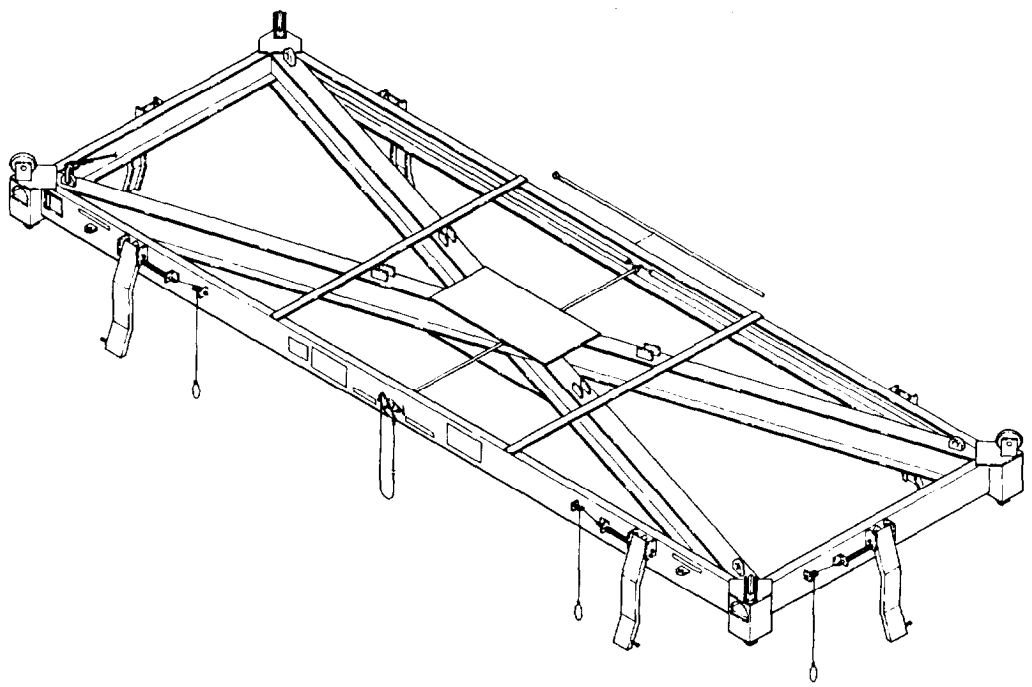
TM 10-3990-205-12&P

TECHNICAL MANUAL

OPERATOR'S, UNIT MAINTENANCE MANUAL
AND
REPAIR PARTS AND SPECIAL TOOLS LIST



SPREADER, LIFTING,
ISO AND INTERMODAL FREIGHT CONTAINERS;
TYPE II, TOP LIFT, SEMIAUTOMATIC TLS
MODEL 214LS20 NSN 3990-01-258-2010
MODEL 215LS40 NSN 3990-01-258-2011

HEADQUARTERS, DEPARTMENT OF THE ARMY

15 DECEMBER 1988

Change

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *23* October 1991

OPERATOR'S, UNIT MAINTENANCE MANUAL
AND
REPAIR PARTS AND SPECIAL TOOLS LIST

SPREADER, LIFTING,
IS0 AND INTERMODAL FREIGHT CONTAINERS;
TYPE II, TOP LIFT, SEMI AUTOMATIC TLS
MODEL 214LS20 NSN 3990-01-258-2010
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Current as of 3 December 1990

TM 10-3990-205-12&P, 15 December 1988, is changed as follows:

1. Remove old pages and insert new pages.
2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
i and ii	*i* and *ii*
1-1 and 1-2	*1-1 and 1-2*
3-13 and 3-14	*3-13 and 3-14*
3-79 and 3-20	*3-19 and 3-20*
A-1 (A-2 *blank)*	*A-1 /(A-2 Blank)*
(Appendix F) i (page ii blank)	*(Appendix F) i/(ii Blank)*
F-1 through 1-5	*F-1 through 1-5*

3. File this change sheet in front of the publication for reference purposes.

Approved for public release; distribution is unlimited.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, *United States Army*
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
00044

Distribution:

To be distributed in accordance with DA Form 12-25-E (Block 3605) Operator, Unit, maintenance requirements for TM10-3990-205-12&P.

Denotes a serious hazard that could cause injury or death to personnel from a peculiar action or condition.

Denotes a less serious hazard from an action or condition that could cause damage to the spreader frames or other equipment.

Personnel in the immediate vicinity and personnel participating in operation of the spreader must be continuously alert to the inherent dangers associated with handling freight containers. The containers are heavy and cumbersome. Personnel on the ground cannot depend on the hoisting equipment operator to be responsible for their safety. The containers are usually stacked in close proximity, therefore, the possibility of being crushed by a swaying container is always present. Failure to exercise adequate safety precautions can result in serious injury or death.

Dry cleaning solvent P-D-680 (SD2) is toxic and flammable. Wear protective goggles, face shield, and gloves and use only in well ventilated area. Avoid contact with skin. eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with skin or clothing is made, flush with water. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

WARNING

PRIOR TO MAKING LIFT, ENSURE ALL TWIST LOCKS ARE SECURELY LOCKED INTO CONTAINER.

WARNING

Do not get under the suspended spreader while performing the following procedures.

WARNING

Do not operate the spreader in a thunderstorm. Gusty winds, heavy precipitation, and lightning, create a hazardous situation for lifting and transporting containers.

WARNING

The spreader shall be firmly supported on timbers or blocks to prevent possible injury to personnel.

WARNING

The spring (7) is under pressure. Be aware and exercise care while performing the following procedure. Wear eye protection during removal of spring.

CAUTION

Do not set the spreader on the twist locks for transporting.

CAUTION

The coupling receptacles on the freight containers must also be checked, and any ice formation removed.

CAUTION

The coupling receptacles on the freight containers must be checked, and snow accumulations removed.

CAUTION

When spreader is not attached to a container, it must be stored on blocks or timbers to prevent twist locks from contacting the ground. Twist locks have machined surfaces and are made of hardened steel, but damage may occur by contact with hard surfaces.

CAUTION

If the spreader is being stored outside, do not let the control cables or sling assemblies rest on the ground.

Technical Manual

No. TM 10-3990-205-12&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 15 DECEMBER 1988

OPERATOR'S, UNIT MAINTENANCE MANUAL
AND
REPAIR PARTS AND SPECIAL TOOLS LIST

SPREADER, LIFTING, ISO AND INTERMODAL FREIGHT CONTAINERS; TYPE II, TOP LIFT, SEMIAUTOMATIC TLS MODEL 214LS20 NSN 3990-01-258-2010 MODEL 215LS40 NSN 3990-01-258-2011

APPROVED FOR PUBLIC RELEASE;DISTRIBUTION IS UNLIMITED

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren MI 48397-5000. A reply will be furnished to you.

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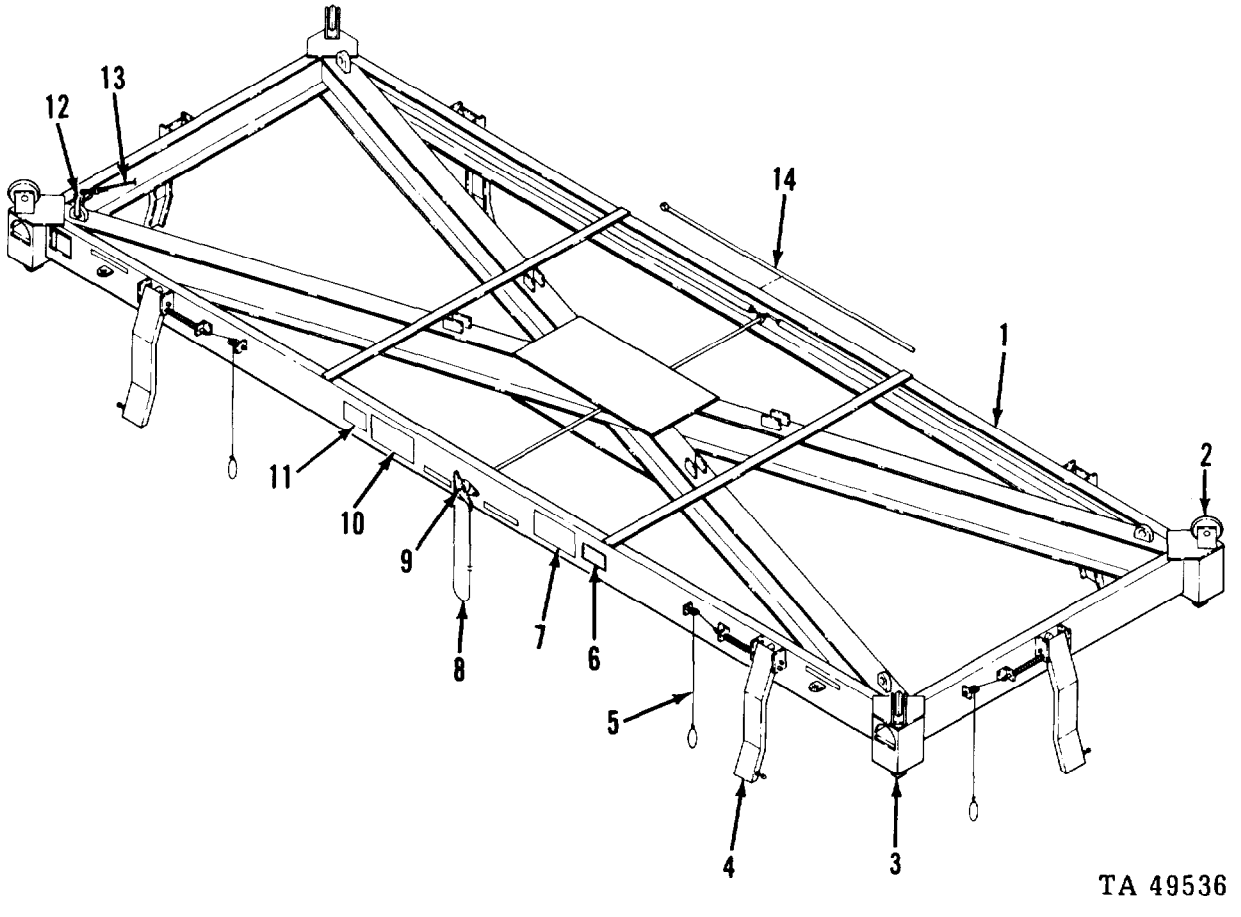
CHAPTER 1

INTRODUCTION

Section I. GENERAL, INFORMATION



1. SPREADER BAR
2. GUIDE WHEEL
3. TWIST LOCK COUPLER
4. ALIGNMENT ARM
5. ALIGNMENT ARM RELEASE CABLE
6. CAUTION PLATE
7. INSTRUCTION/CAUTION PLATE
8. TWIST LOCK CAM ACTUATING CABLE
9. TWIST LOCK ACTUATING CAM
10. INSTRUCTION PLATE
11. IDENTIFICATION PLATE
12. ANCHOR SHACKLE
13. WIRE ROPE ASSEMBLY
14. ALIGNMENT ARM POSITIONING ROD

Figure 1-1. Spreader, Lifting, IS0 and Intermodal Freight Containers; Type II, Top Lift, Semi Automatic TLS, Model 214LS20 or 215LS40

1-1 SCOPE

Type of Manual: Operator's, Unit Maintenance Manual and Repair Parts and Special Tools List.

Model Number and equipment Name:
214LS20 - Spreader, Lifting, IS0 and Intermodal Freight Containers: Type II, Top Lift TLS (20 foot spreader).
215LS40 - Spreader, Lifting, IS0 and Intermodal Freight Containers: Type II, Top Lift TLS (40 foot spreader).

Purpose of Equipment: The spreaders are designed to couple to intermodal freight containers, lift and transport the containers between highway semitrailers, railroad cars, oceangoing ships and storage areas.

1-2 MAINTENANCE FORMS AND RECORDS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750. The Army Maintenance Management System (TAMMS).

1-3 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your spreader bar needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about the design. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MP, Warren, MI 48397-5000.

1-4 DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Demolition of materie1 to prevent enemy use will be in accordance with the requirements of TM 750-244-6, Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use.

1-5 PREPARATION FOR STORAGE OR SHIPMENT

Preparation for storage or shipment is covered in Section IV, paragraphs 3-10 and 3-11.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-6 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

a. Description. The spreader bars are of rugged construction, and are designed for operation over a long period of time. The spreaders (both 20 foot and 40 foot) are equipped with an alignment arm on each end, and two on each side, for ease of positioning the spreader on a container. A cam locking device is installed to prevent the twist lock couplers from moving out of the locked position while a container is being lifted and transported.

b. Capabilities and Features. The spreaders have a wire rope hoist bridle assembly, a rigid frame, and four twist lock freight container couplings. The spreaders are compatible for use with dockside hoists and cranes, crawler cranes, truck cranes, or container handling vehicles.

1-7 EQUIPMENT DATA

a. 20 Foot Spreader

Dimensions (approximate)	Length 20 feet (6.09m) Width 8 feet (2.44m) Height 17 inches (43.18cm)
Payload, minimum (container and contents)	44,800 pounds (20.3MT)
Model Number	214LS20
Operating Temperatures	-25°F to +120°F (-31°C to +480°C)

b. 40 Foot Spreader

Dimensions (approximate)	Length 40 feet (12.19m) Width 8 feet (2.44m) Height 17 inches (43.18cm)
Payload, minimum (container and contents)	67,200 pounds (31.5MT)
Mode1 Number	215LS40
Operating Temperatures	-25°F to +120°F (-31°C to +48°C)

1-8 DIFFERENCE BETWEEN MODELS

The only difference between the Model 214LS20 Spreader and the Model 215LS40 Spreader is in the physical structure of the spreaders. One is designed to handle intermodal freight containers 8 feet wide and 20 feet long. The other spreader is designed to handle containers 8 feet wide and 40 feet long. The mechanical mechanisms for operation of the spreaders are identical.

1-9 SAFETY, CARE, AND HANDLING

WARNING

Personnel in the immediate vicinity and personnel participating in operation of the spreader must be continuously alert to the inherent dangers associated with handling freight containers. The containers are heavy and cumbersome. Personnel on the ground cannot depend on the hoisting equipment operator to be responsible for their safety. The containers are usually stacked in close proximity, therefore, the possibility of being crushed by a swaying container is always present. Failure to exercise adequate safety precautions can result in serious injury or death.

1-10 LOCATION AND DESCRIPTION OF SPREADER **COMPONENTS**

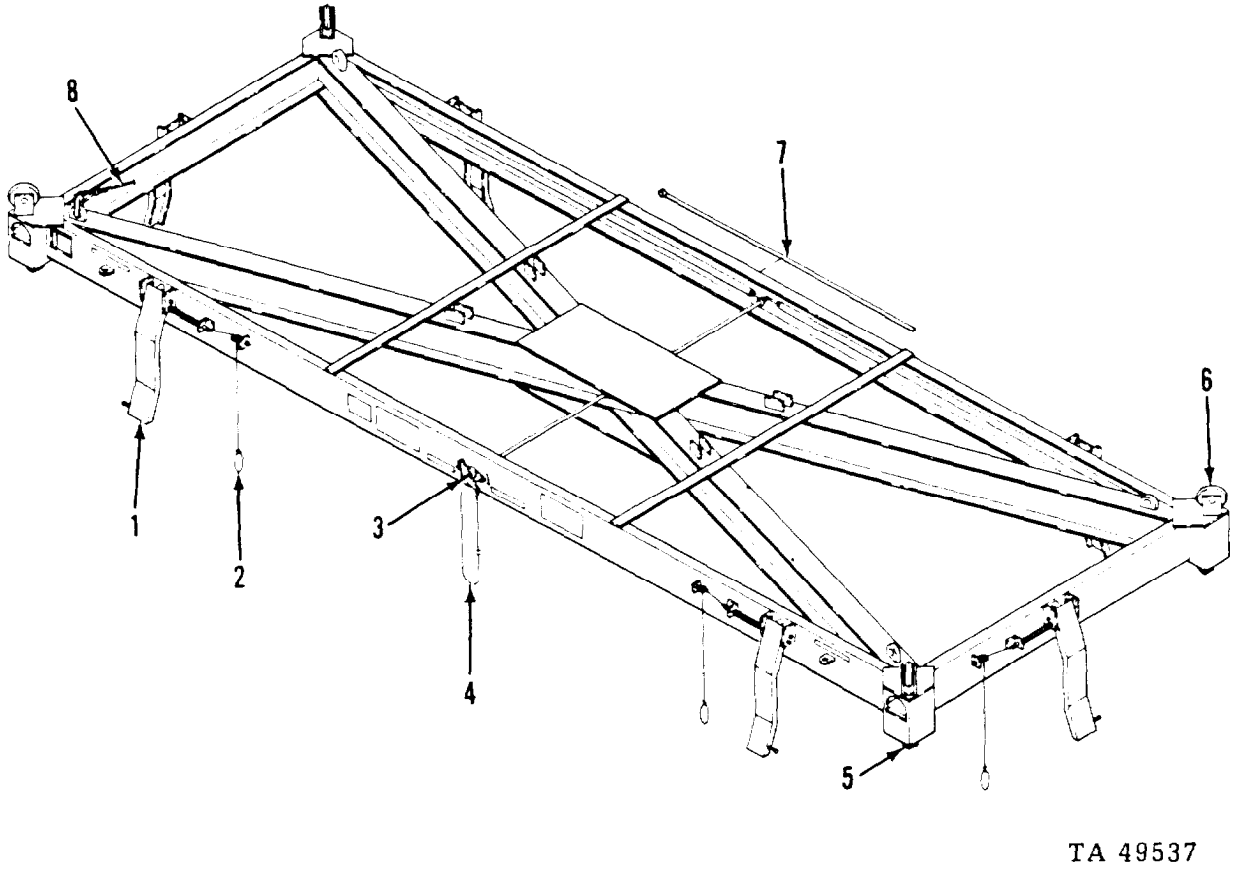


Figure 1-2. Location of Major Components

ALIGNMENT ARM (1). When in the down position, assists the hoisting equipment operator in positioning the spreader on the freight container.

ALIGNMENT ARM RELEASE CABLE (2). Pulling the cable pulls the spring pin out of the alignment arm allowing the alignment arm to be moved to either the up or down position.

TWIST LOCK ACTUATING CAM (3). Rotates in either direction, exerting a force on the control rods to move the four twist locks to the locked or unlocked position.

TWIST LOCK CAM ACTUATING CABLE (4). Pulling the cable in one direction rotates the four twist locks to the locked position. Pulling the cable in the opposite direction rotates the four twist locks to the unlocked position.

TWIST LOCK COUPLER (5). The spreader is equipped with a twist lock at each of the four corners. When the twist locks are parallel to the side members of the spreader frame they are in the unlocked position. When the spreader is in position on a freight container.

and the twist locks are rotated 90 degrees to the locked position, the spreader is coupled to the freight container.

GUIDE WHEEL (6). The spreader is equipped with a guide wheel at each of the four corners. The guide wheels are positioned on the spreader for proper engagement of the spreader to the cell guides of a ship's container cell when freight containers are being loaded aboard, or removed from, a ship.

ALIGNMENT ARM POSITIONING ROD (7). When the spring pin is pulled out of the alignment arm, the positioning rod is used to move the alignment arms from either the up or down position to the opposite position. The eyebolt on the end of the rod is placed over a capscrew, installed near the end of each alignment arm, to facilitate movement of the alignment arms.

WIRE ROPE ASSEMBLY (8). A wire rope assembly is connected to the anchor shackles at each of the four corners of the spreader, The opposite ends of the wire rope assemblies are attached to the hoisting equipment, and provide a means of lifting and transporting the spreader singly or when it is coupled to a freight container.

Section III. TECHNICAL PRINCIPLES OF OPERATION

1-11 PRINCIPLES OF OPERATION

The IS0 and Intermodal Freight Container Lifting Spreaders, Model 214LS20 and Model 215LS40, are designed for lifting and transporting 20 and 40 foot freight containers. The spreaders have an alignment arm on each end and two on each side, to assist the hoisting equipment operator in positioning the spreader on a freight container. The alignment arms are secured in both the up and down positions by a spring pin. Once the spreader is in position on the container, a cable operated twist locking cam is actuated manually to rotate the four twist locks to the locked position. One of the twist locks has a cam locking rod that prevents the twist locks from moving out of the locked position while the container is being lifted and transported. If the container is to be loaded aboard ship, all of the alignment arms must be raised to the up position. The spring pin for each alignment arm is pulled to the released position by a manually operated cable, and the alignment arm positioning rod is used to raise the alignment arms to the up position. The alignment arms are held securely in the up position by the spring pins. A guide wheel is mounted on each of the four corners of the spreader, to keep the spreader in alignment as it is being lowered into the container cell on a ship. When the container is at rest in the desired location, the twist locking cam is actuated by pulling the cable in the opposite direction. This moves the twist locks to the unlocked position. The alignment arms are moved to the down position to prepare the spreader to be coupled to the next freight container. Only three alignment arms are required for use at one time. Two alignment arms on one side and one on one end is sufficient for aligning the spreader on a container. However, the choice of which and how many alignment arms to be moved to the down position rests with the hoisting equipment operator.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1 OPERATOR'S CONTROLS AND INDICATORS

The controls and indicators for operation of the IS0 and Intermodal Freight Container Lifting Spreaders are shown in Figure 2-1, and their function explained in Table 2-1.

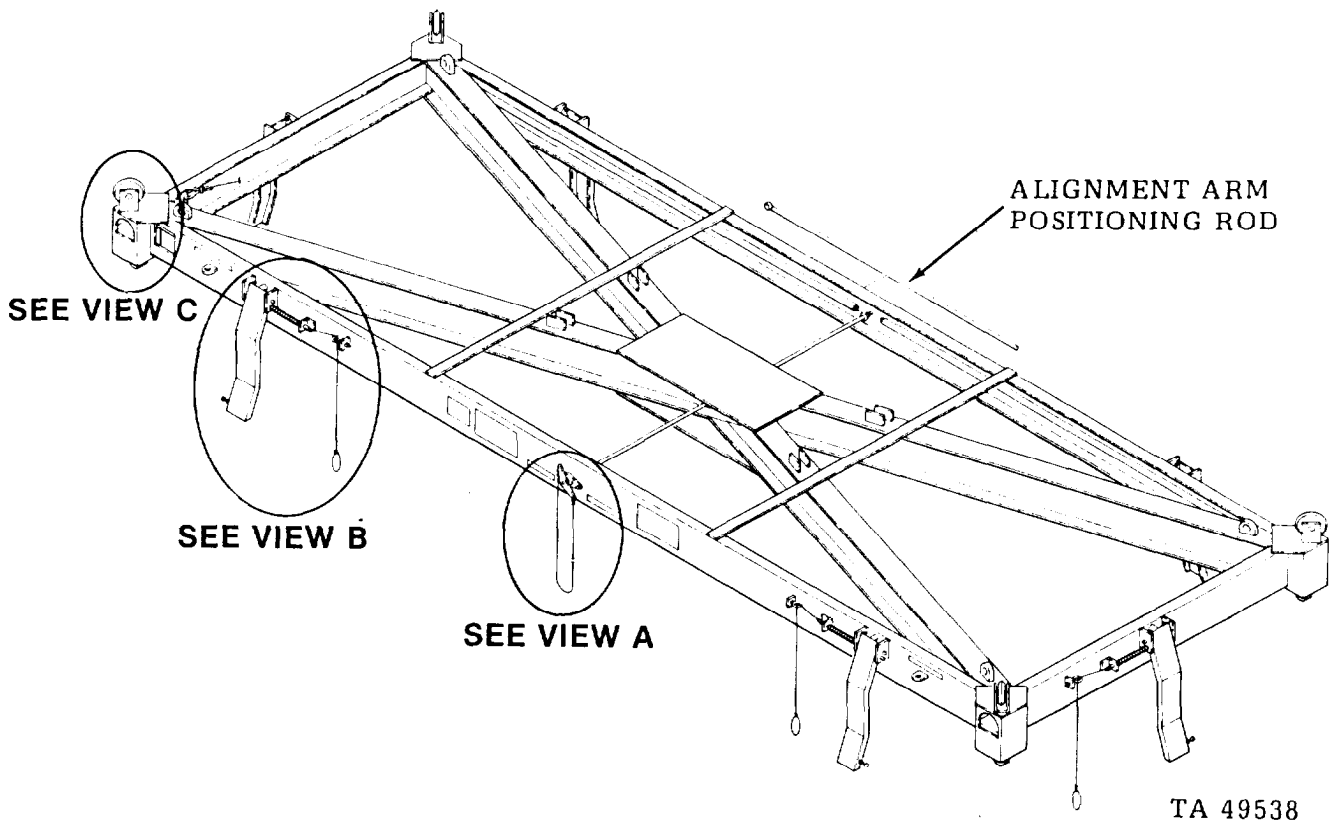


Figure 2-1. Operator's Controls and Indicators

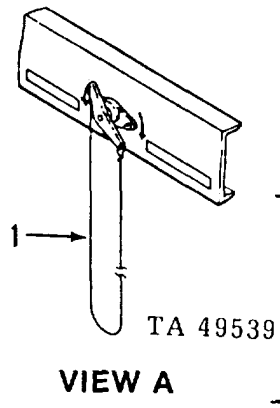
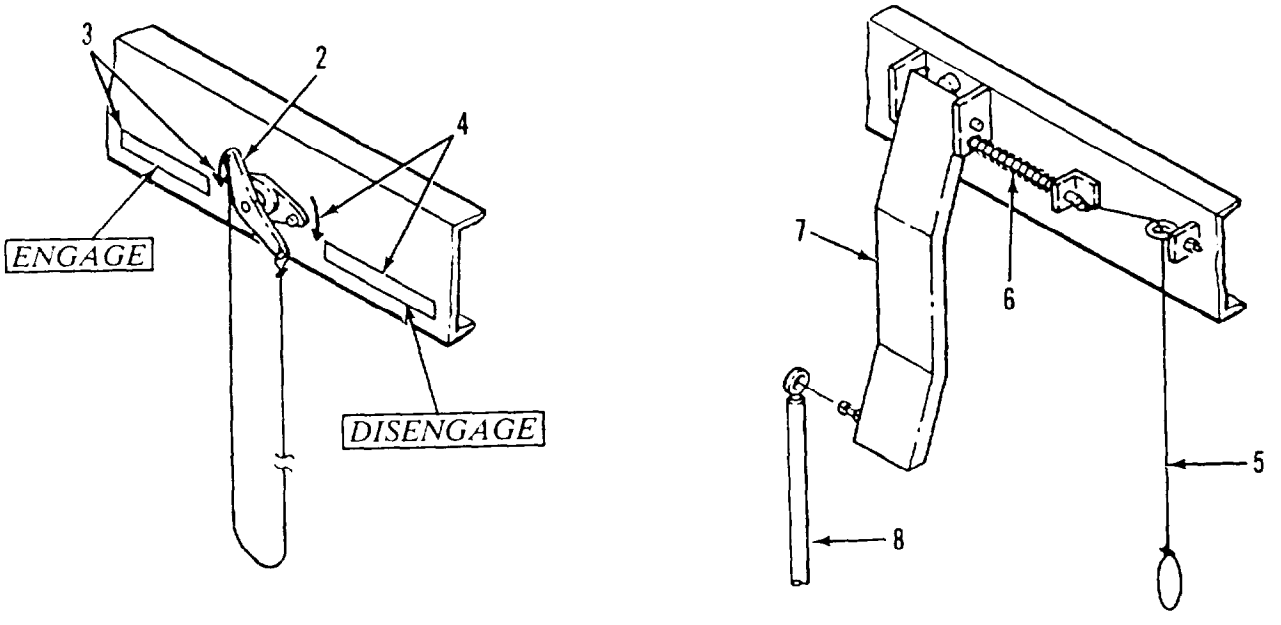


Table 2-1. Controls and Indicators

KEY	CONTROL, INDICATOR	FUNCTION
1	Twist Lock Cam Actuating Cable	Pulling the cable in one direction rotates the twist locks to the locked position. Pulling the cable in the opposite direction rotates the twist locks to the unlocked position.



VIEW A-CONT.

VIEW B

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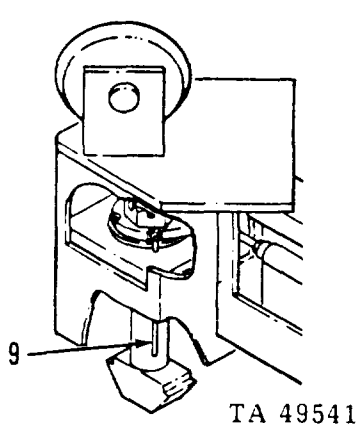
Table 2-1. Controls and Indicators - CONT

KEY	CONTROL, INDICATOR	FUNCTION
2	Twist Lock Actuating Cam	Moves the control rods in the direction to lock or unlock the twist locks, depending on which direction the control cable is pulled.
3	ENGAGE Decal, and Directional Arrow	Indicates the direction to pull the control cable to ENGAGE the twist locks.
4	DISENGAGE Decal, and Directional Arrow	Indicates the direction to pull the control cable to DISENGAGE the twist locks.
5	Control Cable	Pulling the cable pulls the spring pin out of the alignment arm, which allows the alignment arm to be pivoted.
6	Spring Pin	Moves automatically to the in position with spring pressure, to hold the alignment arm in a fixed position, when the control cable is released.

Table 2-1. Controls and Indicators - CONT

KEY	CONTROL INDICATOR	FUNCTION
7	Alignment Arm	When the 6 alignment arms are pinned in the down position, they guide the spreader when the spreader is being lowered onto a container. They are pinned in either the up or down position for lifting and transporting.
8	Alignment Arm Positioning Rod	The eyebolt on the end of the rod is placed over the capscrew to move the alignment arm to the up or down position, when the spring pin is withdrawn by the control cable.
9	Cam Locking Rod  VIEW C	When the spreader is suspended the cam locking rod is in the down position, and the hex nut is in the notch in the locking cam. When the cam locking rod is in this position the twist locks cannot be rotated. When the spreader is lowered onto a freight container, the rod moves upward which moves the hex nut out of the notch in the locking cam, and the twist locks can be rotated to the locked position. When the spreader and container are lifted the rod falls to the down position and the hex nut falls into a second notch in the locking cam, which prevents the twist locks from being moved out of the locked position. If necessary, the cam locking rod can be pushed up manually to disengage the hex nut, and the twist locks can be rotated to either the locked or unlocked position.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-2 OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

a. Do your before (B) PREVENTIVE MAINTENANCE just before you operate the spreader. Pay attention to the CAUTIONS and WARNINGS.

b. When deficiencies or shortcomings are found you can't correct, notify your supervisor.

c. Always do your PREVENTIVE MAINTENANCE in the same order so it gets to be a habit. Once you have had some practice, you will spot anything wrong in a hurry.

d. If you can't fix it, write it on your DA Form 2404 and report it to Unit Maintenance upon completion of the PMCS.

e. When you do your PREVENTIVE MAINTENANCE take along a rag as you will always need at least one.

WARNING

Dry cleaning solvent P-D-680 (SD2) is toxic and flammable. Wear protective goggles, face shield, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with skin or clothing is made, flush with water. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

(1) Keep it clean: Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent (SD2) on all metal surfaces. Use soap and water when you clean rubber or plastic material.

(2) Bolts, nuts and screws: Check them all for obvious looseness, missing, bent or broken condition. You can't try them all with a tool, of course, but look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it. Report it to Unit Maintenance if you can't tighten it.

(3) Welds: Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to Unit Maintenance, before operation.

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services

OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY							
ITEM NO	INTERVAL					ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	W	M		
1	●					SPREADER FRAME Check for bends, cracks, broken welds.	a. Frame is bent to a degree you are unable to lock down all corners without applying weight to one or more comers. b. Frame welds are cracked or broken.

Table 2-2. 0perator/Crew Preventive Maintenance Checks and Services - CONT

OPERATOR/CREW PREVENTATIVE MAINTENNCE CHECKS AND SERVICES B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY							
lTEM NO	INTERVAL					ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	P	w	N		
2						CONTROL CABLES	
	●					Check for missing or broken cables.	
3						CONTROL RODS	
	●					Check for bends or broken rods.	Control rods bent or broken preventing operation.
4	●					Swing Bolts	
	●					Check for broken or cracked bolts	Swing bolts are broken or cracked.
5						COUPLER, TWIST LOCK ASSY	
	●					Check for broken or cracked twist locks.	Twist locks are broken or cracked.
6						GUIDE WHEEL ASSEMBLY	
	●					Check that guide wheels are securely attached and rotate freely.	
7						ALIGNMENT, ARMS	
	●					a. Check for cracks.	
	●					b. Check that arms lock in raised and lowered positions.	
8						SLING ASSEMBLY	
	●					a. Check the wire rope and sockets for damage, wear, correction, and fatigue.	a. Evidence of heat damage of any cause. b. Evidence of kinking, “bird-caging”, crushing, cut, abrasions, sharp bends, rust or any other damage that results in the distortion of rope structure.

Table 2-2. Operator/Crew Preventive Maintenance Checks and Services - CONT

OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES B - BEF0RE D - DURING A -AFTER W - WEEKLY M - MONTHLY							
ITEM NO	INTERVAL					ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	W	M		
8						SLING ASSEMBLY - CONT	
	●					a. Check the wire rope and sockets for damage, wear, corrosion, and fatigue continued	c. Obvious reduction in wire rope diameter. d. One-third the original diameter of outside individual wires is observed. e. Corroded or broken wires at end connections.
	●					b. Check sling assembly and shakles for cracks, bends, breaks and that they are securely attached. **WARNING** PRIOR TO MAKING LIFT, ENSURE ALL TWIST LOCKS ARE SECURELY LOCKED INTO CONTAINER.	Cracked, bent, broken. or not securely attached in any manner.
9						COUPLER, TWIST LOCK ASSEMBLY	
	●					Check that the four twist locks rotate from unlock to lock position. All twist locks must rotate a full 1/4 turn.	One or more twist locks do not rotate 1/4 turn to the locked position.
10						CAM AND BEARING	
	●					Check for cracked bearings, ensure control rods rotate freely in side bearing.	Control rod will not rotate.

Section III. OPERATION UNDER USUAL CONDITIONS

2-3 PREPARATION FOR USE

The IS0 and Intermodal Freight Container Lifting Spreader is shipped fully assembled and ready for use. Perform the following procedures prior to coupling the spreader to a freight container for lifting.

a. Check to see that the spreader has been properly lubricated. Refer to Section I in Chapter 3 and lubricate the spreader, if necessary.

b. With the spreader suspended, check to see that the four twist locks (1) are in the unlocked position, and are properly aligned for coupling to a freight container.

WARNING

Do not get under the suspended spreader while performing the following procedures.

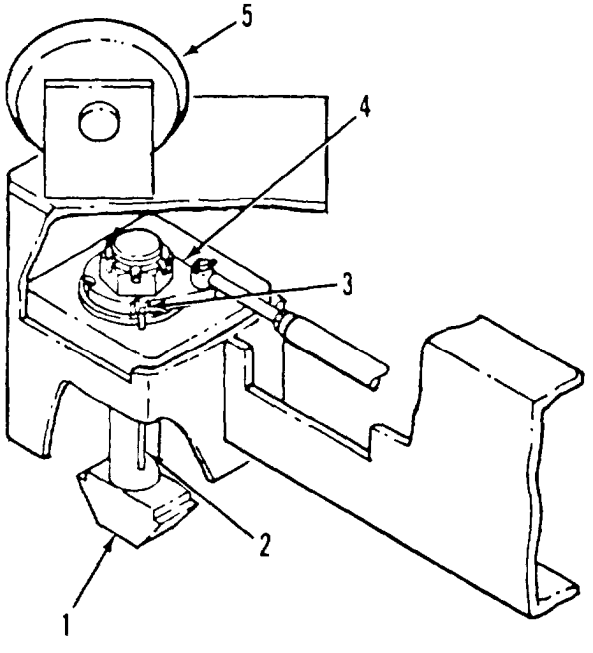
C. Move the cam locking rod (2) upward to disengage the hex nut (3) from the notch in the locking cam (4). Release the rod (2) and check to see that it falls freely to the down position, and that the hex nut (3) is in the notch in the locking cam (4).

d. Check the four guide wheels (5) to see that they rotate freely.

e. With cam locking rod (2) held in a raised position, pull the control cable (6) in the ENGAGE direction to move the twist locks (1) to the locked position.

NOTE

If only one operator is available, the cam locking rod can be held in the raised position with a piece of tape.



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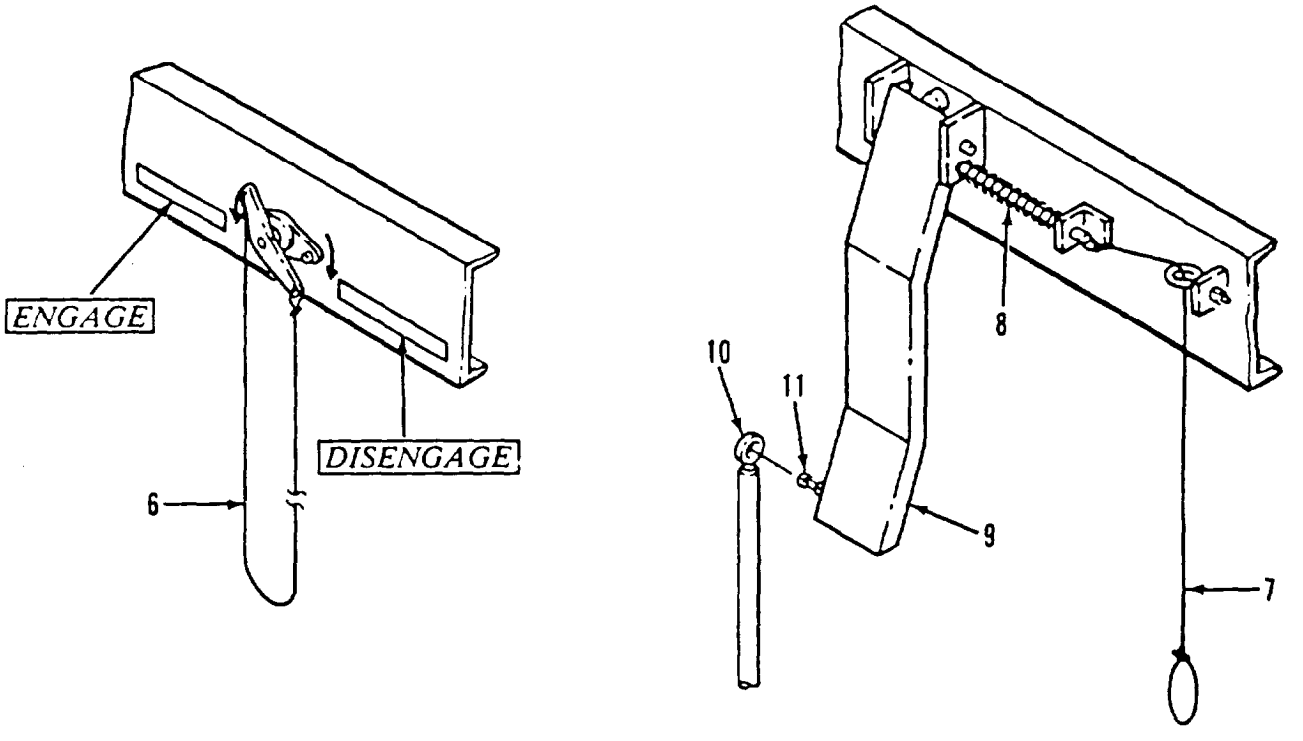
f. Release the cam locking rod (2) and watch to see that the rod falls freely to the down position, and that the nut (3) is in the notch in the locking cam (4).

g. With the cam locking rod (2) in a raised position pull the control cable (6) in the DISENGAGE direction to move the twist locks (1) to the unlocked position.

h. Pull the control cable (7) to disengage the spring pin (8) from the alignment arm (9). Place the eyebolt (10) on the end of the alignment arm positioning rod on the capscrew (11). and move the alignment arm (9) to the up position. Release the control cable (7) and check to see that the spring pin (8) returns to the engaged position, and that the alignment arm (9) is pinned securely in the up position. Return the alignment arm (9) to the down position.

i. Repeat the above procedure until all six of the alignment arms (9) have been checked.



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2-4 OPERATING PROCEDURE

The spreader has six alignment arms, but only two arms on one side and one on the end of the spreader are sufficient to align the spreader on a freight container. The choice of which arms to use depends on the relative location of the hoisting equipment and the container. When the spreader has been properly lubricated, the twist locks in the disengaged position, and the selected alignment arms are pinned in the down position, the spreader is in configuration for coupling to a freight container.

a. Pull the control cable (1) to release the spring pin (2) from the alignment arm (3). Place the alignment arm positioning rod (4) over the capscrew (5) and raise the alignment arm (3) to the up position. Release the control cable (1), and check to see that the alignment arm (3) is pinned securely in the up position.

NOTE

If the containers are stacked in close proximity, the spreader and container will have to be moved to provide sufficient space to raise the alignment arms.

b. Repeat the above procedure until only the three alignment arms to be used to align the spreader on the container remain in the down position.

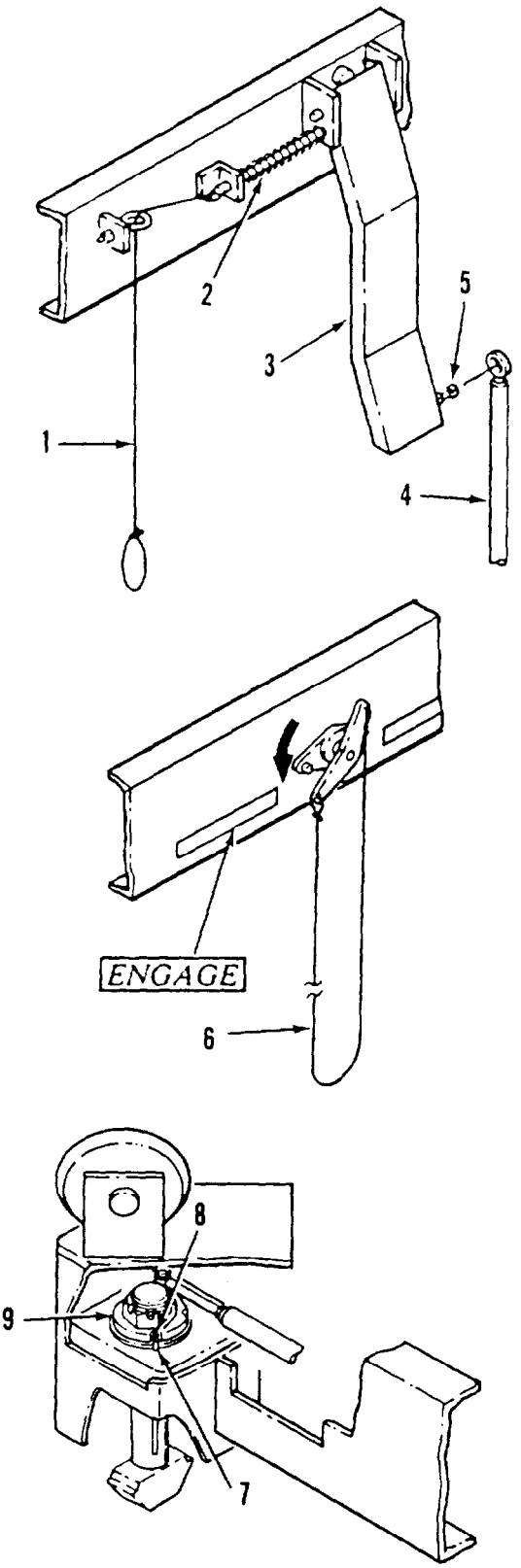
c. When the spreader has been lowered into position on the container, pull the control cable (6) to ENGAGE the twist locks.

d. Check each coupler to ensure they are in the locked position.

NOTE

When tension is applied by the hoisting equipment the spreader will lift slightly before the weight of the container is suspended on the twist locks.

e. With only enough tension applied to the hoisting sling to lift the spreader, look through the opening in the twist lock housing to see that the cam locking rod (7) has moved to the down position and the nut (8) is in the notch in the locking cam (9).



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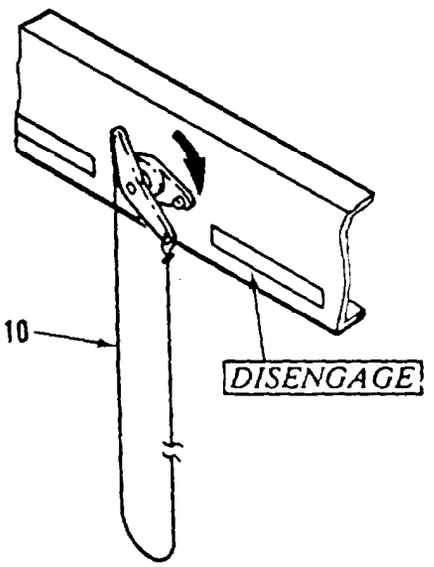
NOTE

Only one comer of the spreader is equipped with a locking cam.

f. Pull the control cable (1) to release the spring pin (2) from the alignment arm (3). Place the alignment arm positioning rod (4) over the capscrew (5) and raise the alignment arm (3) to the up position. Release the control cable (1) and check to see that the alignment arm (3) is pinned securely in the up position.



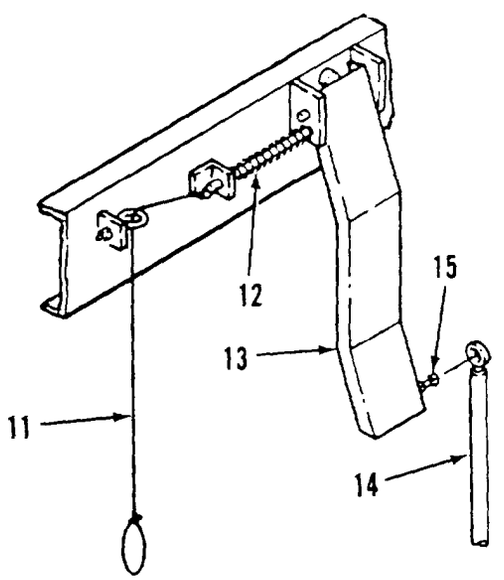
NOTE

If the container is to be lowered into a ship's container cell all alignment arms must be in the up position.

g. Repeat the above procedure until all alignment arms are in the up position.

h. When the container has been transported and placed in the desired location, pull the control cable (10) in the direction to DISENGAGE the twist locks.

i. After the spreader has been uncoupled and removed from the container, pull the control cable (11) to withdraw the spring pin (12) from the alignment arm (13). Place the eyebolt on the alignment arm positioning rod (14) over the capscrew (15), and lower the alignment arm (13) to the down position. Release the control cable (11). and check to see that the alignment arm (13) is pinned securely in the down position.



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j. Repeat the above procedure until the desired alignment arms are secured in the down position.

k. Check to see that the twist locks are in the unlocked position, and properly aligned with the twist lock guides on the frame.

NOTE

The spreader is now ready for coupling to another freight container.

2-5 PREPARATION FOR MOVEMENT

a. Refer to Operating Procedure in the preceding paragraph (2-5) and secure all alignment arms (1) in the up position.

b. Wrap the control cables (2) around the frame (3) and secure them with heavy duty tape or wire.

CAUTION

Do not set the spreader on the twist locks for transporting.

c. Place cribbing or timbers under the frame to support the frame, and prevent damage to the twist locks, during transport.

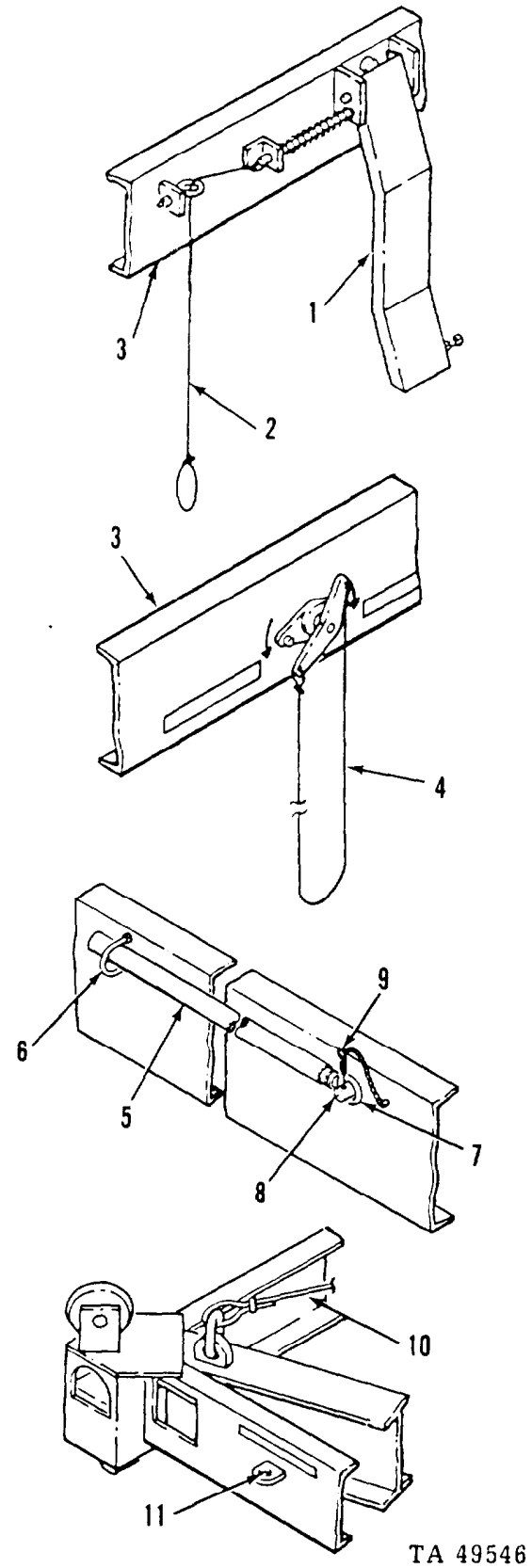
d. Wrap the twist lock control cable (4) around the frame (3) and secure it with heavy duty tape or wire.

e. Slide the end of the alignment arm positioning rod (5) through the U-bolt (6). Position the eyebolt (7) on the pin (8) and install the cotter hairpin (9).

f. When the spreader is in the transport position on the supports, secure the lifting sling (10) to the frame.

g. Anchor the frame securely to the transport vehicle using the 4 tiedowns (11).

h. If the spreader is to be transported by air, refer to the transportation data plate on the spreader frame for instructions.



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2-6 CAUTION, IDENTIFICATION, AND INSTRUCTION PLATES, DECALS, AND STENCILS

The location of caution, identification, and instruction plates, decals, and stencils are shown in figure 2-2. Illustrations of the plates, decals, and stencils are shown 2-2.

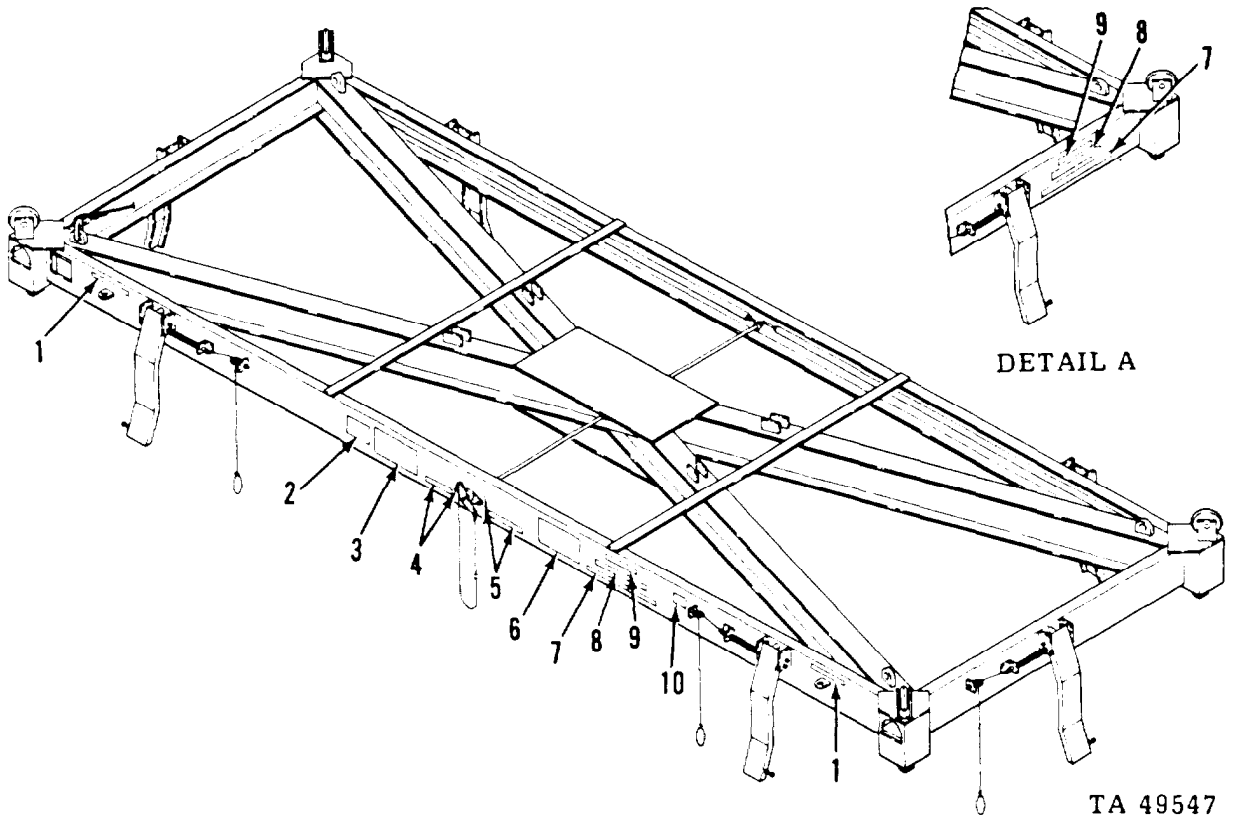

Figure 2-2. Location of Caution, Identification, and Instruction Plates, Decals and Stencils

a. The stencil (1) indicates the location of the four tiedowns on the frame.

TIEDOWN HERE

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b. The plate (2) shows the location of the identification plates for both the 20 FT.and 40 FT. spreaders.

TA 49549

SPREADER, LIFTING, 20FT.

DESIGN ACTIVITY: 55242

MODEL NO: 214LS20

CONTRACT NO: DAAE07-87-C-JO38

SERIAL NO: 214-[ ]

NSN: 3990-01-258-2010

TA 49550

SPREADER, LIFTING, 40FT.

DESIGN ACTIVITY: 55242

MODEL NO: 215LS40

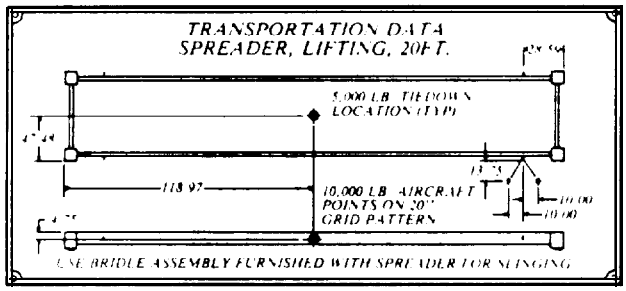
CONTRACT NO: DAAE07-87-C-J038

SERIAL NO: 215-[ ]

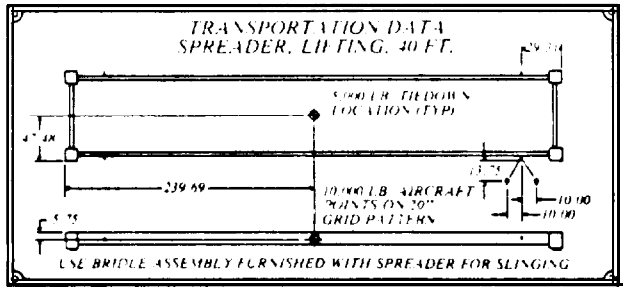
NSN: 3990-01-258-2011

c. The plate (3) shows the location of the transportation data plates for both the 20 FT. and 40 FT. spreaders. All dimensions are in inches.

TA 49551

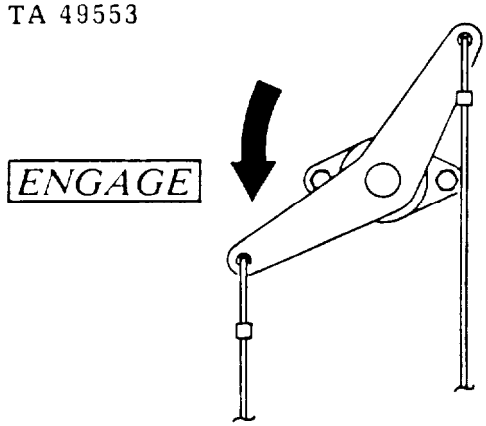


TA 49552



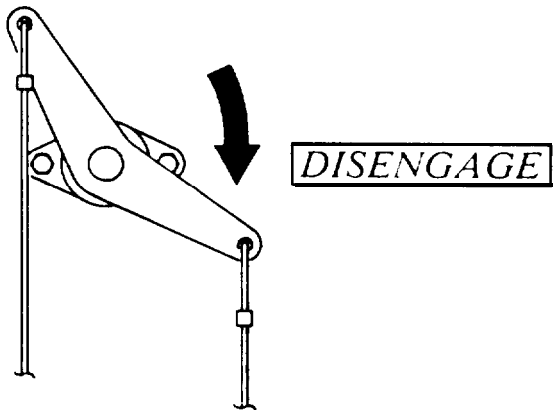
d. The stencils (4) show the direction to pull the control cable to engage the twist locks.

TA 49553

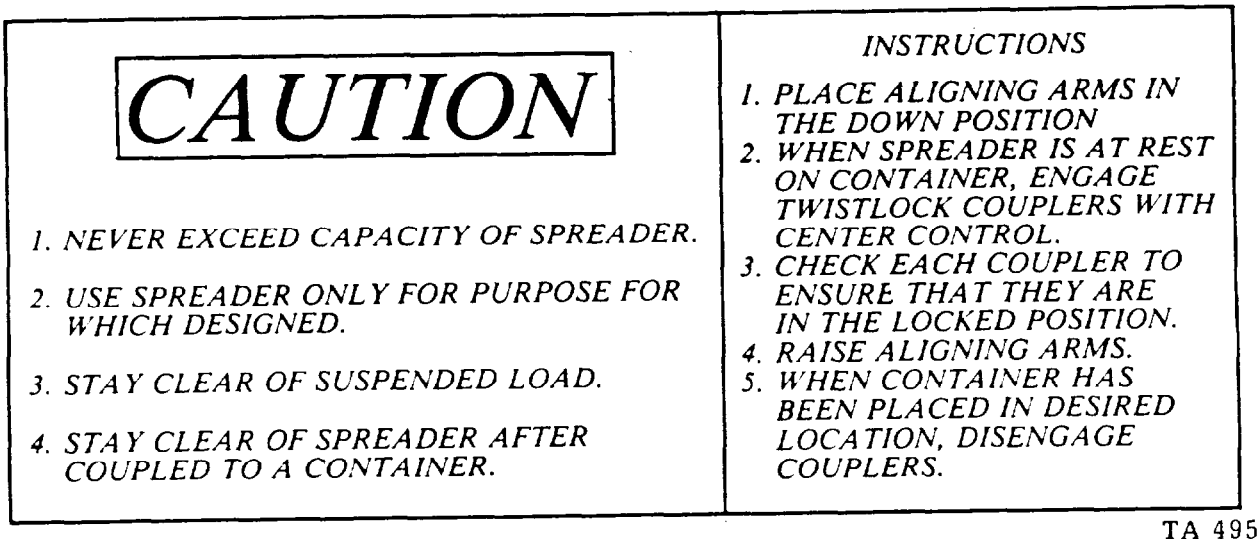


e. The stencils (5) show the direction to pull the control cable to disengage the twist locks.

TA 49554

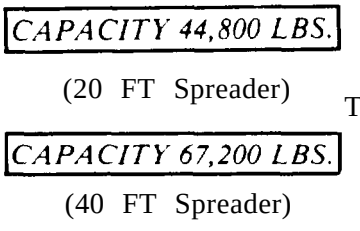


f. The plate (6) outlines cautions to be observed, and instructions for operation of the spreader.



TA 49556

g. The decal (7) shows the lifting capacity of the spreader. DETAIL A (Figure 2-2) shows the location of this decal on the 20 FT Spreader.



TA 49557

h. The decal (8) displays the registration numbers. DETAIL A (Figure 2-2) shows the location of this decal on the 20 FT Spreader.

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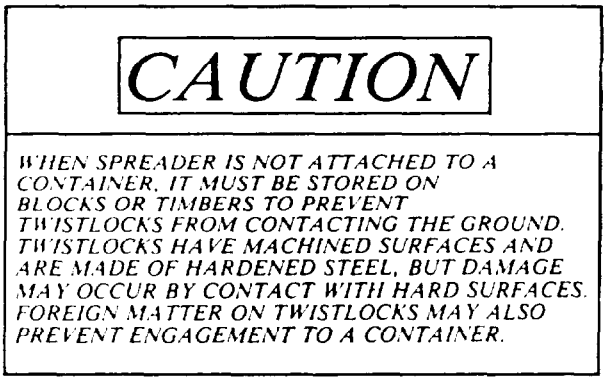
i. The decal (9) denotes the U.S. Government agency procuring the spreader. DETAIL A (Figure 2-2) shows the location of this decal on the 20 FT Spreader.

TA 49560

j. The plate (10) displays caution to be observed when the spreader is to be disconnected from the hoisting equipment.



Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-7 OPERATION IN UNUSUAL WEATHER

a. Operation In Extreme Heat. The spreader is designed for operation in temperatures up to +120ºF (+48°C).

b. Operation In Dusty Conditions. Dusty or sandy conditions will not impair operation of the spreader.

c. Operation In Salt Air Or Sea Spray. If the spreader is operated continuously in a salty atmosphere, the operator must be aware of the probability of rust and corrosion. Inspection for rust and corrosion on movable parts should be performed during the operational check of the spreader, prior to starting lifting operations.

d. Operation In Extreme Cold.

(1) The spreader is capable of operating in temperature as low as -25ºF (-31°C).

(2) If there is precipitation while operating the spreader in temperatures below freezing, the operator must check frequently for ice accumulation that could impair operation of the spreader. Light ice formations can be removed with deicer fluid, scraped, or chipped away and operation continued. If there is sufficient ice formation to make operation of the spreader doubtful, operation should be terminated.

The coupling receptacles on the freight containers must also be checked, and any ice formation removed.

e. Operation In Snow.

(1) Light or dry snow will not affect operation of the spreader.

(2) Wet or heavy snow might freeze when it contacts the spreader, and interfere with operation of the spreader.

The coupling receptacles on the freight containers must be checked, and snow accumulations removed.

f. Operation In A Thunderstorm.

Do not operate the spreader in a thunderstorm. Gusty winds, heavy precipitation, and lightning, create a hazardous situation for lifting and transporting containers.

2-8 EMERGENCY PROCEDURES

There are no emergency operating procedures for the spreader. The spreader must be fully operational at all times. If the spreader and a container are suspended, and a malfunction occurs, or appears to be imminent, the container should be lowered to the surface as quickly and gently as possible.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1 LUBRICATION

The lubrication points, lubricating intervals, and lubricant to be used are shown in Figure 3-1. These lubricating instructions are mandatory.

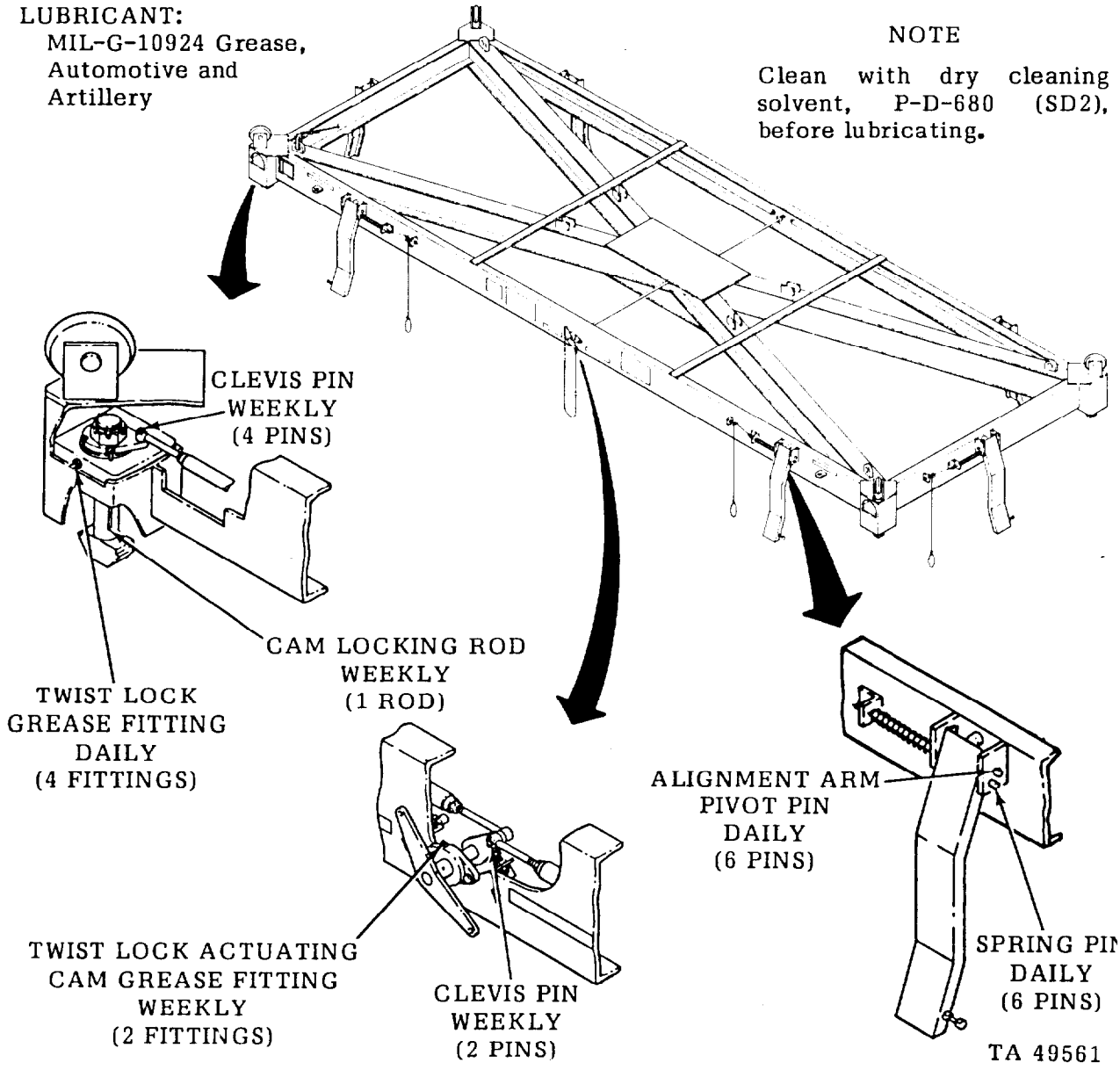


Figure 3-1. Lubrication Points and Lubricating Intervals

Section II. TROUBLESHOOTING

3-2 INTRODUCTION

a. Table 3-1 lists the common malfunctions which you may find during operation or maintenance of the IS0 and Intermodal Freight Container Lifting Spreader or its components. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective action, notify your supervisor.

SYMPTOM INDEX

Table 3-1. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
SPREADER FRAME BENT, CRACKED, OR HAS BROKEN WELDS
Step 1. Perform visual inspection to determine extent of the malfunction.
Notify unit maintenance of the extent of damage.
CONTROL CABLES MISSING OR BROKEN
Step 1. Inspect cables to determine which cables should be replaced.
Notify unit maintenance of cables that need replacement.
CONTROL RODS BENT OR BROKEN
Step 1. Inspect to determine the extent of damage.
Notify unit maintenance of the malfunction.
GUIDE WHEELS DO NOT ROTATE FREELY
Step 1. Rotate guide wheels and check for clearance between wheel and bracket.
Notify unit maintenance if clearance is insufficient.
Step 2. Rotate guide wheels and check for bearing drag.
If guide wheels do not rotate freely, notify unit maintenance.
GUIDE WHEEL ASSEMBLY NOT SECURELY ATTACHED
Step 1. Inspect to determine the reason for loose guide wheel assembly.
Notify unit maintenance of the malfunction.
ALIGNMENT ARM DAMAGED OR WILL NOT LOCK IN UP OR DOWN POSITION
Step 1. Inspect alignment arm for extent of damage.
Notify unit maintenance of the extent of damage.
Step 2. Inspect spring and spring pin for damage.
Notify unit maintenance of damaged spring or spring pin.

Table 3-1. Troubleshooting - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
SLING ASSEMBLY, WIRE ROPE OR SHACKLES WORN OR DAMAGED
Step 1. Inspect wire rope and shackles for excessive wear, or extent of damage. Notify unit maintenance of the extent of wear or damage.
ONE OR MORE TWIST LOCKS DO NOT ROTATE FROM UNLOCKED TO LOCKED POSITION, OR FROM LOCKED TO UNLOCKED POSITION, WHEN THE CONTROL CABLE IS PULLED.
Step 1. Operate the twist locks by pulling the control cable, and determine which twist locks are not operating properly. Notify unit maintenance of the malfunction.
Step 2. Inspect the control rods for bends or other malfunctions. Notify unit maintenance of any unserviceable control rods.

Section III. MAINTENANCE PROCEDURES

3-3 REPLACEMENT OF TWIST LOCK ASSEMBLY COMPONENTS

This task covers:
a. Removal
b. Inspection
c. Installation
d. Lubrication

INITIAL SETUP

Tools

Tool Kit, General Mechanics: Auto
NSN 5180-00-177-7033

Shop Equipment, Auto
Maint: Org. Maint, Commons
N0. 1 NSN 4910-00-754-0654

Materials/Parts

Shaft, Coupling Half - 214A-3
Rod, Cam Lock - 214A-46
Cam, Twistlock Locking - 214A-38
Cam, Twistlock - 214A-7

Materials/Parts - continued

D-Washer Flat - 214A-43
Grease, MIL-G-10924

General Safety Instructions

WARNING

The spreader shall be firmly supported on timbers or blocks to prevent possible injury to personnel.

3-3 REPLACEMENT OF TWIST LOCK ASSEMBLY COMPONENTS - CONT

REMOVAL

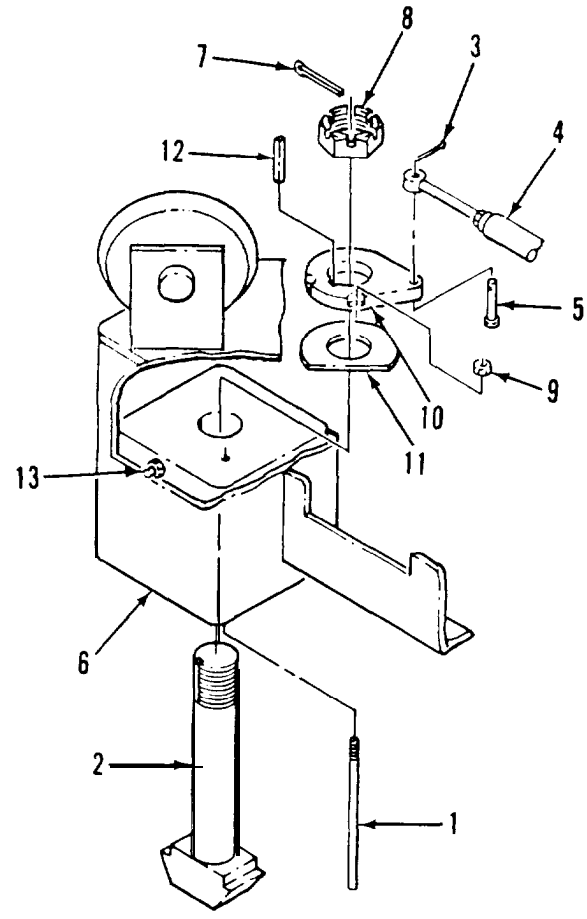
1. Push the cam locking rod (1) up, and pull the twist locking cam actuating cable to move the twist locks (2) to the unlocked position.

2. Remove and discard the cotter pin (3), and lift the control rod (4) off the clevis pin 15).

3. Hold the cam locking rod (1) in the raised position, and rotate the twist lock (2) to a position for easiest access to the components inside the twist lock housing (6).

4. Remove and discard the cotter pin (7). and remove the castellated nut (8).

5. Hold the cam locking rod (1) in a raised position and remove the nut (9). Remove the cam locking rod (1).



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6. Pry lightly on the bayonet end of the twist lock (2) on one side, and then the other, until the twist lock (2) has moved upward enough to insert a 1/2-inch wood or metal spacer between the cam (10) and washer (11).

7. Punch out and remove the key (12).

8. Remove the twist lock (2), cam (10), and washer (11).

NOTE

Do not remove the grease fitting (13) unless replacement is necessary.

INSPECTION

1. Inspect the twist lock (2) for damage and excessive wear.

3-3 REPLACEMENT OF TWIST LOCK ASSEMBLY COMPONENTS - CONT

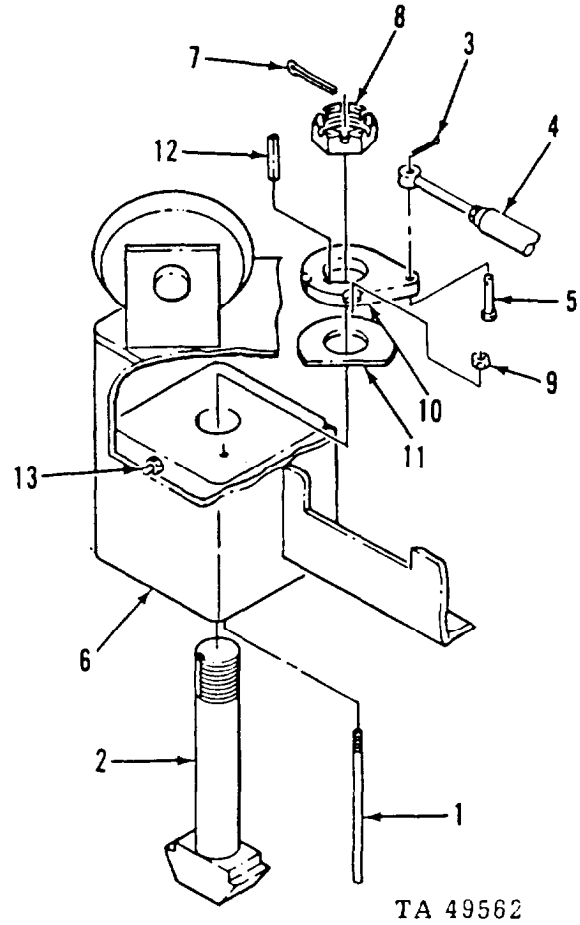
INSPECTION - CONT

2. Inspect the threads on all threaded pars and replace any parts that have defective threads.

3. Inspect the cam (10) for damage or excessive wear.

4. Check all remaining parts for serviceable condition.

5. If the grease fitting (13) was not removed, use a grease gun filled with grease, MIL-G-10924, and apply grease to the grease fitting (13). to make sure that the grease passage in the twist lock housing (6) is clear.



INSTALLATION

1. Insert the twist lock (2) into the twist lock housing (6) and install the key (12), and flat washer (11).

2. With the notches in the locking cam (10) facing upward, insert the clevis pin (5) through the locking cam (10) from the bottom. Install the locking cam (10) and clevis pin (5) in position on the twist lock (2).

3. Install the castellated nut (8) and a new cotter pin (7).

4. Install the cam locking rod (1) and nut (9).

5. Position the control rod (4) on the clevis pin (5) and install a new cotter pin (3).

NOTE

Only one of the four twist lock asemblies is equipped with a locking cam (10), cam locking rod (1), and nut (9). If maintenance is being performed on one of the twist locks without a locking cam, the cam locking rod (1) will still have to be raised in order to rotate the twist locks.

3-3 REPLACEMENT OF TWIST LOCK ASSEMBLY COMPONENTS - CONT

LUBRICATION

1. Lubricate the grease fitting (13) with grease, MIL-G-10924, using a grease gun.
2. Lubricate the cam locking rod (1), and clevis pin (5). by hand with grease MIL-G-10924.

3-4 REPLACEMENT OF GUIDE WHEEL ASSEMBLY COMPONENTS

This task covers:
a. Inspection
b. Removal
c. Repair
d. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanics: Auto
NSN 5180-00-177-7033

Shop Equipment Auto Maint: Org. Maint.
Commons No. 1 NSN 4910-00-754-0654

Materials/Parts

Wheel, Guide - 214A-10
Bearing, Bronze, Oilite AA-1334-2

General Safety Instructions

WARNING

The spreader shall be firmly supported on timbers or blocks to prevent possible injury to personnel.

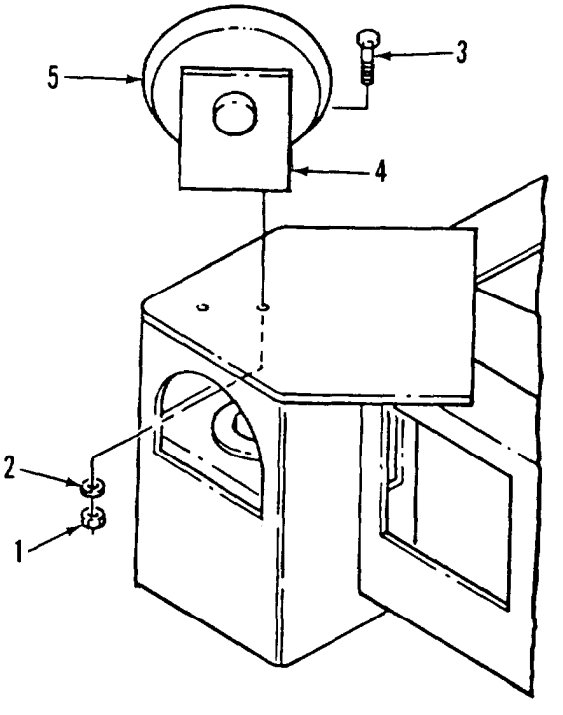
INSPECTION

1. Check to see if the nuts (1). lockwashers (2), and capscrews (3) are loose. Check to see if the mounting bracket (4) is loose, bent, or damaged beyond repair.

NOTE

The mounting bracket (4) is not a replaceable part. If damaged beyond repair, a new bracket will have to be manufactured (See Appendix D).

2. Inspect the guide wheel (5) for looseness and damage. Rotate the guide wheel (5) and check for excessive drag.



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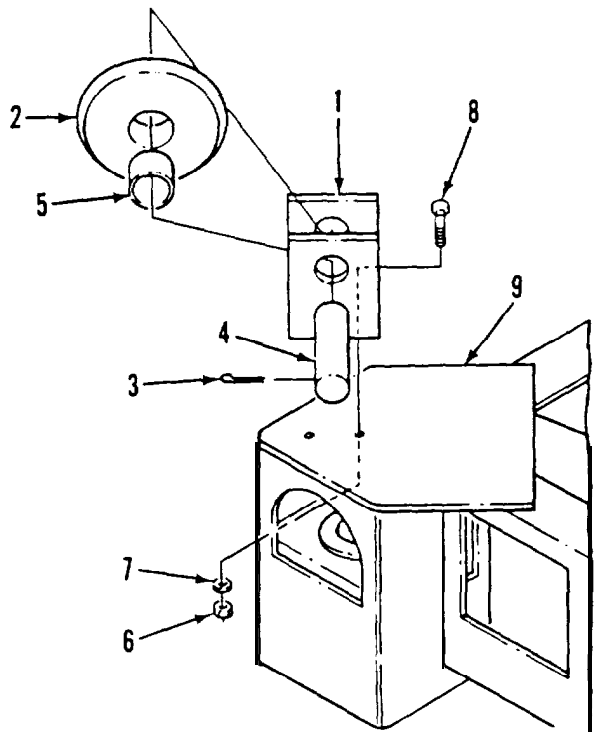
3-4 REPLACEMENT OF GUIDE WHEEL ASSEMBLY COMPONENTS - CONT

REMOVAL

1. Remove and discard the cotter pin (3). Remove the shouldered shaft (4), and remove the guide wheel (2) and bearing (5) as an assembly.
2. Remove the nuts (6), lockwashers (7), and capscrews (8). to remove mounting bracket (1).



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REPAIR

If the bearing (5) requires replacement, remove the bearing and install a new bearing (5) in the guide wheel (2).

NOTE

If the guide wheel (2) requires replacement, install a new bearing (5) in the guide wheel (2).

INSTALLATION

1. Position the mounting bracket (1) on the twist lock housing (9), and install the capscrews (8). lockwashers (7). and nuts (6).
2. Position the guide wheel (2) in the mounting bracket (1), and install the shouldered shaft (4) and a new cotter pin (3).

3-5 SWING BOLT AND/OR CONTROL ROD REPLACEMENT

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Lubrication
f. Adjustment

INITIAL SETUP

Tools

Tool Kit, General Mechanics: Auto
NSN 5180-00-177-7033

Materials/Parts

ROD, 214A-39 F20 or
ROD, 215A-39 F40

3-5 SWING BOLT AND/OR CONTROL ROD REPLACEMENT - CONT

INITIAL SETUP - CONT

Materials/Parts - continued

BOLT, MACHINE, SWING, 214A-35
BOLT, MACHINE, SWING, 214A-44
Grease
MIL-G-10924

General Safety Instructions

WARNING

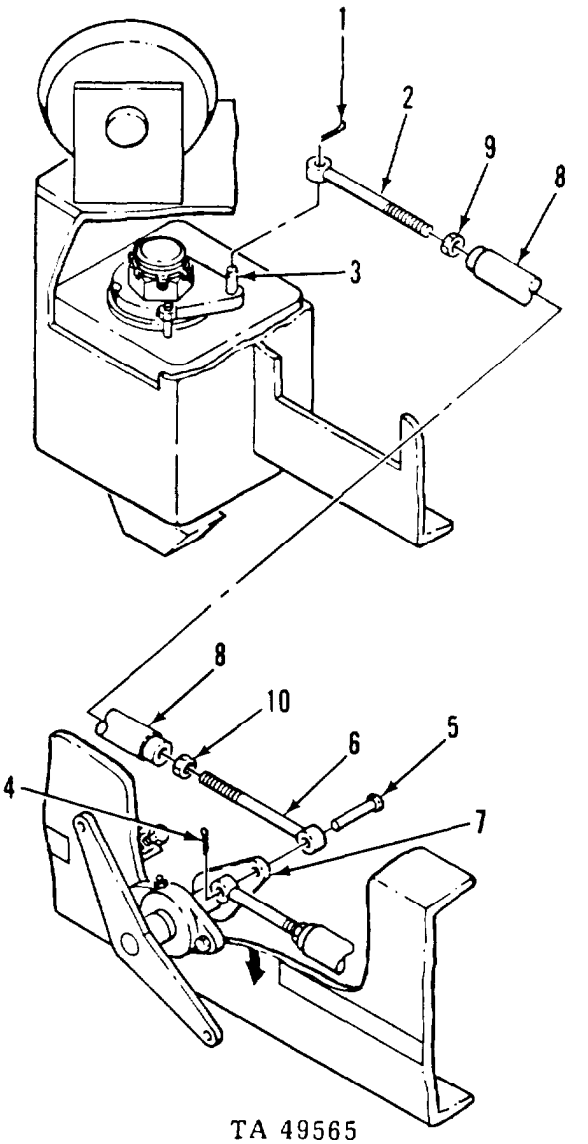
The spreader shall be firmly supported on timbers or blocks to avoid possible injury to personnel.

REMOVAL

1. Remove and discard the cotter pin (1). Lift the swing bolt (2) off the clevis pin (3).
2. Remove and discard the cotter pin (4). Remove the clevis pin (5), to disconnect the swing bolt (6) from the cam (7).
3. Remove the control rod (8) and swing bolts (2 and 6) as an assembly.

DISASSEMBLY

1. Loosen the nut (9) and unscrew and remove the swing bolt (2) from the control rod (8).
2. Remove the nut (9) from the swing bolt (2).
3. Loosen the nut (10) and unscrew and remove the swing bolt (6) from the control rod (8).
4. Remove the nut (10) from the swing bolt (6).



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3-5 SWING BOLT AND/OR CONTROL ROD REPLACEMENT - CONT

ASSEMBLY

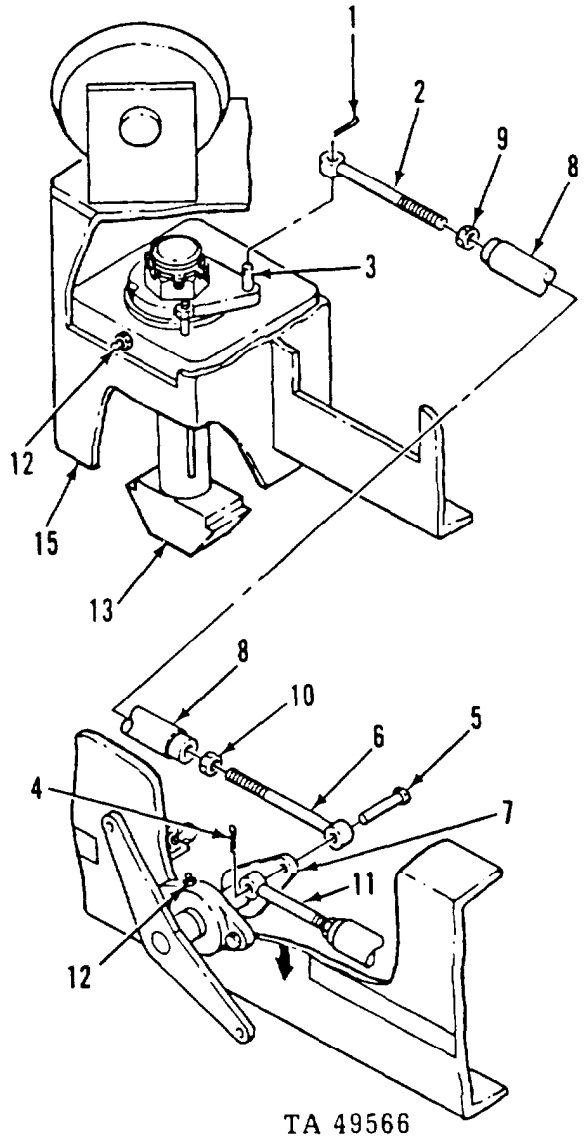
1. Install the nut (9) on the swing bolt (2) and screw the swing bolt (2) into the control rod (8).
2. Install the nut (10) on the swing bolt (6) and screw the swing bolt (6) into the control rod (8).

INSTALLATION

NOTE

Inspect the clevis pin (3) for excessive wear before installing the control rod assembly. Refer to Paragraph 3-3 for procedures to replace the clevis pin (3).

1. Place the swing bolt (2) on the clevis pin (3) and install a new cotter pin (1).
2. Position the swing bolt (6) on the cam (7) and install the clevis pin (5). Place the swing bolt (11) on the clevis pin (5) and install a new cotter pin (4).



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LUBRICATION

1. Lubricate the grease fittings (12) with grease MIL-G-10924 using a grease gun.
2. Lubricate the clevis pins (3 and 5) by hand, with grease ML-G-10924.

ADJUSTMENT

1. Pull the control cable (14) to move the twist lock (13) to the DISENGAGE position.
2. Visually check the twist lock (13) to see if it is aligned with the twist lock guide on the bottom of the twist lock housing (15).

3-5 SWING BOLT AND/OR CONTROL ROD REPLACEMENT - CONT

ADJUSTMENT - CONT

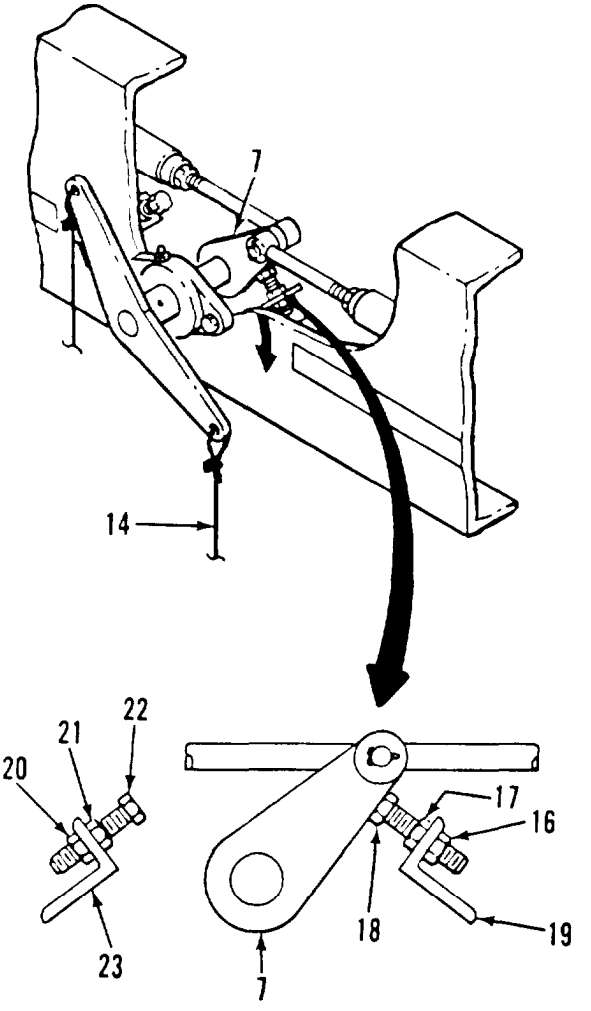
3. If the twist lock (13) and guide are not aligned, loosen the nuts (16 and 17), and turn the stop nut (18) a few turns into the bracket (19). Rotate the control rod (8) in the direction necessary to bring the twist lock (13) and guide into alignment.

4. Tighten the nuts (9 and 10).

5. Check to see that the cam (7) is in contact with the stop bolt (18). If necessary, loosen the nuts (16 and 17) and turn the stop bolt (18) until it contacts the cam (7). Tighten the nuts (16 and 17).

6. Pull the control cable (14) to rotate the twist lock (13) to the ENGAGE position.

7. Check to see that the twist lock (13) has moved to a position 90 degrees to the twist lock guide. If the twist lock (13) is not in a position 90 degrees to the twist lock guide, perform the following procedures.



SIDE VIEW

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a. Loosen the nuts (20 and 21) and turn the stop bolt (22) a few turns into the bracket (23).

b. Position the twist lock (13) at 900 to the twist lock guide.

c. Turn the stop bolt (22) until it contacts the cam (7).

d. Tighten the nuts (20 and 21).

e. Pull the control cable (14) to move the twist lock (13) to the DISENGAGE position.

f. Check to see that the twist lock (13) is aligned with the twist lock guide, and that the cam (7) is in contact with the stop bolt (18).

3-5 SWING BOLT AND/OR CONTROL ROD REPLACEMENT - CONT

ADJUSTMENT - CONT

8. Check the twist locks on all four corners of the spreader in both the ENGAGE and DISENGAGE positions, and make any necessary adjustments.

NOTE

When a control rod assembly is installed, and adjustments are completed, approximately the same number of threads should be visible on the swing bolts in each end of the control rod.

3-6 REPLACE TWIST LOCK ACTUATING COMPONENTS

This task covers:
a. Removal
b. Installation
c. Lubrication

INITIAL SETUP

Tools

Tool Kit, General Mechanics: Auto
NSN 5180-00-177-7033

Materials/Parts

Cam, Outside Center, 214A-26
Cam, Inside Center, 214A-41
Bearing, Shaft, 1-inch Dia., SCJT-1
Bar, Metal, Center, 214A-40
Grease, MIL-G-10924

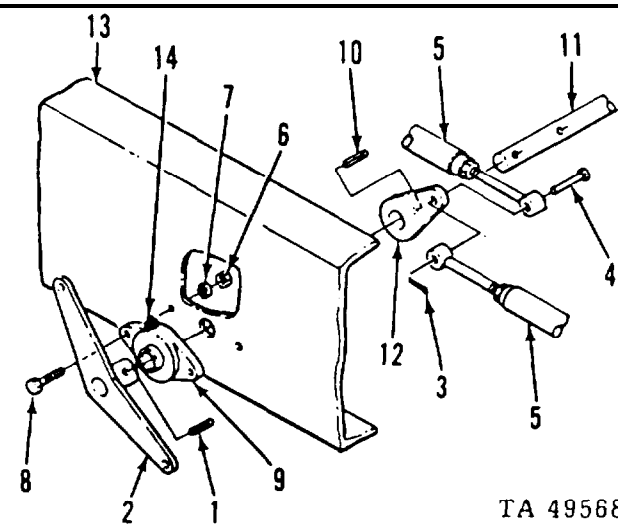
General Safety Instructions

WARNING

The spreader shall be firmly supported on timbers or blocks to prevent possible injury to personnel.

REMOVAL

1. Remove the pin (1) and twist lock actuating cam (2).
2. Remove and discard the cotter pin (3). Remove the clevis pin (4) to disconnect the control rods (5).



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3-6 REPLACE TWIST LOCK ACTUATING COMPONENTS - CONT

REMOVAL - CONT

3. Remove the nuts (6). lockwashers (7), capscrews (8), and bearing (9).
4. Remove the pin (10) from bar (11).
5. Repeat the above procedures and remove the corresponding parts on the opposite side of the spreader.
6. Remove the bar (11) and cams (12).

INSTALLATION

1. Insert the bar (11) through one side of the spreader frame (13), and slide the two cams (12) onto the bar (11). Position the bar (11) in the holes on each side of the spreader frame (13).
2. Slide the cam (12) into position on the bar (11) and install the pin (10).
3. Place the bearing (9) on the bar (11) and install the capscrews (8), lockwashers (7), and nuts (6).
4. Position the twist lock actuating cam (2) on the end of the bar (11) and install the pin (1).

LUBRICATION

1. Lubricate the grease fittings (14) with grease, MIL-G-10924, using a grease gun.
2. Lubricate the clevis pins (4) by hand with grease MIL-G-10924.

3-7 REPLACE CONTROL CABLES

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanics: Auto
NSN 5180-00-177-7033

Materials/Parts

Cable, MIL-W-8342C-72
Cable, MIL-W-8342C-96

General Safety Instructions

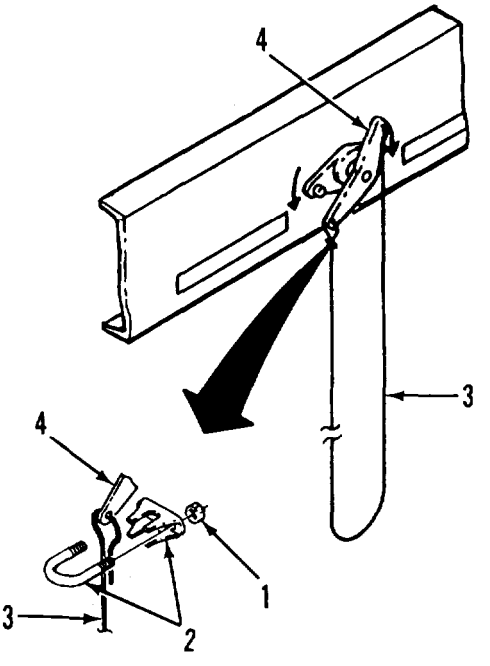
WARNING

The spreader shall be firmly supported on timbers or blocks to prevent possible injury to personnel.

3-7 REPLACE CONTROL CABLES - CONT

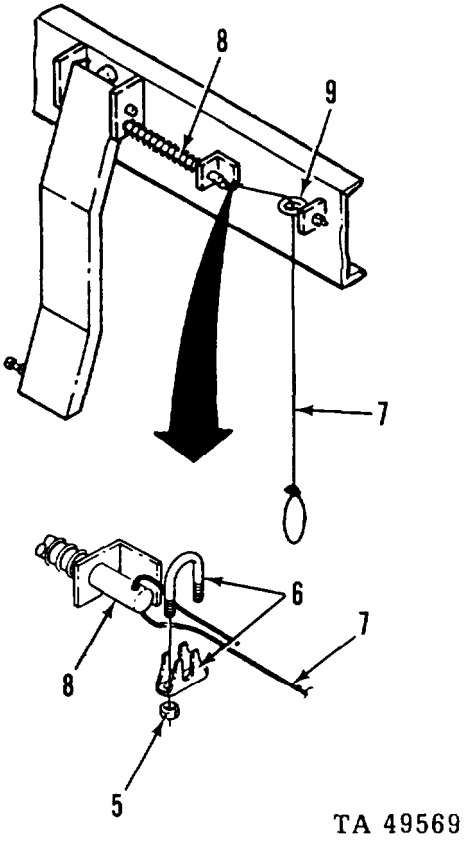
REMOVAL

1. Remove the nuts (1) and remove the cable clamp (2) from the twist lock cam actuating cable (3).
2. Remove the cable clamp from the opposite end of the cam actuating cable (3).
3. Remove the engagement cable (3) from the twist lock actuating cam (4).
4. Remove the nuts (5) and remove the cable clamp (6) from the alignment arm release cable (7).
5. Remove the cable (7) from the spring pin (8) and pull the cable (7) through the eyebolt (9).



INSTALLATION

1. Thread one end of the replacement cable (3) through the hole in one end of the twist lock actuating cam (4).
2. Position the cable clamp (2) on the actuating cable (3) and install the nuts (1).
3. Connect the other end of the cable (3) to the opposite end of the twist lock actuating cam (4).
4. Thread the end of the replacement cable (7) through the eyebolt (9). and the hole in the spring pin (8) far enough to install the cable clamp (6).
5. Position the cable clamp (6) on the alignment arm release cable (7) and install the nuts (5).



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3-8 REPLACE ALIGNMENT ARM AND COMPONENTS

This task covers: a. Inspection b. Removal c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanics: Auto
NSN 5180-00-177-7033

Materials/Parts

Grease, MIL-G-10924
Alignment Arm, 214A-9
Pivot Pin, 214A-25
Spring Pin, 215A-22-1
Spring Stop, 215A-22-3
Spring, RW-11
Alignment Arm Positioning Rod, 215A-50
Eyebolt, MS51937-5

Materials/Parts - continued

Eyebolt, 1764 1
U-Bolt, 215A-22
Rubber Bumper, B-2

General Safety Instructions

WARNING

The spreader shall be firmly supported on timbers or blocks to prevent possible injury to personnel.

REMOVAL

1. ALIGNMENT ARM POSITIONING ROD

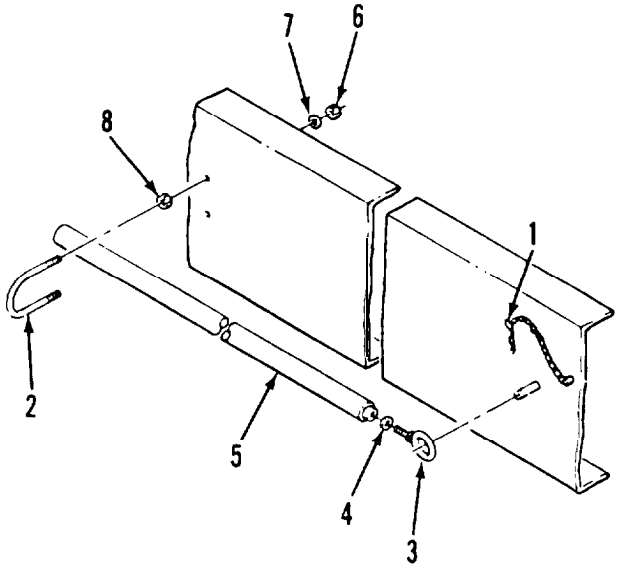
   a. Remove the hairpin (1) and slide the alignment arm positioning rod (5) out of the U-bolt (2).

   b. Remove the eyebolt (3) and lockwasher (4) from the rod (5).

   c. Remove the nuts (6) lockwashers (7), U-bolt (2), and nuts (8).

NOTE

If the rod (5) is damaged, replace the entire alignment arm positioning rod assembly (3, 4, and 5).



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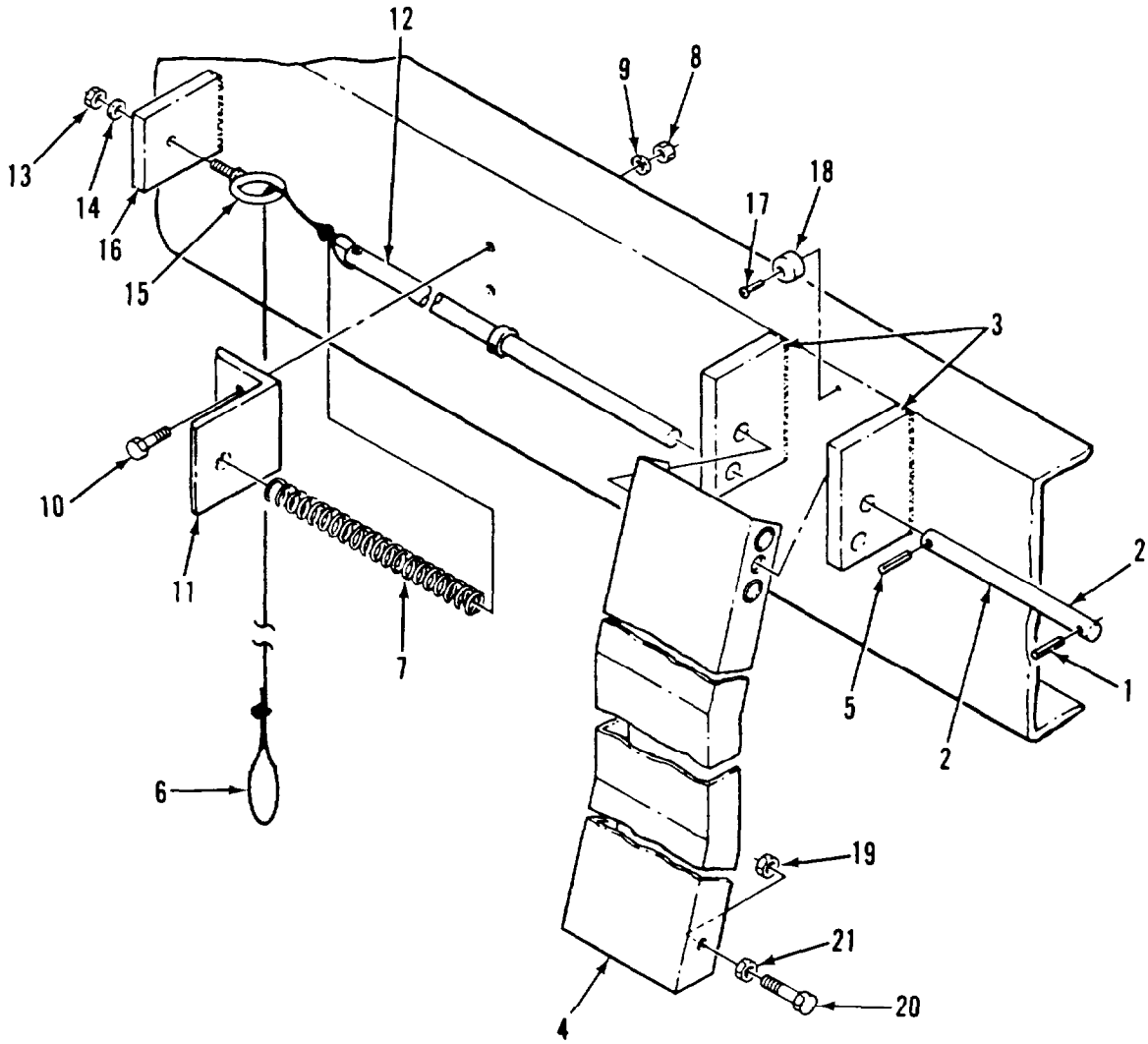
3-8 REPLACE ALIGNMENT ARM AND COMPONENTS - CONT

REMOVAL - CONT



2. ALIGNMENT ARM ASSEMBLY

a. Remove the pin (1) and slide the pivot pin (2) out of the mounting brackets (3) and alignment arm (4).

b. Remove the pin (5).

C. Support the alignment arm (4). and pull the control cable (6) to release the alignment arm (4) from the mounting brackets (3).

d. Refer to Paragraph 3-7 for procedures and remove the control cable (6).

3-8 REPLACEMENT OF ALIGNMENT ARM AND COMPONENTS - CONT

REMOVAL - CONT

WARNING

The spring (7) is under pressure. Be aware and exercise care while performing the following procedure. Wear eye protection during removal of spring.

e. Remove the nuts (8), lockwashers (9), capscrews (10), and bracket (11).

f. Remove the spring (7) from the spring pin assembly (12).

g. Remove the nut (13), lockwasher (14), and remove the eyebolt (15) from the bracket (16).

h. Remove the screw (17) and rubber bumper (18).

i. Remove the nut (19), capscrew (20), and nut (21).

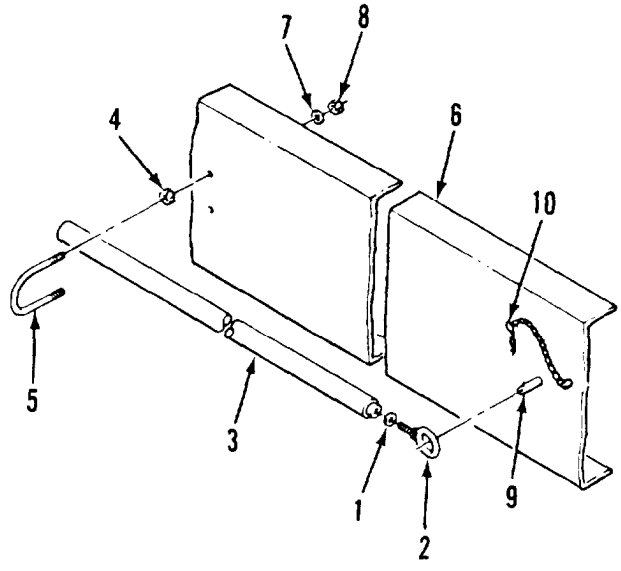
INSTALLATION

1. ALIGNMENT ARM POSITIONING ROD

a. Place the lockwasher (1) on the eyebolt (2), and screw the eyebolt (2) into the rod (3).

b. Install the nuts (4) on the U-bolt (5), and insert the ends of the U-bolt (5) through the holes in the spreader frame (6). Install the lockwashers (7) and nuts (8) on the U-bolt (5). Tighten the nuts (4) against the frame (6) to secure the U-bolt (5).

c. Slide the alignment arm positioning rod (3) through the U-bolt (5). Place the eyebolt (2) on the mounting pin (9) and install the hairpin (10).



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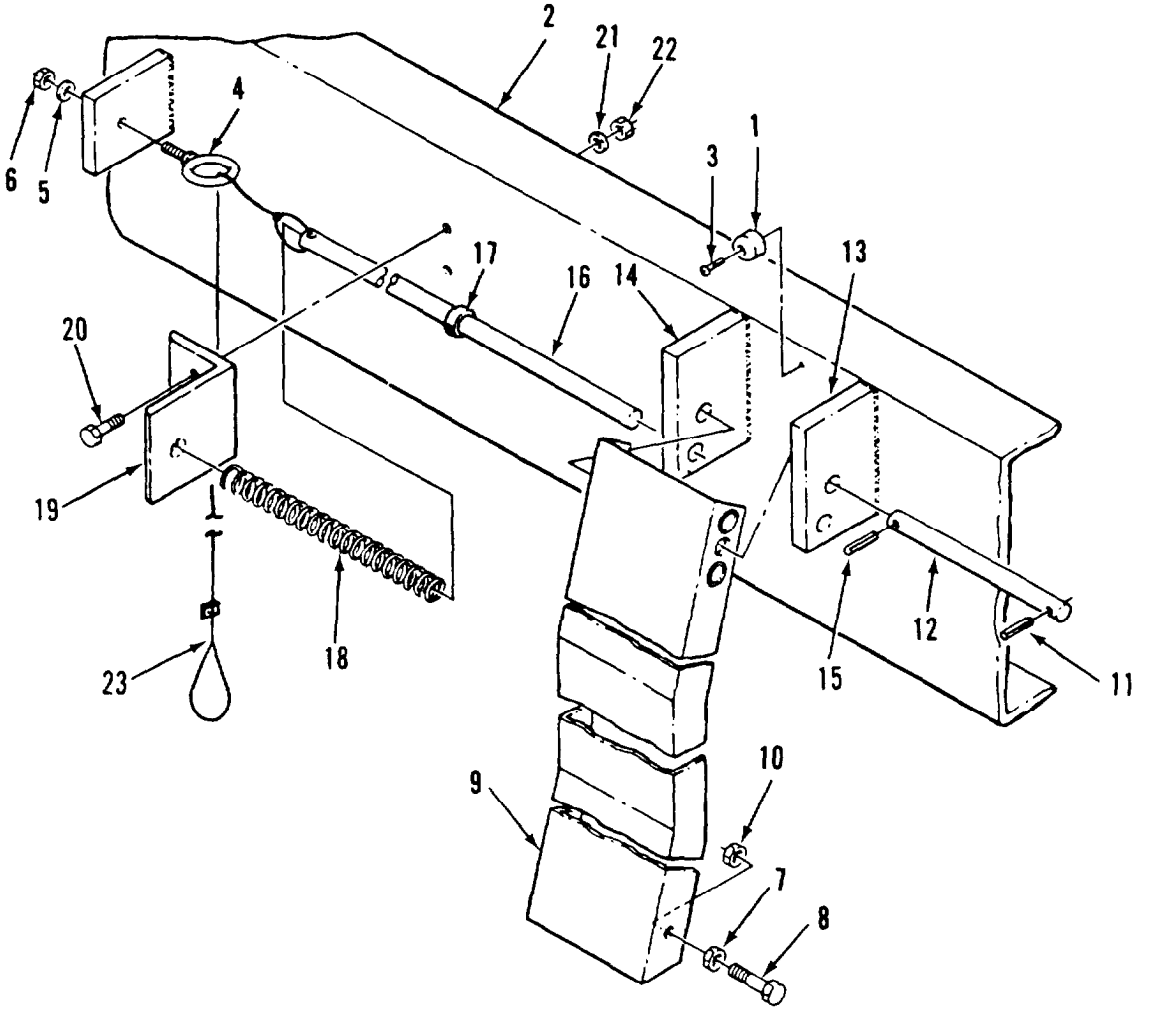
3-8 REPLACE ALIGNMENT ARM AND COMPONENTS - CONT

INSTALLATION - CONT



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2. ALIGNMENT ARM ASSEMBLY

a. Position the rubber bumper (1) on the frame (2) and install the screw (3).

b. Insert the eyebolt (4) through the mounting bracket and install the lockwasher (5) and nut (6).

c. Install the nut (7) on the capscrew (8) and insert the capscrew through the hole in the alignment arm (9). Install the nut (10) on the capscrew (8). and tighten the nut (7).

d. Install the pin (11) in the pivot pin (12).

3-8 REPLACE ALIGNMENT ARM AND COMPONENTS - CONT

INSTALLATION - CONT

e. Position the alignment arm (9) between the mounting brackets (13 and 14). Insert the pivot pin (12) through the top hole in the mounting bracket (13), the center holes in the alignment arm (9). and through the top hole in the mounting bracket (14).

f. Install the pin (15) in the pivot pin (12).

g. Slide the spring pin assembly (16) into the bottom hole in the mounting bracket (14), the bottom holes in the alignment arm (9), and the bottom hole in the mounting bracket (13). until the spring stop (16) contacts the mounting bracket (14).

h. Slide the spring (18) onto the spring pin assembly (16) until it contacts the spring stop (17).

i. Compress the spring (18) as necessary to position the bracket (19) on the spring pin assembly (16) and frame (2). Install the capscrews (20), lockwashers (21), and nuts (22).

j. Refer to Paragraph 3-7 for procedures and install the cable assembly (23).

LUBRICATION

Lubricate the pivot pin (12) and spring pin assembly (16) by hand with grease MIL-G-10924.

3-9 REPLACE SLING ASSEMBLY COMPONENTS

This task covers: a. Inspection b. Remove c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanics: Auto
NSN 5180-00-177-7033

Materials/Parts

Shackle, AN 116-24
Wire Rope Assembly.
214A-33 or 215A-33
Lifting Ring, 214A-67 or 215A-67

General Safety Instructions

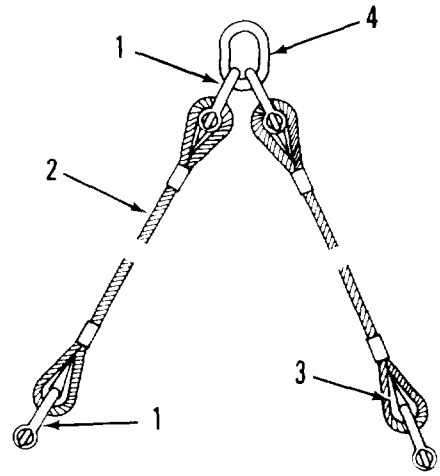
WARNING

The spreader shall be firmly supported on timbers or blocks to prevent possible injury to personnel.

3-9 REPLACE SLING ASSEMBLY COMPONENTS - CONT

INSPECTION

1. Inspect the shackles (1) for damage or excessive wear.
2. Inspect the wire rope assemblies (2) for frayed or broken strands. Check the thimbles (3) for excessive wear.
3. Check the lift ring (4) for damage or excessive wear.



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REMOVAL

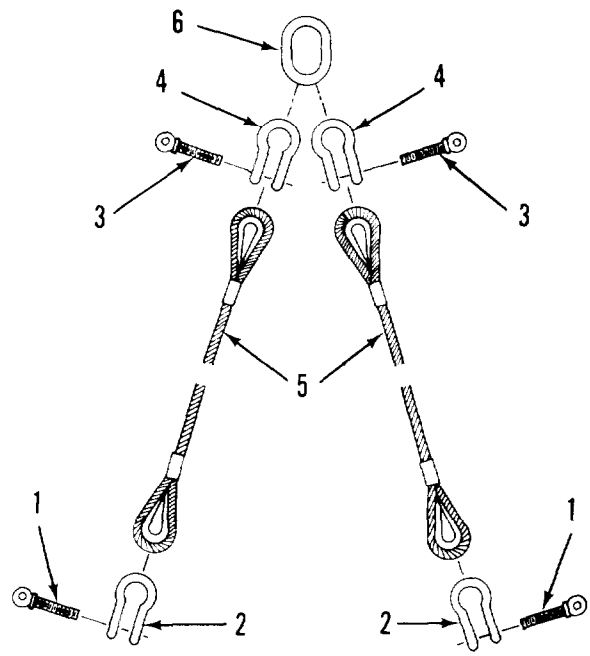
1. Remove the screw pins (1) and shackles (2).
2. Remove the screw pins (3) and shackles (4) to disconnect the cable assemblies (5) from the lifting ring (6).

INSTALLATION

NOTE

Shackles are to be replaced in sets of four, unless the replacement shackle is identical to the original in specification and dimension.

1. Install the bow of the shackles (4) through lifting ring (6), and install the screw pins (3) through the thimbles in the end of the cable assemblies (5).



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2. Install the bow of the shackles (2) through the thimbles in the end of the cable assemblies (5), and install the screw pins (1) through the anchor shackles on the spreader.

Section IV. PREPARATION FOR STORAGE

3-10 SHORT TERM STORAGE

a. Refer to Section I in this Chapter and lubricate the spreader.

b. Apply a film of grease to all unpainted surfaces, and cables, to prevent corrosion.

c. If a container is available for the anticipated storage period, attach the spreader to the container. Refer to Operating Procedure in Chapter 2 and position all six alignment arms to the down position.

CAUTION

When spreader is not attached to a container, it must be stored on blocks or timbers to prevent twist locks from contacting the ground. Twist locks have machined surfaces and are made of hardened steel, but damage may occur by contact with hard surfaces.

d. Place the alignment arm positioning rod in its stowed position on the frame.

3-11 INTERMEDIATE STORAGE

a. Remove any debris or foreign matter, particularly in the twist lock housings. Wash if necessary.

b. Touch up or repaint surfaces where the paint has chipped away, eroded, or deteriorated.

c. Apply a film of grease to all unpainted surfaces, and cables, to prevent corrosion.

d. Refer to Section I in this Chapter and lubricate the spreader.

e. Refer to Operating Procedure in Chapter 2 and position all six of the alignment arms to the up position.

f. Place the alignment arm positioning rod in its stowed position on the frame.

g. Place the spreader on timbers or blocks to prevent damage to the twist locks.

CAUTION

If the spreader is being stored outside, do not let the control cables or sling assemblies rest on the ground.

h. Secure the control cables and sling assemblies to the frame with heavy duty tape or wire.

APPENDIX A

LIST OF APPLICABLE PUBLICATIONS

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals, and other publications referenced in this manual and which apply to the operation, organizational, direct support, and general support maintenance of the IS0 and Intermodal Freight Container Lifting Spreaders for Models 214LS20 and 215LS40.

A-2. PUBLICATION INDEX

DA Pam 25-30, Consolidated Index of Army Publications and Blank Forms, should be consulted frequently for latest changes or revisions and for new publications relating to materiel covered in this technical manual.

A-3. FORMS

Refer to DA Pam 738-750, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms.

Distribution: Operator's, Unit Maintenance Manual For: Spreader, Lifting, Type II, Top Lift, Models 214LS20 and 215LS40 ..... DA Form 12-25A

Equipment Inspection and Maintenance Worksheet ..... DA Form 2404

Product Quality Deficiency Report ..... SF 368

Recommended Changes to Equipment Technical Publications ..... DA Form 2028-2

Recommended Changes to Publications and Blank Forms ..... DA Form 2028

Report of Discrepancy (ROD) ..... SF 364

A-4. TECHNICAL BULLETINS

Standards for Overseas Shipment of Domestic Issue of Special Purpose Vehicles, Combat, Tactical Construction, and Selected Industrial and Troop Support U.S. Army Tank-Automotive Material Readiness Command Managed Items ..... TB 9-2300-281-35

A-5. TECHNICAL MANUALS

Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use ..... TM 750-244-6

Railcar Loading Procedures ..... TM 55-601

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare. repair part, or module (component or assembly) in a manner to allow

B-2, MAINTENANCE FUNCTIONS - CONT

the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown in the maintenance function column (3), Section II.

i. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunctions, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

a. Column (1) - Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be 7411.

b. Column (2) - Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column (3) - Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. Column (4) - Maintenance Level. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(the level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II - CONT

C ..... Operator or crew
O ..... Unit maintenance

e. Column (5) - Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column (6) - Remarks. This column shall, when applicable, contain a letter code, in alphabetical order, which shall be keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

a. Column (1) - Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column (2) - Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column (3) - Nomenclature. Name or identification of the tool or test equipment.

d. Column (4) - National Stock Number. The National stock number of the tool or test equipment.

e. Column (5) - Tool Number. The manufacturer’s part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

a. Column (1) - Reference Code. The code recorded in column 6, Section II.

b. Column (2) - Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

SECTION II. MAINTENANCE ALLOCATION CHART

GROUP NUMBER (1)	COMPONENT/ASSEMBLY (2)	MAINTENANCE FUNCTION (3)	MAINT LEVEL					TOOLS & EQUIP. (5)	REMARKS (6)
			UNIT		INTMED				
			C	O	F	H	D		
7411	Crane Dragline or Clamshell Attachments								
	Spreader Frame	Inspect	0.1						A
		Replace		1.0					
	Coupler, Twist Lock Assy	Inspect	0.1						
		Service	0.2					2	
		Adjust		1.0				1	
		Replace		1.0				1	
		Repair		2.0				1	
	Guide Wheel Assy	Inspect	0.1						
		Service	0.1					2	
		Replace		1.0				1	
		Repair		1.0				1	
	Swing Bolts	Inspect	0.1						
		Replace		1.0				1	
	Control Rods	Inspect	0.1						
		Replace		1.0				1	
	Cam and Bearing	Inspect	0.1						
		Replace		1.0				2	
	Arm, Alignment Assy	Inspect	0.1						
		Service	0.1					2	
		Replace		1.0				1	
		Repair		1.0				1	
	Control Cables	Inspect	0.1						
		Replace		1.0				1	
	Sling Assy	Inspect	0.2						
		Replace		1.0					B

MAINTENANCE LEVELS:

C - OPERATOR/CREW
O - ORGANIZATIONAL = UNIT

F - INTERMEDIATE DIRECT SUPPORT
H - INTERMEDIATE GENERAL SUPPORT

D-DEPOT

STA FORM 668.1
1 OCT 85

PREVIOUS EDITION IS OBSOLETE.

MAINTENANCE ALLOCATION CHART
FOR
SPREADERS, LIFTING
IS0 AND INTERMODAL FREIGHT CONTAINERS
MODEL 214LS20 or 215LS40

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REFERENCE CODE	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER	FSCM
1	O	Tool Kit, General Mechanics: Auto (SC 5810-90-CL-N26)	5180-00-177-7033	W50266	
2	O	Shop Equip. Auto Maint: Org. Maint, Commons No. 1 (SC 4910-95-CL-A74)	4910-00-754-0654	W32593	

SECTION IV. MAINTENANCE ALLOCATION CHART	
REFERENCE CODE	REMARKS
A	No repair is authorized, i.e., welding.
B	Shackles are to be replaced in sets of four, unless the replacement shackle is identical to the original in specification and dimension.

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

C-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the spreader. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical. Class V, Repair Parts, and Heraldic Items).

C-2. EXPLANATION OF COLUMNS

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., Dry Cleaning Solvent, Item 11, Appendix E).

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Unit Maintenance

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by Federal Supply Code for Manufacturer (FSCM) in parentheses.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

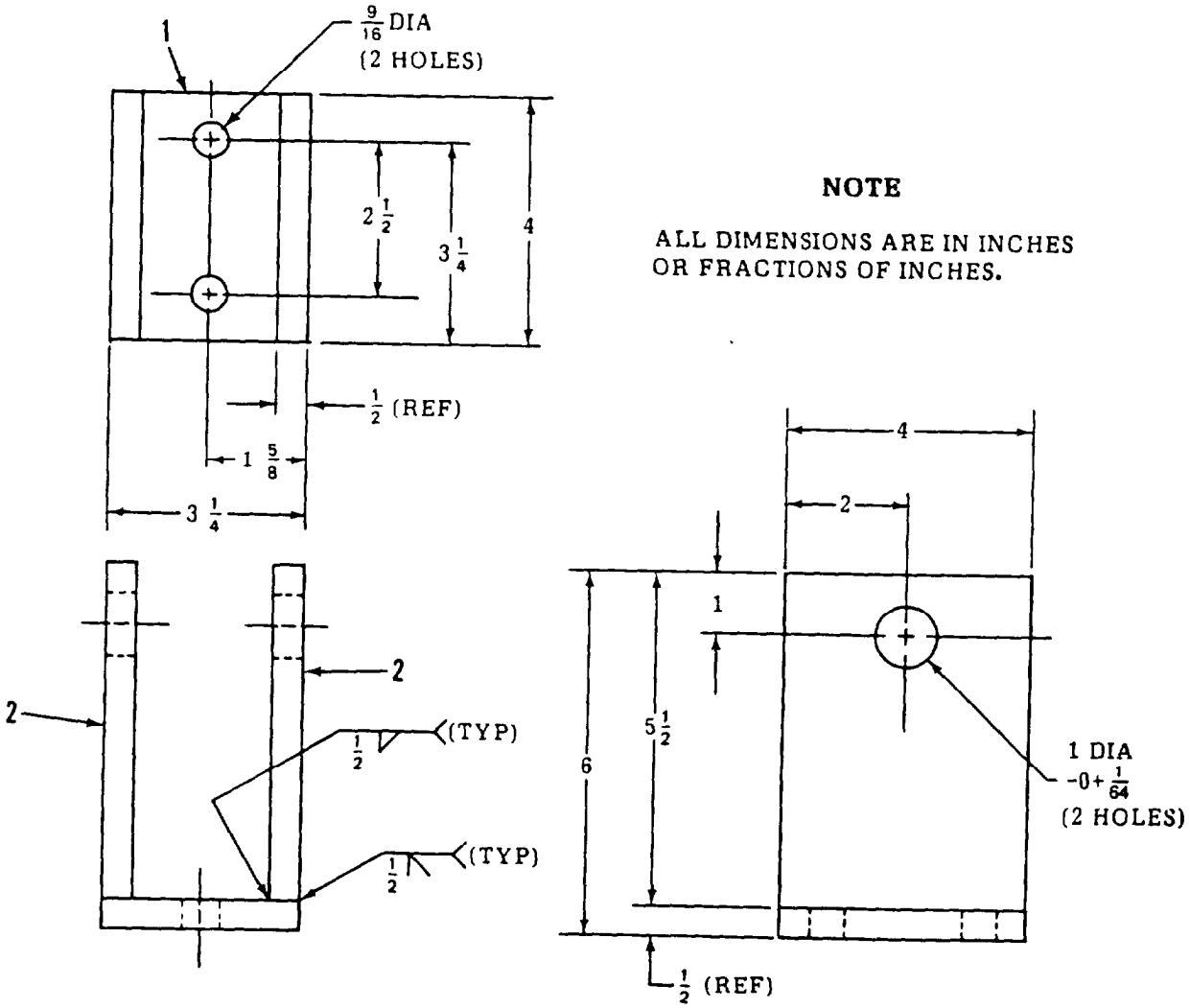
(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	C, O	6850-00-274-5421	Solvent, Dry Cleaning, P-D-680 (SD2)	can
2	O	9150-00-190-0904	Grease, Automotive and Artillery, MIL-G-10924	5 gal can

APPENDIX D

MANUFACTURED ITEMS LIST

D-l. GUIDE WHEEL BRACKET

The following information is furnished in event the guide wheel bracket is damaged, and a replacement bracket must be manufactured (See Page 3-7).



LIST OF MATERIALS			
ITEM	QTY	SPECIFICATION	NOMENCLATURE OR DESCRIPTION
1	1	ASTM A36	PLATE, 1/2 X 3-1/4 X 4 LG., STL.
2	2	ASTM A36	PLATE, 1/2 X 4 X 5-1/2 LG., STL.

Figure D-l. Bracket, Wheel Guide

APPENDIX E

TORQUE LIMITS

NOT APPLICABLE

TECHNICAL MANUAL

TM 10-3990-205-12&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C.,

OPERATOR'S, UNIT MAINTENANCE MANUAL AND REPAIR PARTS AND SPECIAL TOOLS LIST

SPREADER, LIFTING, ISO AND INTERMODAL FREIGHT CONTAINERS; TYPE II, TOP LIFT, SEMI AUTOMATIC TLS MODEL 214LS20 NSN 3990-01-258-2010 MODEL 215LS40 NSN 3990-01-258-2011

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual direct to: Commander U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

Approved for public release: distribution is unlimited.

Current as of 3 December 1990

TABLE OF CONTENTS

APPENDIX F

UNIT MAINTENANCE
REPAIR PARTS AND SPECIAL TOOLS LIST

SECTION I. INTRODUCTION

1. Scope.

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of Unit Maintenance of the Spreader, Lifter. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

2. General.

In addition to Section I. Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. *Section* II. *Repair Parts List.* A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair kits are listed separately in their own functional group within Section II. Repair parts for repairable special tools are also listed in the section. Items listed are shown on the associated illustration(s)/figure(s).

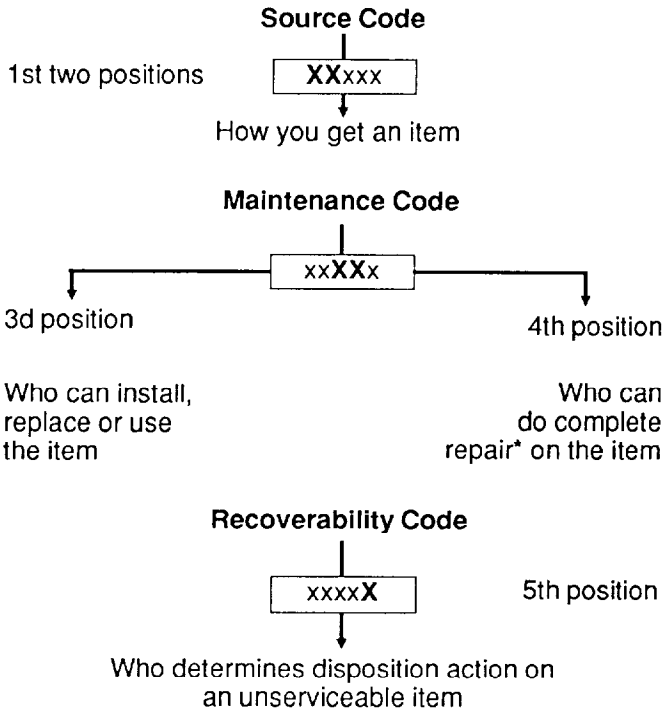
b. *Section III. Special Tools List.* A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

c. *Cross-reference Indexes.* A list, in National Item identification Number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing: in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance. The figure and item number index lists figure and item numbers in alphanumeric sequence and cross-references NSN, CAGE, and part numbers.

3. Explanation of Columns (Sections II and Ill).

a. *ITEM* NO. *(Column* (1)). Indicates the number used to identify items called out in the illustration.

b. *SMR CODE (Column (2))*. The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instructions, as shown in the following breakout:



Complete Repair Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) *Source Code*. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follows:

Code	Application/Explanation
PA *PB* *PC*** *PD* *PE* *PF* *PG*	Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3d position of the SMR code. **Items coded PC are subject to deterioration.
KD *KF* *KB*	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3d position of the SMR code. The complete kit must be requisitioned and applied.
MO-(Made at UM/ A VUM Level) *MF-(Made at IDS/ AVUM Level)* *MH-(Made at IGS Level)* *ML-(Made at Specialized Repair Act (SRA))* *MD-(Made at Depot)*	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the 3d position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.
AO-(Assembled by UM,/AVUM Level) *AF-(Assembled by IDS/AVIM Level)* *AH-(Assembled by IGS Category* *AL-(Assembled by SRA)* *AD- (Assembled by Depot),*	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3d position code of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA -	Do not requisition an "XA"-coded item. Order its next higher assembly. (Also, refer to the NOTE below.)
XB -	If an "XB" item is not available from salvage, order it using the CAGE and part number given.
XC -	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by the manufacturer's part number.
XD -	Item is not stocked. Order an "XD"-coded item through normal supply channels using the CAGE and part number given, if no NSN is available.

NOTE: Cannibalization or controlled exchange, when authorized, may be used as source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 700-42.

(2) Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance.

Code	Application/Explanation
C -	Crew or operator maintenance done within unit maintenance or aviation unit maintenance.
O -	Unit maintenance or aviation unit category can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions.) (NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following maintenance codes:

Code	Application/Explanation
O -	Unit maintenance or Aviation unit is the lowest level that can do complete repair of the item.
F -	Intermediate Direct support or aviation intermediate is the lowest level that can do complete repair of the item.
H -	Intermediate General support is the lowest level that can do complete repair of the item.

D - Depot is the lowest level that can do complete repair of the item.

L - Specialized repair activity is the lowest level that can do complete repair of the item.

Z - Nonreparable. No repair is authorized.

B - No repair is authorized. (No par-s or special tools are authorized for the maintenance of a "B" coded item). However, the item may be reconditioned by adjusting, lubrication, etc., at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Code	Application/Explanation
Z -	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3d position of SMR Code.
O -	Reparable item. When uneconomically reparable, condemn and dispose of the item at unit maintenance or aviation unit level.
F -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the intermediate direct support or aviation intermediate level.
H -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the intermediate general support level.
D -	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L -	Reparable item. Condemnation and disposal of item not authorized below specialized repair activity (SRA).
A -	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. *CAGEC (Column* (3)). The Commercial and Government Entity (CAGE) Code (C) is a 5-digit alphanumeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

d. *PART NUMBER (Column* (4)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

NOTE: When you use a NSN to requisition an item, the item you receive may have a different part number form the part ordered.

e. DESCRIPTION AND USABLE ON CODE (UOC) *(Column* (5)). This column includes the following information:

(1) The Federal item name and, when required, a minimum description to identify the item.

(2) Physical security classification. Not applicable

(3) Items that are included in kits and sets are listed below the name of the kit or set on Figure KIT.

(4) Spare/repair parts that make up and assembled item are listed immediately following the assembled item line entry.

(5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC). Not applicable.

(7) The usable on code, when applicable (see paragraph 5, Special information)

(8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.

(9) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.

f. *QTY (Column* (6)). The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

4. Explanation of Columns (Section IV).

a. *NATIONAL STOCK NUMBER (NSN) INDEX.*

(1) *STOCK NUMBER column.* This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last nine

NSN

digits of the NSN (i.e., 5305-01-674-1467.) When using

NIIN

this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

(2) *FIG. column.* This column lists the number of the Figure where the item is identified/located. The figures are in numerical order in Section II and Section III.

(3) *ITEM column.* The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

b. *PART NUMBER INDEX.* Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order.)

(1) *CAGEC column.* The Commercial and Government Entity (CAGE) Code (C) is a 5-digit alphanumeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(2) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

(3) *STOCK NUMBER column.* This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and CAGEC columns to the left.

(4) *FIG. column.* This column lists the number of the figure where the item is identified/located in Section II and III.

(5) *ITEM column.* The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

c. *FIGURE AND ITEM NUMBER INDEX.*

(1) *FIG. column.* This column lists the number of the figure where the item is identified/located in Section II and III.

(2) ITEM column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

(3) STOCK NUMBER column. This column lists the NSN for the item.

(4) *CAGEC column.* The Commercial and Government Entity (CAGE) Code (C) is a 5-digit alphanumeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(5) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

5. Special Information.

Use the following subparagraphs as applicable:

a. *USABLE ON CODE.* The usable on code appears in the lower left corner of the Description column heading. Usable on codes are shown as "UOC:....." in the Description Column (justified left) on the first line following applicable item description/nomenclature. Uncoded items are applicable to all models. Identification of the usable on codes used in the RPSTL are:

Code	Used On
214LS20	*F20*
215LS40	*MO*

b. *FABRICATION INSTRUCTIONS.* Bulk materials required to manufacture items are listed in the Bulk Material Functional Group of this RPSTL. Part numbers for bulk materials are also referenced in the description column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in the appropriate appendices of this manual

c. ASSEMBLY INSTRUCT/ON. Detailed assembly instructions for items source coded to be assembled from component spare/repair parts are found in the appropriate appendices of this manual. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

d. *KITS.* Line item entries for repair parts kits appear in group 9401 in Section II.

e. INDEX NUMBERS. Items which have the word BULK in the figure column will have and index number shown in the item number column. This index number is a cross-reference between the National Stock Number/Part Number Index and the bulk material list in Section II.

f. *ASSOCIATED PUBLICATIONS.* None Applicable.

6. How to locate Repair Parts.

a. *When National Stock Number or Part Number is Not Known.*

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the some groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) *Third.* Identify the item on the figure and use the Figure and Item Number Index to find the NSN.

b. *When National Stock Number or Part Number is Known:*

(1) First. Using the National Stock Number or the Part Number Index, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see 4.1(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see 4.b). Both indexes cross-reference you to the illustration/figure and item number of the item you are looking for.

(2) *Second.* Turn to the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

7. Abbreviations.

For standard abbreviations see MIL-STD-12D, Military Standard Abbreviations For Use On Drawings, Specifications, Standards And In Technical Documents.

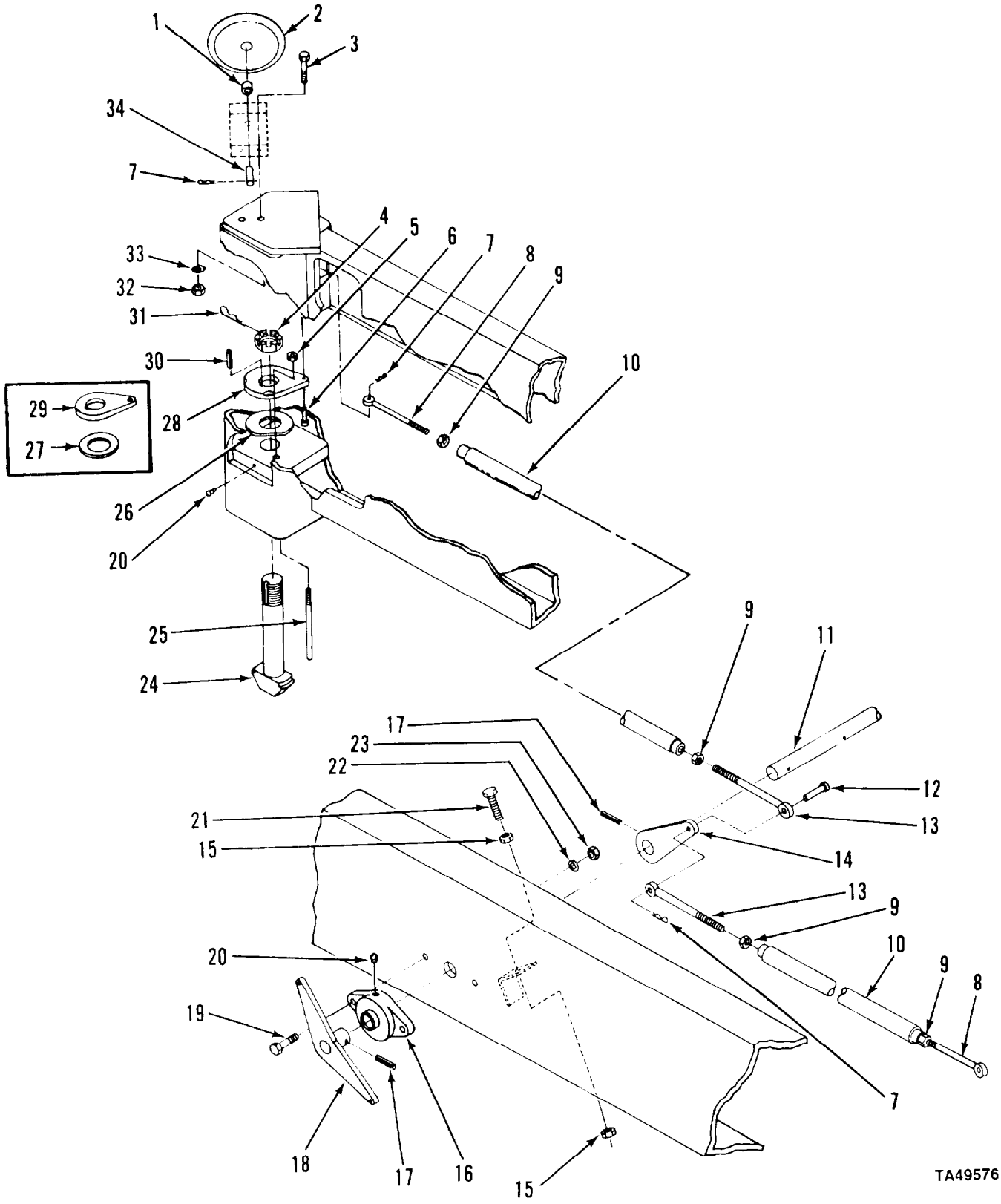


FIGURE 1. LIFTING SPREADER

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 74 CRANES, SHOVELS, AND EARTH MOVING EQUIPMENT COMPONENTS	
				GROUP 7411 CRANE DRAGLINE OR CLAM-SHELL ATTACHMENTS	
				FIG. 1 LIFTING SPREADER	
* 1	PFOZZ	70417	AA-1334-2	BEARING, SLEEVE	4
* 2	PFOZZ	55242	214A-10	WHEEL,GUIDE,LIFTING	4
3	PAOZZ	96906	MS90728-114	SCREW,CAP,HEXAGON H	8
4	PAOZZ	55242	215A-4	NUT,PLAIN,SLOTTED, H	1
5	PAOZZ	55242	215A-45	NUT,PLAIN,HEXAGON	3
6	PAOZZ	96652	11-091	PIN,STRAIGHT,HEADED	4
7	PAOZZ	96906	MS24665-357	PIN,COTTER	14
8	PAOZZ	55242	214A-35	BOLT,MACHINE	4
9	PAOZZ	96906	MS35691-33	NUT,PLAIN,HEXAGON	4
* 10	PFOZZ	55242	215A-39	POST,ELECTRICAL-MEC UOC:F40	4
10	PFOZZ	55242	214A-39	POST,ELECTRICAL-MEC UOC:F20	4
11	PFOZZ	55242	214A-40	METAL BAR	1
12	PAOZZ	96652	11-109	PIN,STRAIGHT,HEADED	2
13	PAOZZ	55242	214A-44	BOLT,EYE	4
* 14	PFOZZ	55242	214A-41	LEVER,REMOTE CONTROL	2
15	PAOZZ	96906	MS35691-17	NUT,PLAIN,HEXAGON	8
* 16	PAOZZ	21335	SCJT-1	BEARING UNIT,BALL	2
* 17	PAOZZ	96906	MS 16562-65	PIN,SPRING	4
* 18	PFOZZ	55242	214A-26	BELL CRANK	2
19	PAOZZ	96906	MS90728-89	SCREW,CAP,HEXAGON H	2
20	PAOZZ	96906	MS15001-1	FITTING,LUBRICATION	6
21	PAOZZ	96906	MS-90728-66	SCREW,CAP,HEXAGON H	4
22	PAOZZ	96906	MS35338-47	WASHER,LOCK	4
23	PAOZZ	96906	MS51967-11	NUT,PLAIN,HEXAGON	4
24	PAOZZ	55242	214A-3	BOLT,MACHINE	4
25	PFOZZ	55242	214A-46	SHAFT,STRAIGHT	4
26	PFOZZ	55242	214A-43	WASHER,FLAT	1
27	PAOZZ	96906	MS27183-36	WASHER,FLAT	3
28	PFOZZ	55242	214A-38	LEVER,REMOTE CONTROL	1
29	PFOZZ	55242	214A-7	LEVER,REMOTE CONTROL	3
30	XOOZZ	55242	214A-8	BAR,SQUARE,KEY	4
31	PAOZZ	96906	MS24665-628	PIN,COTTER	4
* 32	PAOZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON	8
* 33	PAOZZ	96906	MS35338-48	WASHER,LOCK	8
34	PFOZZ	55242	214A-16	SHAFT,STRAIGHT	4

END OF FIGURE

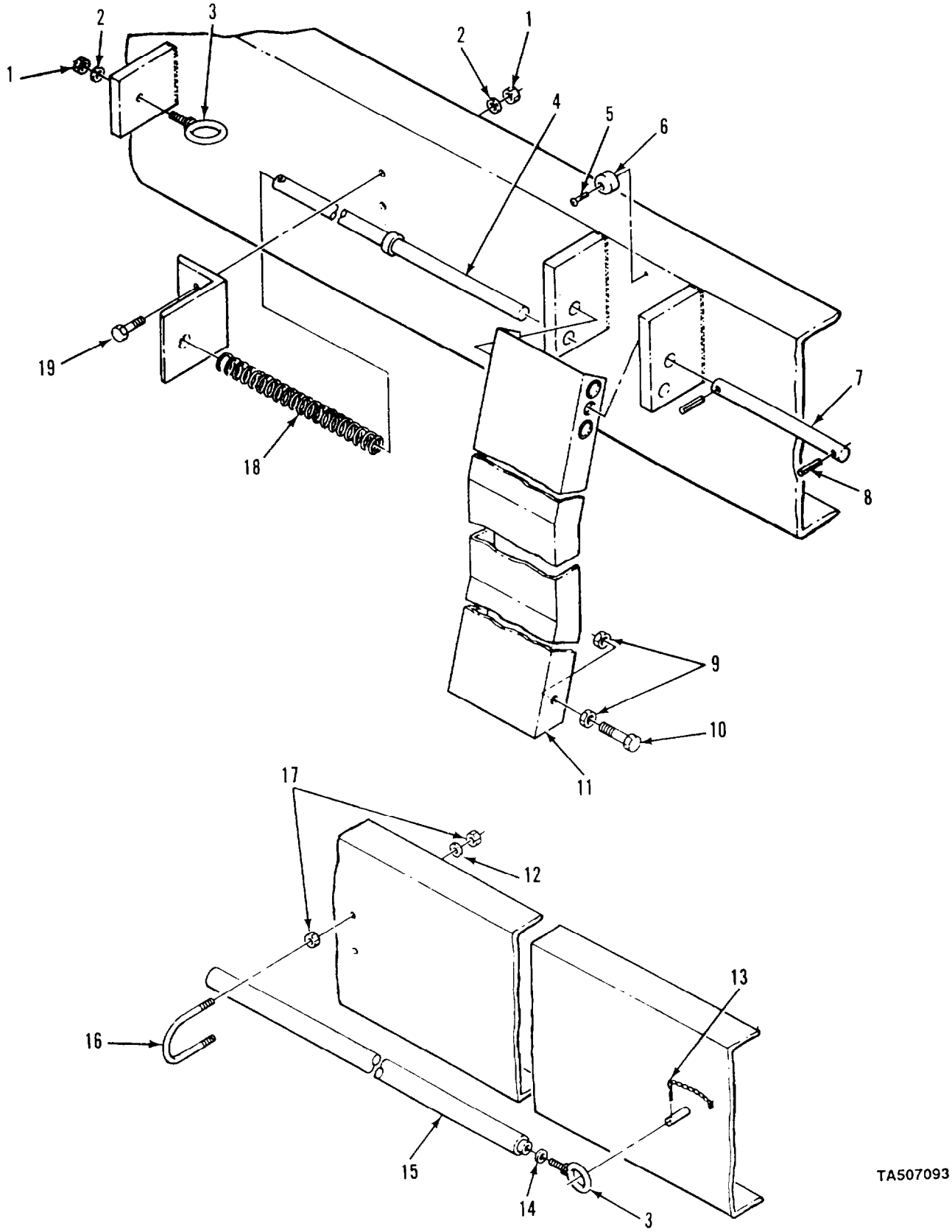


FIGURE 2. LIFTING SPREADER.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 7411 CRANE DRAGLINE OR CLAM-SHELL ATTACHMENTS	
				FIG. 2 LIFTING SPREADER	
* 1	PAOZZ	96906	MS51967-14	NUT,PLAIN HEX	19
* 2	PAOZZ	96906	MS35338-48	WASHER,LOCK	19
* 3	PAOZZ	96906	MS51937-5	BOLT,EYE	7
* 4	PFOZZ	55242	215A-22	PIN,SPRING	6
* 5	PAOZZ	96906	MS24630-48	SCREW.TAPPING.THREA	6
* 6	PAOZZ	1E045	B-2	BUMPER,NONMETALLIC	6
* 7	PFOZZ	55242	214A-25	PIN,STRAIGHT,HEADLE	6
* 8	PAOZZ	96906	MS16562-65	PIN,SPRING	12
* 9	PAOZZ	96906	MS51922-33	NUT,SELF-LOCKING,HE	12
* 10	PAOZZ	96906	MS51095-420	SCREW,CAP,HEXAGON H	6
* 11	PFOZZ	55242	214A-9	ARM,ALIGNMENT	6
* 12	PAOZZ	96906	MS35338-44	WASHER,LOCK	2
* 13	PAOZZ	55242	215A-51	PIN,LOCK	1
* 14	PAOZZ	96906	MS35338-50	WASHER,LOCK	1
* 15	PFOZZ	55242	214A-50	BOLT ASSEMBLY	1
* 16	PAOZZ	55242	215A-52	B0LT,U	1
* 17	PAOZZ	96906	MS51967-2	NUT,PLAIN,HEXAGON	2
* 18	PFOZZ	9N398	RW-11	SPRING,HELICAL,COMP	6
* 19	PAOZZ	96906	MS90728-113	SCREW,CAP,HEXAGON H	12

END OF FIGURE

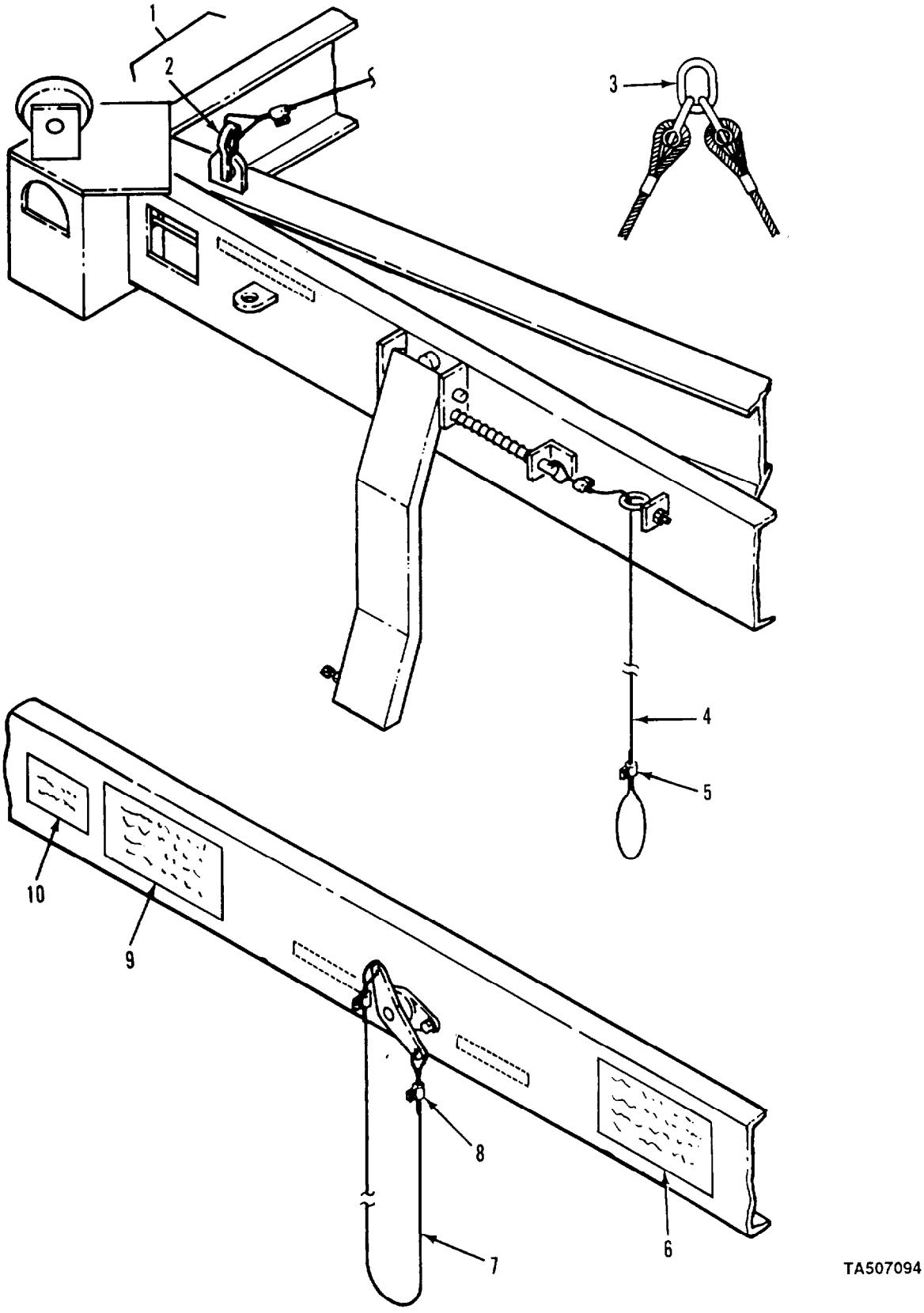


FIGURE 3. LIFTING SPREADER.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 7411 CRANE DRAGLINE OR CLAM-SHELL ATTACHMENTS	
				FIG. 3 LIFTING SPREADER	
* 1	PAOZZ	55242	215A-33	WIRE ROPE ASSEMBLY UOC:F40	4
* 1	PAOZZ	55242	214A-33	WIRE,ROPE ASSEMBLY UOC:F20	4
* 2	PAOZZ	88044	AN116-24	.SHACKLE,ANCHOR	8
* 3	PAOZZ	55242	214A-67	RING,RETAINING UOC:F20	1
* 3	PAOZZ	55242	215A-67	RING,RETAINING UOC:F40	1
* 4	MOOZZ	81349	MIL-W-83420-72	WIRE ROPE	6
* 5	PAOZZ	55242	215A-62	CLAMP,LOOP	16
* 6	PFOZZ	55242	214C-7	PLATE,INSTRUCTION	1
* 7	MOOZZ	81349	MIL-W-83420-96	ROPE,WIRE	2
* 8	PFOZZ	55242	215C-3	PLATE,INSTRUCTION UOC:F40	1
* 8	PFOZZ	55242	214C-3	PLATE,INSTRUCTION UOC:F20	1
* 9	PFOZZ	55242	215C-2	PLATE,IDENTIFICATION UOC:F40	1
* 9	PFOZZ	55242	214C-2	PLATE,IDENTIFICATION UOC:F20	1
				END OF FIGURE	

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 95 GENERAL USE STANDARDIZED PARTS	
				GROUP 9501 BULK MATERIEL	
				FIG. BULK	
* 1	PAOZZ	81349	M83420/1-005	ROPE,WIRE	V
				END OF FIGURE	

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM
5306-00-050-0347	2	3
4730-00-050-4203	1	20
5305-00-063-4568	2	5
5305-00-071-2055	1	19
5305-00-071-2069	2	19
5305-00-071-2070	1	3
5305-00-165-8074	2	10
5310-00-209-0965	1	22
5310-00-225-6993	2	9
4010-00-285-3705	BULK	1
5315-00-298-1481	1	7
5310-00-582-5965	2	12
5310-00-584-5272	1	33
	2	2
5310-00-761-6882	2	17
5310-00-768-0318	1	32
	2	1
5305-00-782-9489	1	21
5310-00-820-6653	2	14
5310-00-834-8732	1	9
5315-00-844-5836	1	17
	2	8
5315-00-846-0126	1	31
5310-00-851-2682	1	15
5310-00-880-8189	1	23
5310-00-982-6571	1	27
3040-01-273-5821	1	25
3040-01-273-5822	1	29
3040-01-273-5823	1	18
3040-01-273-5824	1	28
3040-01-273-5825	1	14
3040-01-273-9183	1	34
3990-01-275-1019	1	2
5306-01-275-3249	1	8
5306-01-275-3250	1	13
5306-01-275-3266	2	16
5310-01-275-3296	1	5
5310-01-275-3300	1	4
5310-01-275-3315	1	26
5315-01-275-3449	1	12
5315-01-275-3450	2	3
5315-01-275-3454	2	7
5306-01-275-3462	2	15
5340-01-275-3498	1	10
5340-01-275-3499	1	10
5360-01-275-3507	2	18
5340-01-275-3535	2	6
5315-01-275-6979	1	6
5315-01-275-6981	2	4
3990-01-275-8383	2	11
9905-01-276-2719	3	8
9905-01-276-2720	3	9
9905-01-276-2723	3	6
3120-01-276-3374	1	1
9905-01-276-4186	3	9
9905-01-276-7017	3	8
4010-01-277-0386	3	1
3130-01-277-0389	1	16
3130-01-277-5070	1	11
5306-01-280-5677	1	24
4030-01-282-3338	3	5
4030-01-284-1493	3	2
5365-01-285-6012	3	3
5365-01-286-6241	3	3
4010-01-305-9536	3	1

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
70417	AA-1334-2	3120-01-276-3374	1	1
88044	AN116-24	4030-01-284-1493	3	2
1E045	B-2	5340-01-275-3535	2	6
81349	MIL-W-8342C-72		3	4
81349	MIL-W-8342C-96		3	7
96906	MS-90728-66	5305-00-782-9489	1	21
96906	MS15001-1	4730-00-050-4203	1	20
96906	MS16562-65	5315-00-844-5836	1	17
			2	8
96906	MS24630-48	5305-00-063-4568	2	5
96906	MS24665-357	5315-00-298-1481	1	7
96906	MS24665-628	5315-00-846-0126	1	31
96906	MS27183-36	5310-00-982-6571	1	27
96906	MS35338-44	5310-00-582-5965	2	12
96906	MS35338-47	5310-00-209-0965	1	22
96906	MS35338-48	5310-00-584-5272	1	33
			2	2
96906	MS35338-50	5310-00-820-6653	2	14
96906	MS35691-17	5310-00-851-2682	1	15
96906	MS35691-33	5310-00-834-8732	1	9
96906	MS51095-420	5305-00-165-8074	2	10
96906	MS51922-33	5310-00-225-6993	2	9
96906	MS51937-5	5306-00-050-0347	2	3
96906	MS51967-11	5310-00-880-8189	1	23
96906	MS51967-14	5310-00-768-0318	1	32
			2	1
96906	MS51967-2	5310-00-761-6882	2	17
96906	MS90728-113	5305-00-071-2069	2	19
96906	MS90728-114	5305-00-071-2070	1	3
96906	MS90728-89	5305-00-071-2055	1	19
81349	M83420/1-005	4010-00-285-3705	BULK	1
9N398	RW-11	5360-01-275-3507	2	18
21335	SCJT-1	3130-01-277-0389	1	16
96652	11-091	5315-01-275-6979	1	6
96652	11-109	5315-01-275-3449	1	12
55242	214A-10	3990-01-275-1019	1	2
55242	214A-16	3040-01-273-9183	1	34
55242	214A-25	5315-01-275-3454	2	7
55242	214A-26	3040-01-273-5823	1	18
55242	214A-3	5306-01-280-5677	1	24
55242	214A-33	4010-01-305-9536	3	1
55242	214A-35	5306-01-275-3249	1	8
55242	214A-38	3040-01-273-5824	1	28
55242	214A-39	5340-01-275-3499	1	10
55242	214A-40	9510-01-277-5070	1	11
55242	214A-41	3040-01-273-5825	1	14
55242	214A-43	5310-01-275-3315	1	26
55242	214A-44	5306-01-275-3250	1	13
55242	214A-46	3040-01-273-5821	1	25
55242	214A-50	5306-01-275-3462	2	15
55242	214A-67	5365-01-285-6012	3	3

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
55242	214A-7	3040-01-273-5822	1	29
55242	214A-8		1	30
55242	214A-9	3990-01-275-8383	2	11
55242	214C-2	9905-01-276-2720	3	9
55242	214C-3	9905-01-276-7017	3	8
55242	214C-7	9905-01-276-2723	3	6
55242	215A-22	5315-01-275-6981	2	4
55242	215A-33	4010-01-277-0386	3	1
55242	215A-39	5340-01-275-3498	1	10
55242	215A-4	5310-01-275-3300	1	4
55242	215A-45	5310-01-275-3296	1	5
55242	215A-51	5315-01-275-3450	2	13
55242	215A-52	5306-01-275-3266	2	16
55242	215A-62	4030-01-282-3338	3	5
55242	215A-67	5365-01-286-6241	3	3
55242	215C-2	9905-01-276-4186	3	9
55242	215C-3	9905-01-276-2719	3	8

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BULK	1	4010-00-285-3705	81349	M8340/1-005
1	1	3120-01-276-3374	70417	AA-1334-2
1	2	3990-01-275-1019	55242	214A-10
1	3	5305-00-071-2070	96906	MS90728-114
1	4	5310-01-275-3300	55242	215A-4
1	5	5310-01-275-3296	55242	215A-45
1	6	5315-01-275-6979	96652	11-091
1	7	5315-00-298-1481	96906	MS24665-357
1	8	5306-01-275-3249	55242	214A-35
1	9	5310-00-834-8732	96906	MS35691-33
1	10	5340-01-275-3498	55242	215A-39
1	10	5340-01-275-3499	55242	214A-39
1	11	9510-01-277-5070	55242	214A-40
1	12	5315-01-275-3449	96652	11-109
1	13	5306-01-275-3250	55242	214A-44
1	14	3040-01-273-5825	55242	214A-41
1	15	5310-00-851-2682	96906	MS35691-17
1	16	3130-01-277-0389	21335	SCJT-1
1	17	5315-00-844-5836	96906	MS16562-65
1	18	3040-01-273-5823	55242	214A-26
1	19	5305-00-071-2055	96906	MS90728-89
1	20	4730-00-050-4203	96906	MS15001-1
1	21	5305-00-782-9489	96906	MS-90728-66
1	22	5310-00-209-0965	96906	MS35338-47
1	23	5310-00-880-8189	96906	MS51967-11
1	24	5306-01-280-5677	55242	214A-3
1	25	3040-01-273-5821	55242	214A-46
1	26	5310-01-275-3315	55242	214A-43
1	27	5310-00-982-6571	96906	MS27183-36
1	28	3040-01-273-5824	55242	214A-38
1	29	3040-01-273-5822	55242	214A-7
1	30		55242	214A-8
1	31	5315-00-846-0126	96906	MS24665-628
1	32	5310-00-768-0318	96906	MS51967-14
1	33	5310-00-584-5272	96906	MS35338-48
1	34	3040-01-273-9183	55242	214A-16
2	1	5310-00-768-0318	96906	MS51967-14
2	2	5310-00-584-5272	96906	MS3538-48
2	3	5306-00-050-0347	96906	MS51937-5
2	4	5315-01-275-6981	55242	215A-22
2	5	5305-00-063-4568	96906	MS24630-48
2	6	5340-01-275-3535	1E045	B-2
2	7	5315-01-275-3454	55242	214A-25
2	8	5315-00-844-5836	96906	MS16562-65
2	9	5310-00-225-6993	96906	MS51922-33
2	10	5305-00-165-8074	96906	MS51095-420
2	11	3990-01-275-8383	55242	214A-9
2	12	5310-00-582-5965	96906	MS35338-44
2	13	5315-01-275-3450	55242	215A-51
2	14	5310-00-820-6653	96906	MS35338-50
2	15	5306-01-275-3462	55242	214A-50

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FIG	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
2	16	5306-01-275-3266	55242	215A-52
2	17	5310-00-761-6882	96906	MS51967-2
2	18	5360-01-275-3507	9N398	RW-11
2	19	5305-00-071-2069	96906	MS90728-113
3	1	4010-01-277-0386	55242	215A-33
3	1	4010-01-305-9536	55242	214A-33
3	2	4030-01-284-1493	88044	AN116-24
3	3	5365-01-285-6012	55242	214A-67
3	3	5365-01-286-6241	55242	215A-67
3	4		81349	MIL-W-8342C-72
3	5	4030-01-282-3338	55242	215A-62
3	6	9905-01-276-2723	55242	214C-7
3	7		81349	MIL-W-8342C-96
3	8	9905-01-276-2719	55242	215C-3
3	8	9905-01-276-7017	55242	214C-3
3	9	9905-01-276-2720	55242	214C-2
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By Order of the Secretary of the Army:

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METRIC CONVERSION TABLE

UNIT	ABBREVIATION OR SYMBOL	EQUIVALENT	METRIC EQUIVALENT	ABBREVIATION
		WEIGHT		
Grain	gr	0.036 drams	0.0648 grams	g or gm
Dram	dr	27.343 grains	1.771 grams	g or gm
Ounce	oz	16 drams	28.349 grams	g or gm
Pound	lb or #	16 ounces	0.453 kilograms	kg
Hundredweight	cwt			
Short hundredweight		100 pounds	45.359 kilograms	kg
Long hundredweight		112 pounds	50.802 kilograms	kg
Ton				
Short ton		2000 pounds	0.907 metric tons	MT or t
Long ton		2240 pounds	1.016 metric tons	MT or t
		LENGTH		
Inch	in or "	0.083 feet	2.54 centimeters	cm
Foot	ft or '	12 inches	30.480 centimeters	cm
Yard	yd	3 feet	0.9144 meters	m
Rod	rd	16.5 feet	5.029 meters	m
Mile	mi	5280 feet	1.609 kilometers	km
		AREA		
Square inch	sq in or in^2	0.007 square feet	6.451 square centimeters	sq or cm^2
Square foot	sq ft or ft^2	144 square inches	0.093 square meters	sq m or m^2
Square yard	sq yd or yd^2	9 square feet	0.836 square meters	sq m or m^2
Square rod	sq rd or rd^2	30.25 square yards	25.293 square meters	sq m or m^2
Acre		4840 square yards	4047 square meters	sq m or m^2
Square mile	sq mi or m^2	640 acres	2.590 square kilometers	sq km or km^2
		VOLUME		
Cubic inch	cu in or in^3	0.00058 cubic feet	16.387 cubic centimeters	cu cm, cm^3 or cc
Cubic foot	cu ft or ft^3	1728 cubic inches	0.028 cubic meters	cu m or m^3
Cubic yard	cu yd or yd^3	27 cubic feet	0.765 cubic meters	cu m or m^3
		CAPACITY		
Fluidram	fl dr	0.225 cubic inches	3.696 milliliters	ml
Fluidounce	fl oz	8 fluid drams	29.573 milliliters	ml
Gill	gi	4 fluid ounces	118.291 milliliters	ml
Pint	pt	4 gills	0.473 liters	l
Quart	qt	2 pints	0.946 liters	l
Gallon	gal	4 quarts	3.785 liters	l

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