ROUTINE

MWO effective date is 31 December 2002 and completion date is 30 December 2006.

MWO 9-2330-390-35-1

MODIFICATION WORK ORDER

MODIFICATION OF M1022A1 DOLLY SET

POSITIONING TUBE REINFORCEMENT

Headquarters, Department of the Army, Washington, D.C.

31 December 2002

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028-2 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form of the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or E-mail your letter, DA Form 2028 or DA Form 2028-2 direct to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITIED.

1. PURPOSE.

This modification provides reinforcement for the vertical positioning tubes during all operations.

2. PRIORITY.

This modification is classified as ROUTINE.

3. END ITEM TO BE MODIFIED.

NOTE

Application will be controlled/determined by PM, LTV based on Approved DCSOPS distribution plans/funding streams for M1022A1.

NOMENCLATURE	NSN	PART	CAGEC	MODEL
Dolly Set: Lift, Transportable Shelter, 7-1/2 ton	2330-01-378-9997			M1022A1

Vehicle National Stock Number (NSN) will not change as a result of this MWO.

4. MODULE (S) TO BE MODIFIED.

Not applicable

5. PART (S) TO BE MODIFIED.

NOMENCLATURE	NSN	PART NO.	CAGEC
Frame Section, Structural			
* Front	2510014262443	8D00107-1	21439
* Rear	2510013935087	8D00141-1	21439
Frame Section, Structural			
* Front	2510013935868	8D00106-1	21439
* Rear	2510013935744	8D00140-1	21439

6. APPLICATION.

a. Time Compliance Schedule: The effective date of this MWO is 31 December 2002 and its completion date is 30 December 2006.
b. The Lowest level of Maintenance authorized to apply the MWO is General Support (GS) maintenance.
c. Work force and man-hour requirements for application of the MWO to a single unit, end item, or system:

REQUIREMENTS

DESCRIPTION	WORK FORCE/SKILLS	MAN-HOURS
Detaching Front and Rear Dollies	Operational	0.5
Removal of Structural Frame Sections		
*Front	Operational / Mechanic	2.0
*Rear	Operational / Mechanic	2.0
Removal of Vertical Positioning Tubes		
* Front	Cutting	1.0
* Rear	Cutting	1.0
Preparation Bottom Beam		
* Front	Grinding / Welding / Painting	2.5
* Rear	Grinding / Welding / Painting	2.5
Preparation Top Beam		
* Front	Grinding / Welding / Painting	3.5
* Rear	Grinding / Welding / Painting	3.5
Assembly of Modified Frame Sections		
* Front	Operational / Mechanic	2.0
* Rear	Operational / Mechanic	2.0
Installation of Structural Frame Sections		
* Front	Operational / Mechanic	3.0
* Rear	Operational / Mechanic	3.0
Placing Dolly into Transport or Travel Mode	Operational	0.5
Total man-hours required for a single application of this MWO		29.0

7. TECHNICAL PUBLICATIONS AFFECTED/CHANGED AS A RESULT OF THIS MWO.

Technical Publication	Date
TM 9-2330-390-14&P C4	01 Nov 00
AWS 2.4-Standard Symbols for Welding, Brazing, and Non-destructive Examination	
AWS 3.0-Terms and Definitions	
AWS D1.1- Structural Steel Welding Code	
MIL-C-53072B	

8. MWO KITS, PARTS AND THEIR DISPOSITION.

a. The following kit is required to accomplish this modification. The security classification of this kit is unclassified. Shipping data is: weight 452.2 lbs;

NOMENCLATURE	NSN	CAGEC	PART
Positioning Tube Reinforcement Kit	2510-01-497-9906	19207	57K4484

b. Positioning Tube Reinforcement Kit component parts are listed below. The listing is used to inventory the kit for completeness. Refer to Figure 1 for a graphical depiction of each component.

ITEM	NOMENCLATURE	RETAILER	PART NO.	QTY.
19	Mount - Lower Front	Fabricated	001025-1-008	2
20	Mount - Lower Rear (L)	Fabricated	001025-1-013(L)	1
21	Mount - Lower Rear (R)	Fabricated	001025-1-013(R)	1
22	Bolt – 7 x ½ UNC, Hex	McMaster Carr	91257A738	4
23	Bushing – Steel, Shoulder	Fabricated	001025-1-016	8
24	Nut – ½ UNC, Locking	McMaster Carr	92501A437	4
25	Shim – Position Cylinder	Fabricated	001025-1-007	4
26	Bolt – ¼ UNC, Flat Head	McMaster Carr	91253A536	12
27	Assembly-Cable Lanyard	Fabricated	001025-1-907	4
28	Mount - Upper	Fabricated	001025-1-003	4
29	Pin – 1 x 7, Clevis	ITW	11-339-01	4
30	Pin – Cotter, Hairpin	McMaster Carr	98335A094	4
31	Spacer	McMaster Carr	92510A371	4
32	Mount - Stability Cable	Fabricated	001025-1-009	4
33	Tube – Lower Vertical	Fabricated	001025-1-103	4
34	Tube – Upper Vertical (L)	Fabricated	001025-1-104(L)	2
35	Tube – Upper Vertical (R)	Fabricated	001025-1-104(R)	2
91	Plate, Instruction	NSN 9905-00-858-5682	10930014	1

c. Bulk and Expendable Material.

NOMENCLATURE	NSN	CAGEC	PART	QTY.
Wire Welder				
Tape: Duct 2”	5640-00-103-2254	39428	1791K70	A/R
Tape: Pressure Sensitive Adhesive 2”	7510-00-473-9513	81349	MIL-T-23397	A/R
Screw, Drive	5305-01-417-1545	45722	NO. 4-3/16	A/R
Nut, Lock	5310-00-045-3299	96906	MS51922-17	A/R
Pin, Cotter	5315-00-234-1673	96906	MS24665-688	A/R
Pin, Cotter	5315-00-059-0217	96906	MS24665-624	A/R
TAG: Marker	9905-00-537-8954	81349	MIL-T-12755	A/R
Grease: Aircraft,WTR	9150-01-262-3358	81349	MIL-G-81322	A/R
Solvent: Dry Cleaning, Type II	6850-00-281-1985	81348	P-D-680	A/R
Fluid: Hydraulic	9150-00-223-4134	81349	MIL-H-5606	A/R
Rag: Wiping	7920-00-205-1711	64067	7920-00-205-1711	A/R

d. Parts Disposition. All parts not used during installation will be returned to stock for disposition in accordance with AR 725-50.

9. SPECIAL TOOLS; TOOL KITS; JIGS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND FIXTURES REQUIRED.

a. Hand tools and tool kits necessary to apply MWO are listed:

NOMENCLATURE	NSN	CAGEC	SUPPLY CATALOG
Tool Kit, General Mechanic's	5180-00-177-7033	50980	SC 5180-90-N26
Kit, Redundant Power	1730-01-4062585	21439	8D00220-1
Wrench, Twist Lock		21439	8D00136 (Provided w/ Dolly)
Drill Set, Twist	5133-00-293-0983	55719	SC 4910-95-CL-A74
Drill, Electric, Portable	5130-00-293-1849	81348	SC 4910-95-CL-A74
Welder, Short Arc Mig	3431-01-071-9104	30367	P/N SWM-14

b. Tools necessary to apply MWO are contained in the following shop set:

NOMENCLATURE	NSN	CAGEC	SUPPLY CATALOG
Shop Equipment, Automotive Maintenance And Repair	4910-00-754-0654	19204	SC 4910-95-A74

10. MODIFICATION PROCEDURE.

WARNING

Use extreme caution when handling heavy parts. Lifting device is required when parts weigh over 50 lb (23 kg) for a single person lift, over 100 lb (45 Kg) for a two person lift, and over 150 lbs (68 kg) for a three or more person lift. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause serious injury or death to personnel

NOTE

- **Hydraulic lines should be tagged before removal.**
- **Positioning cylinder ports should be plugged with masking tape or other suitable means as lines are disconnected or fittings are removed.**
- **A suitable container should be used to catch any draining hydraulic fluid. Ensure that all spills are properly cleaned.**

a. DOLLY PREPARATION

NOTE

- **Preparation procedures are the same for front and rear dollies.**

1. Uncouple Dolly set from Tow vehicle
2. From the transport or travel mode (Figure 2) perform operations needed to detach front and rear dollies (Refer to Appendix A).

3. Place front and rear dollies into maneuvering position (Figure 3) and separate by a distance of at least 30 ft or side by side. (Refer to Appendix B, Section a).
4. Place wooden blocks (12”x12” stock) under each end of each bottom beam and remove dolly half from maneuvering position (Refer to Appendix B, Section b). The condition of each dolly half should resemble Figure 4.

NOTE

- **Removal of the top hooks, detent lanyard pins, and toolbox-mounting brackets (front dolly) is not necessary.**

5. Remove the top and bottom beams and positioning cylinders from both the front and rear dollies (Figure 5) (Refer to Appendix C, Section a).

NOTE

- **The preferred method of applying the MWO is performing the required cutting, grinding, welding and painting WITHOUT removing bottom dolly beams from dolly suspension (see Figure 5). The bottom beams of the dolly may be removed from the dolly suspension if required IAW TM 9-2330-390-14&P. However extreme care must be taken during reassemble due to close tolerances.**

6. With a permanent-marking device, appropriately identify each support beam for future reference (i.e. front bottom, front top, rear bottom, or rear top).
7. Clean and inspect all parts (Refer to Appendix C, Section b).

b. TOP AND BOTTOM BEAM PREPARATION

NOTE

- **Preparation procedures are NOT the same for the front and rear or the top and bottom beams. Discrepancies will be noted when necessary.**

- **All surfaces to be welded should be free of paint and other surface treatments. Three recommended methods for removal are the use of plastic media blasting at approximately 40 PSI, the use of paint remover such as MIL-R-81294, type I, or the use of a hand-held portable sander/grinder equipped with a wire brush.**

1. Remove the vertical tubes from the top and bottom beams obtained from both the front and rear dolly. Cut tubes within 0.5 in. from each support beam surface (Figure 6).
2. Grind off remaining tube material flush with surface of beam at all vertical tube connections.

NOTE

- **Steps 3 through 6 describe the modification of the support beams. Accurate component identification and placement is essential to proper installation.**

- **All welding should adhere to procedures in accordance with AWS D1.1. Surfaces to be welded must be preheated for proper fusion. Weld filler material to be 70 Ksi min tensile strength. Weld joints should be metal to metal fit. Weld gaps shall not exceed 0.09 inch.**

3. Position tube mounts (19) over the front bottom beam as designated in Figure 7. Clamp and weld in place.
4. Position tube mounts (20 & 21) over the rear bottom beam as designated in Figure 7. Clamp and weld in place.
5. Position tube mounts (28) over the front and rear top beams as designated in Figure 8. Clamp and weld in place.
6. Position stability cable mounts (32) on front and rear top beams as designated in Figure 8. Clamp and weld in place.
7. Perform visual and Dye penetrant inspection of welds per AWS D1.1. Dye penetrant inspection shall only be performed on suspect welds.
8. Once modified, clean, treat, prime and CARC topcoat in accordance with MIL-C-53072 (ME) and drawing 12355846. Effected area modified must be sanded to 'White Metal', re-primed using Moisture-Cure Zinc rich primer in accordance with drawing 12461890, 1.5 mil min dry film thickness and top coated in accordance with 12355846-100.

c. FRAME ASSEMBLY

NOTE

- **Assembly procedures are the same for the front and rear dollies. Figure 9 illustrates assembly for the front dolly.**

- **Mounting hardware must face outward to prevent interference.**

1. Attach cylinder shims (25) to tube mounts on bottom beam (3) using flat head screws (26). Torque each screw to 10 ft-lbs.
2. Position mounting tabs on lower vertical tube (33) between the tube mount tabs on the bottom beam.
3. Insert the positioning cylinder (2) into the lower vertical tube (33) with the hydraulic connections facing outboard as shown in Figure 9.
4. Insert bolt (22) through one steel bushing (23) with bushing shoulder adjacent to bolt head. Per Figure 9, insert bolt and bushing sub-assembly through the tube mounting tabs on the bottom beam, the lower vertical tube (34) and the positioning cylinder base (2).
5. Place a second steel bushing (23) onto bolt (22). Finish the lower tube connection by placing locking nut (24) onto bolt (22). Prior to the application

of torque, insure that each of the steel bushings (23) fit into the holes in each tab of the tube mount.

6. Torque lower tube connection bolts (22) to 25-30 ft-lbs.
7. Repeat steps 2 though 7 to complete second lower tube connection.
8. Slide one of the upper vertical tubes (34 or 35) over an assembled lower vertical tube. Proper assembly will have the stability cable mount positioned inboard and to the container mounting surface as shown in Figure 9.
9. Per Figure 9, insert clevis pin (29) into upper vertical tube (34 or 35), tube mounting tabs on the upper beam (1), and the positioning cylinder rod end (2).
10. Add spacer (31) to free end of clevis pin (29).
11. Insert cotter pin (30) to complete upper tube connection.
12. Repeat steps 9 though 12 to complete second upper tube connection.
13. Install both stability cables (27) to mounts provided as shown in Figure 9
14. Install instruction plates previously removed (Task 17, Appendix C, Section a) on front dolly upper vertical tube. Use plate as template to drill 6 (0.082-0.086) holes for mounting plate. Position first plate (uncoupling instructions) 25" below upper beam on front upper left (hydraulic valve side) vertical tube. Position second plate (coupling instructions) ½" below the first plate. Use #4-3/16 drive screws to attach.
15. Install hanger brackets (front dolly). Position previously removed hanger bracket on upper vertical tube (34), 8 in (15.2cm) below top beam (1). Reinstall U-bolt, and two flat washers with new locknuts.

d. Installation

NOTE

- **Installation procedures are the same for the front and rear dollies. Figure 10 illustrates installation for the front dolly.**

1. Install the assembled structural frame to both the front and rear dollies (Figure 10) (Refer to Appendix C, Section c). This includes the bottom beams if removed.

NOTE

- **Prior to operation of the modified Dolly set, properly check hydraulic system for leaks and bleed (Refer to Appendix D).**

2. Remove wooden blocks (12"x12" stock) under each end of each bottom beam and place dolly half into maneuvering position (Figure 3) (Refer to Appendix B, Section a).
3. Perform operations needed to return dollies to travel or transport mode Figure 2.

11. CALIBRATION REQUIREMANTS.

Not applicable to this MWO

12. WEIGHT AND BALANCE DATA.

a. Additional weight (452.2 lbs).

ITEM	NOMENCLATURE	PART NO.	WEIGHT (lbs)	QTY.
19	Mount - Lower Front	001025-1-008	8.18	2
20	Mount - Lower Rear (L)	001025-1-013(L)	7.70	1
21	Mount - Lower Rear (R)	001025-1-013(R)	7.70	1
22	Bolt – 7 x ½ UNC, Hex	91257A738	0.52	4
23	Bushing – Steel, Shoulder	001025-1-016	0.25	8
24	Nut – ½ UNC, Locking	92501A437	0.03	4
25	Shim – Cylinder	001025-1-007	1.24	4
26	Bolt – ¼ UNC, Flat Head	91253A536	0.02	12
27	Assembly-Cable Lanyard	001025-1-907	1.50	4
28	Mount - Upper	001025-1-003	8.29	4
29	Pin – 1 x 7, Clevis	11-339-01	1.70	4
30	Pin – Cotter, Hairpin	98335A094	0.05	4
31	Spacer – 1.0 in. ID	92510A371	0.14	4
32	Mount - Stability Cable	001025-1-009	1.06	4
33	Tube – Lower Vertical	001025-1-103	40.12	4
34	Tube – Upper Vertical (L)	001025-1-104(L)	49.65	2
35	Tube – Upper Vertical (R)	001025-1-104(R)	49.65	2

b. Weight Removed (320.9 lbs).

ITEM	NOMENCLATURE	PART NO.	WEIGHT (lbs)	QTY.
-	Lower Vertical Tube		36.47	4
-	Upper Vertical Tube		42.00	4
13	Pin – Straight, Headed	8D00060-2	1.07	4
14	Washer – Flat, 1 in.	AN960-1616	0.40	4
15	Pin - Cotter	MS24665-495	0.01	4
16	Pin - Cotter	MS24665-351	0.01	4
17	Washer – Flat, ½ in.	MS51412-8	0.03	4
18	Pin – Straight, Headed	8D00060-3	0.23	4

c. Net Weight Increase (131.3 lbs).

13. QUALITY ASSURANCE REQUIREMENTS.

a. General. The following information is furnished to ensure the proper application of this MWO and provide clarification in regard to the adequacy of installer's inspection methods and procedures applicable to Quality Assurance (QA). Inspection shall be IAW TM 9-2330-390-14&P, and MWO.

b. Installer Responsibilities. The installer is responsible for following instructions in MWO 9-2330-39-35-1, and TM 9-2330-390-14&P. The installer will report Positioning Tube Reinforcement Kits received that are damaged or missing component parts so the kit supplier can be properly notified. Any discrepancies noted will be corrected before the vehicle leaves the installer's work area. Requirements contained in this MWO shall be included in the installer's inspection plan or quality assurance program. As a minimum, a checklist will be maintained indicating all requirements have been satisfactorily accomplished for each kit. These requirements shall not be construed as eliminating the installer's responsibility from complete compliance with provisions of the contract and submitting to the Government products that meet all requirements of the contract.

c. Government Verification. All QA operations, installation changes, and inspections performed by the installer are subject to Government verification at unannounced and varying intervals. Verification will consist of observations and inspections to confirm that practices, methods, and procedures of the installer's written inspection plan are being properly applied; and that Government product inspection to confirm the quality of product offered for Government acceptance does not deviate from prescribed acceptance standards specified in TM 9-2330-390-14&P. Deviations will be brought to the attention of the installer for correction.

d. In-process Inspection. During normal assembly operations, paragraph 10, Modification Procedure, will be used to check the installer's work. After installation is complete, the installer will correct any defects noted before the Dolly is placed in service. All Dollies modified during a production shift will be checked to ensure product quality.

14. RECORDING AND REPORTING OF THE MODIFICATION.

a. Records and Reports. The organization responsible for MWO application will report application information as follows:

(1) Reporting will be accomplished by electronic means. MWO application information can be input directly into the Modification Management Information System (MMIS) over the Internet. If Internet is not available, recording will be on a 3.5-inch disk, which will be mailed to the MMIS administrator. Entry into the MMIS system is password protected. New users can register on-line at http://208.242.67.250/mwo. Passwords are normally approved and issued within 48 hours.

(2) Submission will be comprised of nine (9) data elements listed in the table below. Elements 1,2,4,6,7,8 & 9 are given for this MWO (as shown). The

person reporting the MWO data, will acquire the remaining elements (3 & 5), and input all nine into MMIS.

DATA Elements	Input Data

1. Material Change Number (MCN)
2. MWO Number
3. Unit Identification Code (UIC) @ Battalion Level
4. NSN of End Item
5. Serial Number
6. USA Registration Number
7. Date of Application
8. Hours required for Application.
9. Software Version

(3) For off-line reporting, the 3.5-inch disk shall be mailed to the following address:
Commander
TACOM-Warren
ATTN: AMSTA-LC-CIPWM
Warren, MI 48397-5000

b. Marking Equipment.
   (1) After the Positioning Tube Reinforcement Kit is installed, mark MWO under 9-2330-390-35-1 in the MWO Applied block and Date Applied in Date Block on MWO instruction plate P/N 10930014 (91).
   (2) To install the MWO instruction plate, locate and drill a 0.082-0.086 inch diameter hole on the front upper left (hydraulic valve side) vertical tube above the instruction plate (see figure 11). Use #4-3/16 drive screws to attach.

15. MATERIAL CHANGE (MC) NUMBER.

a. The Material Change (MC) Number for this MWO is 1-02-08-0001

16. MODIFICATION IDENTIFICATION.

a. When installed correctly, the Positioning Tube Reinforcement Kit will appear as shown in figure 10.
b. After the Positioning Tube Reinforcement Kit is installed, the positioning tube reinforcement should be inspected for secure mounting. Any faults detected, or discrepancies noted, will be corrected before the dolly is returned to normal service.

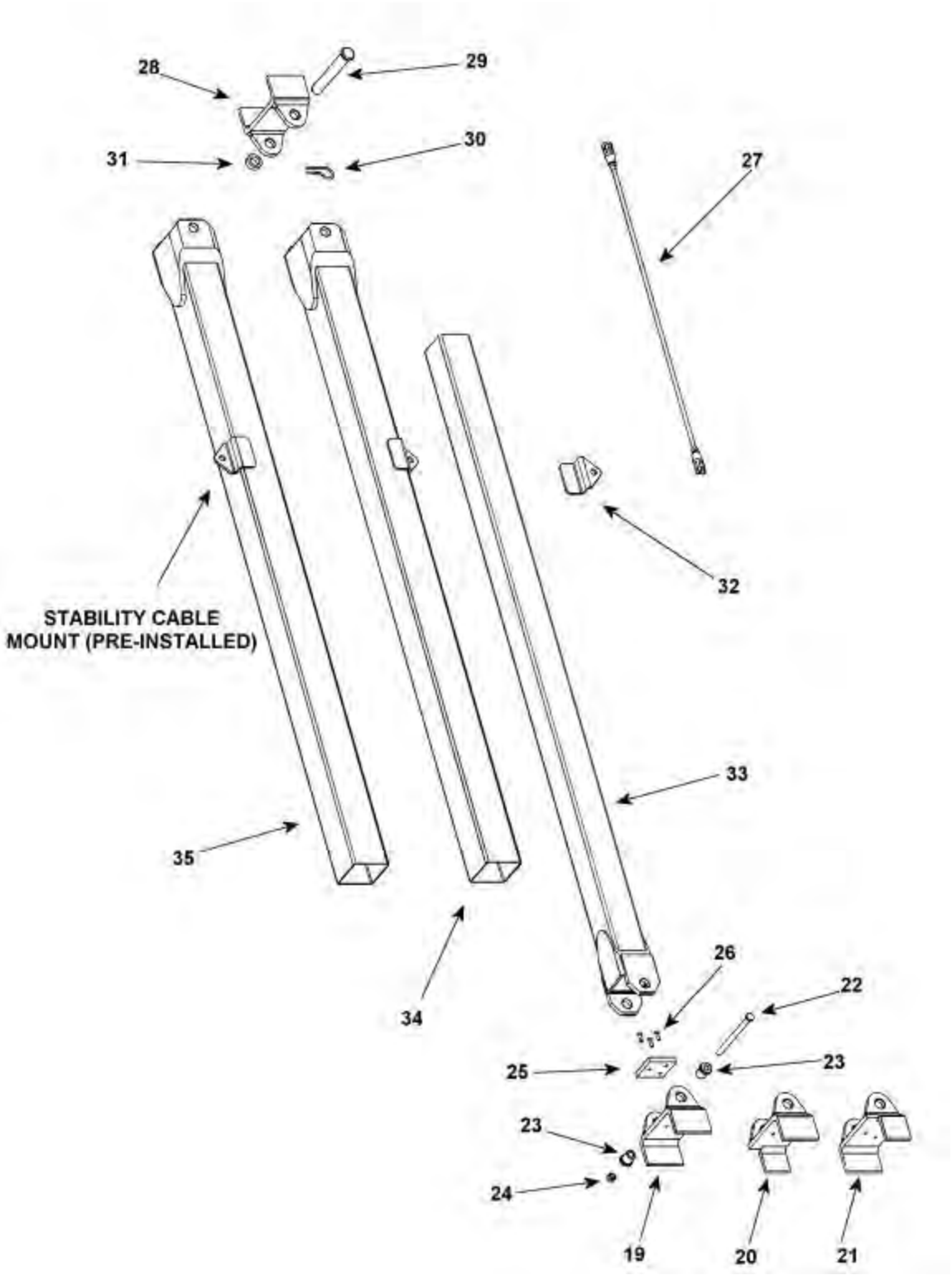
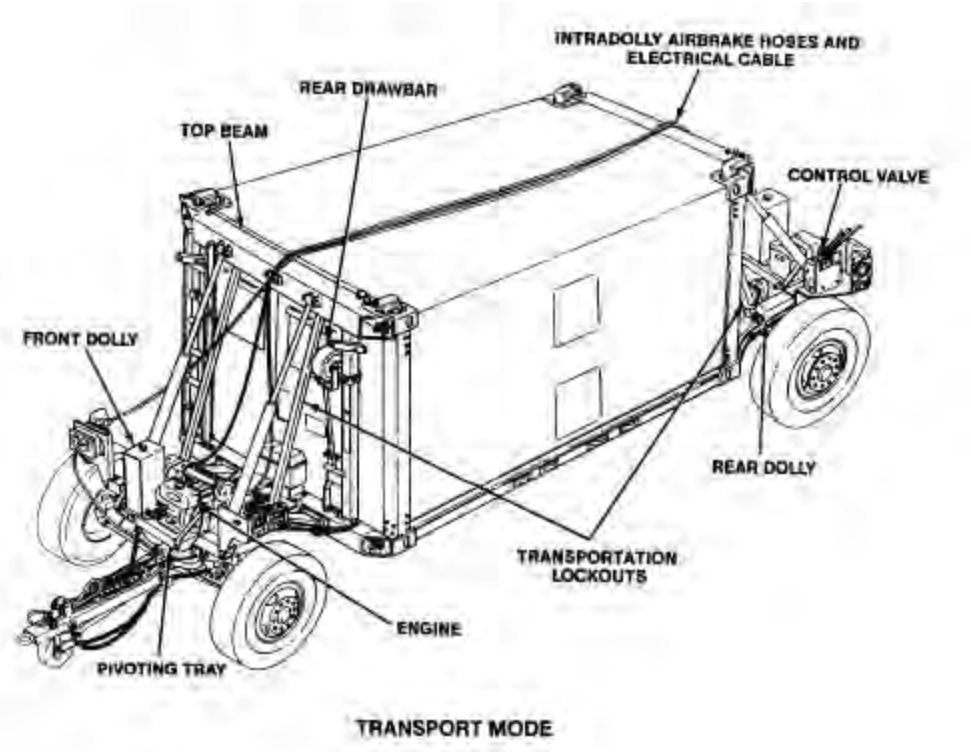

28
29
31
30
27
32
STABILITY CABLE
MOUNT (PRE-INSTALLED)
33
35
34
26
22
25
23
23
24
19
20
21

Figure 1


INTRADOLLY AIRBRAKE HOSES AND ELECTRICAL CABLE
REAR DRAWBAR
TOP BEAM
CONTROL VALVE
FRONT DOLLY
REAR DOLLY
TRANSPORTATION LOCKOUTS
ENGINE
PIVOTING TRAY
TRANSPORT MODE

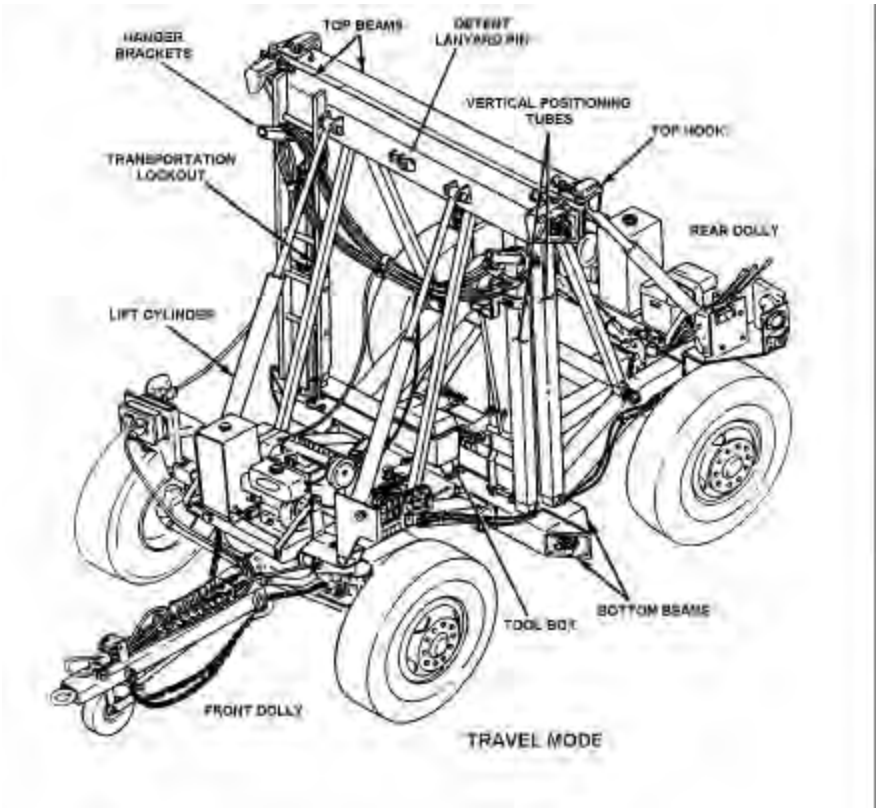

HANGER BRACKETS
TOP BEAMS
DETENT LANYARD PIN
VERTICAL POSITIONING TUBES
TOP HOOK
TRANSPORTATION LOCKOUT
REAR DOLLY
LIFT CYLINDER
TOOL BOX
BOTTOM BEAMS
FRONT DOLLY
TRAVEL MODE

Figure 2

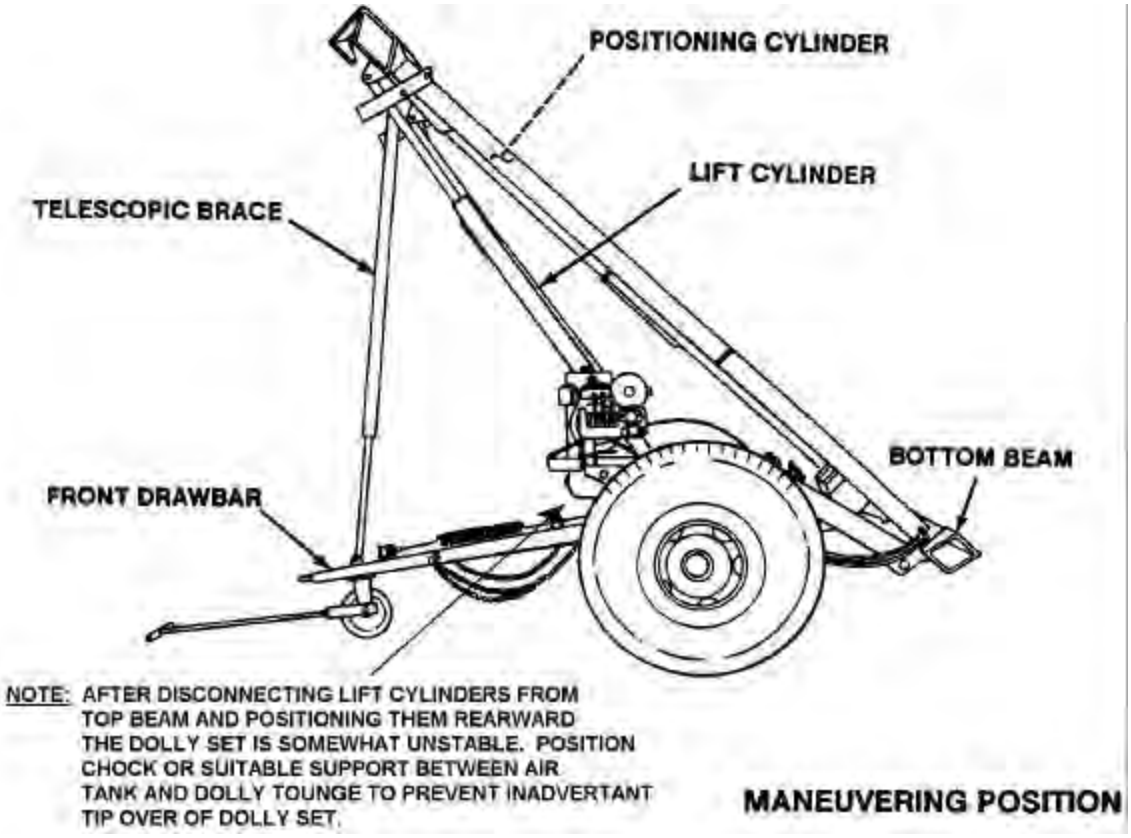

POSITIONING CYLINDER
LIFT CYLINDER
TELESCOPIC BRACE
BOTTOM BEAM
FRONT DRAWBAR
NOTE: AFTER DISCONNECTING LIFT CYLINDERS FROM TOP BEAM AND POSITIONING THEM REARWARD THE DOLLY SET IS SOMEWHAT UNSTABLE. POSITION CHOCK OR SUITABLE SUPPORT BETWEEN AIR TANK AND DOLLY TOUNGE TO PREVENT INADVERTANT TIP OVER OF DOLLY SET.
MANEUVERING POSITION

Figure 3

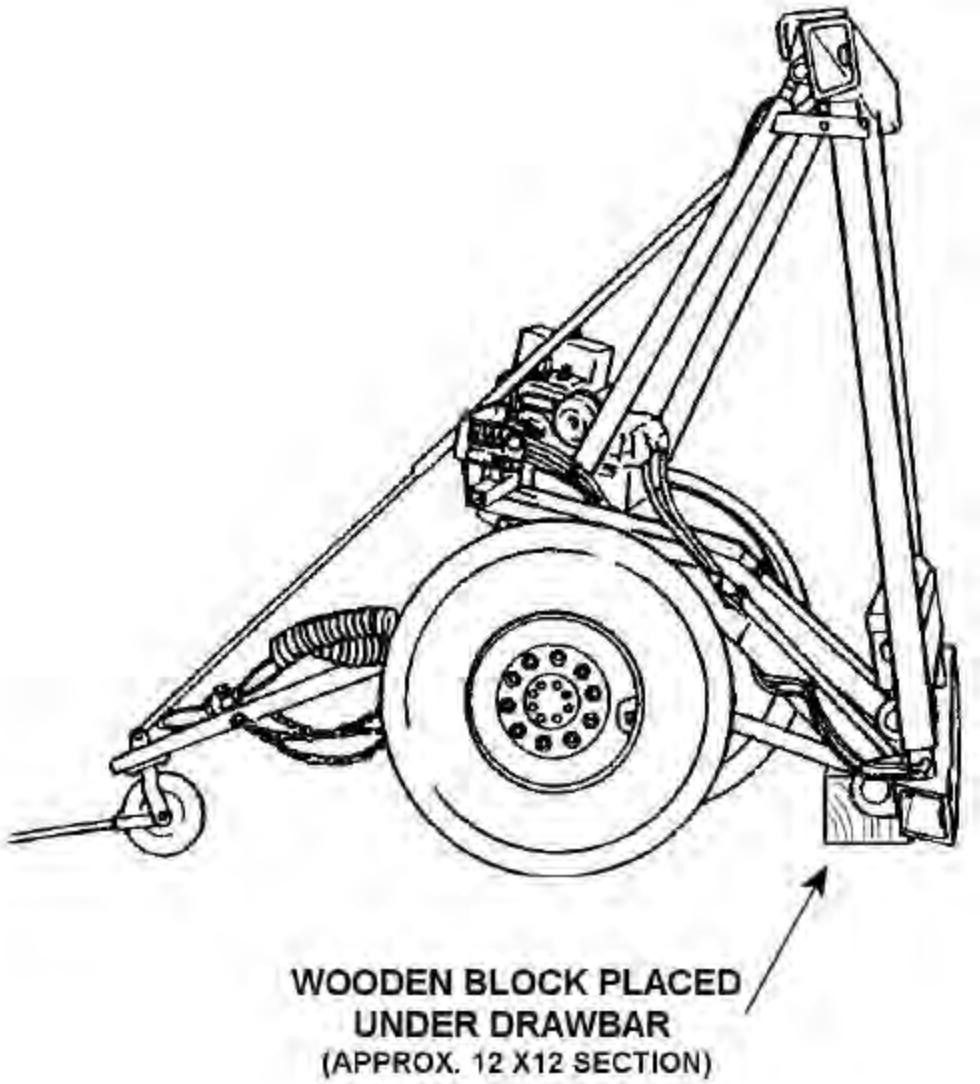


Figure 4

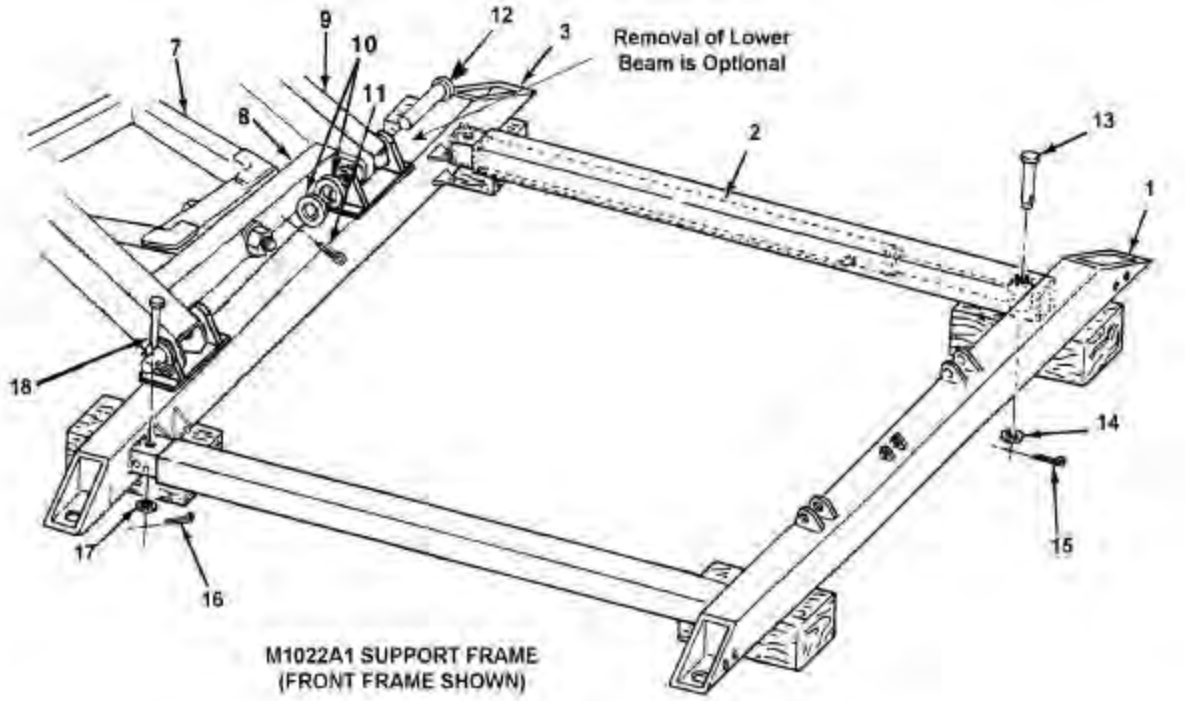

9
12
3
Removal of Lower
Beam is Optional
7
10
11
8
2
13
1
18
14
15
17
16
M1022A1 SUPPORT FRAME
(FRONT FRAME SHOWN)

Figure 5

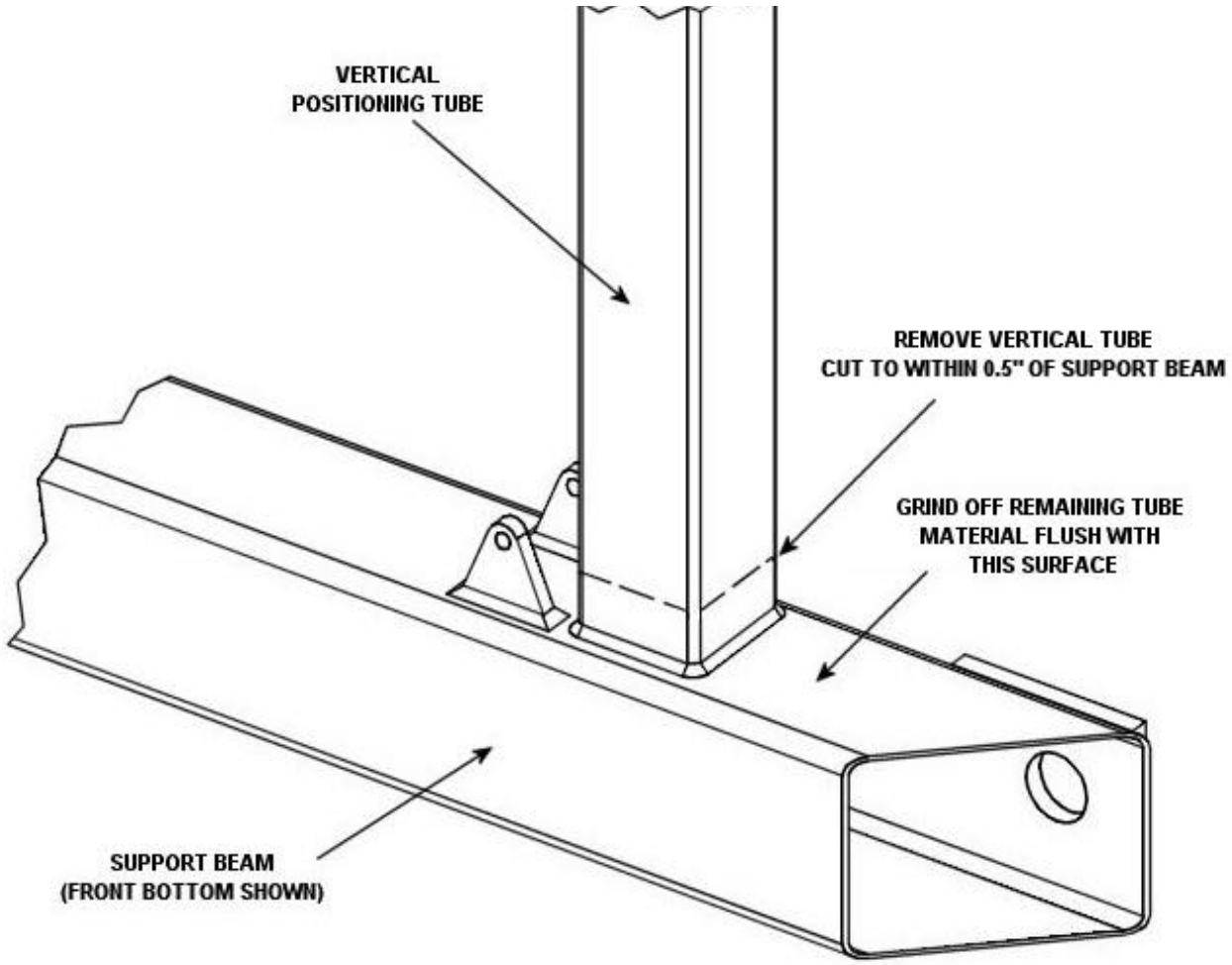

VERTICAL
POSITIONING TUBE
REMOVE VERTICAL TUBE
CUT TO WITHIN 0.5" OF SUPPORT BEAM
GRIND OFF REMAINING TUBE
MATERIAL FLUSH WITH
THIS SURFACE
SUPPORT BEAM
(FRONT BOTTOM SHOWN)

Figure 6

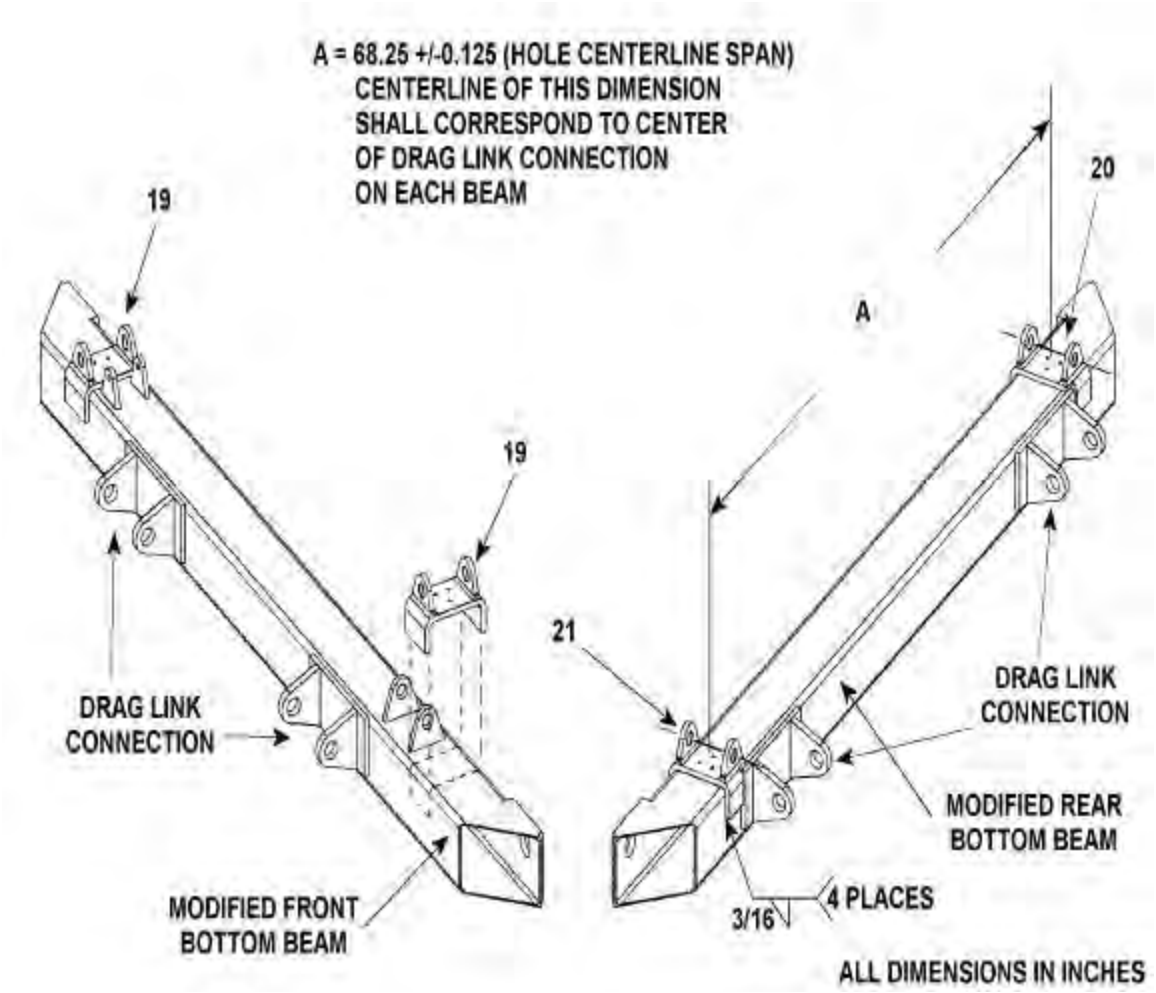

A = 68.25 +/-0.125 (HOLE CENTERLINE SPAN)
CENTERLINE OF THIS DIMENSION
SHALL CORRESPOND TO CENTER
OF DRAG LINK CONNECTION
ON EACH BEAM
19
19
20
A
21
DRAG LINK
CONNECTION
DRAG LINK
CONNECTION
MODIFIED REAR
BOTTOM BEAM
MODIFIED FRONT
BOTTOM BEAM
3/16
4 PLACES
ALL DIMENSIONS IN INCHES

Figure 7

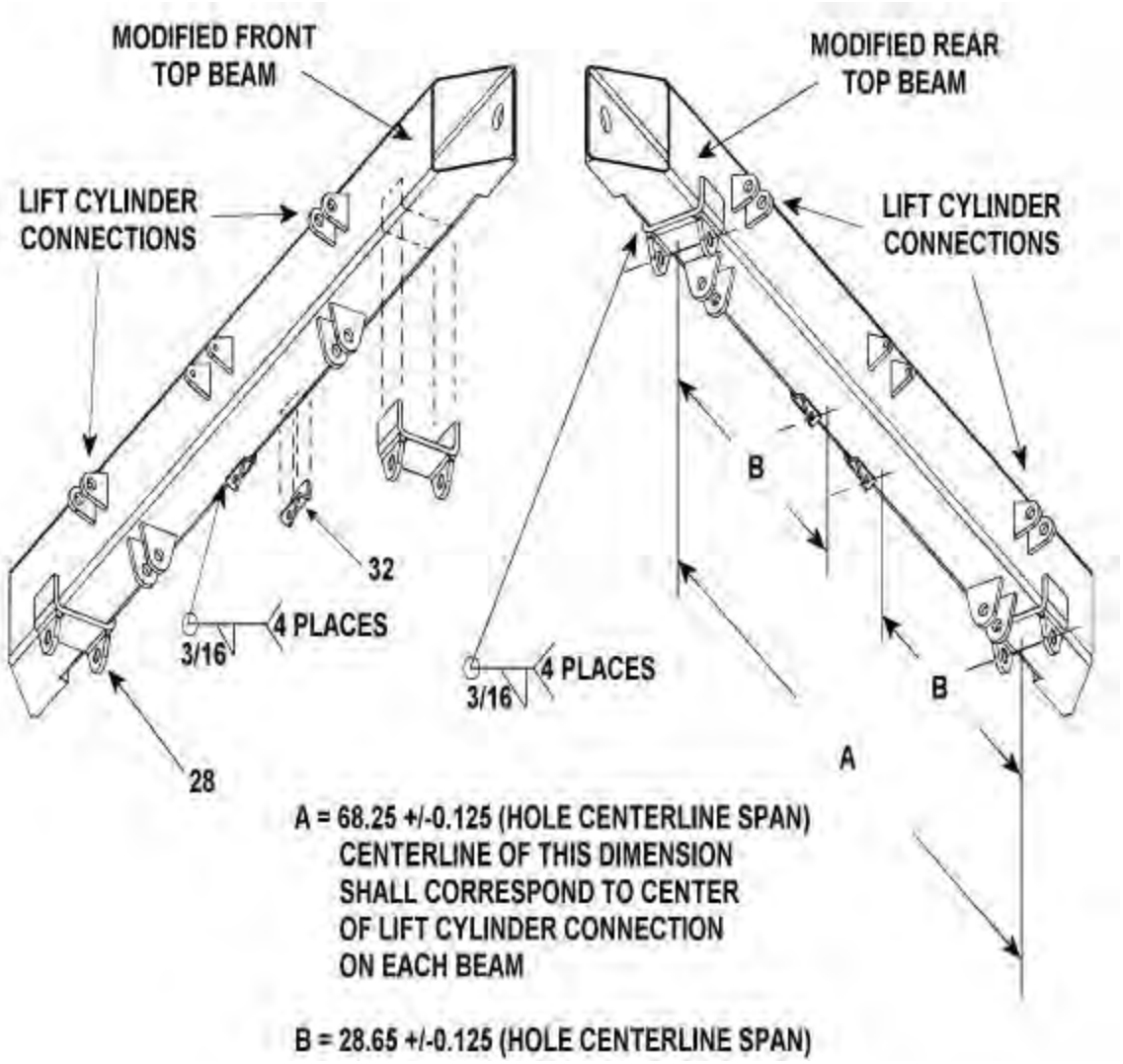

MODIFIED FRONT
TOP BEAM
LIFT CYLINDER
CONNECTIONS
32
4 PLACES
3/16
28
MODIFIED REAR
TOP BEAM
LIFT CYLINDER
CONNECTIONS
B
4 PLACES
3/16
B
A
A = 68.25 +/-0.125 (HOLE CENTERLINE SPAN)
CENTERLINE OF THIS DIMENSION
SHALL CORRESPOND TO CENTER
OF LIFT CYLINDER CONNECTION
ON EACH BEAM
B = 28.65 +/-0.125 (HOLE CENTERLINE SPAN)

Figure 8

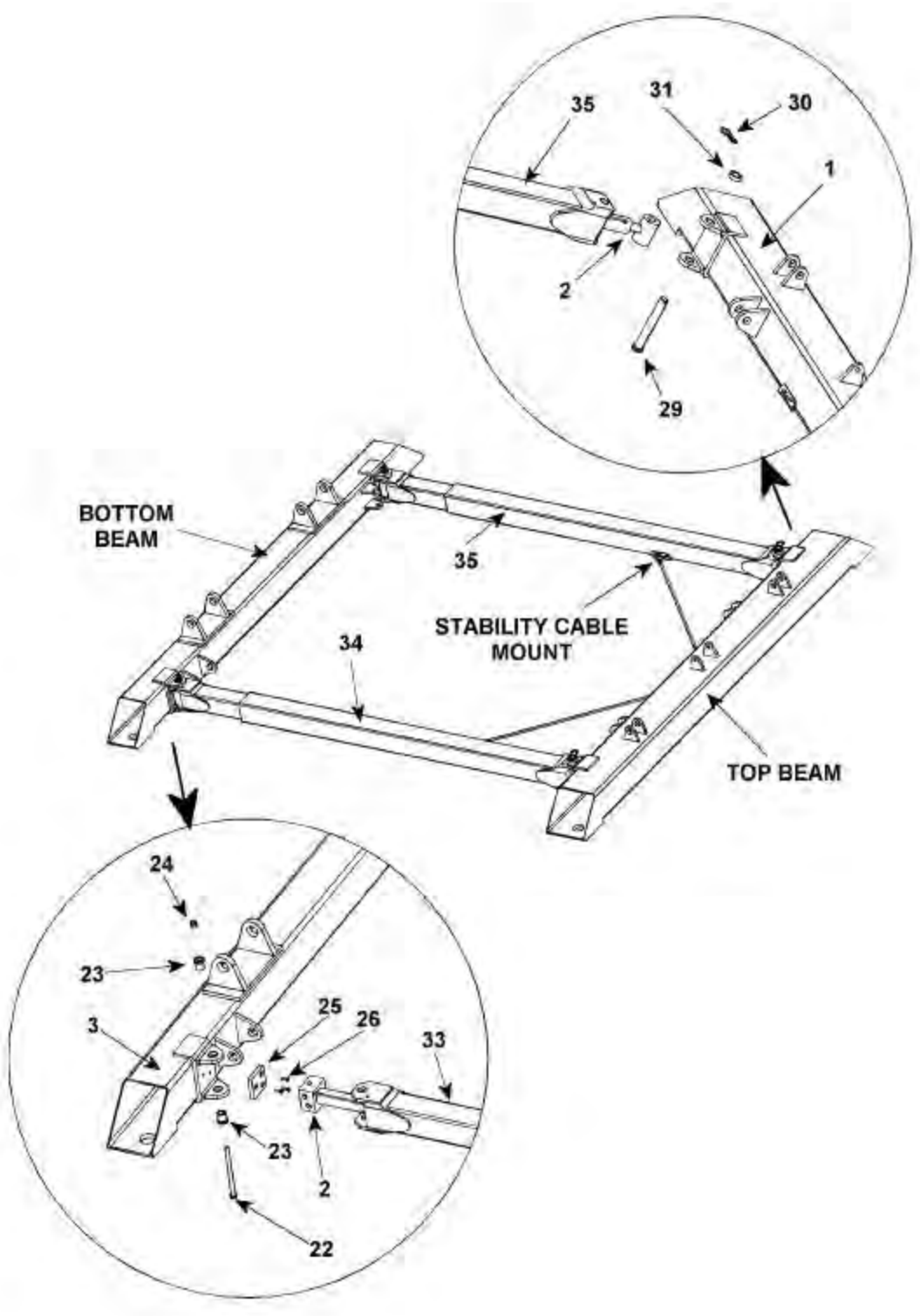

35
31
30
1
2
29
BOTTOM
BEAM
35
STABILITY CABLE
MOUNT
34
TOP BEAM
24
23
3
25
26
33
23
2
22

Figure 9

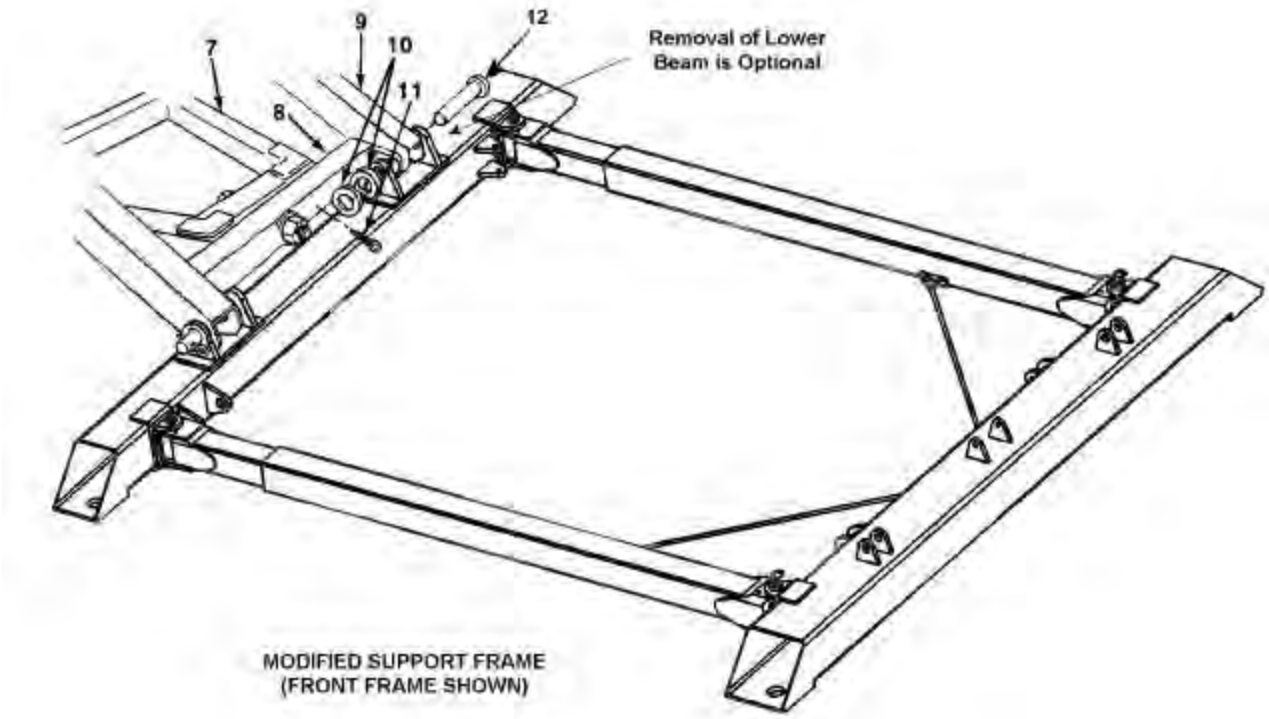

7
8
9
10
11
12
Removal of Lower
Beam is Optional
MODIFIED SUPPORT FRAME
(FRONT FRAME SHOWN)

Figure 10

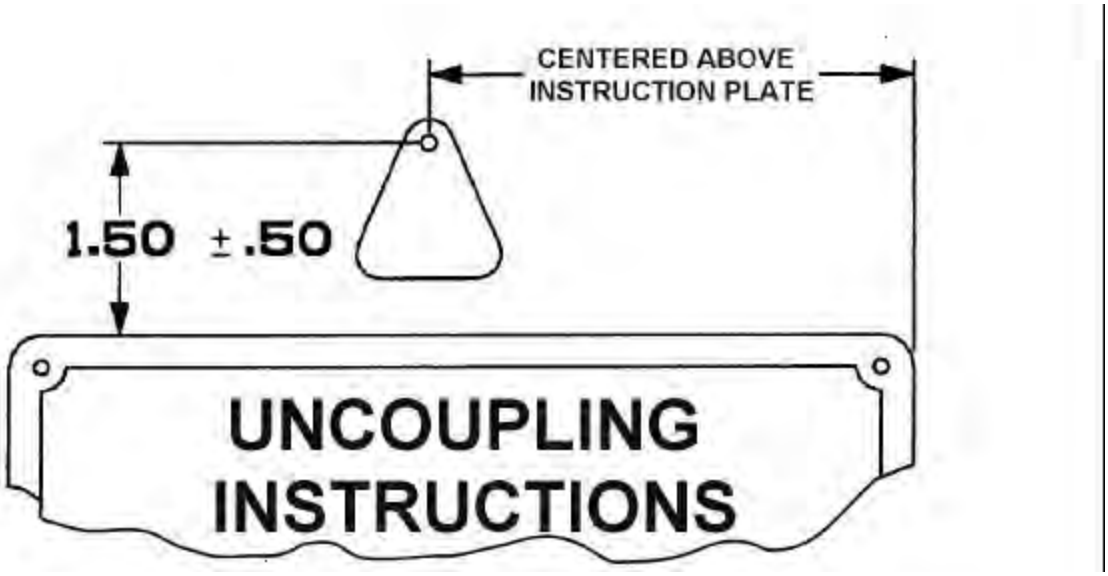

CENTERED ABOVE
INSTRUCTION PLATE
1.50 ±.50
UNCOUPLING
INSTRUCTIONS

Figure 11

APPENDIX A: LOWERING DOLLY SET WITH OR WITHOUT SHELTER AND DETACHING FRONT AND REAR DOLLIES.

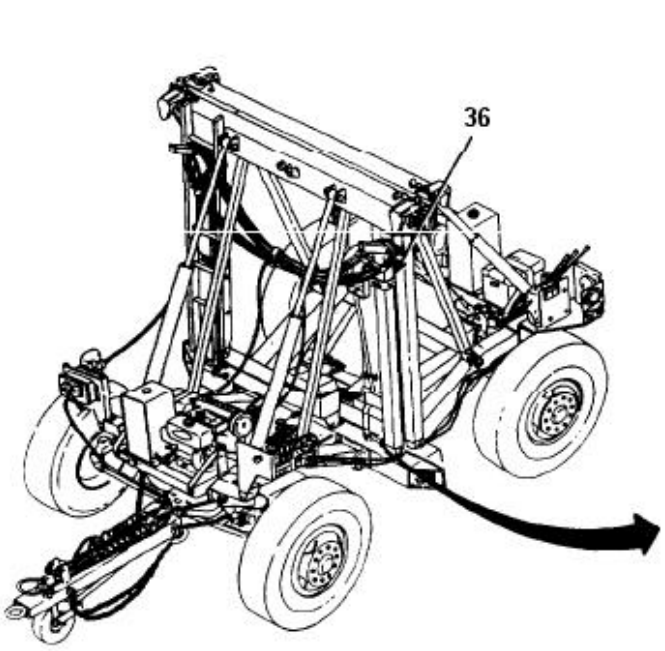
WARNING

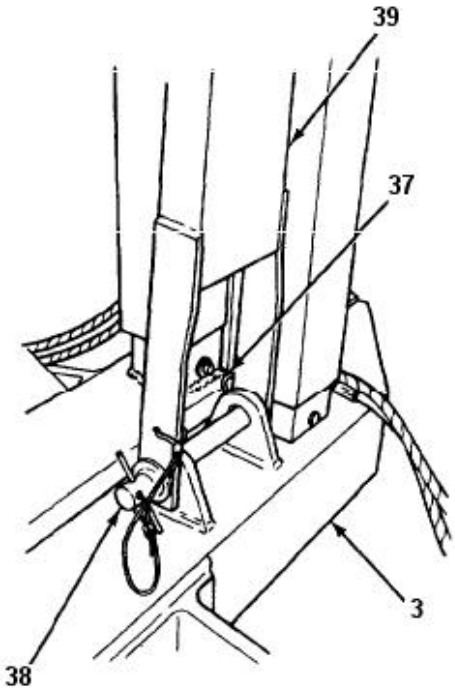
- **All personnel must use caution when standing near dolly set and shelter (if present) during lowering and detaching operations. Failure to follow this warning may cause serious injury or death to personnel.**

NOTE

- **Procedures to lower dolly set, with or without shelter, and detach front and rear dollies are similar. Differences will be identified as they occur.**

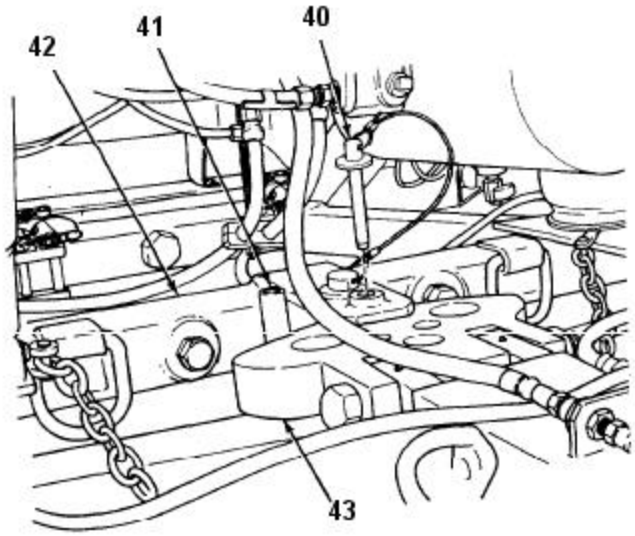
a. Remove stowage strap (36), lockpin (37), and pin (38), and remove rear drawbar (39) from stowage on bottom beam (3) of front dolly.

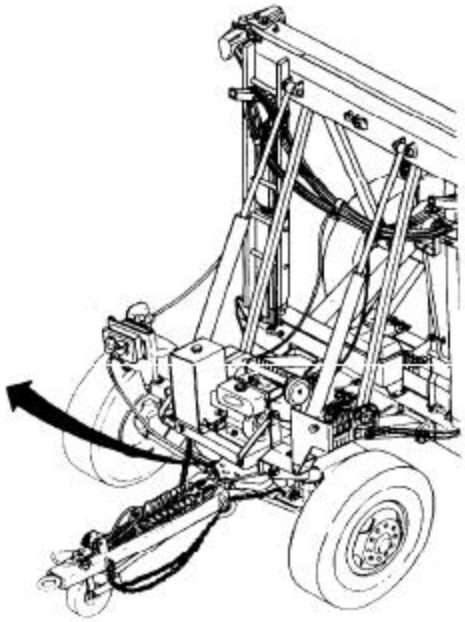




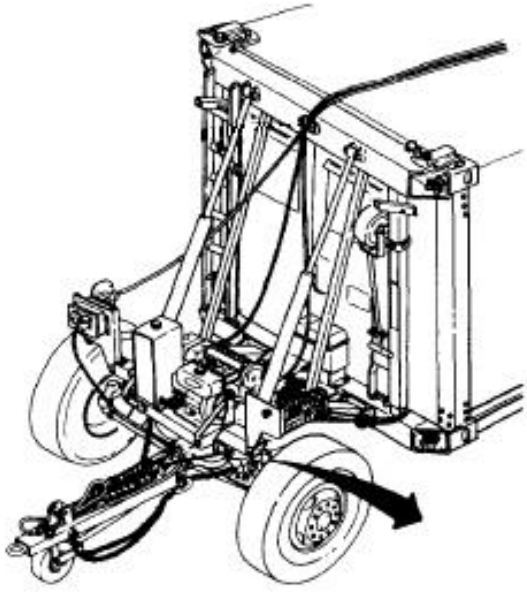
APPENDIX A: LOWERING DOLLY SET WITH OR WITHOUT SHELTER AND DETACHING FRONT AND REAR DOLLIES (Con't).

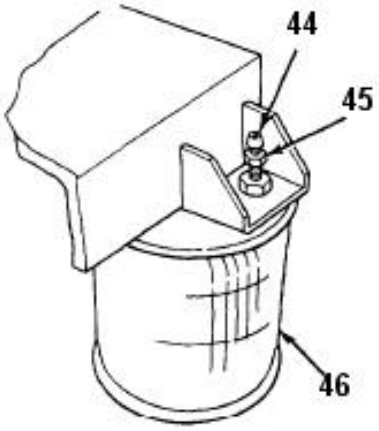
b. Remove steering locking pin (40) from stowage tube (41). Install steering locking pin through front axle (42) and steering link (43) to lock steering.





c. At front and rear, remove two caps (44) of air bag valves (45) and deflate air bags (46). Install caps on air bag valves.

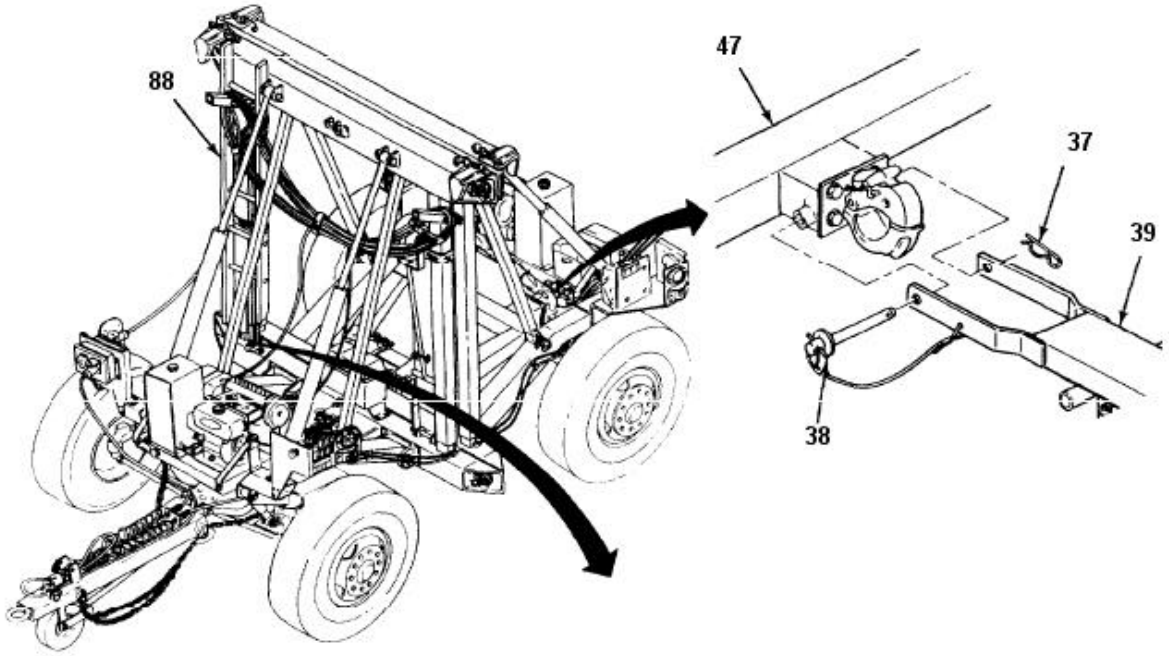




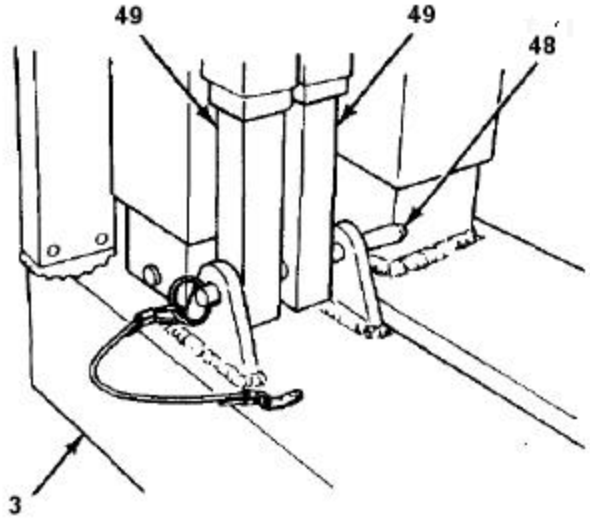
APPENDIX A: LOWERING DOLLY SET WITH OR WITHOUT SHELTER AND DETACHING FRONT AND REAR DOLLIES (Con't).

d. Install rear drawbar (39) to rear axle (47) with pin (38) and lockpin.

e. Remove two stowage straps and ladder (88). Set ladder aside.

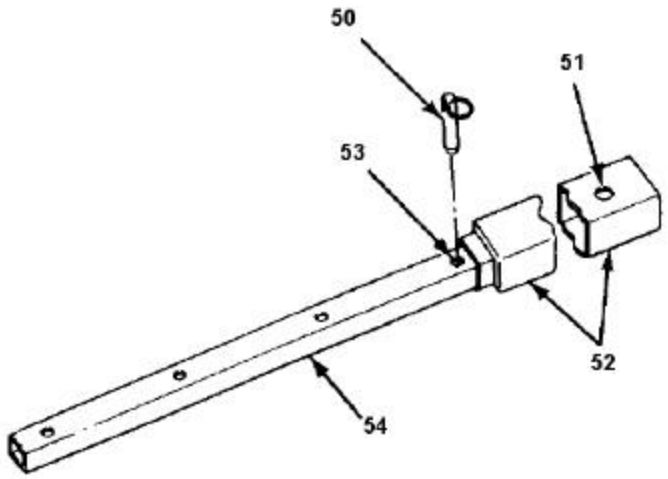


f. Remove stowage strap and detent pin (48), and remove two telescopic braces (49) from stowage on bottom beam (3) of front dolly.

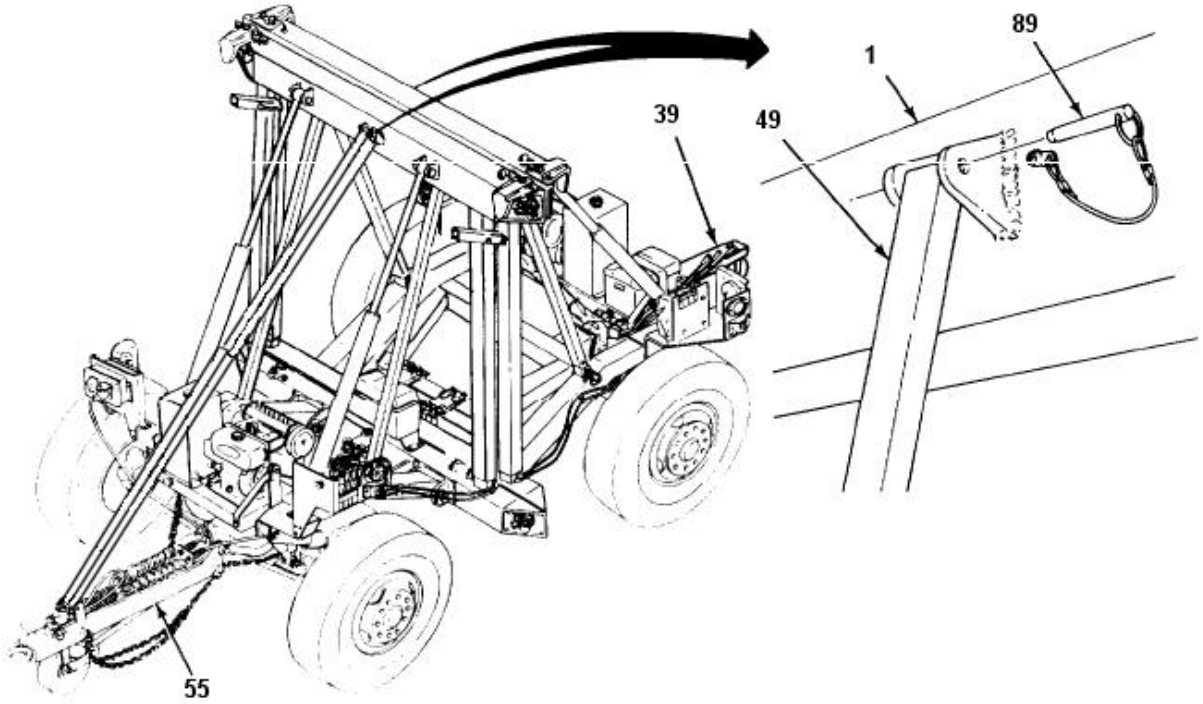


APPENDIX A: LOWERING DOLLY SET WITH OR WITHOUT SHELTER AND DETACHING FRONT AND REAR DOLLIES (Con't).

g. Remove rest pin (50) from hole (51) at end of each larger brace (52). Install rest pin in fourth hole (53) from end of each smaller brace (54).



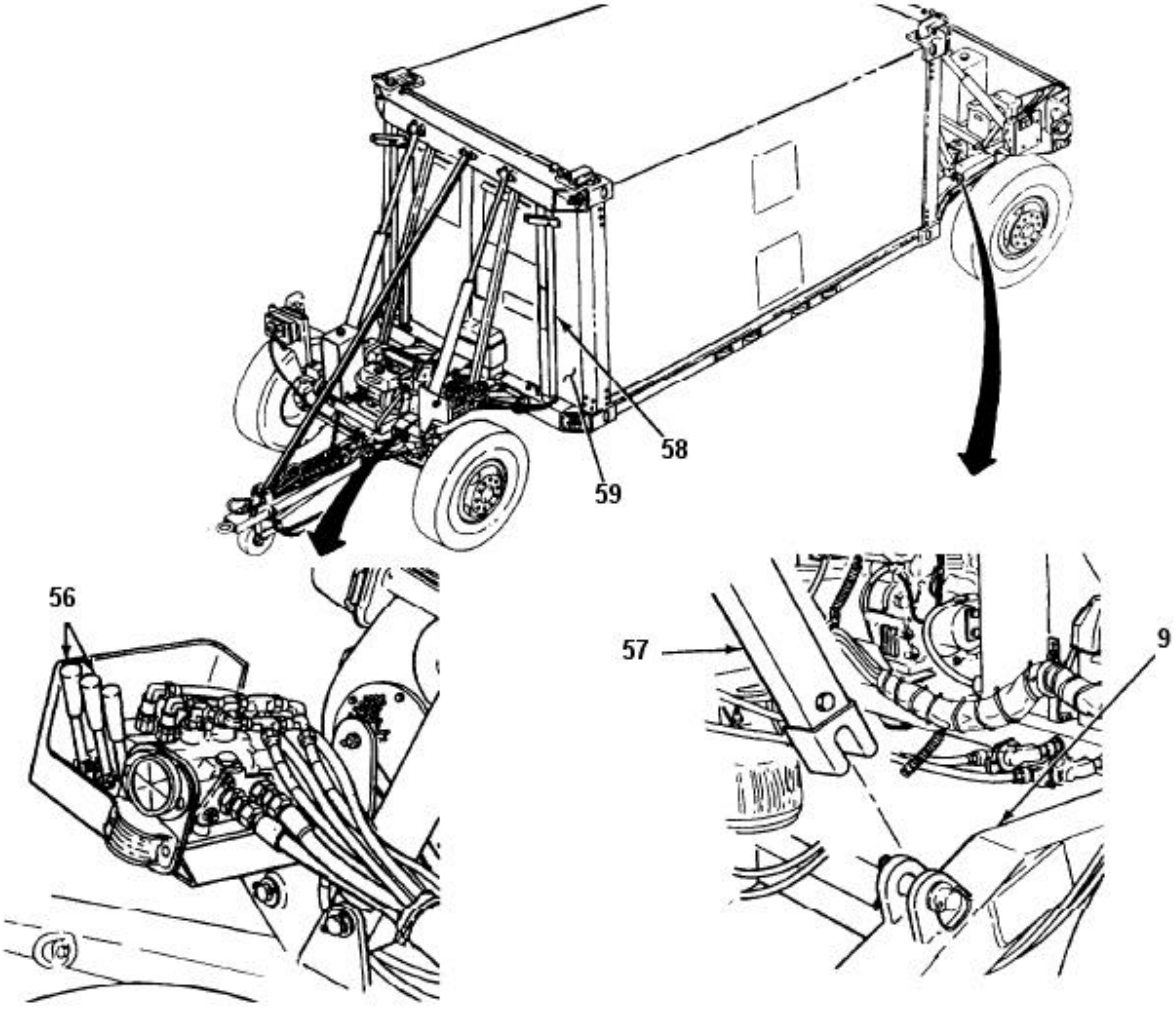
h. Install two telescopic braces (49) to front and rear drawbars (55 and 39) and top beams (1) with four detent pins (89).



APPENDIX A: LOWERING DOLLY SET WITH OR WITHOUT SHELTER AND DETACHING FRONT AND REAR DOLLIES (Con't).

i. Start engine at front and rear dollies.

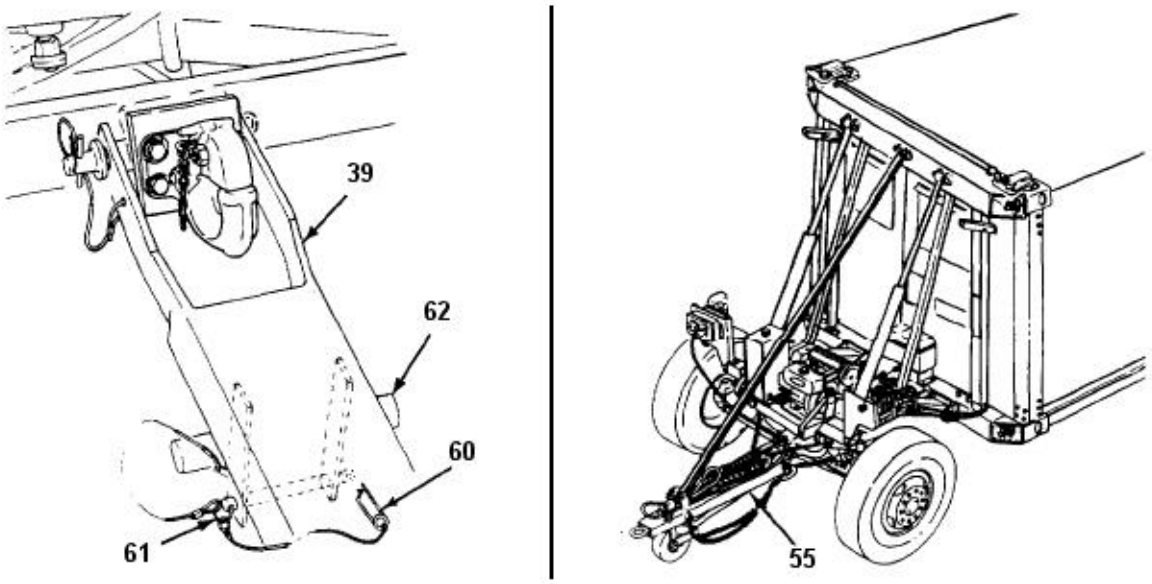
j. At front and rear, pull down on two-lift cylinder levers (56) to slightly extend lift cylinders. Disengage transportation lockouts (57) from suspension links (9). Secure each transportation lockout to top beam vertical tube (58) with stowage strap.



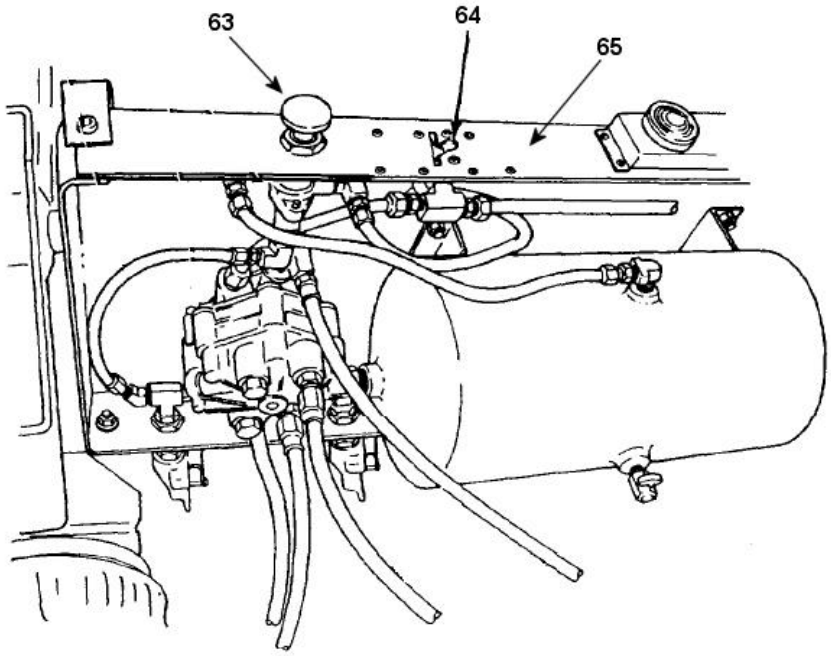
k. At front and rear, push up on two lift cylinder levers (56) and lower dolly set with or without shelter (59) to the ground.

APPENDIX A: LOWERING DOLLY SET WITH OR WITHOUT SHELTER AND DETACHING FRONT AND REAR DOLLIES (Con't).

l. Remove safety pin (60) and hitch pin (61) and release handle (62) from stowage under rear drawbar (39). Repeat for handle at front drawbar (55).



m. Release brakes on rear dolly by pushing in on airbrake control knob (63) and turning parking brake lever (64) on pivoting tray (65) to OFF position.



APPENDIX A: LOWERING DOLLY SET WITH OR WITHOUT SHELTER AND DETACHING FRONT AND REAR DOLLIES (Con't).

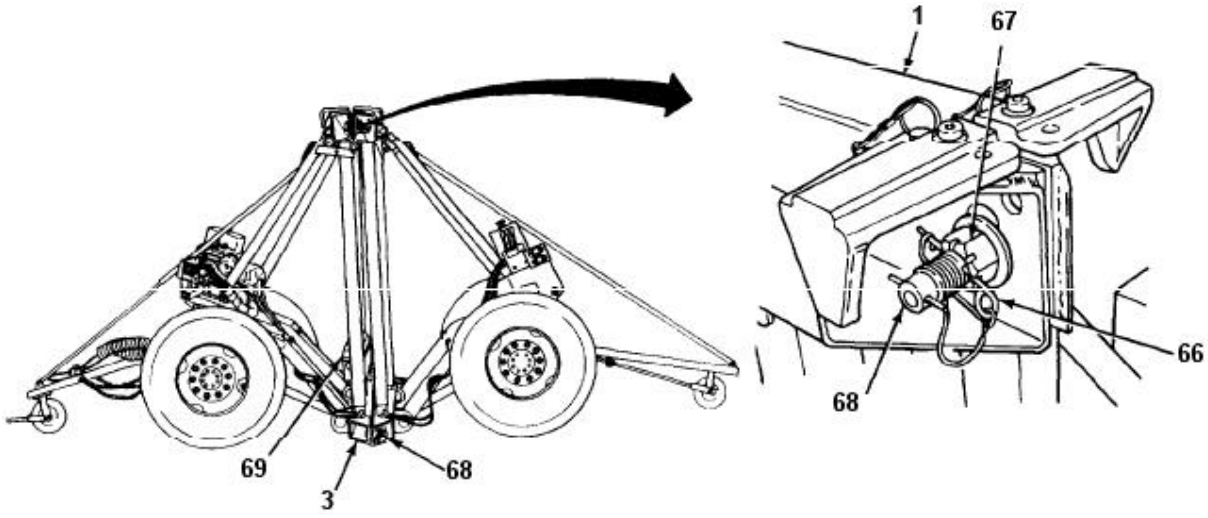
WARNING

- **Use extreme caution when removing twist locks. Keep hands and/or feet clear of top hooks, top and bottom beams, and from between beams and shelter. Failure to follow this warning may cause serious injury to personnel.**
- **Use extreme caution when loosening and removing twist locks. Loosened twist locks at top beam MUST be removed or they may fall, causing serious injury to personnel.**
- **Use extreme caution when using ladder. Have an assistant hold ladder to ensure that it is stable. Failure to follow this warning may cause serious injury to personnel.**

NOTE

- **If there is difficulty loosening twist lock nut or twist locks do not come out, it may be necessary to operate hydraulic control valve to slightly retract or extend each lift cylinder.**
- **If detaching dolly halves from each other, perform step l. Skip remaining steps in task.**
- **If detaching dolly halves from shelter, skip step n and perform steps o through s.**

n. At front and rear, remove safety pins (66). Use twist lock wrench (table 9a) to loosen nuts (67) at top beams (1). Rotate twist locks (68) 90° and remove from top beams. Repeat to remove from bottom beams (3). Stow twist locks in toolbox (69) on front dolly.

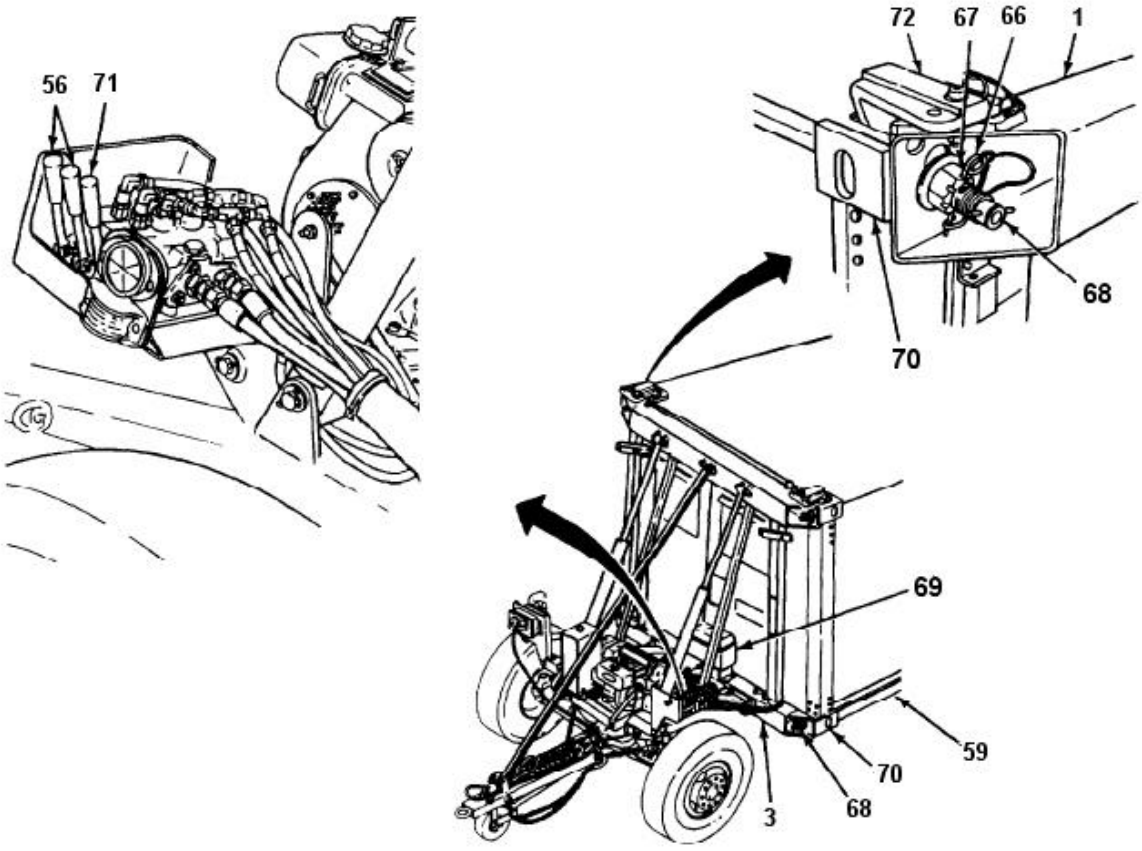


APPENDIX A: LOWERING DOLLY SET WITH OR WITHOUT SHELTER AND DETACHING FRONT AND REAR DOLLIES (Con't).

o. At front and rear, remove safety pins (66). Use twist lock wrench (table 9a) to loosen nuts (67) at top and bottom beams (1 and 3). Rotate twist locks (68) 90° and remove from top beams and shelter (59). Stow removed twist locks in toolbox (69) on front dolly.

p. At bottom beams (3) rotate twist locks (68) 90°. Pull out, but DO NOT remove twist locks. Ensure that heads of twist locks are aligned with holes in corner blocks (70) of shelter (59).

q. At front and rear, pull down on two lift cylinder levers (56) to extend lift cylinders. Stop when bottom beam (3) is approximately 6 in. (15 cm) from shelter (59) and twist locks (68) are free of corner blocks (70).



r. At front and rear, pull down on positioning cylinders lever (71) until bottom beam (3) rests on the ground.

s. At front and rear, briefly pull down on two lift cylinder levers (56) and then briefly pull down on positioning cylinders lever (71). Repeat as required until top hooks (34) are clear of corner blocks (70) at top of shelter (59).

APPENDIX B. MANEUVERING POSITION

a. Placing Dolly Half in Maneuvering Position.

WARNING

- **DO NOT operate control valve levers to put front or rear dolly in maneuvering position unless telescopic brace and front axle steering locking pin are installed. Telescopic brace and front axle steering locking pin must ALWAYS be installed before lift cylinders reach their vertical position. Failure to follow this warning may cause front or rear dolly to overturn, resulting in serious injury or death to personnel.**

CAUTION

- **Use extreme caution to ensure that near (left side) top beam vertical tube does not contact control valve and fittings and cause damage when placing dolly half in maneuvering position. Carefully follow all steps and monitor position of lift cylinders and pivoting tray to guard against binding and interference.**

NOTE

- **The maneuvering position is a three-wheel configuration. The dolly half's center of gravity is shifted over the axle, the top beam is resting over the drawbar, and the axle is level with the ground. In this position, the dolly half can be easily moved and positioned where required.**
- **Before proceeding, ensure that all stowed items such as rear drawbar, ladder, and intradolly air hoses and cable have been removed; air bags must be deflated; transportation lockouts have been secured to top beam vertical tubes with stowage straps; and toolbox has been closed.**
- **The following steps are performed at the front and/or rear dolly as required. Procedure begins with bottom beam resting on ground with top and bottom beams vertical and engines running at high idle.**

(1) Ensure that front axle steering locking pin (40) is installed to lock steering. Ensure that telescopic braces are installed.

(2) Pull down on positioning cylinders lever (71) to extend positioning cylinders (2) until telescopic brace (49) reaches rest pin (50).

(3) Quickly push up on positioning cylinders lever (71) to FLOAT position.

APPENDIX B. MANEUVERING POSITION (Con't).

CAUTION

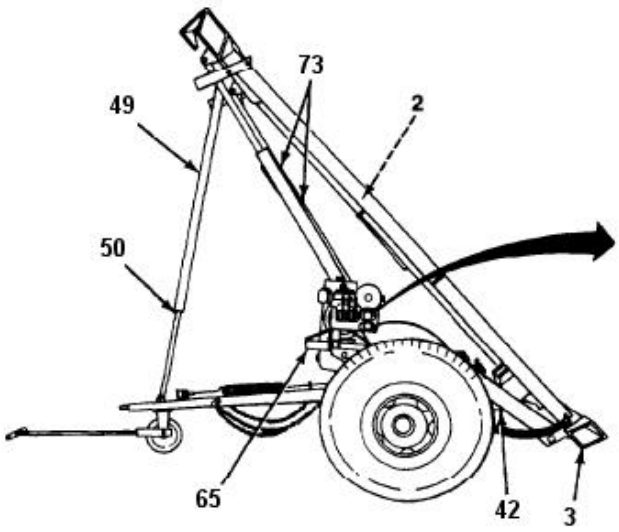
- **Proceed slowly and with caution to prevent equipment damage.**

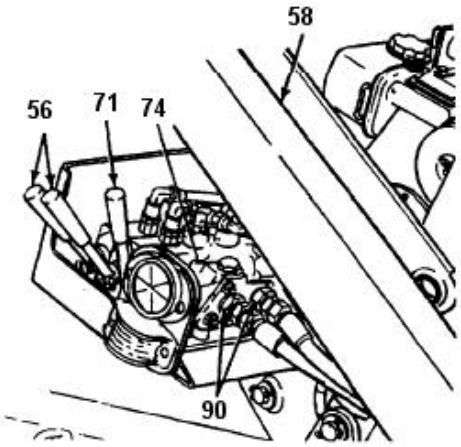
NOTE

- **If operating a dolly half equipped with side lift kit, extension of lift and positioning cylinders should stop when top beam vertical tubes have extended approximately 49 in. (124 cm) and positioning cylinder limit lines are just visible.**

(4) Pull down on two lift cylinder levers (56) to extend lift cylinders (73) and positioning cylinders (2). Stop when near (left side) top beam vertical tube (58) reaches within ½ in. (13 mm) of hydraulic control valve (74) and fittings (90).

(5) Continue to pull down on two lift cylinder levers (56), allowing near (left side) lift cylinder (73) to lead far (right side) lift cylinder. Maintain clearance of 1/8 in. (13 mm).





(6) If operating a dolly half equipped with side lift kit, return positioning cylinders lever (71) to NEUTRAL position.

(7) Continue to pull down on two lift cylinder levers (56) until bottom beam (3) is raised off the ground and axle (42) and pivoting tray (65) are parallel to the ground. Dolly half is now in maneuvering position.

WARNING

- **While in maneuvering position, DO NOT operate positioning cylinders lever. Failure to follow this warning may cause bottom beam to lower to the ground, causing serious injury to personnel**.

(8) Return positioning cylinders lever (71) to NEUTRAL position, as required.

APPENDIX B. MANEUVERING POSITION (Con't).

b. Removing Dolly Half From Maneuvering Position.

CAUTION

- **Use extreme caution to ensure that near (left side) top beam vertical tube does not contact control valve and fittings an cause damage when removing dolly half from maneuvering position. Carefully follow all steps and monitor position of lift cylinders and pivoting tray to guard against blinding and interference.**

NOTE

- **The following steps are performed at the front and/or rear dolly as required. When procedure has been completed, bottom beam will be resting on ground with top and bottom beams vertical.**

(1) Push up on two lift cylinder levers (56) to retract lift cylinders (73). Stop when near (left side) top beam vertical tube (58) reaches within ½ in. (13 mm) of hydraulic control valve (74) and fittings (90).

(2) Continue to push up on two lift cylinder levers (56), allowing far (right side) lift cylinder (73) to lead near (left side) lift cylinder. Maintain clearance of ½ in. (13 mm).

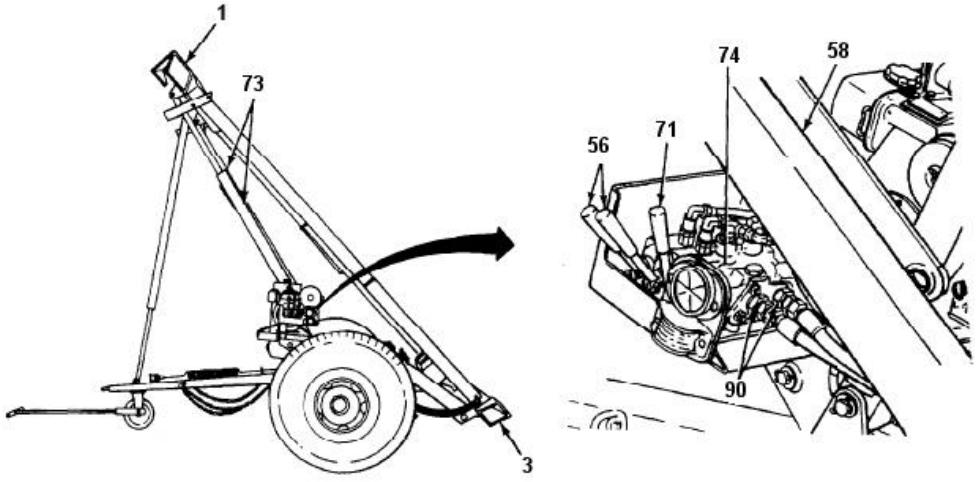
(3) Continue to push up on two lift cylinder levers (56) until bottom beam (3) rests on ground.

(4) Quickly push up on positioning cylinders lever (71) to FLOAT position.

(5) Push up on lift cylinder levers (56) to retract lift cylinders (73) until approximately 6 in. (15 cm) of stroke remain on lift cylinders.

(6) Return positioning cylinders lever (71) to NEUTRAL position.

(7) Push up on positioning cylinders lever (71) until top and bottom beams (1 and 3) are vertical.



APPENDIX C: TOP AND BOTTOM BEAM AND HYDRAULIC LIFT CYLINDER REMOVAL / INSTALLATION

a. REMOVAL

WARNING

- **DO NOT disconnect hydraulic lines and fittings while engine is running or before hydraulic system pressure has been released. When engine is running, hydraulic system is under pressure. Dolly set must be fully lowered on to the blocks and the engine must be shut down before lines and fittings are disconnected. A line or fitting disconnected under pressure will explode with great force and cause serious injury or death to personnel.**

- **Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury to personnel. Relieve pressure before disconnecting hydraulic lines and fittings. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles that eject hydraulic fluid under high pressure. Use a piece of cardboard or paper to search for leaks. If any hydraulic fluid is injected into the skin, it MUST be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.**

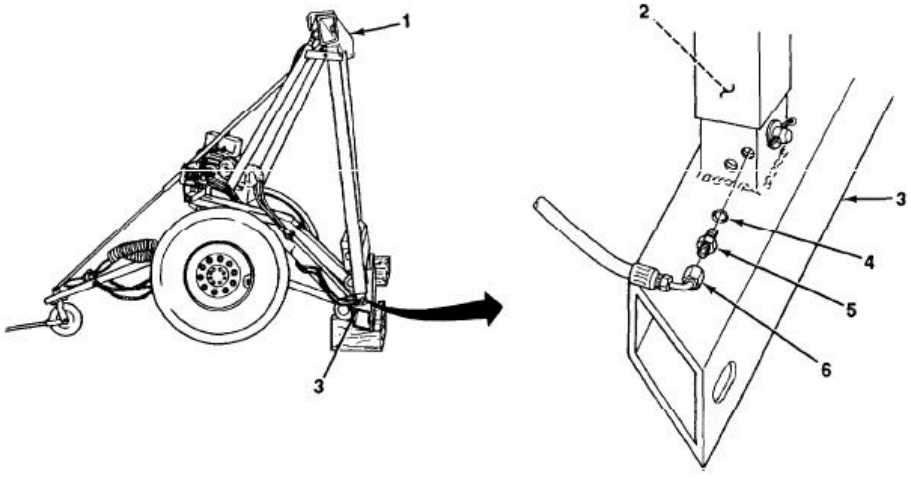
NOTE

- **Procedures are the same for front and rear dollies. Rear dolly is illustrated.**

1. Disconnect two hose assemblies (6) from straight connectors (5) at positioning cylinders (2) inside bottom beam (3).

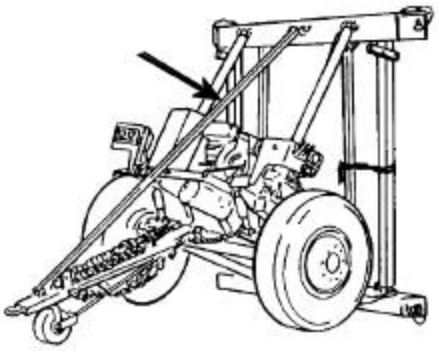
2. Remove two straight connectors (5) and preformed packings (4) from positioning cylinders (2). Discard preformed packings.

3. Attach a suitable lifting device to top beam (1) and adjust so that weight of top beam is on the lifting device.



APPENDIX C: TOP AND BOTTOM BEAM AND HYDRAULIC LIFT CYLINDER REMOVAL / INSTALLATION (Con't).

4. Remove telescopic brace.



WARNING

- **Use extreme caution when handling heavy parts. Lifting device is required when parts weight over 50 lb (23 kg) for a single person lift, over 100 lb (45 kg) for a two person lift, and over 150 lb (63 kg) for a three or more person lift. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause serious injury or death to personnel.**

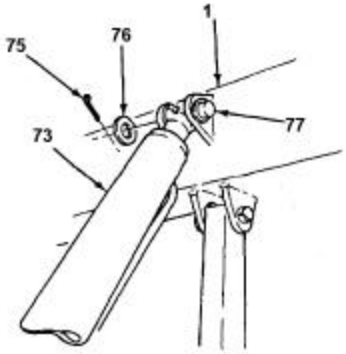
- **DO NOT attempt to replace both lift cylinders at the same time unless dolly halves are attached to each other or top beam is supported by a suitable lifting device. If top beam is not supported, it will fall to the ground. Failure to follow this warning will cause serious injury or death to personnel.**

5. Support lift cylinder (73) with a suitable lifting device.

6. Remove cotter pin (75), flatwasher (76), and clevis pin (77) from hydraulic lift cylinder (73) and top beam (1). Discard cotter pin.

NOTE

- **DO NOT disconnect hydraulic lift cylinder lower connections from suspension link.**

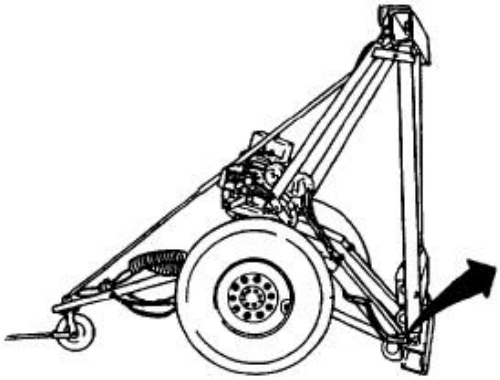


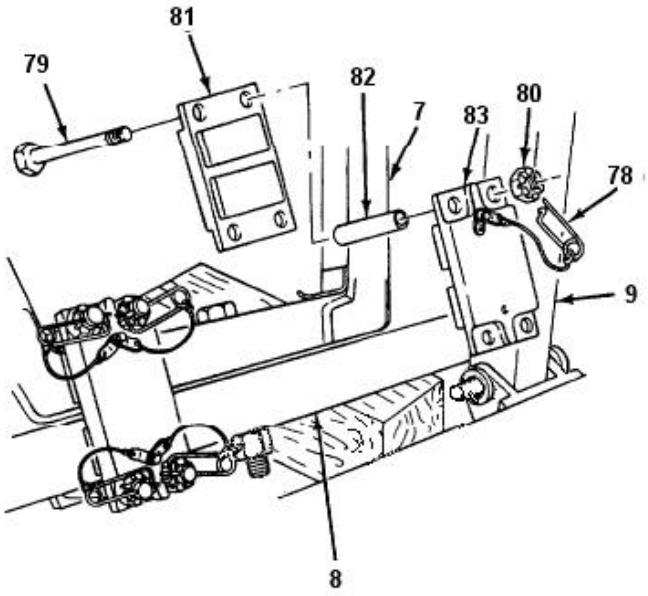
7. Swing cylinder down and support utilizing rubber vehicle chocks, NSN 2540-01-052-6234, P/N MS 52127-2 or equivalent, between cylinder and dolly suspension structure.

APPENDIX C: TOP AND BOTTOM BEAM AND HYDRAULIC LIFT CYLINDER REMOVAL / INSTALLATION (Con't).

8. Remove eight safety pins (78) from bolts (79).

9. Remove four nuts (80), bolts (79), bottom lockout bracket (81), four sleeves (82), and top lockout bracket (83) from each end of pivot axle bracket (8) and axle assembly (7).





APPENDIX C: TOP AND BOTTOM BEAM AND HYDRAULIC LIFT CYLINDER REMOVAL / INSTALLATION (Con't).

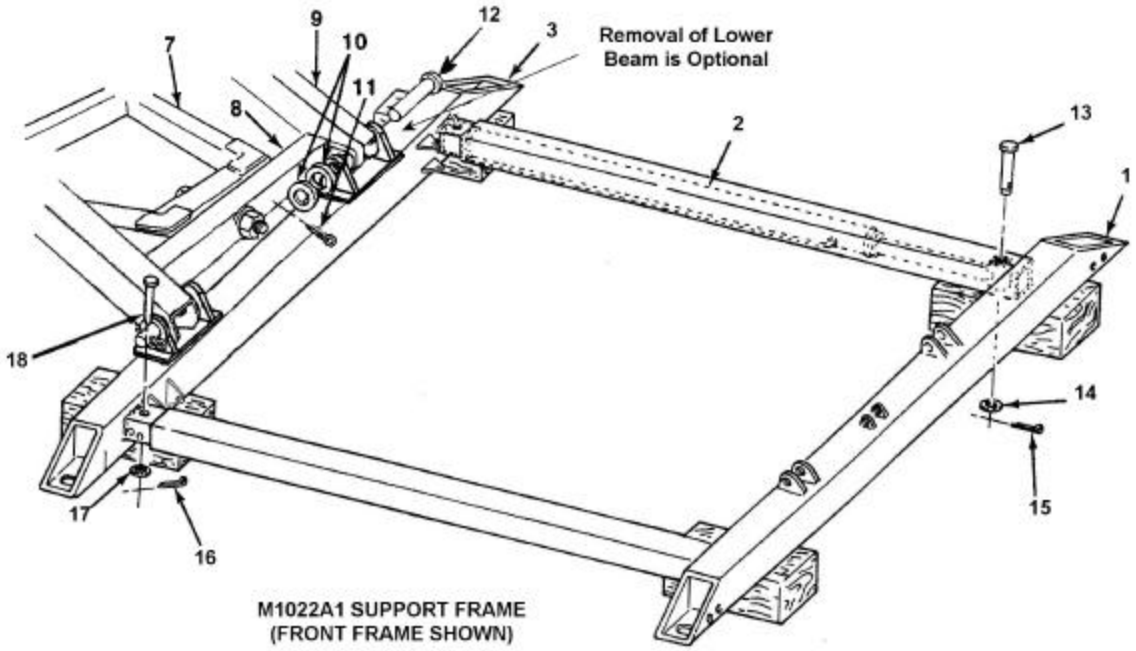
WARNING

- **Use extreme caution when lowering top and bottom beams and placing on the ground. Ensure that lifting device is secure and all personnel stand clear. Failure to follow this warning may cause serious injury to personnel or damage to beams and positioning cylinders.**

10. Remove two cotter pins (15), flatwashers (14), and clevis pins (13) from positioning cylinders (2) and top beam (1). Discard cotter pins.

11. Lower top and bottom beams (1 and 3) to the ground and support on wooden blocks or other cribbing.

12. With top beam (1) suitably supported, remove top beam with telescoping vertical tubes from positioning cylinders (2) and bottom beam (3). Keep top beam with telescoping tubes and bottom beam supported on wooden blocks.



M1022A1 SUPPORT FRAME
(FRONT FRAME SHOWN)

APPENDIX C: TOP AND BOTTOM BEAM AND HYDRAULIC LIFT CYLINDER REMOVAL / INSTALLATION (Con't).

13. Remove two cotter pins (16) flatwashers (17) and clevis pins (18) from positioning cylinders (2) and bottom beam (3). Discard cotter pins.

14. Remove two positioning cylinders (2) from bottom beam (3). Place positioning cylinders on a clean work surface.

15. Place a wooden block or other suitable support under axle assembly (7) and pivot axle bracket (8).

16. Remove hanger brackets (front dolly). Set aside for installation to modified structure.

17. Remove data plates (front dolly). Set aside for installation to modified structure.

b. CLEANING AND INSPECTION

- **Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100° F - 138° F (38° C - 59° C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and seek medical attention.**

1. Clean top and bottom beam mounting hardware and straight connectors with dry cleaning solvent and dry with clean rags.

2. Clean top and bottom beams as required to remove any grease, dirt, or mud.

3. Inspect all components for cracks, breaks, bends, corrosion or damaged threads. Replace damaged components.

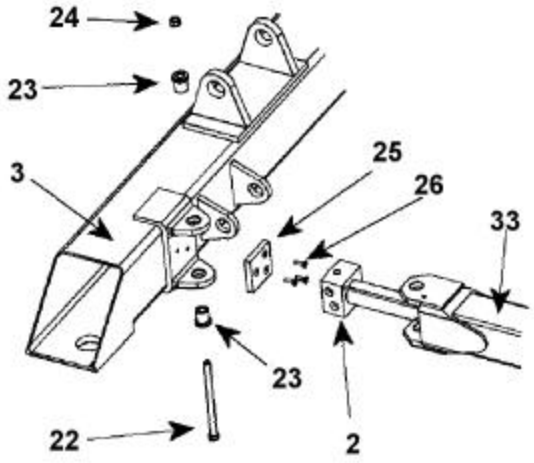
APPENDIX C: TOP AND BOTTOM BEAM AND HYDRAULIC LIFT CYLINDER REMOVAL / INSTALLATION (Con't).

c. INSTALLATION

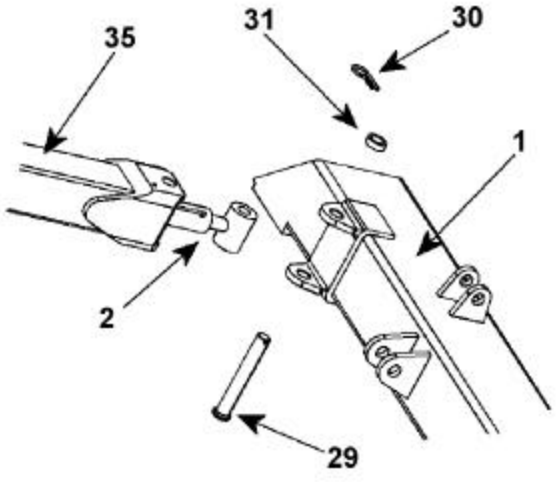
NOTE

- **Ensure that hole at rod end positioning cylinder is aligned with hole in top beam.**
- **To ensure proper assembly install items (29), (30), (31) as illustrated below.**
- **Ensure that openings for fittings in positioning cylinders are aligned with holes in bottom.**
- **To ensure proper assembly install items (22), (23), (24) as illustrated below.**

1. Install two fully collapsed positioning cylinders (2) inside telescoping vertical tube (33 &35).
2. Install two clevis pins (29), spacer (31), and new cotter pins (30) on positioning cylinders (2) and top beam (1).
3. Mount spacer plates (25) to bottom beam (3) using flat head screws (26).
4. With top and bottom beams (1 and 3) fully supported, install two positioning cylinders (2) on bottom beam (3).
5. Install two bolts (22), bushings (23), and new locknuts (24) on positioning cylinders (2) and bottom beam (3).



LOWER POSITIONING TUBE CONNECTION



UPPER POSITIONING TUBE CONNECTION

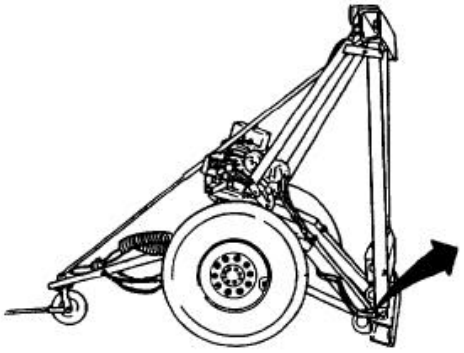
APPENDIX C: TOP AND BOTTOM BEAM AND HYDRAULIC LIFT CYLINDER REMOVAL / INSTALLATION (Con't).

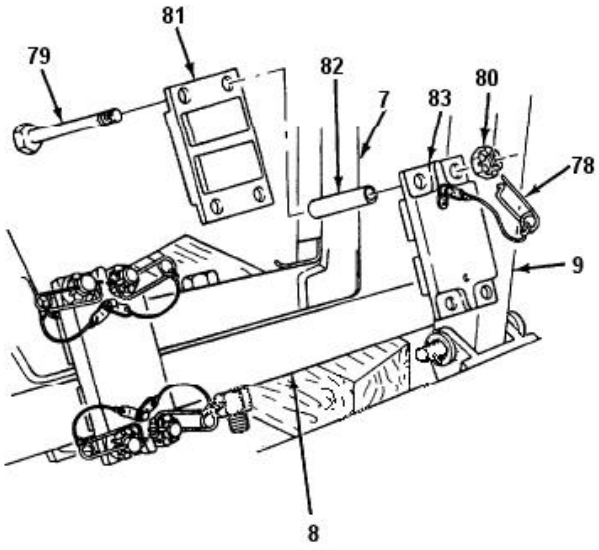
WARNING

- **Use extreme caution when raising top and bottom beams. Ensure that lifting device is secure and all personnel stand clear. Failure to follow warning may cause serious injury to personnel or damage to beams and positioning cylinders.**

5. Raise top and bottom beams (1 and 3) with positioning cylinders (2). Support beams in vertical position.

6. Coat four bolts (79) with grease. Install top lockout bracket (83), four sleeves (82), bottom lockout bracket (81), four bolts and nuts (80) on each end of pivot axle assembly (8) and axle assembly (7). Hand tighten nuts, then tighten with wrench 1 ¼ to 2 flats. Install eight safety pins (78) on bolts (79).



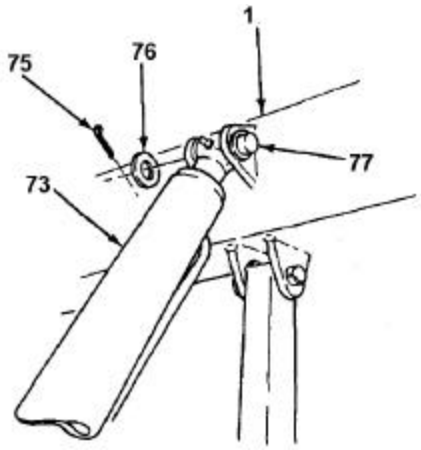


7. Support hydraulic lift cylinder (73) with a suitable lifting device.

8. Install hydraulic lift cylinder (73) on top beam (1) with clevis pin (77), flatwasher (76), and new cotter pin (75).

9. Remove lifting device from hydraulic cylinder (73).

10. Install telescopic brace.



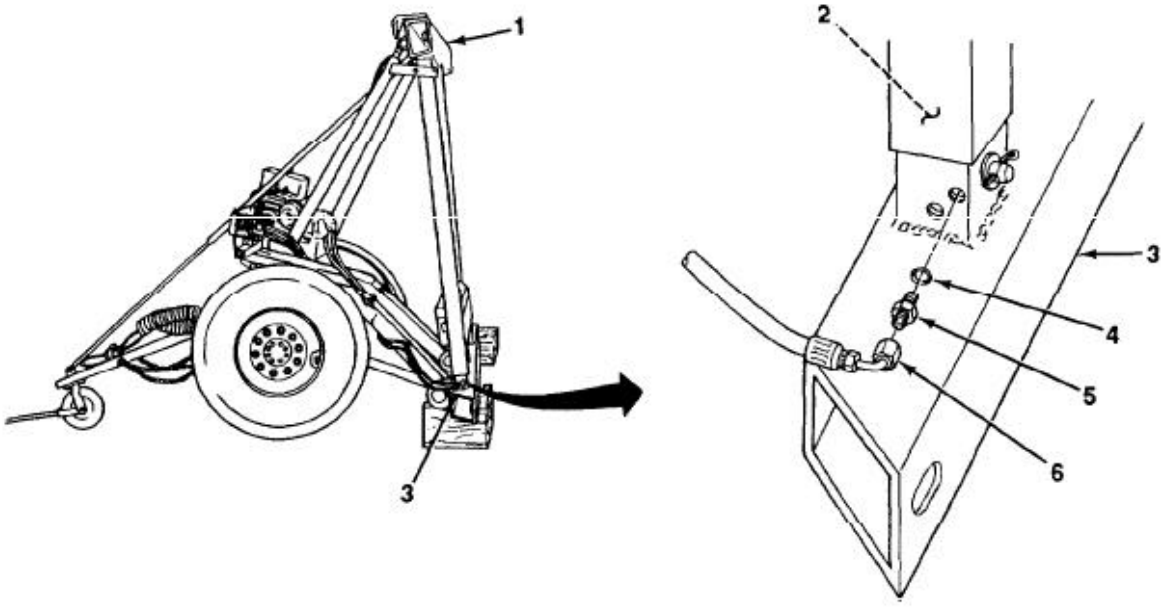
APPENDIX C: TOP AND BOTTOM BEAM AND HYDRAULIC LIFT CYLINDER REMOVAL / INSTALLATION (Con't).

NOTE

- **Preformed packings should be lightly coated with hydraulic fluid before installation.**

11. Install two new preformed packings (4) and straight connectors (5) on positioning cylinders (2) inside bottom beam (3).

12. Connect two hose assemblies (6) to straight connectors (5) at positioning cylinders (2).



Follow-on Tasks:

- Install toolbox (front dolly).
- Bleed hydraulic system. (See Appendix D).
- Check for leaks.
- Remove wooden blocks from ends of bottom beam.
- Ensure proper air inflation in air bags.

APPENDIX D: HYDRAULIC SYSTEM BLEEDING

This Task Covers: Bleeding

Initial Setup:

Equipment Conditions:

- Front and rear dollies lowered and detached

Tools/Test Equipment:

- Suitable lifting device, 5000 lb capacity minimum.

Materials/Parts:

- Hydraulic fluid (MIL-H-5606)
- Rags

WARNING

- **Top beams of front and rear dollies must be secured with a suitable lifting device throughout entire bleeding procedure if bleeding hydraulic system of a dolly set with side lift kit when ONLY side lift positioning cylinders were replaced. Top and bottom beams must also be kept vertical. Until bleeding is complete, air in the hydraulic system may cause erratic movement when extending and retracting hydraulic cylinders. Failure to support top beams and to keep tops and bottoms beams vertical may cause an accident resulting in serious injury or death to personnel.**

CAUTION

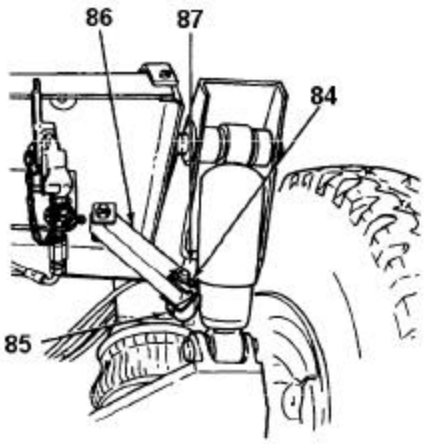
- **DO NOT allow dirt or dust to enter hydraulic reservoir. Damage to hydraulic system will result.**

NOTE

- **This procedure is used to bleed the hydraulic system of a dolly half without side lift kit OR a dolly set with side lift kit when only side lift positioning cylinders were replaced.**

BLEEDING

1. Remove safety pin (84) and hitch pin (85) and unlock pivoting tray lockout brace (86) from lower bracket (87).



APPENDIX D: HYDRAULIC SYSTEM BLEEDING (Con't).

NOTE

- **If bleeding hydraulic system of a dolly set with side lift kit, when ONLY side lift positioning cylinders were replaced, top beams must be supported by a suitable lifting device capable of raising 16 ft (4.9 m) above the floor. A sling with minimum capacity of 5000 lb (2270 kg) must be used.**

2. Support top beam (1) with a lifting device as required.

3. Start engine.

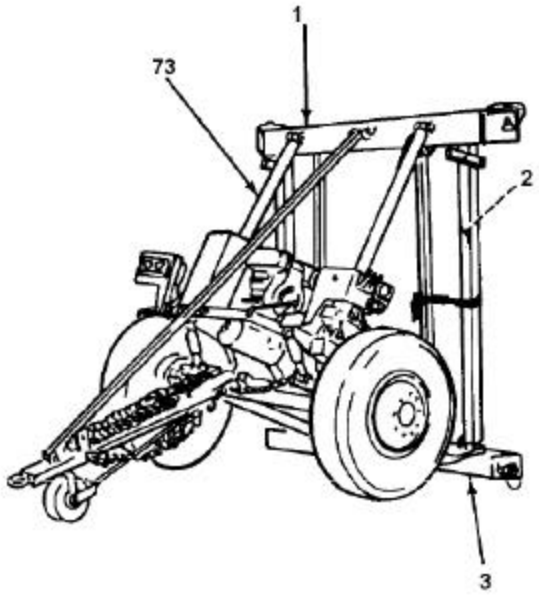
4. Fill hydraulic reservoir.

NOTE

- **During extension, maintain slack in hoist sling as top beam is raised.**

5. Operate hydraulic control valve to extend lift cylinders (73) and positioning cylinders (2) in turn. Keep top and bottom beams (1 and 3) vertical as cylinders are extended.

6. When full extension is reached, hold lift cylinder levers (56) and positioning cylinders lever (71) in extend position for 30 seconds.

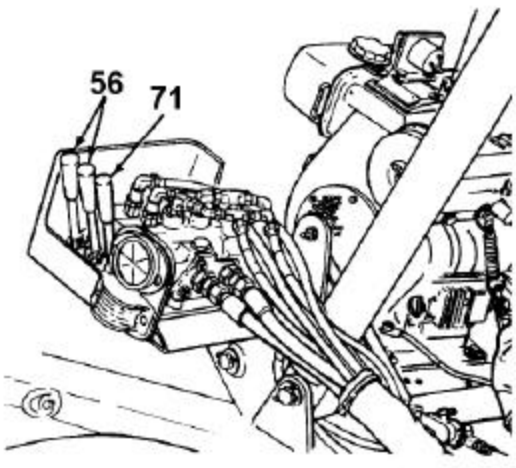


NOTE

- **During retraction, maintain slack in hoist sling as top beam is lowered.**

7. Operate hydraulic control valve to retract lift cylinders (73) and positioning cylinders (2) in turn. Keep top and bottom beams (1 and 3) vertical as cylinders are retracted.

8. When full retraction is reached, hold lift cylinder levers (56) and positioning cylinders lever (71) in retract position for 30 seconds.



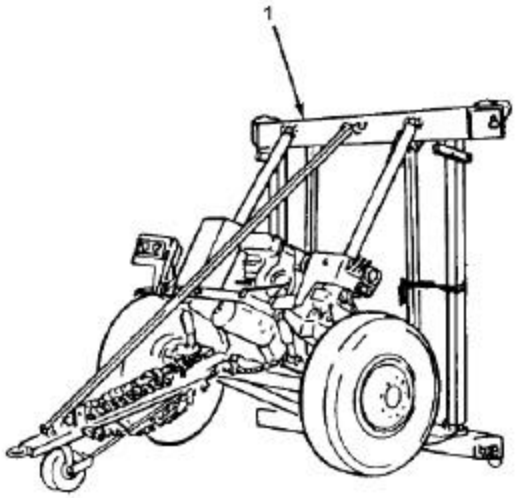
APPENDIX D: HYDRAULIC SYSTEM BLEEDING (Con't).

9. Shut down engine.

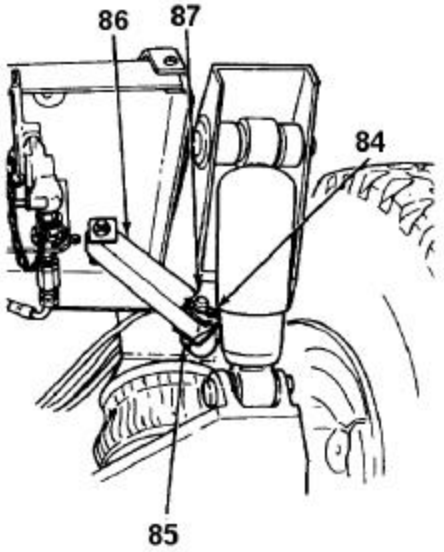
10. Check hydraulic fluid level and fill as required.

11. Repeat steps 5 through 8 two more times or until operation of hydraulic system is smooth.

12. Remove support from top beam (1) as required.



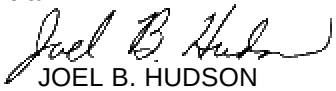
13. Install hitch pin (85) and safety pin (84) and lock pivoting tray lockout brace (86) on lower bracket (87).



By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army

0218401

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 391037, requirements for MWO 9-2330-390-35-1.

PIN: 080069-000