RIGID LIFT

INSTALLATION & OPERATION MANUAL

MODELS: RL-B10 THRU RL-L125

THIS MANUAL IS TO BE USED IN CONJUNCTION WITH THE APPROPRIATE PUMP INSTALLATION MANUAL AND HOIST PARTS LIST.

IMPORTANT
FAILURE TO COMPLETE THE ENCLOSED WARRANTY CERTIFICATE MAY VOID YOUR
WARRANTY
IF YOU NEED ASSISTANCE CALL
1-800-227-1702

Harsh International, Inc.
600 Oak Ave.
Eaton, CO 80615
(970) 454-2291
FAX: (970) 454-3491

Price: $2.50

Manual Part Number: 102685H

Congratulations on your recent purchase of a Harsh Hoist! This manual is only a small part of Harsh's continuing effort to serve their customers and bring the best products possible to you the customer. If you have any questions or experience any problems contact your local Harsh Distributor or the Harsh Factory.

Harsh International, Inc.
600 Oak Avenue
Eaton, CO 80615
(970) 454-2291
Fax: (970) 454-3491

NOTES:

1) For single axle trucks, tail hinge placement is based on 32 inches from the center line of the tail hinge pin to the center line of the truck axle with a 2 inch clearance between the cab and bed. For tandem axle trucks, the center of the tail hinge pin is mounted 0 to 2 inches forward from the back edge of the rear tire. This is based on a length of 44 inches from the center of the trunnion to the center of the tail hinge pin. Overhang is measured from the center pin on the tail hinge to the rear of the bed. Tire size and suspension configuration may cause these measurements to vary.

2) The calculated capacity, in tons, is for the body and payload together with an evenly distributed, non-diminishing, solid load for the full cycle. The center (center of gravity) of the load is assumed to be at the center of the body. To insure adequate hoist capacity you should take into account the type of material, and how it will be loaded. The capacities will be reduced if the body is loaded more to the front than to the rear or if part of the load behind the tail hinge is unloaded prior to raising the hoist.

Table of Contents

IMPORTANT INFORMATION

This manual has been prepared to provide the owner and operator with the information required to properly operate and maintain the unit. It is important that you, the owner or operator, read this manual prior to operating or performing any maintenance work on the unit.

For your convenience, we have provided this space for you to record your model and serial numbers and date of purchase as well as your dealership name and address.

Some of the information below is needed for ordering parts. Please fill in information for faster service when ordering.

Owner's Name: _____

Owner's Address: _____

Model Number: _____

Serial Number: _____

Purchase Date: _____

Dealer Name: _____

Dealer Address: _____

Dealer Telephone Number: _____

This hoist was shipped with a HARSH WARRANTY VALIDATION CERTIFICATION card. This certification card must be completely filled out and returned to HARSH prior to any warranty being processed. If you did not receive this certification card please contact HARSH.

INSTALLATION FACTS

1. The hoist can be mounted with the Scissor Hinge either fore or aft for mounting versatility.
2. Plan how the hoist, safety prop, and pump will fit on the truck. The mounting area of the hoist must be free from the cross members, air tanks, etc. for correct mounting.
3. The hoist upper mounts may sit up between the bed cross sills. It may be necessary to shift the hoist fore or aft slightly to avoid cutting or moving the bed cross sills. This will slightly effect the tipping angle and capacity. If the truck frame width is to wide you must build a suitable subframe for the hoist to mount on as you cannot pull the hoist mounts out of the hoist tubes more then 1/4 inch.
4. Determine where the PTO and pump can be located. The pump position will determine how the hoist can be plumbed. Also, keep the cylinder(s), pump, and reservoir away from heat sources such as exhaust pipes.
5. Tilt cab trucks may require greater cab to bed clearance. This is necessary to allow the truck cab (when tilted) to clear the bed. Also any obstruction (air cleaner stack, exhaust pipes, etc.) must be two inches or more from the bed being installed.
6. Take time to become familiar with all hoist parts and how they are to be mounted. **Take notice how the mounts are banded for shipping. This is how the hoist is mounted.**
7. All work should be done by qualified personnel.
8. Insure that this Manual along with the Pump Installation Manual and Hoist Parts Manual are forwarded to the end user.
9. Never modify the hoist or pump in any way. Install the hoist according to the Installation Manual, and Parts Manual for the specific model of hoist.
10. These instructions are for typical installations. If your requirements are different due to body and truck configuration, it is the responsibility of the installer to insure the installation is completed correctly. Before beginning the installation you should always review all appropriate technical manuals and information from the truck chassis manufacturer, trade organizations, and other applicable sources.
11. Never install a double acting hoist (power up & power down) as a single acting hoist (power up only). These hoists have been designed and tested as double acting hoists and modification of the plumbing to use them as a single acting hoist can result in excessive pressure build up inside the cylinder which may lead to cylinder failure and possible damage to the hoist, body, truck, and/or personal injury.

READ ALL PROVIDED MATERIAL AND SAFETY INSTRUCTIONS BEFORE INSTALLING HOIST!

INSTALLATION PROCEDURES

1. Remove the box from the truck frame. Construct a subframe or filler blocks for trucks with frames too wide or those that do not have a straight frame (pickups) (see Figure 1). In the following instructions, the subframe will be referred to as the truck frame for this type of truck.

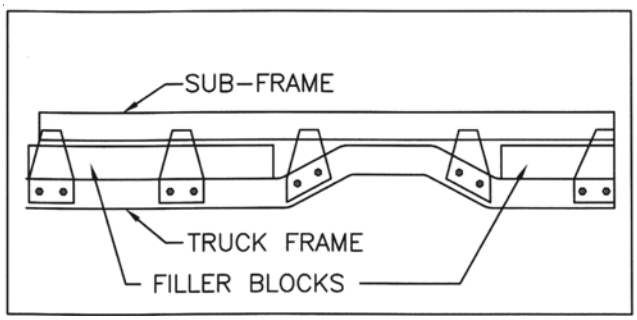

Figure 1: Sub-Frame

2. To install the tail hinge assembly, determine where the tail hinge will be placed for your truck. For single axle trucks, the distance from the front of the tail hinge to the rear spring hanger should be 4 to 6 inches (see Figure 2). The distance from the axle to the center of the tail hinge should be approximately 32 inches; allowing clearance for mud flap brackets.

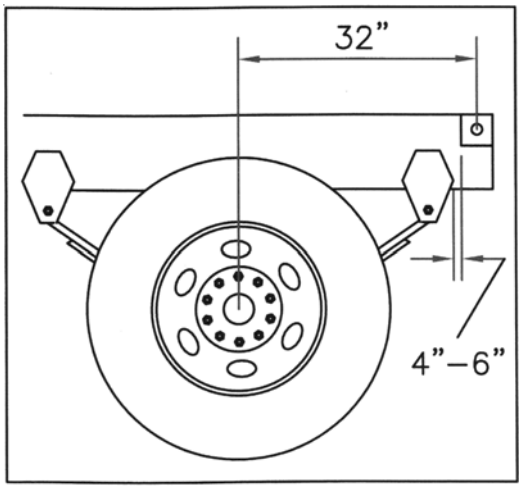

Figure 2: Tail Hinge Placement

For a tandem axle truck, the tail hinge is mounted as follows. The distance from the center of the pivot pin, on the hinge assembly, to the rear edge of the rear tire should be 0 to 2 inches (see Figure 3). If the truck has a rear spring hanger the distance from the front of the tail hinge to the spring hanger should be 4-6 inches. This placement will give a distance of approximately 44 inches from the center of the trunnion to the center of the tail hinge pin. The tail hinge is placed close to the axle to avoid frame damage and severe weight transfer from the front axles when dumping.

WARNING:
Always use suitable stands and hoisting and lifting equipment when lifting the hoist, body or other heavy items.

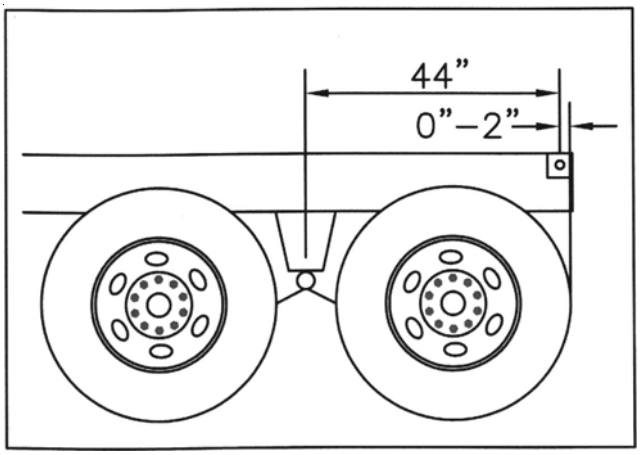

Figure 3: Tandem Axles

After placement of the tail hinge is determined cut out the top rear section of the frame, in which the tail hinge will set (see Figure 4). The hinge should be mounted flush with the top and end of the frame. It may be necessary to cut off the excess length of the truck frame.

After the hinge assembly is in place, insure that the tail hinge is square with the truck frame. Weld the assembly securely to the frame.

INSTALLATION PROCEDURES

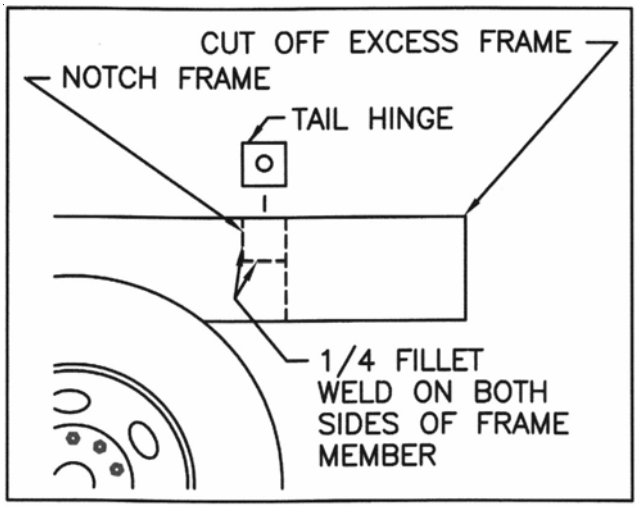

Figure 4: Notching Frame

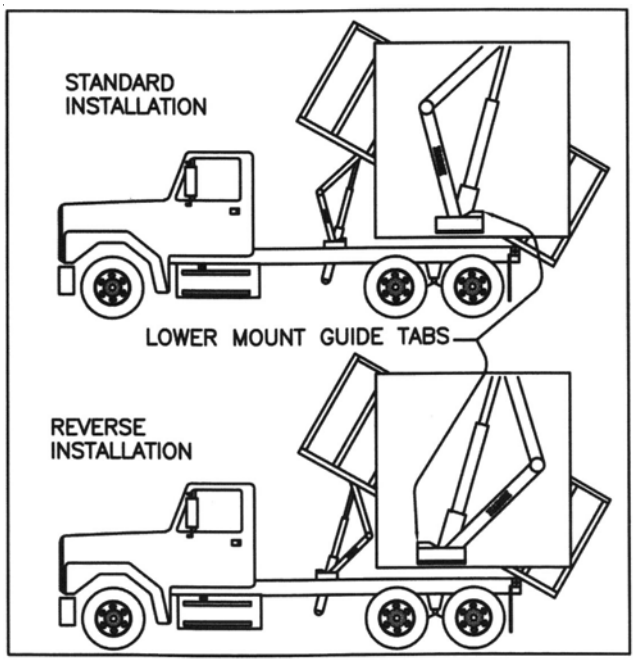

Figure 5A: Lower Mount Guide Tabs

3. Insert lower frame mounts into hoist frame. Make sure the bed guide tabs of the lower mount are facing away from the scissor hinge (see figure 5A).

Do not let the hoist slide side to side. Push the mounts in all the way. If the frame is too wide, build the subframe in, so that it is not necessary to pull the mounts out.

For narrow truck frames, remove the supplied spacer tubes that are found between the lower mounts and the scissor assembly. Consult the specification sheet of your particular hoist model for further information on spacer usage. On telescopic units the cylinder hose port must be toward the scissor hinge. The ear of the top cylinder mount should be rotated so it points down toward the cylinder port. Install the cylinders into the frame with the brass bushings greased and toward the cylinder. You should hand coat the top side of the brass bushing with grease to insure that a complete film of grease is present. After doing so, place the hoist on the truck frame in the position it is to be mounted. Refer to the mounting chart supplied with the hoist, for the "mounting length" at which the hoist is to be positioned.

The mounting length is the distance from the center of the tail hinge pin to the center of the hoist lower mount tube. The hoist can be mounted in the standard or reverse installation to allow for cylinder swing clearances. See Figure 5B. ***IMPORTANT: Do not weld or fasten lower mounts to the truck frame at this time!***

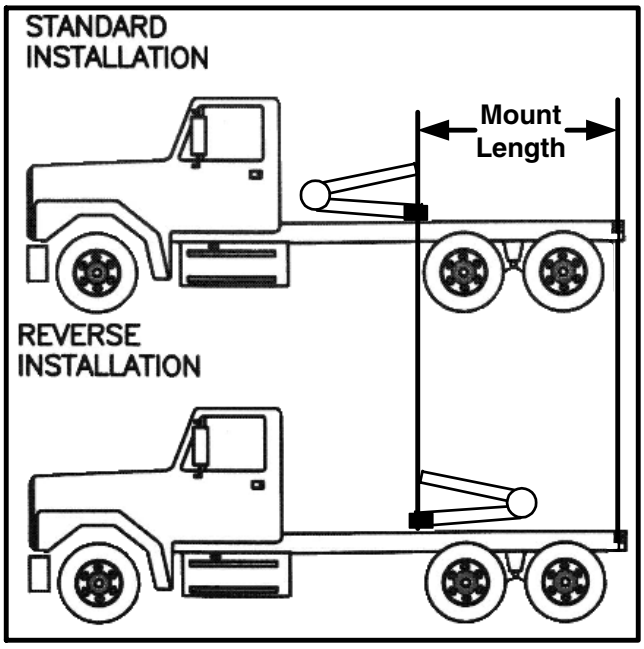

Figure 5B: Mount Length

INSTALLATION PROCEDURES

IMPORTANT:
All welding and cutting must be performed by qualified personnel.

IMPORTANT:
Liberally hand grease the brass bushing(s) before installing into the upper cylinder mounts.

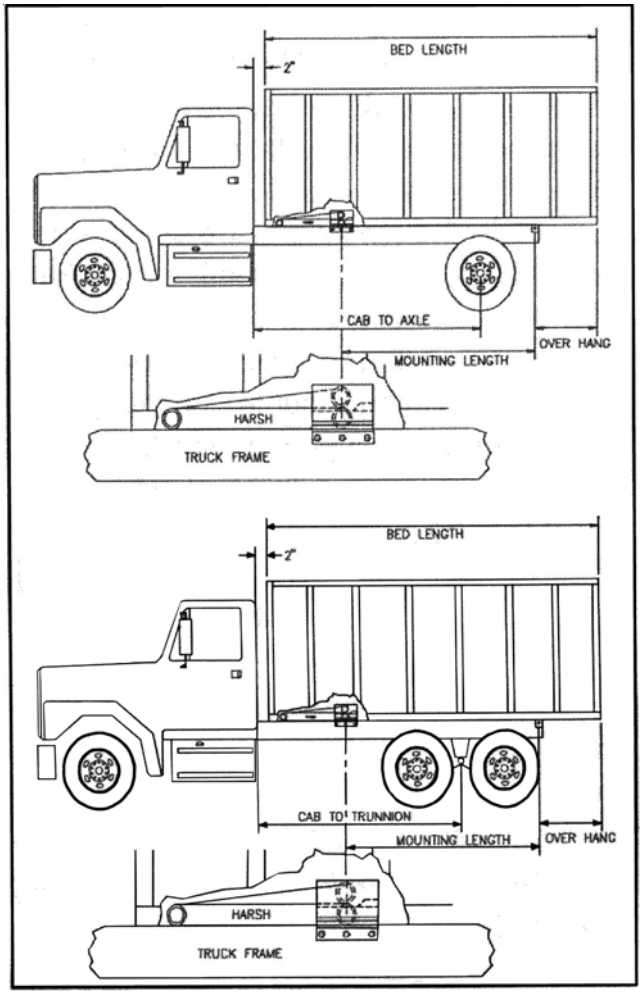

Figure 6:Mount Locations

4. Measure the distance between the front of the bed and the location that the mounting chart recommends for place-ment of the upper hoist mounts. **Do not forget to allow for cab to bed clear-ance. This distance should be at least 2 inches, and more for cab over trucks.** This is done so that adjustments can be made in hoist location to insure proper mounting. The upper mounts are designed to fit between the bed cross sills (see Figure 6).

If the upper hoist mounts are not between the cross sills, the hoist will need to be moved to the front or rear for proper clearance. When doing so, keep in mind the room needed for the hoist to operate between the frame rails. Any changes to the mounting length will affect the capacity and dumping angle of the hoist. **EXAMPLE**: *If the hoist must be moved forward on the truck, the hoist capacity will be greater but the dump angle will decrease.*

5. **Pump Installation**.
Refer to the pump installation information supplied in the small parts bundle for your pump.

6. Make sure that the hoist is square with the truck frame. Before attaching the lower mount angles, recheck for any possible interference (cylinder swing, etc.). Clamp the lower mount angles to the lower hoist mounts and weld the full length of the lower mount. **Do not weld on the truck frame. The frame of the truck is heat treated for strength, and welding could significantly decrease its strength.** Drill and bolt the lower mount angles to the side of the truck frame (see Figure 7).

INSTALLATION PROCEDURES

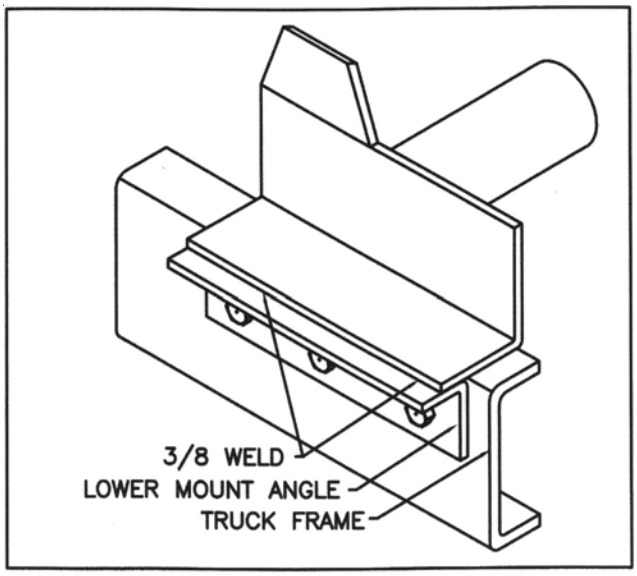

Figure 7: Attaching Mount Angles

For narrow truck frames, bolt angles (at least 3/8 inch thick) to the side of the truck frame to compensate for the bed long members being wider than the frame of the truck (see Figure 8). If more than half of the long member channel's width extends beyond the original truck frame's width, then the bed long members need to be narrowed slightly. Do not narrow the bed long members too much, or the upper hoist mounts will not fit. When used, the support angles must be added to the entire length of the truck frame. **Do not weld the angles to the truck frame!**

7. Insert the top hoist mounts into the hoist frame in the same way in which they were shipped. Set the lower arm of the scissor assembly parallel to the truck frame. This can be done using a jack stand (see Figure 9).

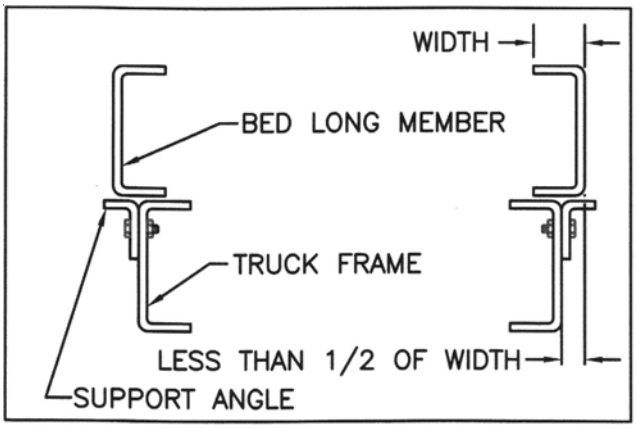

Figure 8: Support Angles

IMPORTANT:
Never drill or weld on the top or the bottom of the truck frame*!*

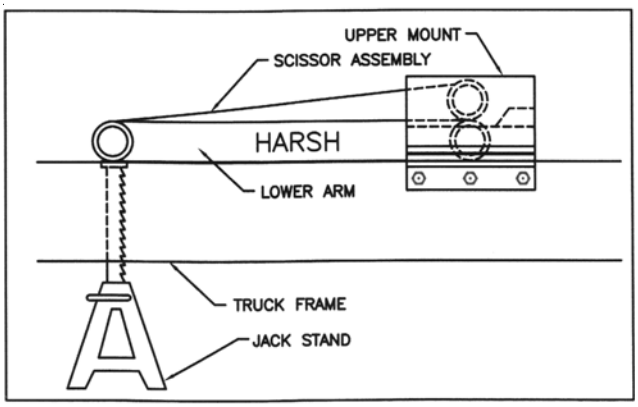

Figure 9: Jack Stand Placement

8. Using hard wood boards that are one inch thick and the same width as the frame, cover the bottom of the bed long members where the long members will rest on the truck frame when fully lowered (see Figure 10).

INSTALLATION PROCEDURES

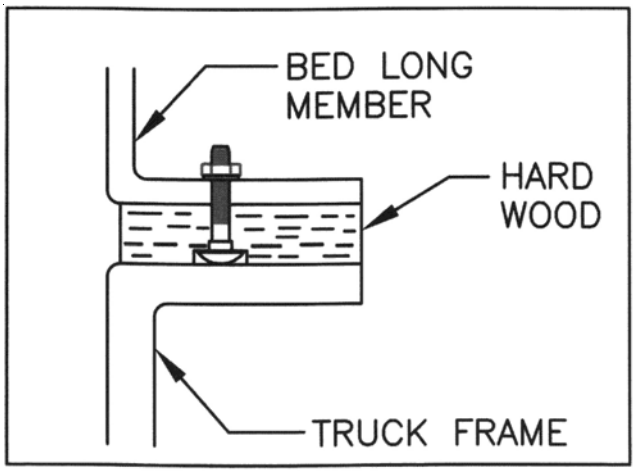

Figure 10: Board Placement

Drill and bolt the boards in place with carriage bolts that are recessed into the wood. By doing this the weight of the bed and the load is distributed across the length of the truck frame and is not concentrated on a few points. On completed installations there should be a gap between the upper and lower mounts from the use of the wood spacer. This is acceptable, because it distributes the load over the full length of the truck frame, preventing a concentrated load at the mounting point.

9. Lower the truck bed onto the truck frame, positioning it exactly as it will be mounted when lowered. Weld the vertical plate assembly of the tail hinge to the long member of the bed with the pin inserted in the tail hinge assembly (see Figure 11). Insure that the vertical plate assemblies are installed correctly as shown. It may be necessary to install some washers as spacers between the pin bushings and the vertical plates to help center the body and keep it from moving from side to side.

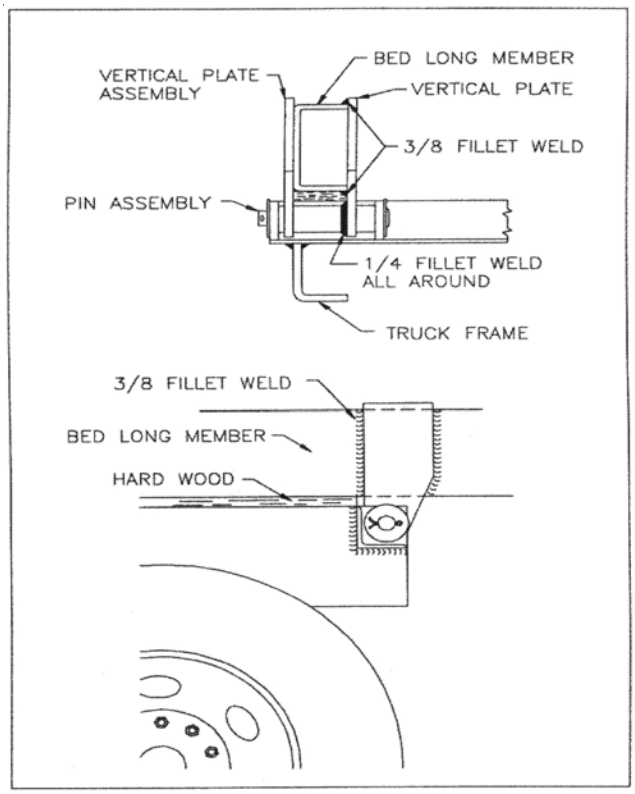

Figure 11: Vertical Plate Assembly

10. There are two methods to attach the upper hoist mount to the bed long member. One method is to bolt the upper mount to the long member. The other method is to weld the upper mount to the long member.

Both methods require a 1/4 inch diagonal plate installed to the long member, centered on the upper mount location (see Figure 12). This will prevent the long member from rolling under. This plate is furnished by the installer due to the variety of long member sizes.

INSTALLATION PROCEDURES

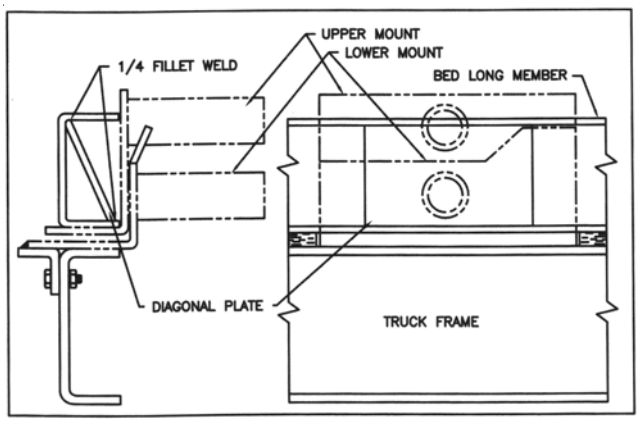

Figure 12: Diagonal Plate

A. For bolt-on applications a stringer plate must be welded to the upper mount. This allows the upper mount to be bolted to the long member (see Fig-ure 13). Drill and bolt the stringer attachment plate to the long member. It may be necessary to raise the bed to complete bolting the upper mount.

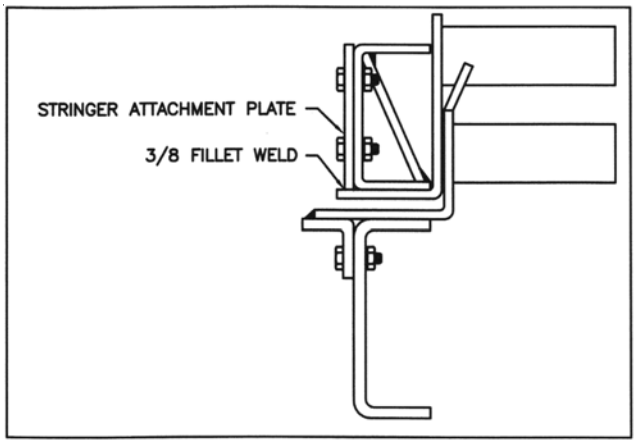

Figure 13: Stringer Attachment Frame

B. For applications in which the upper mount is welded, it can be welded in place as shown in Figure 14.

11. Fill the oil reservoir with a recommended hydraulic fluid, as listed in the Maintenance portion of this manual. Connect the hydraulic hoses and fittings as illustrated in the parts manual supplied with the hoist and the pump. Use Loctite Hydraulic Sealant on all threaded NPT pipe joints.

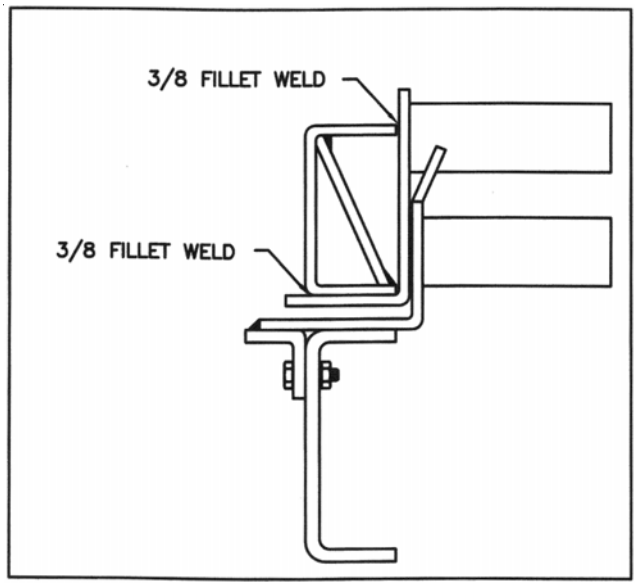

Figure 14: Welding Upper Mount

12. **Grease all** hoist, tail hinge, and drive line grease fittings. This will prevent damage and insure smooth operation. When greasing the hoist, pump the grease until a generous amount comes out the ends. This ensures complete lubrication.

IMPORTANT:

The installer must grease all hoist grease points prior to operating the hoist for the first time. Failure to do so may damage the hoist!

13. Following the procedures discussed in sections 14 and 15, depending on the hoist model. Raise the bed slowly in steps checking for clearance of all hoist and drive line components. Raising the hoist and stopping

it in several positions to check for clearance will help prevent damage to the truck and hoist. Areas to check include: the pump, the PTO drive shaft, cylinder swing, top mounts, bed cross sills, tail hinge, etc. See the Operation portion of this manual for operation instructions that apply to your hoist.

14. **Single Acting Cylinders:** For single acting (power up only) cylinder hoists, complete the steps in this section. If the hoist is operated with no clearance problems then raise the hoist until fully extended. **Support the bed with a suit-able overhead hoist to prevent lower-ing of the truck bed.** With the pump running, and the control knob in the raise position, loosen the bleeder screw (at the top of the cylinder) **one half turn** to allow the air to escape (see Figure 15).

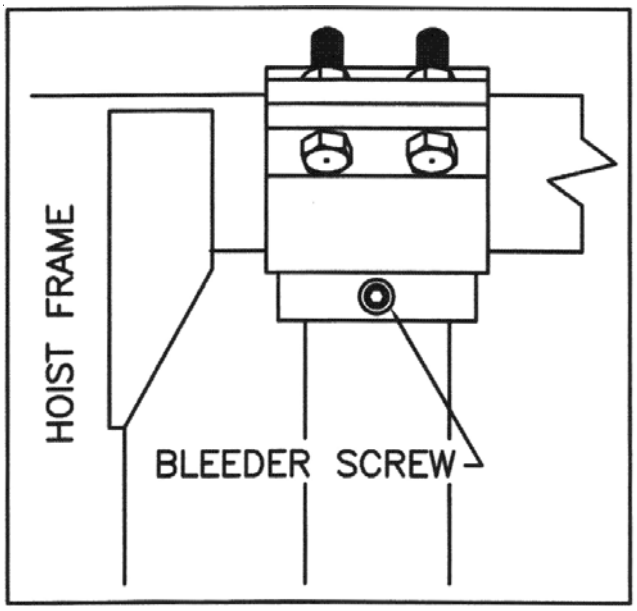

Figure 15: Bleeder Screw Location

Do not remove the bleeder screw or the ball may be lost (see Figure 16). When the air and foam stops escaping from the bleeder screw, and the fluid is clear, retighten the bleeder screw. Unhook the overhead hoist and lower the truck bed.

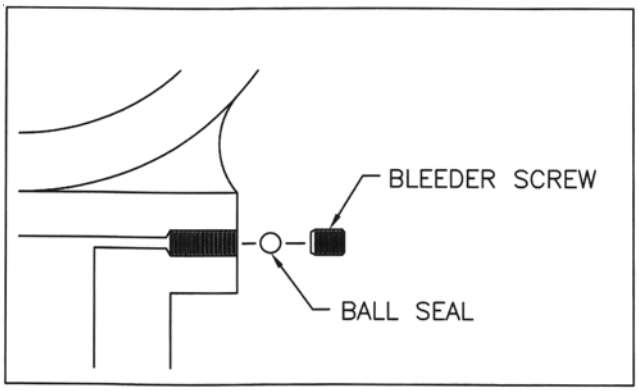

Figure 16: Ball Seal

WARNING:
Insure the safety prop is installed on all applications!

15. **Double Acting Cylinders:** For hoists designed as double acting (power up and power down) complete the steps in this section. If the hoist is operating with no clearance problems, then raise the hoist to half of the possible dump angle. **Support the bed with a suitable overhead hoist to prevent lowering of the truck bed.** Fill the hydraulic tank 3/4 full with hydraulic fluid. Continue to raise the hoist fully. Unhook the overhead hoist and lower the truck bed.

IMPORTANT:
Never modify a double acting cylinder to use a single acting cylinder! Serious damage to the cylinder may occur!

16. Raise and lower the hoist several times. Check the hydraulic fluid in the reservoir according to the pump installation instructions.
17. **All installations must include a safety prop.** To install a safety prop on the truck,

raise the unloaded body to the approximate desired height. When the desired height is reached, securely brace the truck body in this position with a suitable support or overhead hoist. During the installation you will be working under the body. **Do not depend on the hoist hydraulic system to hold the body up.** External hoists and/or rigid body braces between the truck frame and the body could be used to provide additional support. Whichever method is used, it must be capable of holding the body up if the hoist hydraulic system should fail. ***Remember the safety prop is only intended to support an empty body and is not intended to be used with a loaded body.*** If it is necessary to work on a unit, the body must be unloaded prior to using the safety prop.

A single safety prop is usually adequate for bodies 16 foot and shorter. Two safety props should be used on bodies longer than 16 foot, one on each side of the body. The safety prop is designed to operate on either or both sides of the truck. It will also operate in front of, or behind the hoist mounts. The safety prop should be located so it will clear all external obstructions, such as the fuel tank, air tank, battery box, fenders, etc. The figures show the safety prop installed on the left hand side (drivers side) of the truck. When installing two safety props, they must make contact with the bottom support angle at the same time. The bottom support angle is shipped unwelded so you may install it on either side. **Insure that the open end of both angles is toward the front of the truck.**

All welding should be performed by a qualified welder who is familiar with this type of welding. Remember the weight of the unloaded body must be supported by this safety prop. Therefore you will want to insure that the welding will be adequate.

For assembled drive line installation instructions, see page 25.

SAFETY PROP INSTALLATION

SAFETY PROP INSTALLATION INSTRUCTIONS.

1. Raise the empty box, and brace up box. The Top Pin Plate Assembly should be clamped to the box long members. (The plate assembly should be flush with the top of the box long member). Hang the Safety Prop on the pin and with the Prop hanging straight down, hold the dimensions as shown in Figure 17.

   NOTE: a. Brace up the box while working under it.
   b. The Safety Prop may be mounted on either forward or aft of the hoist lower mount.
   c. The Safety Prop will swing forward to the latching storage position, therefore you must insure that you have adequate clearance for this swing.

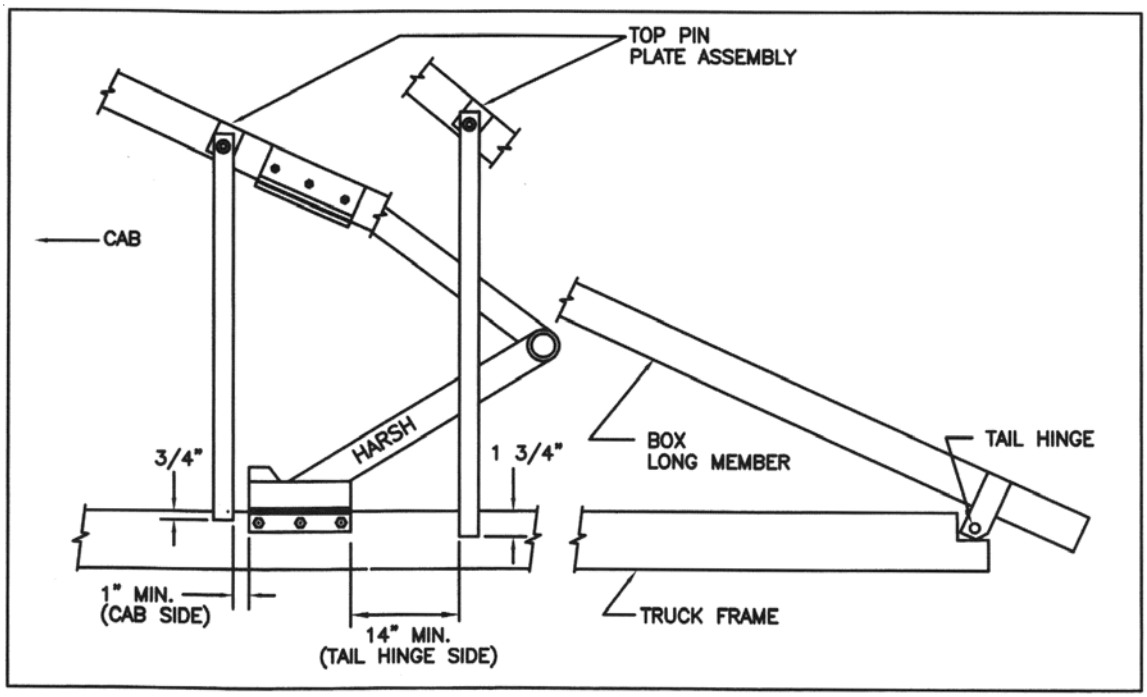

Figure 17: Safety Prop Dimensions

2. Weld the Top Pin Plate Assembly to the box long member (see Figure 18). Remove the weld splatter from the pin.

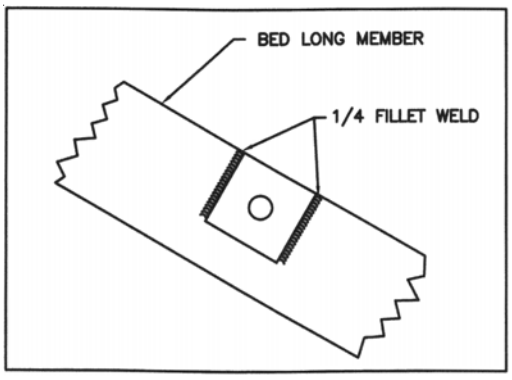

Figure 18: Top Pin Plate Assembly

SAFETY PROP INSTALLATION

3. Assemble the washers and Safety Prop to the Top Pin and weld as shown in Figure 19.

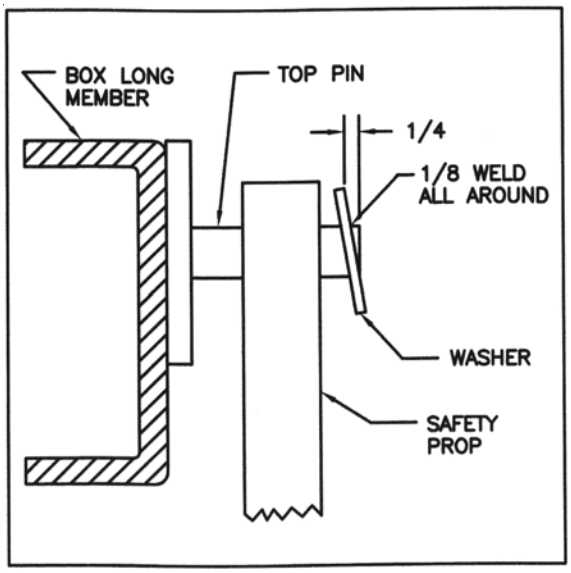

Figure 19: Safety Prop Assembly

4. Clamp the bottom Support Angle in position as shown in Figure 20.

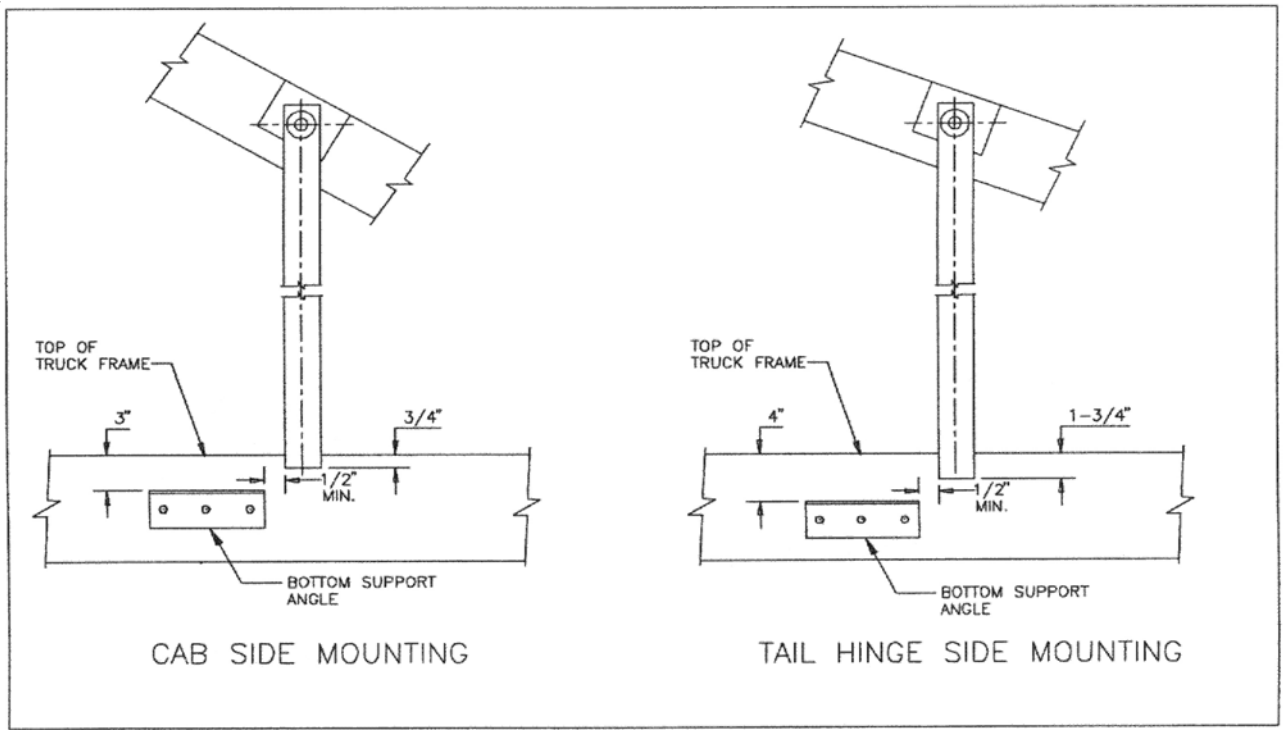

Figure 20: Bottom Support Angle Position

NOTE: The Safety Prop must be hanging vertical with the truck level.

SAFETY PROP INSTALLATION

5. Weld the Side Plate and Stop Peg following the dimensions shown in Figure 21.

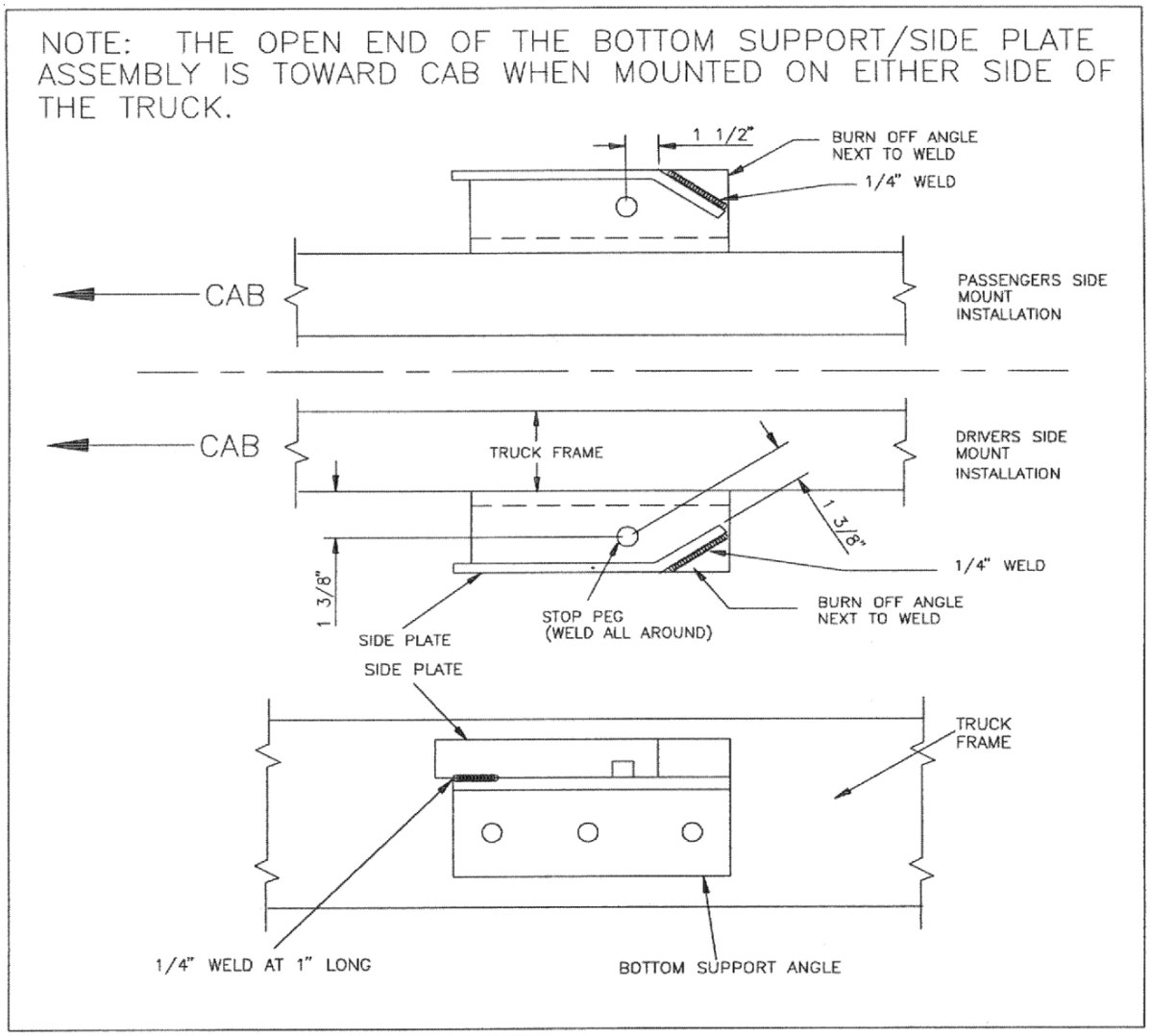

Figure 21: Side Plate and Stop Peg Position

6. Burn off the corner of the Bottom Support Angle as shown in Figure 21.

SAFETY PROP INSTALLATION

7. Drill and bolt the Bottom Support Angle in place. (See Figure 20.)

8. Lower the box and weld the Latching Bracket to the box cross member close to the rub rail and near the end of the Safety Prop as shown in Figure 22. **The latching bracket will be welded so the Safety Prop swings forward (toward the cab) when in the latched storage position.**

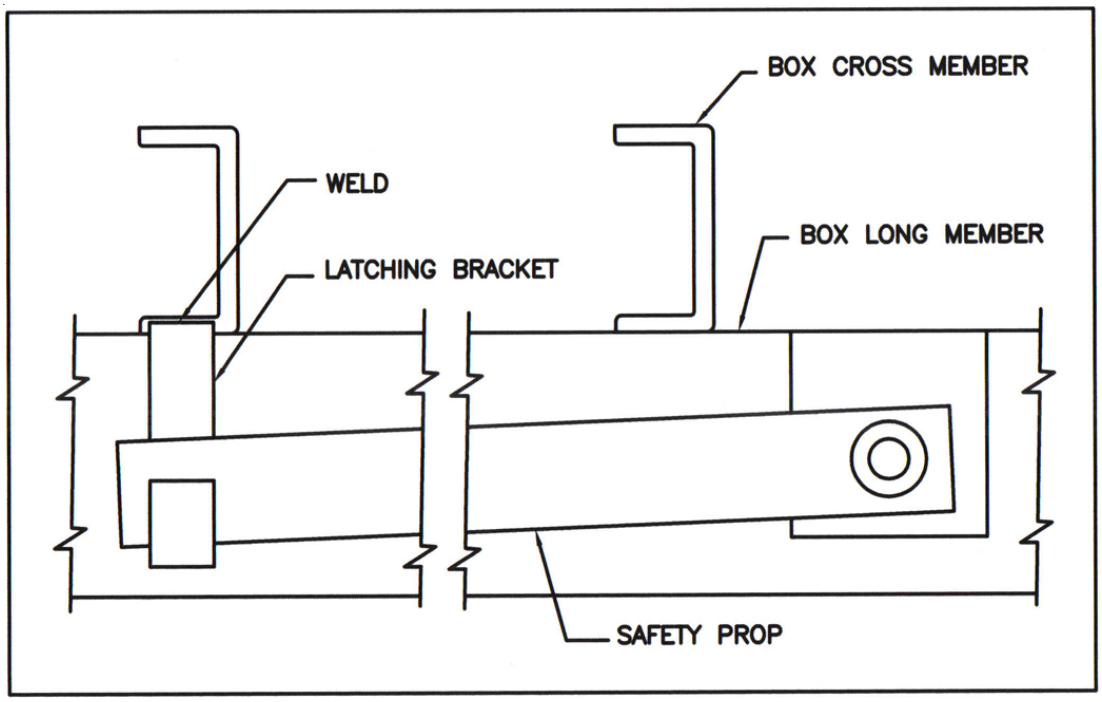

Figure 22: Latching Beacket Location

IMPORTANT:
This manual and the Pump Installation Manual must be forwarded to the end user!

SAFETY PROP OPERATION

WARNING:

Use the Safety Prop only with an empty box. The Safety Prop is not designed to support a loaded box! If it is necessary to work on a box, it must be unloaded first.

Once the Safety Prop installation is complete, it can be operated as follows:

A. The Safety Prop should be unlatched from the latching bracket. Once unlatched, the Safety Prop should hang down.

B. Raise the body until the Safety Prop slides into the bottom support angle above the stop peg. Do not raise the body too far or it will allow the Safety Prop to go past the bottom support angle.

C. Slowly lower the body back down until the Safety Prop rests firmly on the bottom support angle (over the stop peg).

D. To release the Safety Prop, raise the body several inches until the box prop swings up and past the bottom support angle. The body can then be lowered completely down to the truck frame. **When lowering, insure that there are no obstructions in the swing path of the Safety Prop. If an interference or obstruction is encountered, stop the lowering process and swing the Safety Prop up into the latching bracket.**

E. Once the body is fully down, swing the Safety Prop up into the latching bracket.

SAFETY INSTRUCTIONS

1. Always insure the Hoist Control in the cab works free and is in good operating order. The controls must be clearly marked for function and operation.

2. Always check for overhead wires, obstructions, and people before raising the hoist.

3. Dump with the truck at rest, on level ground and with a balanced load. The Rigid Lift design gives added stability over other hoist designs in normal dumping operations. The hoist is not designed to operate in extreme conditions.

4. The operator must stay in the cab, at the controls during the duration of the dumping cycle. If there are bystanders around the dumping area, the operator must have an outside observer present to insure that all bystanders are a safe distance away.

5. Never permit anyone under a loaded dump bed.

6. Bring a loaded dump body down slowly by easing the control knob inward. On double acting cylinders, make sure the pump is running when doing so or the reservoir may over flow. Resulting in the loss of fluid and allowing air into the system.

7. Always use the safety prop to secure the dump bed up before any maintenance or inspection is performed under the empty dump body as specified by the safety decals provided by Harsh International, Inc. The safety prop is not designed or intended for supporting a loaded body. If repairs or maintenance is needed, you must unload the body before attempting any repairs.

8. Observe all PTO safety instructions provided by the PTO manufacturer as well as those listed in the hoist information.

   A. Do not go under the vehicle when the engine is running.
   B. Do not work on PTO or shaft when the engine is running.
   C. Do not engage or disengage the PTO or driven equipment by hand from under the vehicle when the engine is running.

NOTE: For assembled drive line installation instructions see page 25.

⚠ WARNING

This power unit contains a hydraulic pump that is capable of developing pressure in excess of **5,000 psi (345 BAR)**.

A pressure relief valve is used to set the pressure at the desired level. Tampering with, adjusting, modifying, or removing the relief valve is extremely dangerous and is not recommended. Only a trained hydraulics technician, using a calibrated hydraulic pressure gauge to assure the proper pressure setting is achieved, should make adjustments to the relief valve.

Warning: changes to the output pressure may render the power unit incompatible with pressure limitations of other components in the hydraulic circuit. This may cause catastrophic failure of those components, and could result in property damage, serious personal injury, or death.

OPERATING INSTRUCTIONS

1. Operation warnings.

A. Do not operate hoist while truck is moving.
B. Make sure all loads are level in the truck bed.
C. Do not dump loads while on uneven or unstable ground.
D. Never operate PTO pump over the rated speed. (Check with pump manufacture for maximum speeds.
E. Disengage PTO while driving truck to prevent pump damage.
F. Do not increase the pump pressure. Serious damage could occur if increased above the rated setting.
G. If the hoist is a power down hoist (double acting cylinders) do not continue to send power to lower hoist after the bed is fully lowered. Damage to the truck and the hoist could occur.
H. Never allow hoist to bounce or jerk when stopping the hoist movement.

2A. To raise and lower a control cable hoist.

A. Set the emergency/parking brake.
B. Put the truck in park or neutral. Check area around truck for clearance.
C. Engage PTO shaft while the engine is idling. For electric pumps have the engine running to charge the battery.
D. Press the centering button on the control and activate the valve to full up position to raise the hoist.
E. **Warning:** Do not exceed the pumps RPM rating at the shaft.
F. To stop the hoist at any position while raising, position the control to the center position
G. Stopping the hoist just before the cylinder(s) are fully extended will help to increase the life of the hoist and pump.
H. To lower the hoist, have the pump running, press the centering button, and position the control to the lowering position. The pump must be operating and the valve must be fully activated when lowering a two way hoist. This allows the pump to return hydraulic fluid to the top of the cylinder. Failure to follow this procedure will overflow the reservoir and allow air and contamination to enter the system. On electric pumps, make sure the pump motor is running while lowering the hoist or the pump may be damaged.
I. To stop the hoist from lowering, slowly return the control to the center position. **Always make sure that the lever is centered when the box is** fully lowered.
J. Never allow the hoist to bounce or jerk when stopping hoist movement. This could cause serious damage to the truck frame and the hoist. This could also void the warranty due to misuse of the hoist.

OPERATING INSTRUCTIONS

2B. To raise and lower an electric switch control hoist.

A. Keep the truck running to charge the battery.
B. Set the emergency/parking brake.
C. Put the truck in park or neutral.
D. Press the “up” button or the toggle switch on the control box to “up”, to raise the hoist.
E. Release the control button to stop the hoist at any position while raising.
F. Stopping the hoist just before the cylinder(s) are fully extended will help to increase the life of the hoist and pump.
G. To lower the hoist, press the “down” button or toggle switch to “down”.
H. To stop the hoist while lowering, release the button or toggle switch.
I. Never allow the hoist to bounce or jerk when stopping hoist movement. This could cause serious damage to the truck frame and the hoist. This could also void the warranty due to misuse of the hoist.
J. Units with an electric pump have an internal flow control located in the lowering circut. This is installed to slow the lowering speed of the hoist and prevent the over-flowing of the tank with the return oil. This also allows sufficient oil to be pumped into the top of the cylinder.

MAINTENANCE INSTRUCTIONS

1. Periodic maintenance and inspection will increase hoist life. Check all bolts, cotter pins, hydraulic lines, hydraulic reservoir level, scissor assembly, universal joints, and drive line components every 50 hoist cycles or weekly whichever comes first.

2. Lubricate all grease fittings before using the hoist the first time and every 50 hoist cycles there after. Greasing the hoist will prevent hoist damage and help to maintain lifting capacity. Severe conditions may require more frequent servicing.

3. Change the hydraulic oil when it becomes dirty or at least once every 12 months. Dirty oil causes increased seal wear and oil leakage. The following recommended hydraulic oils were selected based on the following characteristics. Their ability to raise the hoist in a minimum amount of time, as well as, anti-corrosion, anti-wear, and anti-foaming properties.

IMPORTANT NOTICE

ALWAYS USE THE OIL RECOMMENDED BY THE PUMP MANUFACTURE. IF NO SPECIFIC OIL HAS BEEN RECOMMENDED BY THE PUMP MANUFACTURE THEN YOU CAN USE ONE OF THE FOLLOWING.

A. Approved all weather oils:
- Texaco - Aircraft Hydraulic Oil 15
- Shell - Aeroshell Fluid 4
- Exxon - Univis J43

B. The following oils or equivalent are acceptable at temperatures above freezing:

Texaco Brands:	Rando HD 32
	Texamatic Dexron
	Texamatic F
Co-Op:	Automatic Transmission Oil Dexron
	Automatic Transmission Oil F

4. Field repair of hydraulic components should not be attempted. This would include hydraulic cylinders, valves, and pumps. These components should be sent to a Harsh dealer-distributor. Seals and o-rings on hydraulic cylinders should only be installed by a qualified hydraulic specialist. New parts can be obtained from your Harsh dealer-distributor. Insure that the complete hydraulic system is flushed after any component failure.
5. Harsh does not supply weld-on components for the scissor assembly. If damage occurs, Harsh recommends replacement of the entire scissor assembly.

TROUBLESHOOTING

1. The hoist will not raise smoothly:

A. Air in the cylinders. (Refer to Installation sections 14 and 15.)
B. Lubricate hoist and tail hinge.

2. Failure to raise load properly:

A. Release bed tie-downs.
B. Hoist capacity has been exceeded. (See page 2, Notes:)
C. Blocked or pinched hydraulic line.
D. Control valve is not moving the full stroke, reducing the hoist speed.
E. The pump intake is blocked from dirty oil or oil that is too thick for cold weather.
F. Pump is not operating because the PTO shaft is not turning or the pump is bad. Have the pump checked by your local Harsh dealer or the Harsh Factory.

3. Failure to raise the hoist fully:

A. Check the hydraulic oil level in the reservoir.
B. Air in the cylinder(s). (Refer to Installation sections 14 and 15.)
C. Lubricate the hoist components.

4. Failure to lower hoist:

A. Control valve is not moving the full stroke.
B. Check for blocked or pinched hydraulic lines.
C. Lubricate the hoist components.

5. Oil leakage:

A. Check all fittings and hoses. Contact your local Harsh dealer to order replacement hoses and fittings. Use only hoses and fittings supplied by Harsh.
B. Gland nut leaking, may require cylinder repair. Contact your local Harsh dealer.

6. Oil spilling out the reservoir tank:

A. Oil foaming caused by oil that is too thick, or air in the hydraulic lines. Cycle the hoist several times and bleed the air out of the cylinder(s). (Refer to Installation sections 14 and 15.)
B. PTO was not engaged during lowering.
C. The body weight is too great, causing the hoist to lower too rapidly. A flow control valve must be installed in this situation.

7. The hoist raises very slow:

A. The oil is too thick for cold weather.
B. A hydraulic line is partially blocked or pinched.
C. The filter screen is dirty.
D. The pump is worn or defective.
E. Control valve is not moving the full stroke.

CYLINDER REWORK INSTRUCTIONS

1. Special Equipment Required:

A. Bronze coated or brass vise or vise inserts.
B. Hydraulic pressure available.
C. Gland nut and piston spanner wrenches.

2. General:

A. Whenever clamping on a surface that moves past an o-ring or seal, extra care must be taken to prevent nicks, scratches, and deformation.
B. All parts that have scores or nicks on moving surfaces should be replaced with new parts.
C. Keep the cylinder parts very clean when reassembling.

3. Disassembly:

A. Extend cylinder stages either manually or with hydraulic pressure.

WARNING: Never use air pressure to extend stages or cylinders!

B. Clamp on the cylinder body with a vise and unscrew the gland nut on the cylinder body.
C. Remove the gland nut with the cylinder rod or tube.
D. For telescopic or multiple stage cylinders, continue loosening gland nuts and removing smaller stages one at a time.
WARNING: Do not use pipe wrenches or other tools that will damage or scratch cylinder rods and tubes.
E. Remove the gland nut(s) from the cylinder rod or tubes.
F. Remove all o-rings, backup rings, stop rings, and wear rings. **Hint:** Keeping all parts to a gland nut, piston, or cylinder tube together will help to identify parts. This will make the reassembly of the cylinder easier.
G. Clean all metal parts and dry them thoroughly.
H. Install all o-rings, backup rings, stop rings, and wear rings using clean grease to hold parts in place if necessary. Grease all o-rings before installing them. Be sure to have all parts fully seated in their respective grooves before attempting final assembly.
I. Oil all moving parts: piston, cylinder rod, cylinder tubes, etc.
J. Assemble all gland nuts on their respective cylinder tubes.
K. Reassemble cylinder in the reverse order that it was disassembled. Tighten all gland nuts as you go. When reassembling the cylinder top mount, use Loctite 290.

CAUTION: Make sure not to damage o-rings, seals, etc. when assembling cylinder.

L. The cylinder is now ready to install in the hoist assembly.

ASSEMBLED DRIVE LINE INSTALLATION

When installing the pump and drive line attempt to position the pump so the face of the pump shaft is **46 inches** from the face of the PTO output shaft. This will allow installation of the assembled drive line without having to adjust its length. If it is not possible to mount the pump in this location, the installer will need to shorten the shaft following the procedures listed below.

Insure that the pump is mounted to provide the necessary clearance for the drive line and shield to rotate without interference from any obstructions.

Measure the actual distance from the face of the pump shaft to the face of the PTO shaft. Subtract this measurement from **46 inches**. **The difference is the amount that the drive line must be shortened.** Both the inner and outer shields as well as the hex shaft must be shortened by this amount.

A. Pull the two halves of the drive line apart.

B. Cut the necessary amount off the end of the inner and outer plastic tubes.

C. Cut the same amount off the end of the hex shaft and chamfer the end of the shaft. Be careful not to damage the plastic shields during the shortening process as this may interfere with the proper operation of the shield.

D. Slide the assembly back together and install the drive line on the unit.

E. Grease the drive line.

FOLLOW ALL OTHER INSTALLATION PROCEDURES SHOWN IN THE INSTALLATION MANUAL.

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