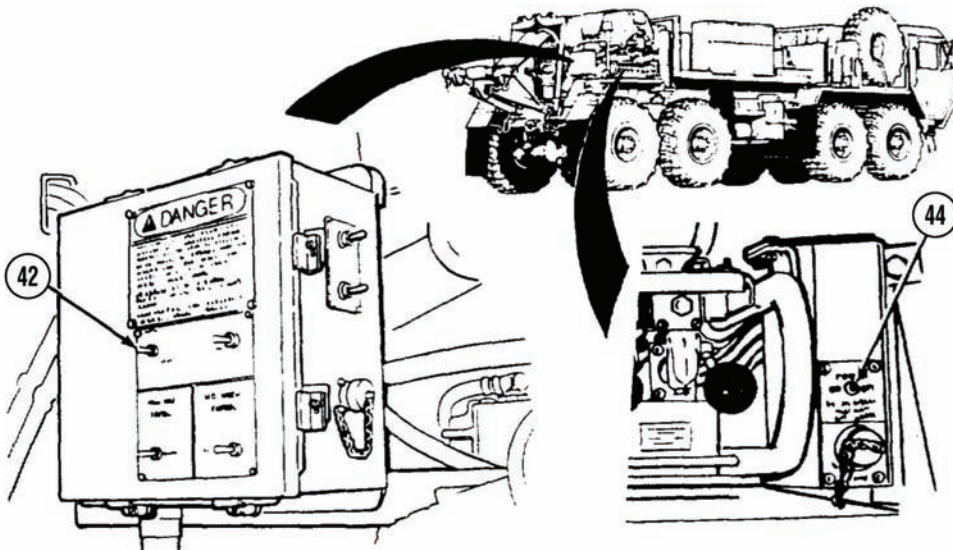
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

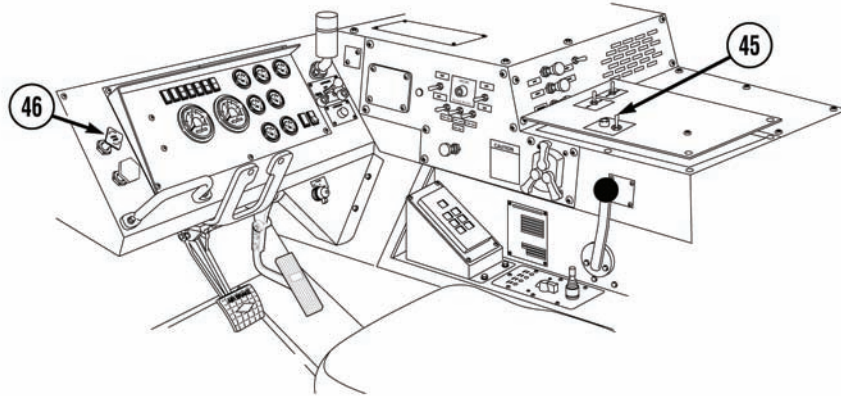
CAUTION

- Make sure all rigging is secure. Loose rigging can become entangled and cause equipment damage.
- Fully retract two tow cylinders before lifting disabled vehicle or damage to equipment may result.

46. Push in LIFT CYLINDER control lever (6) to retract lift cylinder (43) to raise disabled vehicle approximately 1 ft. (30 cm) off ground.
47. Adjust slack in two 16 ft. (4.9 m) safety chains so chains between crosstube and wrecker are approximately 1 ft. (30 cm) off ground.



48. Set POWER switch (42) to OFF position.
49. Set POWER switch (44) to OFF position.



50. Set PTO ENGAGE switch (45) to OFF position.
51. Turn on service drive lights (TM 9-2320-279-10-2).
52. Turn on emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle (refer to M35 operator's manual).
53. Push in PARKING BRAKE control (46) and select desired gear (TM 9-2320-279-10-2).

WARNING

The M984A1 should not be operated at speeds over 15 MPH (24 km/hr) except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain condition	Maximum speed towed load up to 50,000 lbs (22,700 kg)	Maximum speed towed load above 50,000 lbs (22,700 kg)
On road-level	35 mph (56.3 km/hr)	30 mph (47.3 km/hr)
On road-hilly	30 mph (47.3 km/hr)	20 mph (32.2 km/hr)
Off road	15 mph (24.2 km/hr)	15 mph (24.2 km/hr)

WARNING

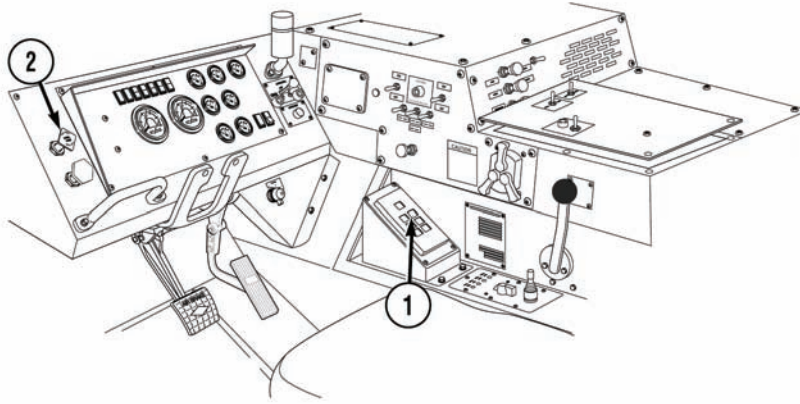
Speeds in excess of the above can result in loss of control, serious injury, or death.

54. Transport disabled vehicle.

END OF TASK

FRONT DISCONNECT**NOTE**

This is a two-soldier task.

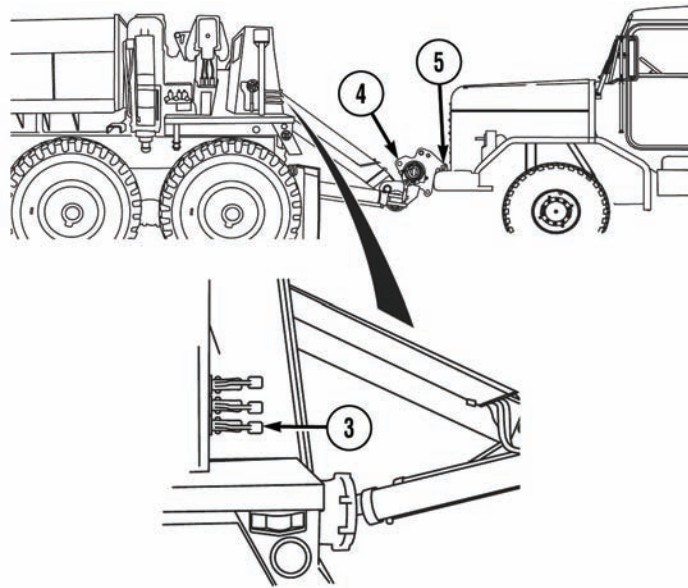


1. Set transmission range selector (1) to N (neutral).
2. Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground or serious personal injury or death can result.

3. Prepare retrieval system for operation (TM 9-2320-279-10-2).



NOTE

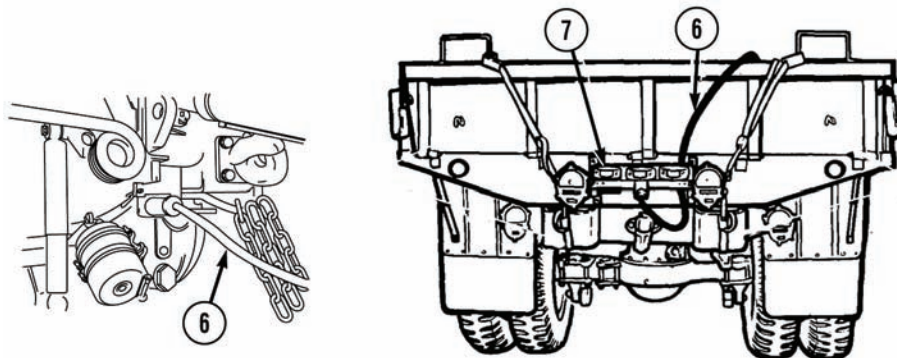
After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (51 to 102 mm) to allow for adjustment when removing adapters.

4. Pull LIFT CYLINDER control lever (3) to extend lift cylinder and lower disabled vehicle to the ground to release tension on MUAs (4) on tow eyes (5).

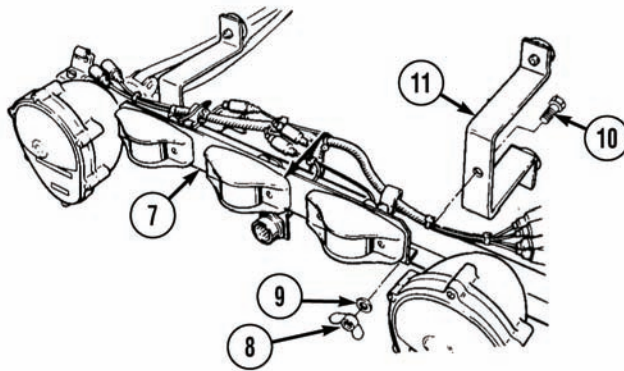
WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may results in personal injury.

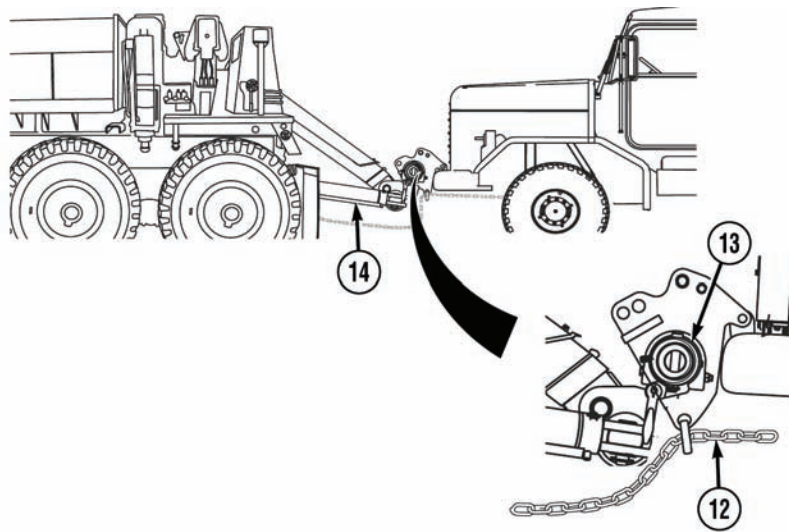
5. Apply PARKING BRAKE on disabled vehicle (refer to M35 operator's manual). If parking brake is inoperable chock wheels on disabled vehicle.



6. Remove tow light cable (6) from wrecker.
7. Remove tow light cable (6) from emergency tow lights (7) and stow.
8. Remove emergency tow lights (7) from disabled vehicle.



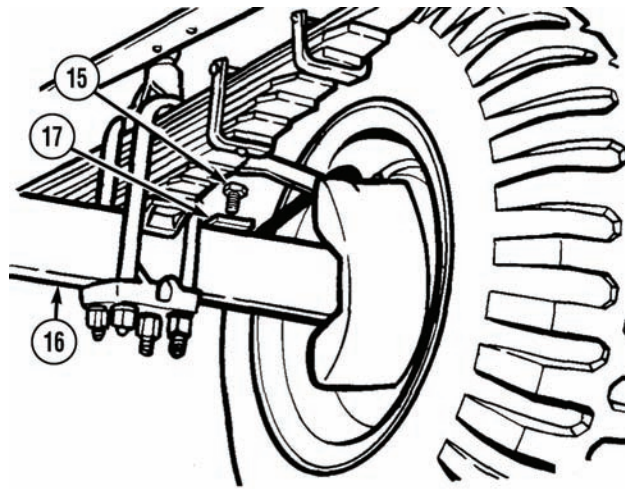
9. Remove two nuts (8), washers (9), screws (10), and brackets (11) from emergency tow lights (7). Stow emergency tow lights (7) and brackets (11).



CAUTION

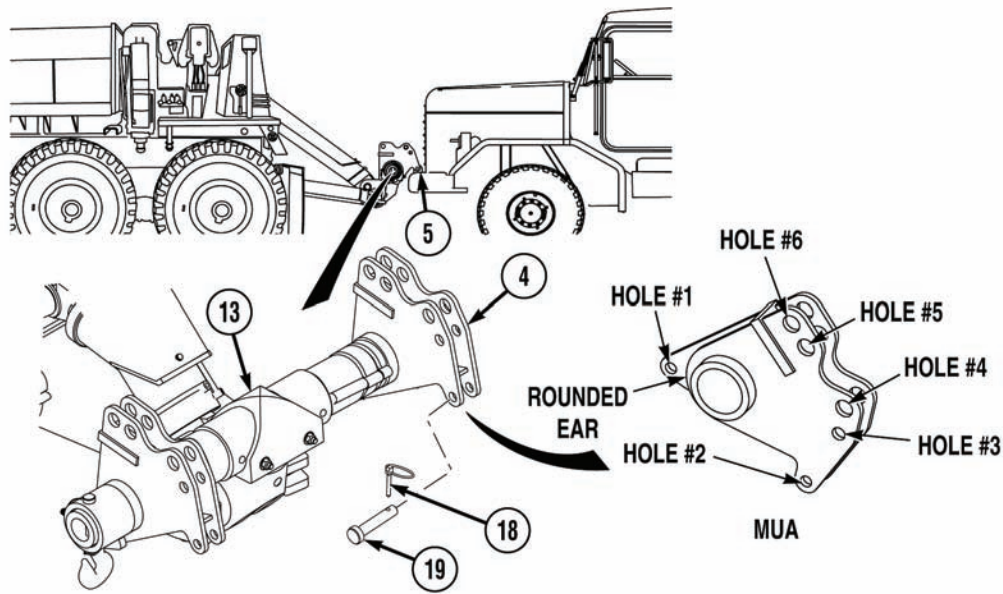
When removing chains, make sure grab hooks do not catch on brake lines. Equipment damage may result.

10. Remove and stow two 16 ft. (4.9 m) safety chains (12).
11. Unwrap two springs from crosstube (13) and connect to tow cylinders (14).

**NOTE**

- Left side shown.
- Brake line bracket is located on top rear of axle.

12. Remove screw (15) from axle (16).
13. Install brake line bracket (17) with screw (15).
14. Repeat steps (12) and (13) for opposite side of disabled vehicle.

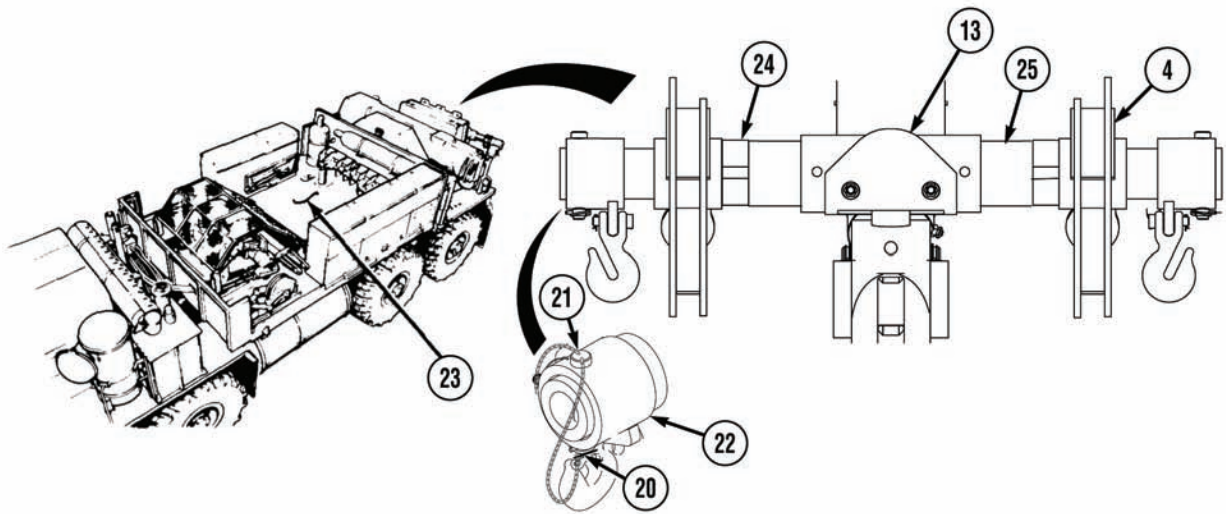
**WARNING**

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

15. Remove two quick pins (18) and pins (19) from hole #2 on MUAs (4).
16. Remove MUAs (4) from tow eyes (5) on disabled vehicle.
17. Operate retrieval controls (TM 9-2320-279-10-2) to extend lift cylinder and lower crosstube (13) until MUAs are no longer supported by bumper of disabled vehicle.



18. Drive wrecker forward a few feet and park (TM 9-2320-279-10-2).

WARNING

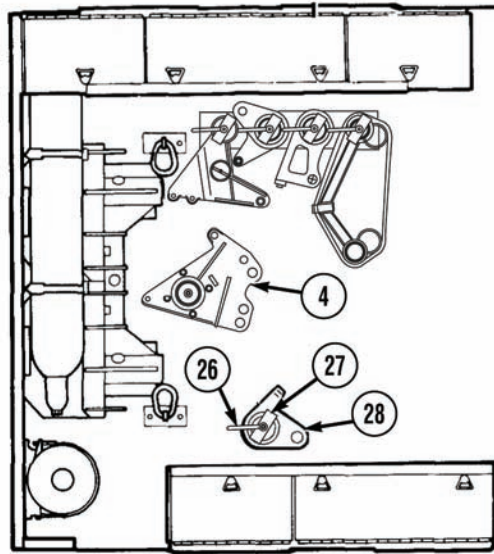
As springs and end caps are removed, crosstube can swing in all directions and adapters may slide off and can cause personal injury.

19. Remove two springs from tow cylinders (14).
20. Remove two quick pins (20) and pins (21) from end caps (22).
21. Remove two end caps (22) from crosstube (13).

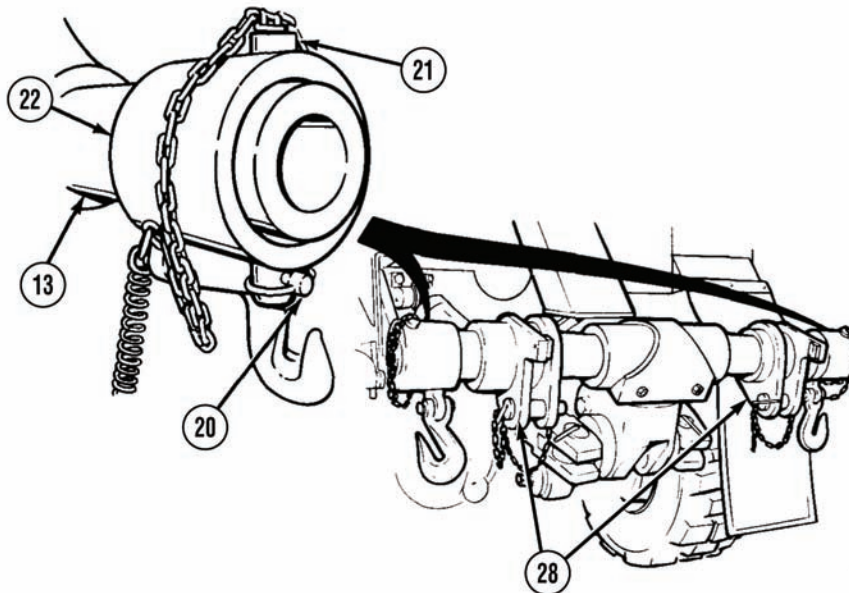
WARNING

MUAs are heavy handle carefully or serious personal injury may result.

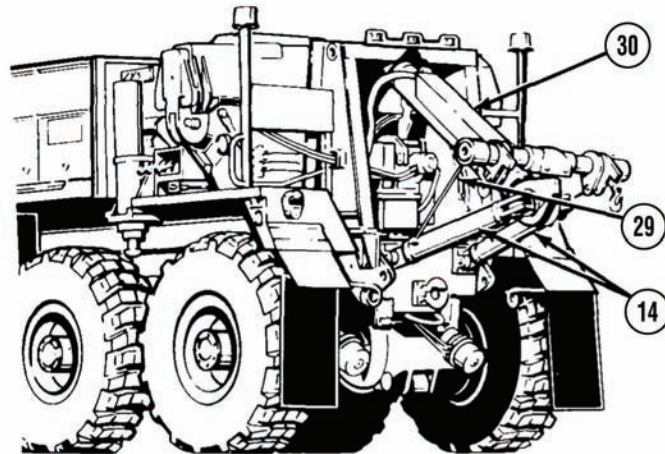
22. Remove two MUAs (4) from crosstube (13) and place on equipment body floor (23).
23. Remove and stow two 1.5 in. (38 mm) spacers (24).
24. Remove and stow two 4 in. (102 mm) spacers (25).



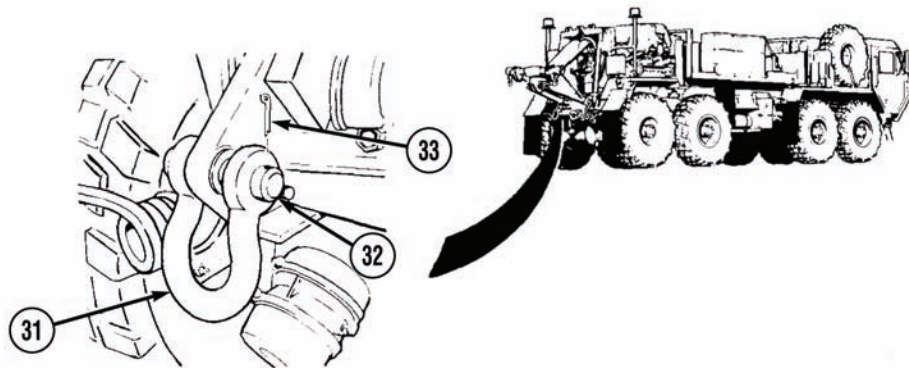
25. Remove lock handle (26), lock plate (27), and M977 front adapters (28).
26. Install two MUAs (4) removed from crosstube (13), with lock plate (27), and lock handle (26).



27. Install two M977 front adapters (28) on crosstube (13).
28. Install two end caps (22) on crosstube (13). Install two pins (21) and quick pins (20).



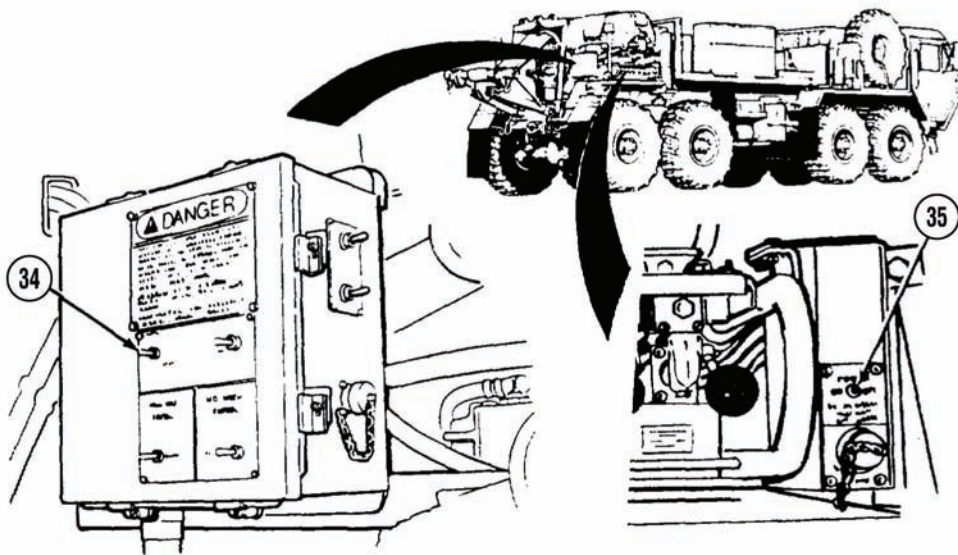
29. Install two springs (29) on tow cylinders (14).
30. Operate retrieval controls and fully retract lift cylinder (30) and tow cylinders (14).



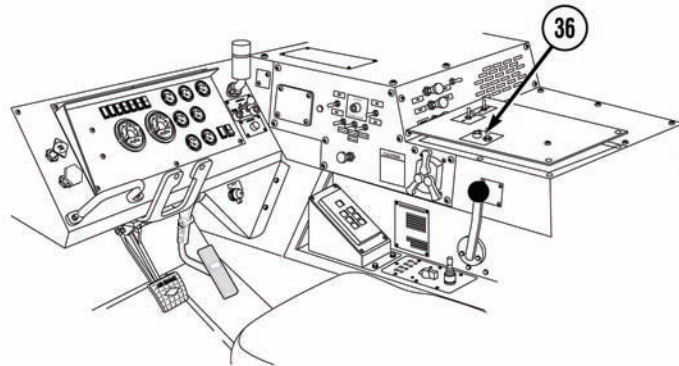
NOTE

Right and left towing shackles are installed the same way.

31. Install two towing shackles (31), pins (32), and cotter pins (33).



- 32. Set POWER switch (34) to OFF position.
- 33. Set POWER switch (35) to OFF position.



- 34. Turn off emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle.
- 35. Turn off service drive lights (TM 9-2320-279-10-2).
- 36. Set PTO ENGAGE switch (36) to OFF position.
- 37. Remove and stow beacon lights (TM 9-2320-279-10-2).
- 38. Shut off engine (TM 9-2320-279-10-2).
- 39. Unlock disabled vehicle's steering (refer to M35 operator's manual).

END OF TASK

END OF WORK PACKAGE

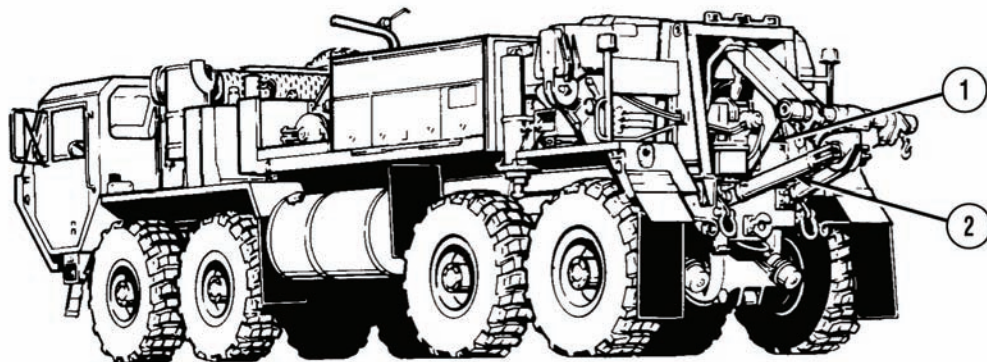
OPERATOR MAINTENANCE
FRONT LIFT AND TOW OF M1008

FRONT HOOKUP

NOTE

This is a two-soldier task.

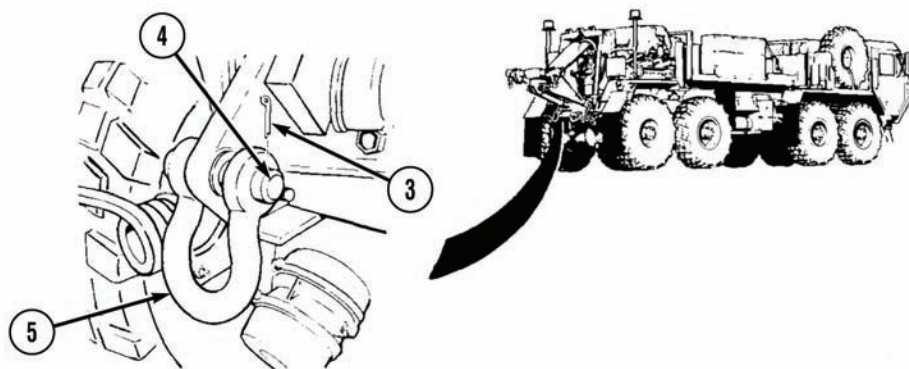
1. Prepare retrieval system for operation (TM 2320-279-10-2).



WARNING

Hold crosstube when removing springs. Crosstube may swing and cause adapters to slide, resulting in personal injury.

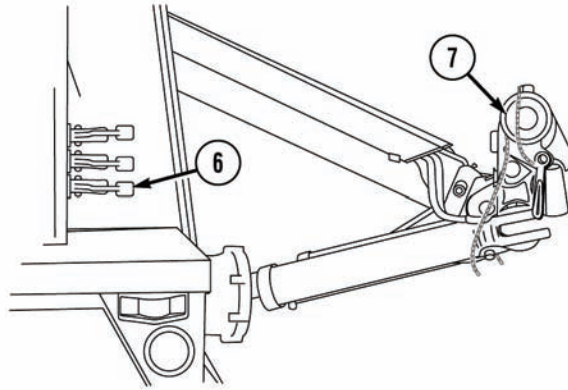
2. Disconnect two springs (1) from tow cylinders (2).



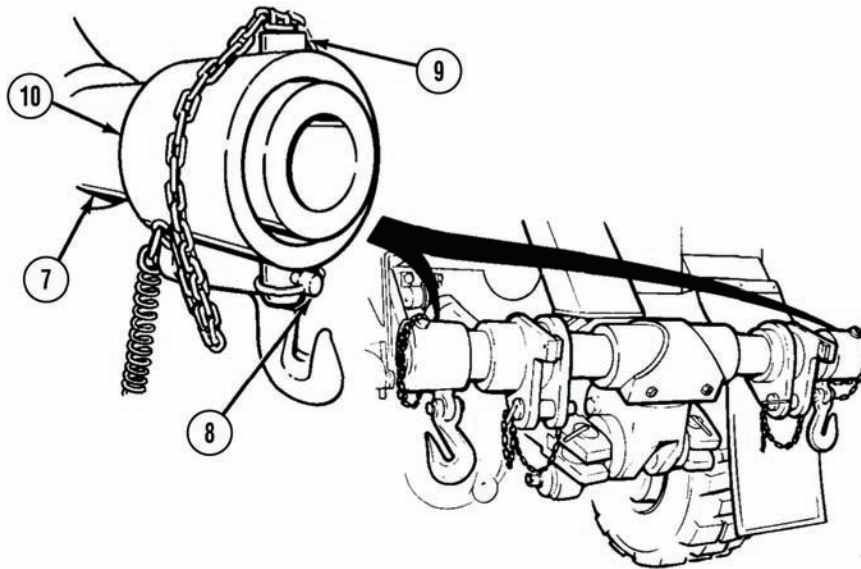
NOTE

Right and left towing shackles are removed the same way.

3. Remove two cotter pins (3), pins (4), and towing shackles (5).



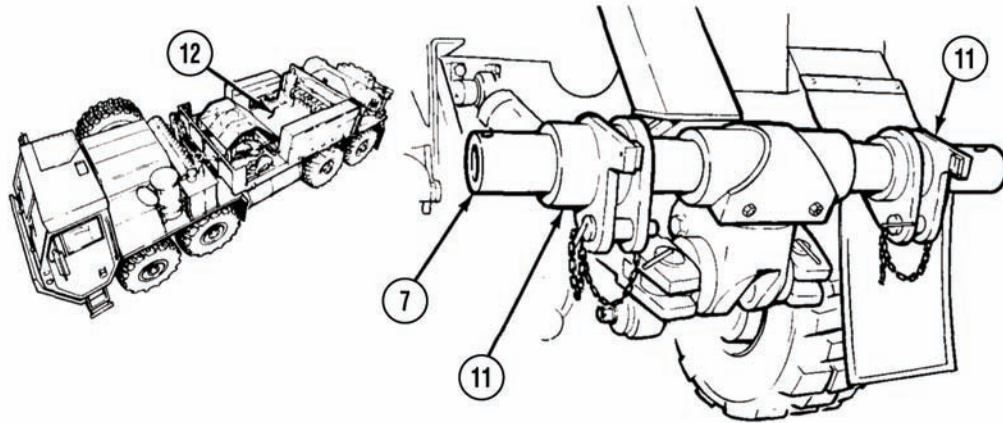
4. Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft. (1 m) above the ground.
5. Position wrecker so that crosstube (7) is approximately 1 ft. (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



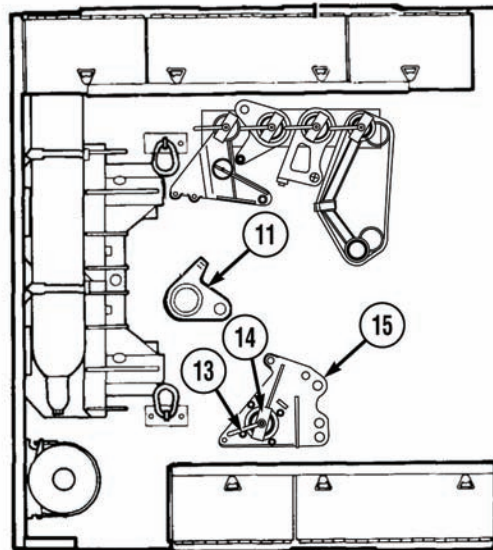
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

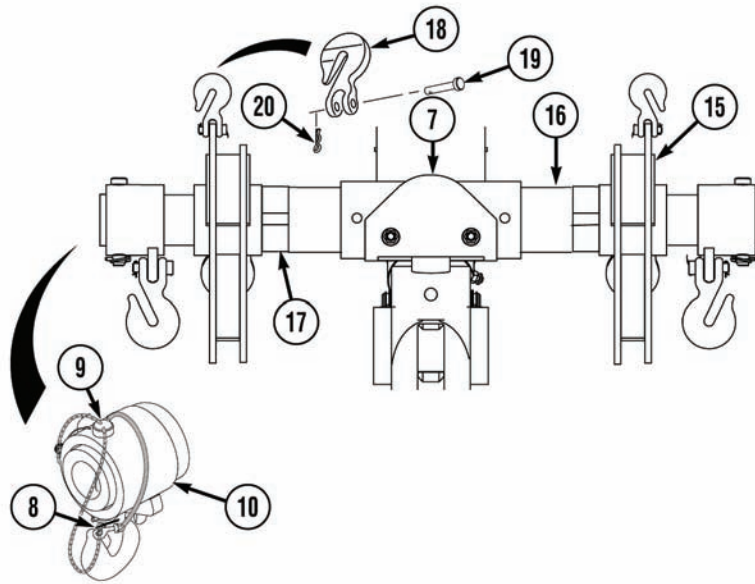
6. Remove two quick pins (8) and pins (9) from end caps (10).
7. Remove two end caps (10) from crosstube (7).



8. Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



9. Remove lock handle (13), lock plate (14), and two Multi-Use Adapters (MUAs) (15).
10. Install two M977 front adapters (11), lock plate (14), and lock handle (13).



11. Remove two 4 in. (102 mm) spacers (16) and two 1.5 in. (38 mm) spacers (17) from stowage.
12. Install two 4 in. (102 mm) spacers (16) on crosstube (7).
13. Install two 1.5 in. (38 mm) spacers (17) on crosstube (7).

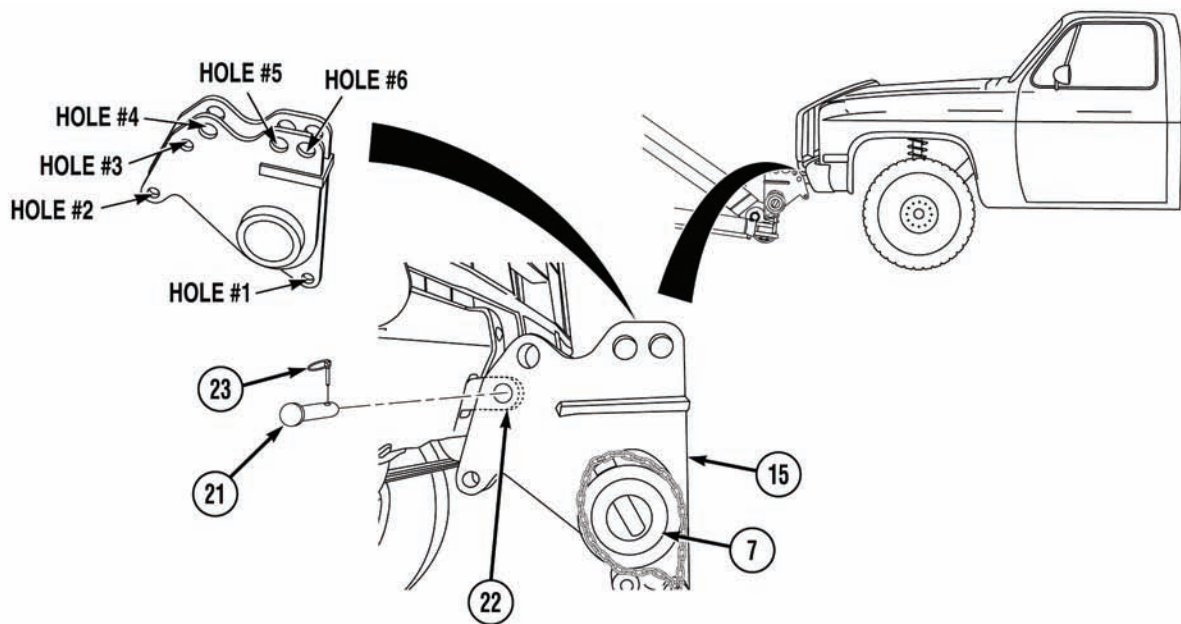
WARNING

- **Adapters and end caps may slide off when installing and may cause personal injury.**
- **MUAs are heavy, handle carefully or serious personal injury will result.**

NOTE

MUAs must be positioned on crosstube with rounded ear of MUA toward center of crosstube.

14. Install two MUAs (15) on crosstube (7) with holes facing tow eyes of disabled vehicle.
15. Install two end caps (10) on crosstube (7).
16. Install two pins (9) and quick pins (8).
17. Install two lift clevises (18) in hole #1 of MUAs (15) with pins (19) and cotter pins (20).
18. Attach two springs (1) on tow cylinders (2).



19. Remove two pins (3483740) (21) from stowage.

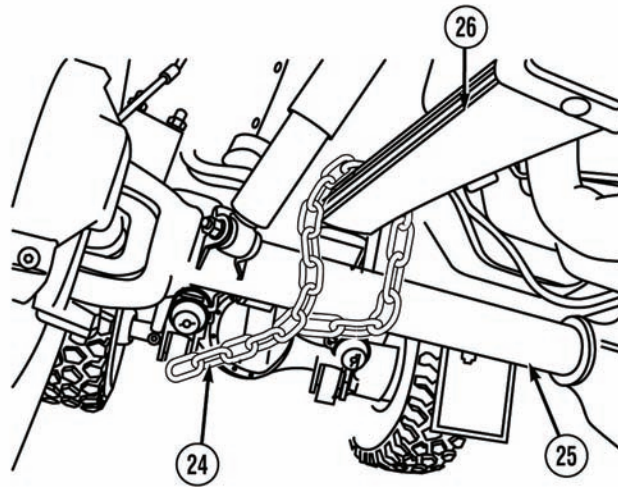
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retrieval system or serious personal injury or death may result.

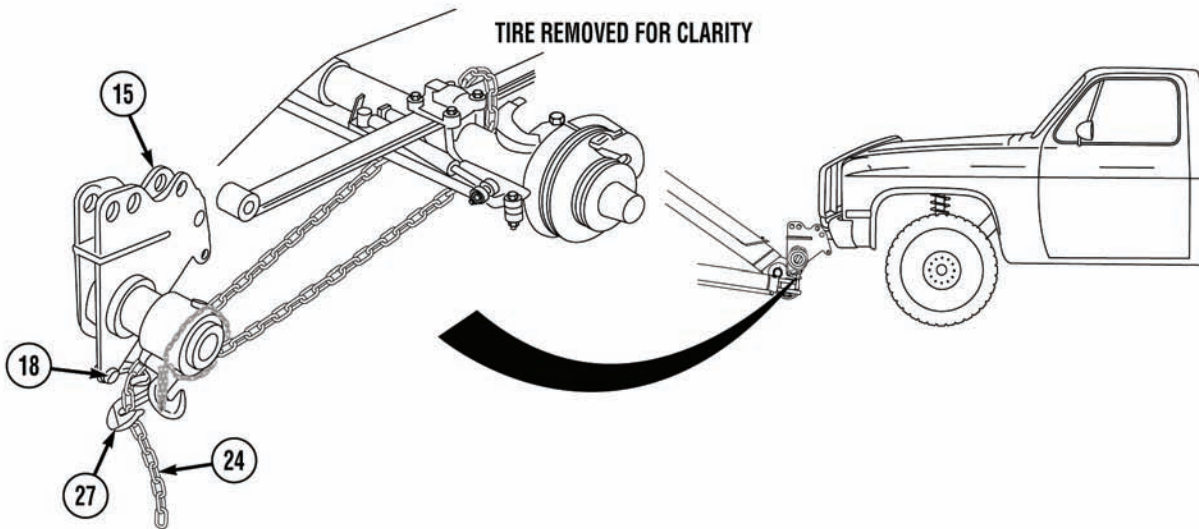
CAUTION

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

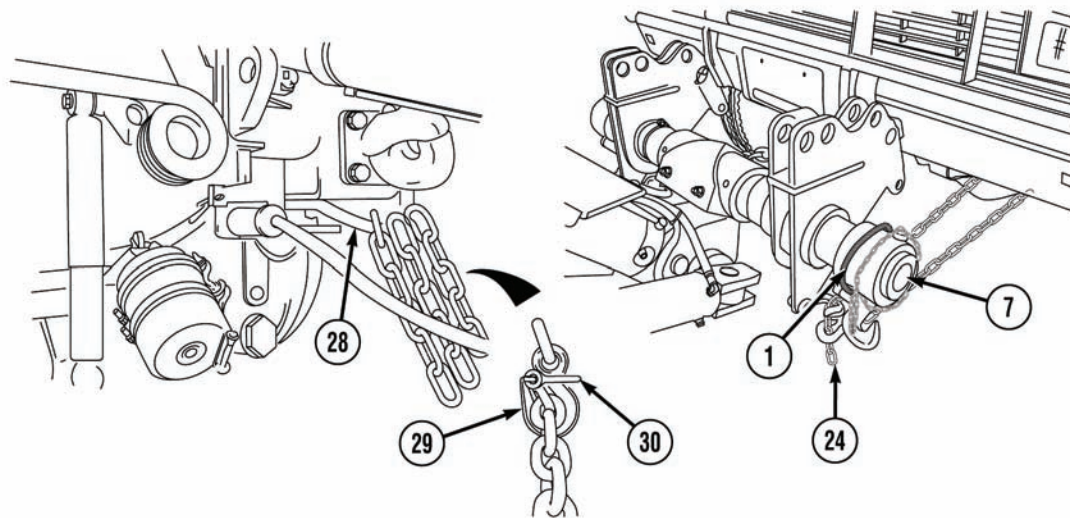
20. Soldier A operates retrieval system (TM 9-2320-279-10-2) while Soldier A and Soldier B position crosstube (7) so hole #3 on MUAs (15) align with front tow eyes (22).
21. Insert two pins (21) through MUAs (15) and front tow eyes (22). Install quick pins (23) in pins (21).
22. Soldier A operates retrieval system (TM 9-2320-279-10-2) to rotate MUAs (15) until hole #5 is directly above crosstube (7).
23. Release PARKING BRAKE and place transmission in NEUTRAL on disabled vehicle (refer to M1008 operator's manual).



24. Remove two 12 ft. (3.7 m) chains (24) from stowage.
25. Route one end of 12 ft. (3.7 m) chain (24) behind front axle (25), and loop over leaf spring (26) on disabled vehicle.



26. Route 12 ft. (3.7 m) chain (24) through lift clevis (18) on MUA (15).
27. Pull chain (24) tight and attach grab hook (27) to chain near lift clevis (18).
28. Repeat steps (26) and (27) for other 12 ft. (3.7 m) chain (24).

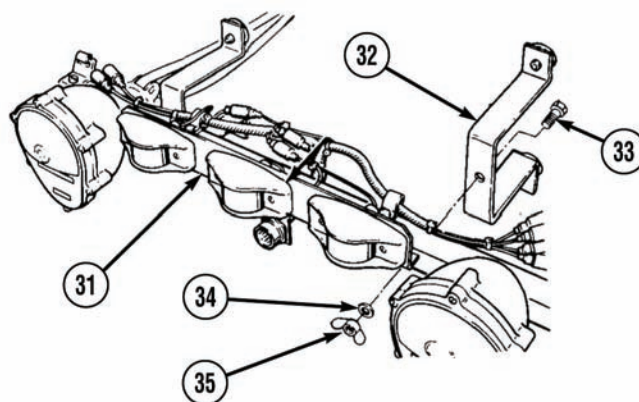


NOTE

- Safety chains can be routed to safety chain hoop or towing shackles. Towing shackles can be used only after towing cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.
- 12 ft. (3.7 m) chains will act as safety chains when connected to wrecker.

29. Route 12 ft. (3.7 m) chain (24) through safety chain hoop (28) and secure grab hooks (29) with safety shackles (30).

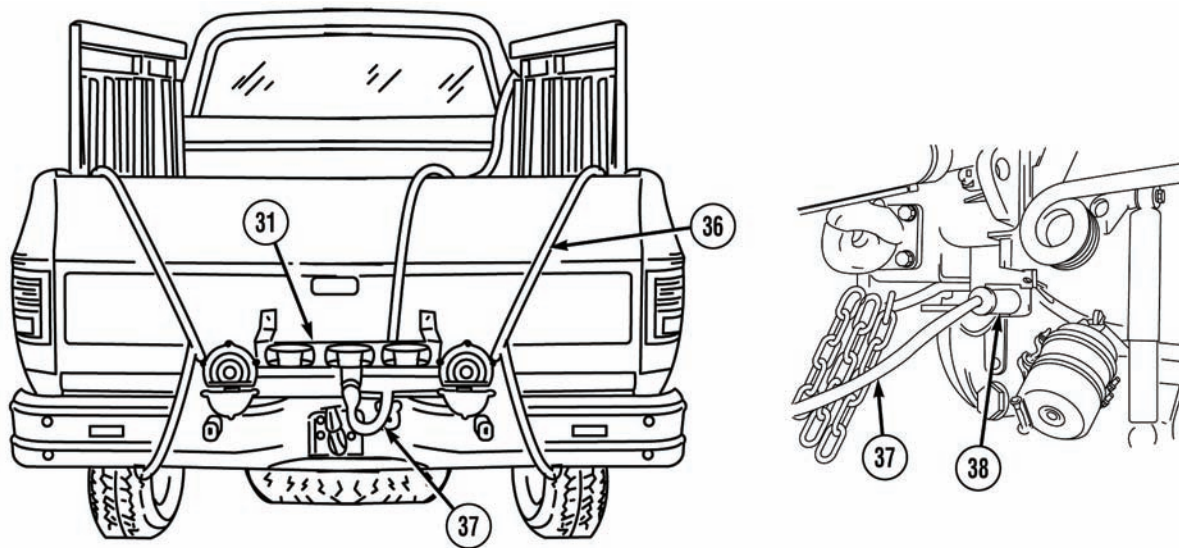
30. Wrap two springs (1) around crosstube (7) and secure.



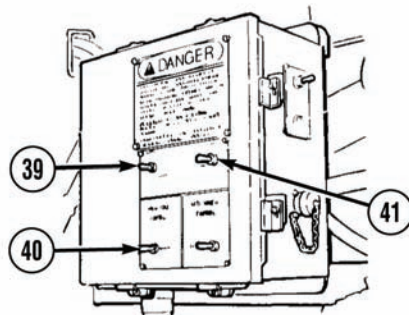
31. Prepare disabled vehicle for towing (refer to M1008 operator's manual).

32. Remove emergency tow lights (31) and two brackets (32) from stowage.

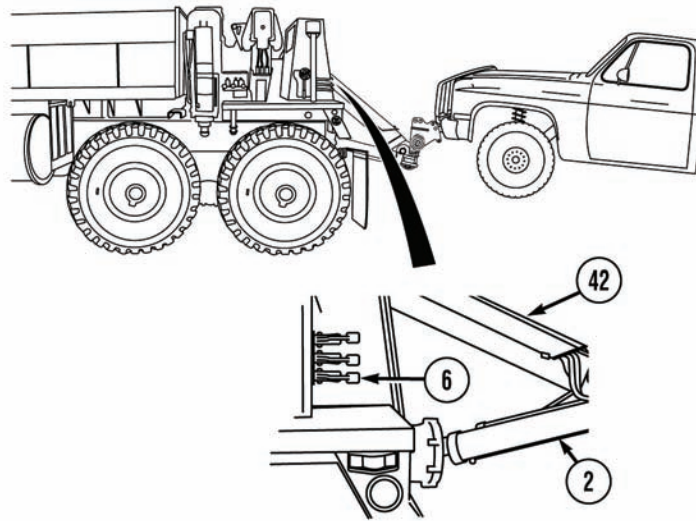
33. Install two brackets (32) in center holes of emergency tow lights (31) with two screws (33), washers (34), and nuts (35).



34. Install emergency tow lights (31) on rear of disabled vehicle and fasten securely with straps (36).
35. Remove tow light cable (37) from stowage and connect to emergency tow lights (31).
36. Route other end of tow light cable (37) along disabled vehicle and connect to rear electrical connector (38) on wrecker.
37. Lock disabled vehicle's steering (refer to M1008 operator's manual).



38. Set POWER switch (39) to ON position.
39. Set HIGH IDLE switch (40) to CONTINUOUS.
40. Push and release LATCH switch (41). Engine speed will increase to approximately 1500 rpm.

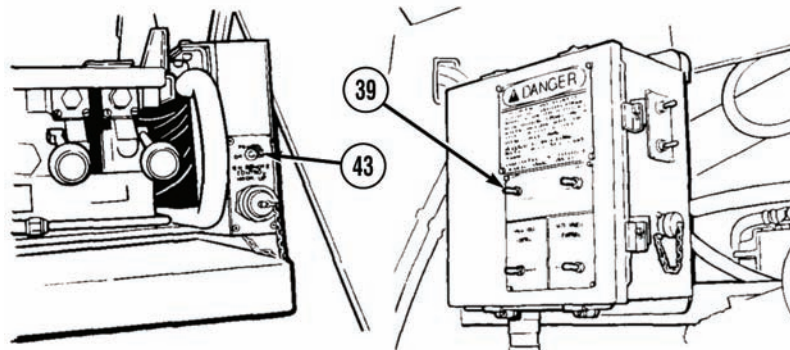


WARNING

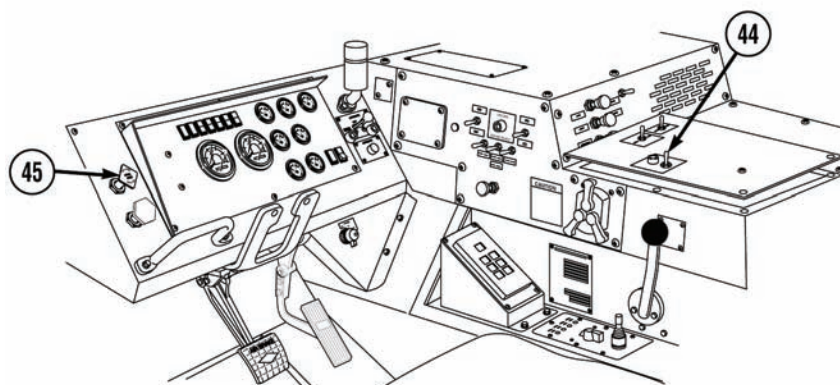
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- **Make sure all rigging is secure. Loose rigging can become entangled and cause equipment damage.**
 - **Fully retract two tow cylinders before transporting disabled vehicle or damage to equipment may result.**
41. Push in LIFT CYLINDER control lever (6) to retract lift cylinder (42) to raise disabled vehicle approximately 1 ft. (30 cm) off ground.
 42. Alternately push in TOW and LIFT CYLINDER control levers to retract lift cylinder (42) until tow cylinders (2) are fully retracted and vehicle is approximately 1 ft. (30 cm) above ground.
 43. Adjust slack in two 12 ft. (3.7 m) chains so chains between crosstube (7) and wrecker are approximately 1 ft. (30 cm) off ground.



44. Set POWER switch (39) to OFF position.
45. Set POWER switch (43) to OFF position.



46. Set PTO ENGAGE switch (44) to OFF position.
47. Turn on service drive lights (TM 9-2320-279-10-2).
48. Turn on emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle (refer to M1008 operator's manual).
49. Push in PARKING BRAKE control (45) and select desired gear (TM 9-2320-279-10-2).

WARNING

The M984A1 should not be operated at speeds over 15 MPH (24 km/hr) except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain condition	Maximum speed towed load up to 50,000 lbs (22,700 kg)	Maximum speed towed load above 50,000 lbs (22,700 kg)
On road-level	35 mph (56.3 km/hr)	30 mph (47.3 km/hr)
On road-hilly	30 mph (47.3 km/hr)	20 mph (32.2 km/hr)
Off road	15 mph (24.2 km/hr)	15 mph (24.2 km/hr)

WARNING

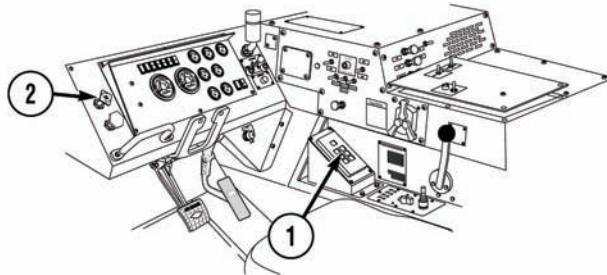
Speeds in excess of the above can result in loss of control, serious injury, or death.

50. Transport disabled vehicle.

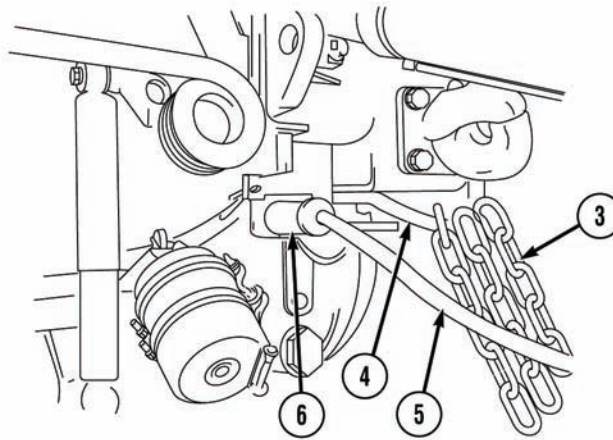
END OF TASK

FRONT DISCONNECT**NOTE**

This is a two-soldier task.



1. Set transmission range selector (1) to N (neutral).
2. Pull PARKING BRAKE control (2).

**WARNING**

Do not go underneath disabled vehicle while it is raised off ground. Falling vehicle could cause serious injury or death.

3. Remove 12 ft. (3.7 m) chains (3) from safety chain hoop (4) or towing shackles.
4. Remove tow light cable (5) from electrical connector (6).

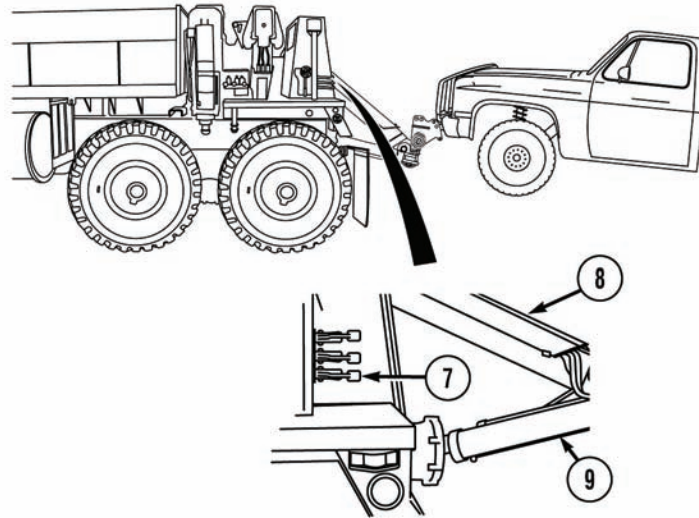
CAUTION

Any cargo in bed must be tied down before doing steps (5) through (8), or cargo may be damaged.

NOTE

High idle must be engaged when lowering disabled vehicle.

5. Prepare retrieval system for operation (TM 9-2320-279-10-2).



6. Push LIFT CYLINDER control lever (7) to retract lift cylinder (8) until tow cylinders (9) are even with ground.

NOTE

Tow cylinders should remain even with ground during step (7).

7. Alternately extend lift and tow cylinders until tow cylinders (9) are extended approximately 10 in. (25 cm).

CAUTION

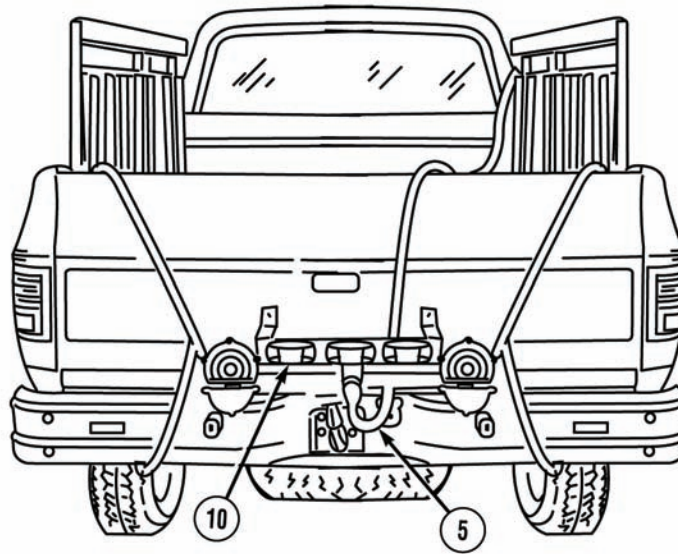
Do not contact pintle hook with lift cylinder or equipment damage may result.

8. Pull LIFT CYLINDER control lever (7) to lower disabled vehicle to ground allowing safety chain at front axle to remain slack.

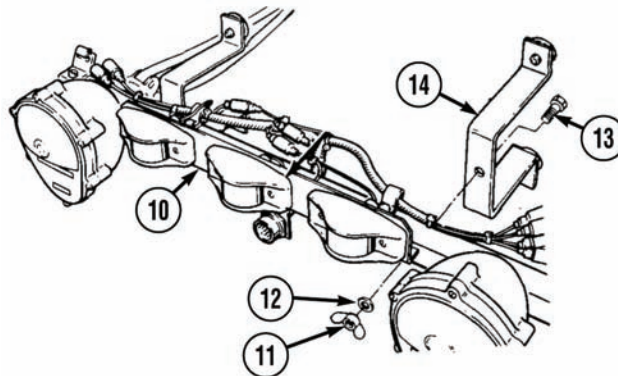
WARNING

**If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle.
Failure to chock wheels may result in injury to personnel.**

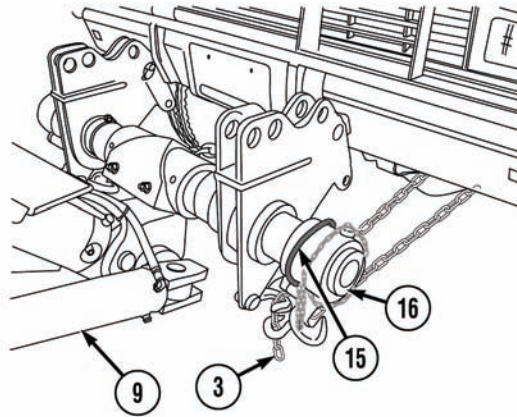
9. Apply PARKING BRAKE and place transmission in PARK on disabled vehicle (refer to M1008 operator's manual).



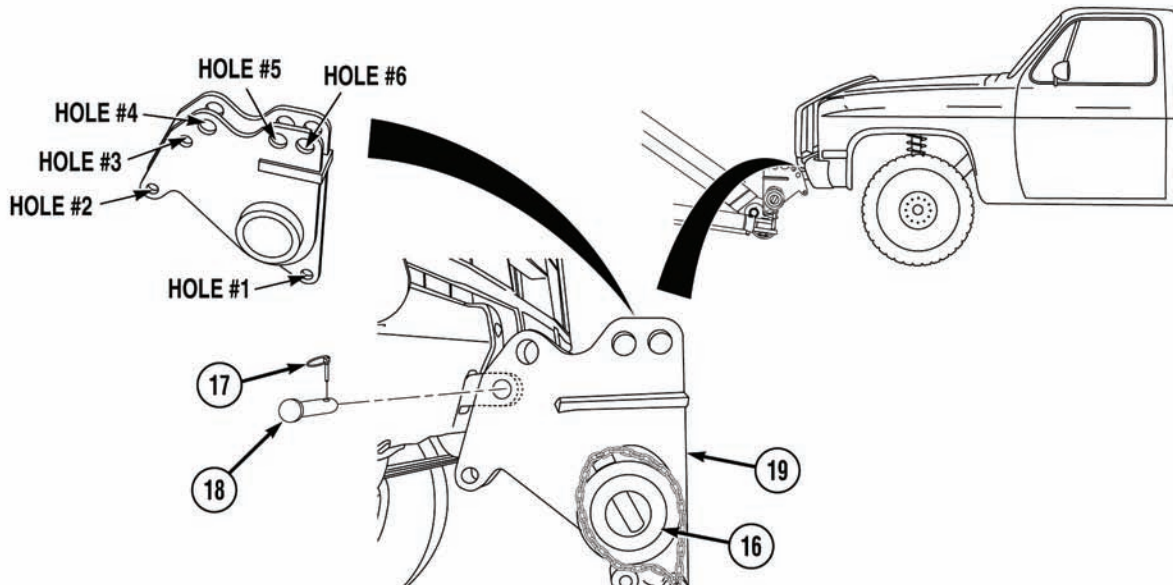
10. Remove tow light cable (5) from emergency tow lights (10) and stow.
11. Remove emergency tow lights (10) from disabled vehicle.



12. Remove two nuts (11), washers (12), screws (13), and brackets (14) from emergency tow lights (10). Stow emergency tow lights (10) and brackets (14).



13. Remove and stow two 12 ft. (3.7 m) chains (3).
14. Unwrap two springs (15) from crosstube (16) and connect to tow cylinders (9).



WARNING

Do not allow MUAs to swing around, personal injury may result.

NOTE

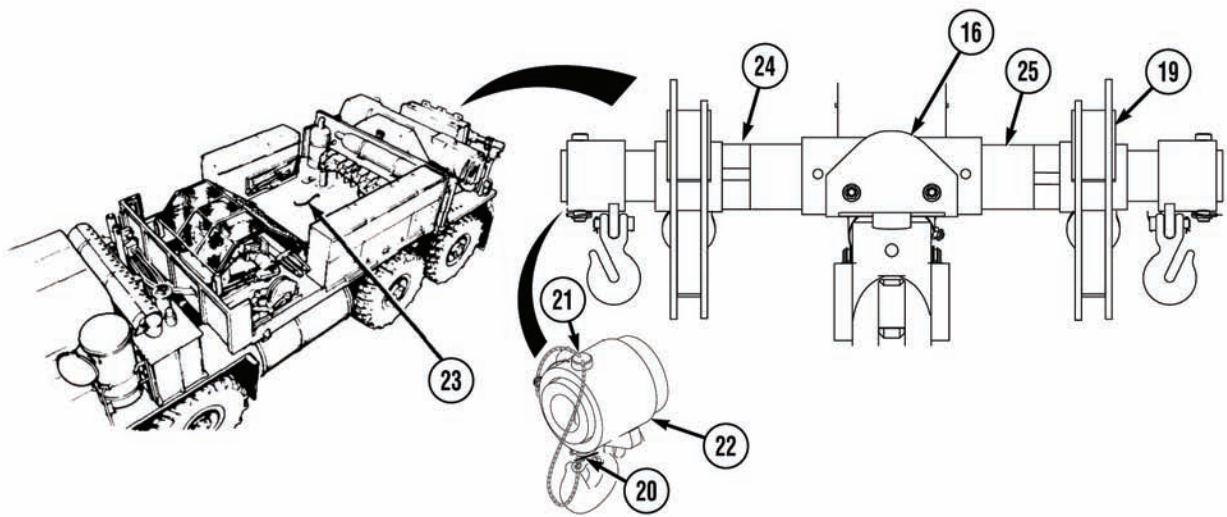
Use retrieval controls to position crosstube to relieve tension from adapters.

15. Remove two quick pins (17) and pins (18) from hole #2 on MUAs (19).

CAUTION

Do not contact pintle hook with lift cylinder. Equipment damage may result.

16. Operate retrieval controls (TM 9-2320-279-10-2) to extend lift cylinder and lower crosstube (16) until MUAs (19) are no longer supported by bumper of disabled vehicle.



17. Drive wrecker forward a few feet and park (TM 9-2320-279-10-2).

WARNING

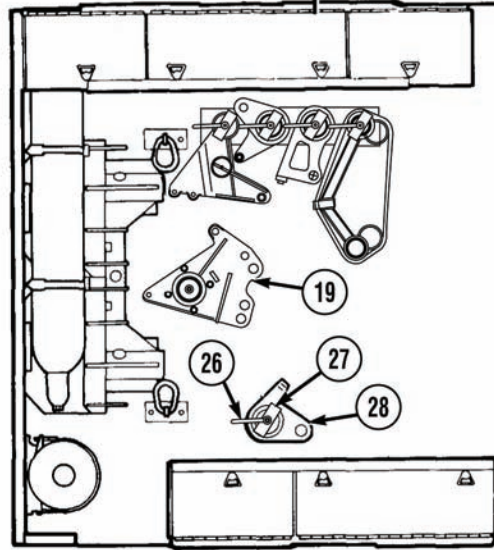
As springs and end caps are removed, crosstube can swing in all directions and adapters may slide off and can cause personal injury.

18. Remove two springs (15) from tow cylinders (9).
19. Remove two quick pins (20) and pins (21) from end caps (22).
20. Remove two end caps (22) from crosstube (16).

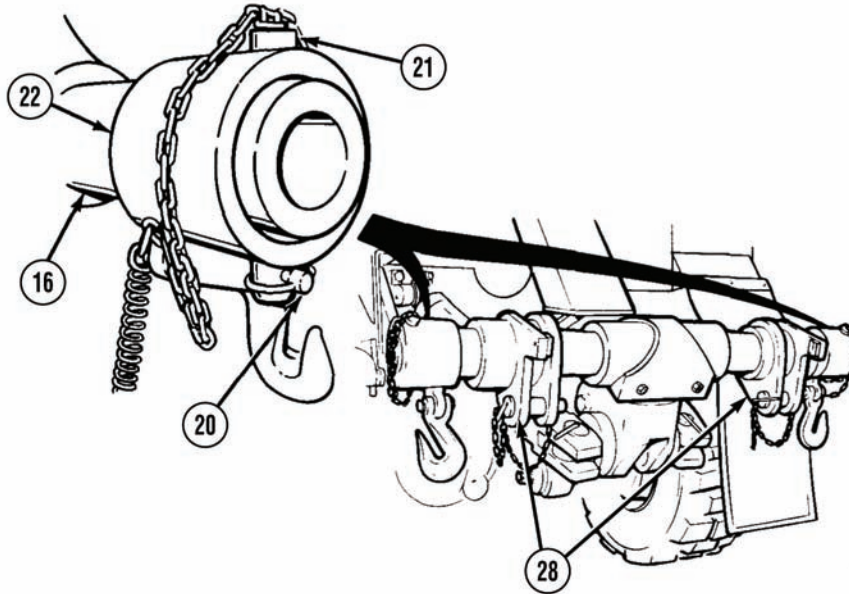
WARNING

MUAs are heavy, handle carefully or serious personal injury may result.

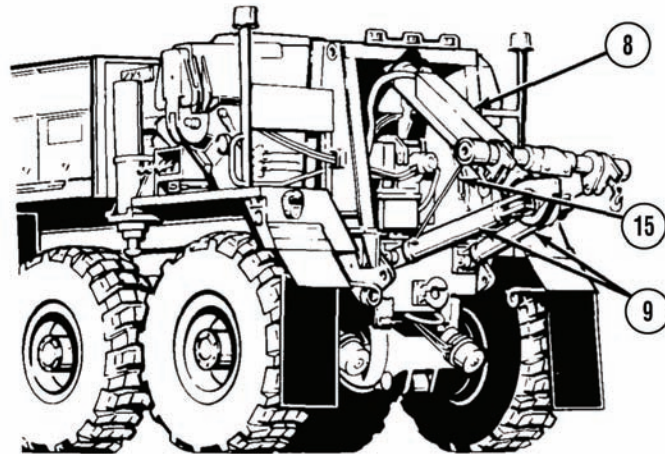
21. Remove two MUAs (19) from crosstube (16) and place on equipment body floor (23).
22. Remove and stow two 1.5 in. (38 mm) spacers (24).
23. Remove and stow two 4 in. (102 mm) spacers (25).



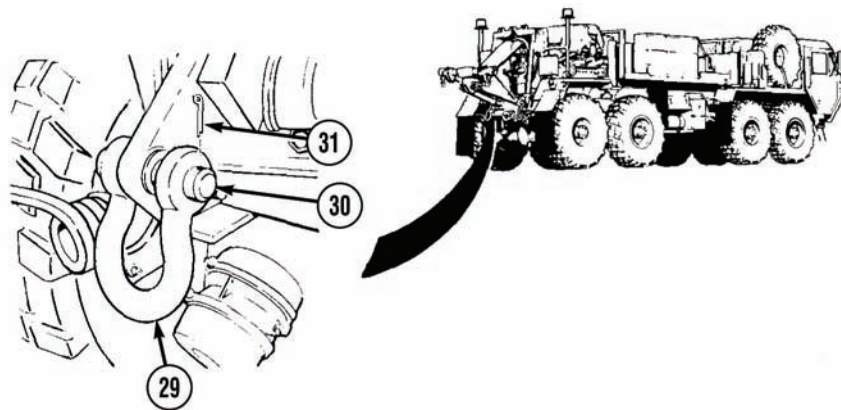
24. Remove lock handle (26), lock plate (27), and M977 front adapters (28).
25. Install two MUAs (19) removed from crosstube (16), with lock plate (27), and lock handle (26).



26. Install two M977 front adapters (28) on crosstube (16).
27. Install two end caps (22) on crosstube (16). Install two pins (21) and quick pins (20).



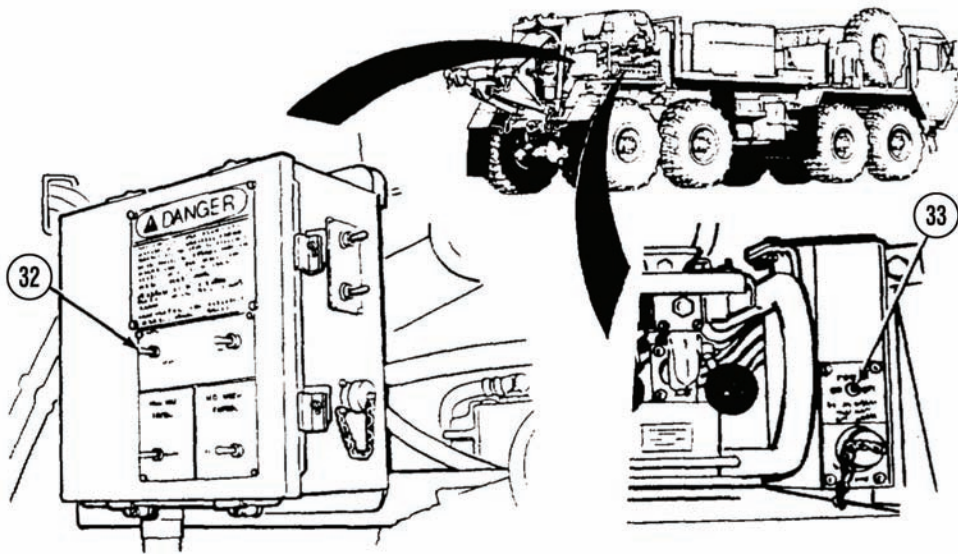
28. Install two springs (15) on tow cylinders (9).
29. Operate retrieval controls and fully retract lift cylinders (8) and tow cylinders (9).



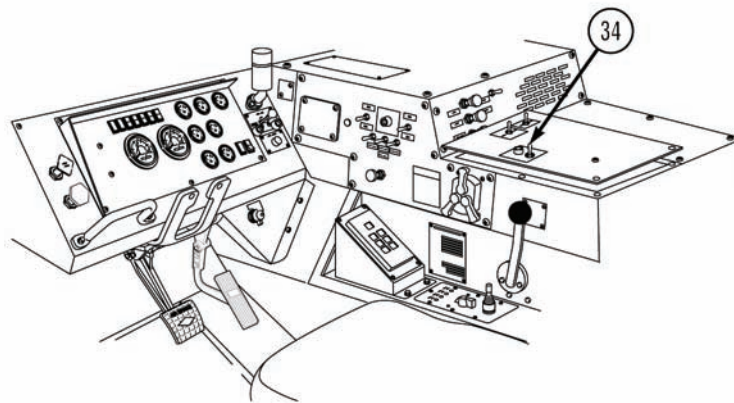
NOTE

Right and left towing shackles are installed the same way.

30. Install two towing shackles (29), pins (30), and cotter pins (31).



- 31. Set POWER switch (32) to OFF position.
- 32. Set POWER switch (33) to OFF position.



- 33. Turn off emergency flashers on wrecker (TM 9-2320-279-10-2) and disabled vehicle.
- 34. Turn off service drive lights (TM 9-2320-279-10-2).
- 35. Set PTO ENGAGE switch (34) to OFF position.
- 36. Remove and stow beacon lights (TM 9-2320-279-10-2).
- 37. Shut off engine (TM 9-2320-279-10-2).
- 38. Unlock disabled vehicle's steering (refer to M1008 operator's manual).

END OF TASK

END OF WORK PACKAGE

OPERATOR MAINTENANCE
COMPONENTS OF END ITEM (COEI) ADDITIONS

INTRODUCTION

This section lists Components Of End Item (COEI) that are being added to the HEMTT wrecker to accommodate these procedures.

EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

Column (1) Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

Column (2) National Stock Number (NSN). Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

Column (3) Description and Part Number. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE Code (in parenthesis) followed by the part number.

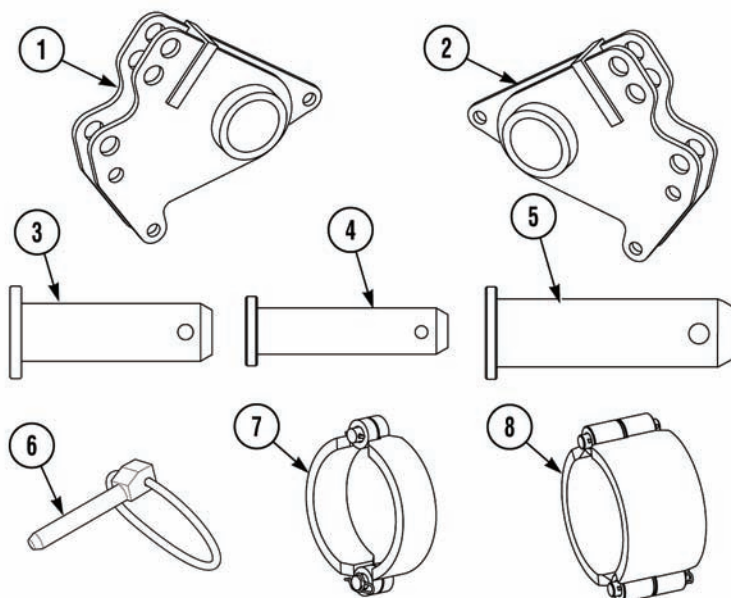
Column (4) Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (ea, in., pr).

Column (5) Quantity Required (Qty. Req'd.). Indicates the quantity of the item authorized to be used with/on the equipment.

COMPONENTS OF END ITEMS ADDED

Table 1. Components of End Items.

(1) Illus Number	(2) National Stock Number (NSN)	(3) Description and Part Number	(4) U/M	(5) Qty. Reqd.
1	5340-01-516-2058	ADAPTER, MULTI-USE, LH, WELDMENT (45152) 3483699	EA	1
2	5340-01-516-2059	ADAPTER, MULTI-USE, RH, WELDMENT (45152) 3484856	EA	1
3	5315-01-515-6847	PIN, FMTV M/U ADAPTER UPPER (45152) 3483739	EA	2
4	5315-01-515-6846	PIN, FMTV/HMMV M/U ADPTR, LWR (45152) 3483740	EA	2
5	5315-01-516-2062	PIN, MTRV/939 M/U ADAPTER (45152) 3483735	EA	4
6	5315-01-490-7325	PIN, QUICK (45152) 3406240	EA	4
7		SPACER, 1.5W, MULTI-USE (45152) 1KK602	EA	2
8		SPACER, 3.0W, MULTI-USE (45152) 1KK601	EA	2



END OF WORK PACKAGE

OPERATOR MAINTENANCE
ILLUSTRATED LIST OF ASSEMBLED ITEMS

INTRODUCTION

This work package details how to assemble the spacers used in this manual and provides part numbers for reference. Once assembled, these spacers should not be disassembled unless repairs or replacements are needed.

EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

Column (1) Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

Column (2) National Stock Number (NSN). Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

Column (3) Description and Part Number. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE Code (in parenthesis) followed by the part number.

Column (4) Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (ea, in., pr).

Column (5) Quantity Required (Qty. Req'd.). Indicates the quantity of the item authorized to be used with/on the equipment.

1.5 IN. (38 MM) SPACER ASSEMBLY PROCEDURES**NOTE**

Two spacers must be assembled to complete the COEI additions (WP 0008).

1. Fit two spacer halves (1) together and insert two pins (2).
2. Secure one pin (2) with cotter pin (3).
3. Secure other pin (2) with rue ring (4).
4. Repeat steps (1) through (3) to assemble other spacer.

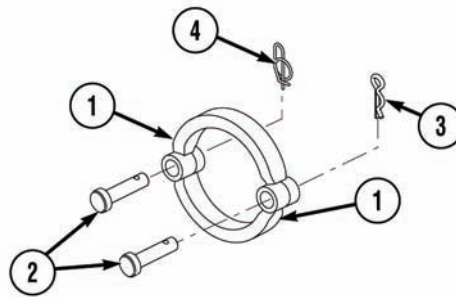


Table 1. Illustrated List of Assembled Items for 1.5 in. (38 mm) Multi-Use Spacer.

(1) Illus Number	(2) National Stock Number (NSN)	(3) Description and Part Number	(4) U/M	(5) Qty. Reqd.
1	5365-01-516-2069	SPACER, 1.5 W, WELDMENT (45152) 3471878	EA	4
2	5315-01-516-2070	PIN, 1-1/4 IN. (45152) 3471882	EA	4
3	5315-01-513-1553	COTTER PIN (45152) 3341263	EA	2
4	5315-01-490-5334	RING, RUE (45152) RUE-24-S	EA	2

3.0 IN. (76 MM) SPACER ASSEMBLY PROCEDURES

NOTE

Two spacers must be assembled to complete the COEI additions (WP 0008).

1. Insert spring pin (1) on one side of two 3 in. (76 mm) pins (2).
2. Fit two spacer halves (3) together and insert two pins (2).
3. Secure one pin (2) with spring pin (1).
4. Secure other pin (2) with rue ring (4).
5. Repeat steps (1) through (4) to assemble other spacer.

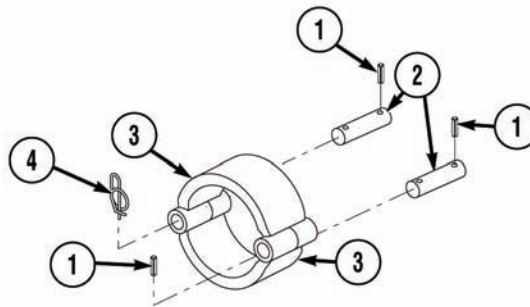


Table 2. Illustrated List of Assembled Items for 3.0 in. (76 mm) Multi-Use Spacer.

(1) Illus Number	(2) National Stock Number (NSN)	(3) Description and Part Number	(4) U/M	(5) Qty. Reqd.
1	5315-01-516-2071	PIN, SPRING, 125K075 (45152) 3475291	EA	6
2	5315-01-516-2068	PIN, 3-IN. (45152) 3471888	EA	4
3	5365-01-516-2066	SPACER, 3.0 W, WELDMENT (45152) 3471714	EA	4
4	5315-01-490-5334	RING, RUE (45152) RUE-24-S	EA	2

END OF WORK PACKAGE

By Order of the Secretary of the Army:

Official:

A handwritten signature in black ink, reading "Sandra R. Riley". The signature is written in a cursive style with a large, stylized "S" and "R".

SANDRA R. RILEY

*Administrative Assistant to the
Secretary of the Army*
0604108

PETER J. SCHOOMAKER
*General, United States Army
Chief of Staff*

DISTRIBUTION: To be distributed in accordance with the Initial Distribution Number (IDN) 344845, requirements for TB 9-2320-279-12-1.

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter=10 Millimeters=0.01 Meters=0.3937 Inches
 1 Meter=100 Centimeters=1000 Millimeters=39.37 Inches
 1 Kilometer=1000 Meters=0.621 Miles

WEIGHTS

1 Gram=0.001 Kilograms=1000 Milligrams=0.035 Ounces
 1 Kilogram=1000 Grams=2.2 Lb
 1 Metric Ton=1000 Kilograms=1 Megagram=1.1 Short Tons

LIQUID MEASURE

1 Milliliter=0.001 Liters=0.0338 Fluid Ounces
 1 Liter=1000 Milliliters=33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter=100 Sq Millimeters=0.155 Sq Inches
 1 Sq Meter=10,000 Sq Centimeters=10.76 Sq Feet
 1 Sq Kilometer=1,000,000 Sq Meters=0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter=1000 Cu Millimeters=0.06 Cu Inches
 1 Cu Meter=1,000,000 Cu Centimeters=35.31 Cu Feet

TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$

212° Fahrenheit is equivalent to 100° Celsius

90° Fahrenheit is equivalent to 32.2° Celsius

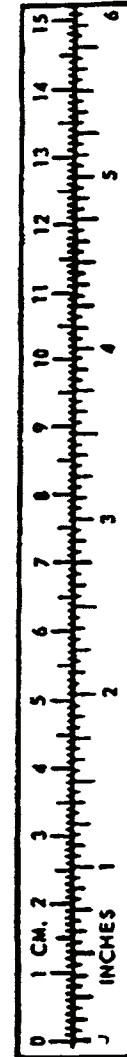
32° Fahrenheit is equivalent to 0° Celsius

$9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches.....	Centimeters.....	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles.....	Kilometers	1.609
Square Inches.....	Square Centimeters.....	6.451
Square Feet.....	Square Meters.....	0.093
Square Yards.....	Square Meters.....	0.836
Square Miles.....	Square Kilometers.....	2.590
Acres.....	Square Hectometers.....	0.405
Cubic Feet.....	Cubic Meters.....	0.028
Cubic Yards.....	Cubic Meters.....	0.765
Fluid Ounces.....	Milliliters	29.573
Pints	Liters.....	0.473
Quarts.....	Liters.....	0.946
Gallons.....	Liters.....	3.785
Ounces.....	Grams.....	28.349
Pounds.....	Kilograms.....	0.454
Short Tons.....	Metric Tons	0.907
Pound-Feet	Newton-Meters.....	1.356
Pounds/Sq Inch	Kilopascals.....	6.895
Miles per Gallon.....	Kilometers per Liter.....	0.425
Miles per Hour.....	Kilometers per Hour.....	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters.....	Inches.....	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles.....	0.621
Sq Centimeters	Square Inches.....	0.155
Square Meters.....	Square Feet.....	10.764
Square Meters.....	Square Yards.....	1.196
Square Kilometers	Square Miles.....	0.386
Sq Hectometers	Acres	2.471
Cubic Meters.....	Cubic Feet.....	35.315
Cubic Meters.....	Cubic Yards.....	1.308
Milliliters.....	Fluid Ounces.....	0.034
Liters.....	Pints	2.113
Liters.....	Quarts.....	1.057
Liters.....	Gallons.....	0.264
Grams.....	Ounces.....	0.035
Kilograms.....	Pounds.....	2.205
Metric Tons	Short Tons.....	1.102
Newton-Meters.....	Pound-Feet	0.738
Kilopascals.....	Pounds per Sq Inch.....	0.145
Km per Liter.....	Miles per Gallon.....	2.354
Km per Hour.....	Miles per Hour	0.621



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