HS2000 HYDRAULIC SWING HOIST INSTRUCTIONS

REIMANN & GEORGER CORPORATION
HOISTING PRODUCTS **BUFFALO, NY**
P/N 6102021 **6/12/11**

PRE-HOISTING CHECKLIST

This checklist must be checked prior to each use of the hoist. This checklist must be used in conjunction with the maintenance and inspection procedures outlined in this manual. The hoist and related equipment must be thoroughly inspected prior to each use by a trained person. A trained person is one who has read and thoroughly understands this instruction manual and related equipment manuals and, through training and experience, has shown knowledge regarding the safe operational procedures. If you do not have such a person in your organization, please contact Reimann & Georger Corporation or its distributors and they will assist you in providing such a "trained person." Do not permit any person who is not fully trained to operate this swing hoist. This checklist should be maintained as a permanent record.

- ☐ Discuss work plan, personal protective equipment, and each crew member's responsibility before starting to set-up. All crew members must be familiar with the use of hand signals.
- ☐ Insure OSHA compliant fall protection is in place.
- ☐ Insure a competent person (qualified engineer) has determined the structural deck can support the intended loads in hoisting and material handling.
- ☐ Insure hoisting operation will clear all power lines and obstructions.
- ☐ Insure hoisting area is secured from all unauthorized personnel.
- ☐ Insure that all hoisting accessories such as forks, buckets, and slings are commercially manufactured, are in good condition, and have a rated load capacity.
- ☐ Capacity of slings decreases as the angle increases. Insure slings have a capacity of at least 2000 lbs. and are in good condition.
- ☐ Inspect wire rope for signs of wear and damage. Replace defective wire rope immediately.
- ☐ Insure at least three wraps of wire rope are on the winch drum at maximum travel.
- ☐ Insure bolt securing wire rope end loop to the drum flange is tight and in good condition.
- ☐ Insure wire rope is unwinding from the top and not the bottom of the winch drum.
- ☐ Insure there is sufficient weight on the wire rope to maintain 10 lbs. of tension at all times.
- ☐ Insure wire rope is reeved properly for either one (1) part of line for 1000 lbs. capacity or two (2) parts of line for 2000 lbs. capacity.
- ☐ Insure upper pin and hairpin between Front Leg and Stabilizer are connected and in good condition.
- ☐ Insure lower pin and hairpin between Front Leg and Stabilizer are connected and in good condition.
- ☐ Insure pin and hairpin between Front Leg and Upper Counterweight Leg are connected and in good condition.
- ☐ Insure pin and hairpin between Brace and Lower Counterweight Leg are connected and in good condition.
- ☐ Insure pin and hairpin between Front Leg and Socket are connected and in good condition.
- ☐ Insure pin and hairpin between Front Leg and Cylinder Mount are connected and in good condition.
- ☐ Insure pin and hairpin between Cylinder Mount and Counterweight Leg are connected via the sliding tube and in good condition.
- ☐ Insure pin and hairpin between Cylinder and Cylinder Mount pillow block bearing are connected and in good condition.

PRE-HOISTING CHECKLIST (continued)

- ☐ Insure pin and hairpin between Cylinder Rod and Boom pillow block bearing are connected and in good condition.
- ☐ Insure the two pins and hairpins between the Winch and Counterweight Leg are connected and in good condition.
- ☐ Insure upper and lower sections of Counterweight Leg are bolted together using grade 5 bolts and nuts with shake washers.
- ☐ Insure all bolts between upper and lower sections of Counterweight Leg are tight (60-75 ft-lbs.) and in good condition.
- ☐ Insure the two lockscrews are tight on sliding tube connecting Cylinder Mount to Counterweight Leg.
- ☐ Insure Brace is slid into socket and lockscrews are tightened.
- ☐ Insure Boom pins are completely engaged in the Front Leg sockets.
- ☐ Insure the Front Leg is mounted to 2”x 6” lumber to distribute the load along the roof edge.
- ☐ Insure the Operator Fence is lowered.
- ☐ Insure all structural members of the hoist are free of defects and damage that may affect the integrity of the hoist.
- ☐ Insure the Front Leg is vertically plumb.
- ☐ Insure 2000 lbs. (Ontario OHSA: 1140 kg.) of Reimann & Georger Corporation approved ballast blocks are secured in the Counterweight Basket with rope.
- ☐ Insure 3/4” plywood is placed under Counterweight Basket to distribute the weight.
- ☐ Insure bolt through the Pivot Sheave is in good condition and is held securely in place with a locknut.
- ☐ Insure Pivot Sheave can rotate freely.
- ☐ Insure bolt through the Boom Sheave is in good condition and is held securely in place with a locknut.
- ☐ Insure Boom Sheave can rotate freely.
- ☐ Insure the pin through the Cable Keeper is in good condition and is securely in place.
- ☐ Insure Cable Keeper is in the locked position.
- ☐ Insure Block and Swivel Hook have a rated capacity of at least 2000 lbs. and are in good condition.
- ☐ Insure Safety Latch on the Hook does not support any load.
- ☐ Insure all Shackles have a rated capacity of at least 2000 lbs. and are in good condition.
- ☐ Insure power unit has been properly maintained.
- ☐ Insure hydraulic hoses are properly connected and in good condition.
- ☐ Operate hoist with no load to test hoisting operation, controls, and power unit.

INSPECTOR: _____ DATE: _____

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1 SAFETY

1.1 INTRODUCTION

Your Reimann & Georger Corporation HS2000 Hydraulic Swing Hoist has been engineered to provide lifting performance, long term economics and safety advantages that no other type can match. However, even a well-designed and well-built hoist can malfunction or become hazardous in the hands of an inexperienced and/or untrained user. Therefore, read this manual and related equipment manuals thoroughly before operating your hoist to provide maximum safety for all operating personnel, and to get the maximum benefit from your equipment.

1.2 SAFETY DEFINITIONS

A safety message alerts you to potential hazards which could injure you or others or cause property damage. The safety messages or signal words for product safety signs are **DANGER**, **WARNING**, and **CAUTION**. Each safety message is preceded by a safety alert symbol and is defined as follows:

DANGER: Indicates an imminently hazardous situation which, if not avoided, **will** cause death or serious injury. This safety message is limited to the most extreme situations.

WARNING: Indicates potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury. It may also be used to alert against unsafe practices and property-damage-only accidents.

1.3 HYDRAPAK AND HOIST SAFETY LABELS

These labels warn you of potential hazards which could cause injury. Read them carefully. If a label comes off or becomes illegible, contact Reimann & Georger Corporation for a free replacement.

1.4 HS2000 HOIST SAFETY RULES

1. Operators must be thoroughly trained before operating this hoist. A trained person is one who has read and thoroughly understands this instruction manual and related equipment manuals and, through training and experience, has shown knowledge regarding the safe operational procedures.

2. Prior to setting up the hoist there must be a plan of action outlining the work to be accomplished, individual responsibilities, personal protective equipment, and method of communication.

3. A good line of communication must be maintained between the hoist operator and the ground crew. All crew members must be familiar with hand signals.

4. Follow the Pre-Hoisting Checklist before operating.

5. Use only Reimann & Georger Corporation approved ballast blocks or factory approved equal as counterweight.

6. Ensure 2000 lbs. (Ontario OHSA: 1140 kg.) of ballast blocks are secured properly in the lower counterweight basket before operating the hoist. Tie ballast blocks to basket with rope. **No** human being shall **ever** be utilized as ballast.

7. Wear heavy leather gloves when handling wire rope.

8. All personnel shall be protected by OSHA compliant fall protection.

9. Never use the hoist structure to anchor life lines, worker's harnesses or other attachments.

10. Hoist operator must stand behind the operator fence while the hoist is operating.

11. Hoisting area is to be clear of power lines. Consult power company before you work near power lines.

12. Hoisting area is to be kept clear of unauthorized personnel at all times. Place barricades or secure the area in such a manner that if there were an equipment failure, no personnel would be injured.

13. Keep out from under a raised load.

14. Never hoist over an open doorway.

15. Never exceed the Rated Load Capacity; 1000 lbs. for single line pull or 2000 lbs. for double line pull. The Rated Load Capacity is the maximum load which should ever be applied to the hoist. Rated Load Capacity is for straight line pull; avoid side loads.

16. Avoid sudden stops and shock loads.

17. All hoisting accessories such as forks, buckets and slings must be commercially manufactured.

18. All hooks, slings, shackles, and other hoisting accessories must be properly maintained and installed.

19. Secure load before lifting.

20. Tag lines shall be used to control all loads.

21. No person shall be allowed to ride on the hoist.

22. Do not climb the hoist; use only a step ladder with OSHA compliant fall protection. Do **not** use an extension ladder.

23. Check the hoist periodically during operation.

24. Do not disconnect hydraulic hoses or fittings while hydraulic power source is running.

25. Do not attempt to make adjustments while the hoist is being operated.

26. Keep all body parts clear of moving parts.

27. At end of operation, the hoist should be secured to prevent unauthorized use. Never assume you will find the hoist in the same condition in which you left it.

28. Do not weld or otherwise modify the hoist. Such alterations may weaken the structural integrity of the hoist.

29. Only trained personnel are authorized to do repairs.

30. Do not operate hoist when under the influence of drugs, alcohol, or medication.

2 SPECIFICATIONS

2.1 TECHNICAL DATA

The following specifications apply to the hoist assembly. Detailed specifications for the HydraWinch and the HydraPak are in the separate manuals for these items.

	U.S.	ONTARIO
Hoist capacity (2 parts of line):	2000 lbs.	907 kg.
Hoist speed (1 part of line):	up to 165 fpm	up to 50 mpm
Hoist wire rope supplied	200 ft.	61 m
Hoist wire rope—maximum length*	300 ft.	91 m
Boom overhangs roof	5 ft.	1.5 m
Maximum height under hook to roof deck	12 ft.	3.7 m
Assembly weights:		
Boom weight:	86 lbs.	39 kg.
Counterweight Leg assembly weight:	140 lbs.	63 kg.
Front Leg, Stabilizer assembly weight:	130 lbs.	59 kg.
Winch weight:	100 lbs.	45 kg.
Brace weight:	17 lbs.	8 kg.
Socket weight:	11 lbs.	5 kg.
Cylinder mount weight:	27 lbs.	12 kg.
Cylinder weight:	21 lbs.	10 kg.
Total weight of above parts:	532 lbs.	242 kg.
HydraPak H1158S	278 lbs.	126.2 kg.
Counterweight required	2000 lbs.	1134 kg.**
Ballast blocks required	40	46**
Ballast block weight (minimum)	50 lbs.	23 kg.

* Consult factory for longer wire rope lengths.
** Counterweight required for Ontario is greater due to counterweight ratio of 1.25 to 1.

2.2 NAMEPLATE AND SERIAL NUMBER TAG

It is important to identify your hoist completely and accurately whenever ordering spare parts or requesting assistance in service. The hoist has a product nameplate located on the boom. The label shows the model and serial numbers and capacity rating. The hoist label should appear as the sample nameplate shown in Figure 2-1. Record the model and serial numbers, and capacity rating for future reference.

Figure 2-1.
Typical Hoist Product Nameplate

MODEL HS2000

SERIAL NUMBER _____

CAPACITY RATING 2000 LBS.

3 INSTALLATION AND SETUP

3.1 PRIOR TO SETUP

1. If the unit is new from the factory, cut the banding and separate the parts. Remove shipping protection on Boom pins and Front Leg sockets.

WARNING:
ENSURE ALL STRUCTURAL MEMBERS OF THE HOIST ARE FREE OF DEFECTS AND DAMAGE THAT MAY AFFECT THE INTEGRITY OF THE UNIT.

2. Hoist installation and setup cannot proceed until all necessary parts and equipment have been raised to the roof deck where the hoisting operations will be done. Use a hoist beam, swing beam, or freight elevator for this purpose.

WARNING:
ENSURE THE HOISTING AREA IS SECURED FROM ALL UNAUTHORIZED PERSONNEL. ENSURE THAT OSHA COMPLIANT FALL PROTECTION IS IN PLACE.

WARNING:
A COMPETENT PERSON MUST DETERMINE THAT THE STRUCTURAL DECK CAN SUPPORT THE INTENDED LOADS IN HOISTING AND MATERIAL HANDLING IN ADDITION TO THE WEIGHT OF THE COUNTERWEIGHT ON THE ROOF DECK. FAILURE TO DO THIS CAN RESULT IN DEATH, SERIOUS PERSONAL INJURY OR EQUIPMENT FAILURE.

WARNING:
PRIOR TO SETTING UP THE HOIST THERE MUST BE A PLAN OF ACTION OUTLINING THE WORK TO BE ACCOMPLISHED, INDIVIDUAL RESPONSIBILITIES, PERSONAL PROTECTIVE EQUIPMENT, AND THE METHOD OF COMMUNICATION. FAILURE TO DO THIS CAN RESULT IN DEATH, SERIOUS PERSONAL INJURY OR EQUIPMENT FAILURE.

3. Attach Pivot Block (P/N 00428) to Front Leg using the enclosed 3/4" x 4-1/2" bolt and locknut as shown in Figure 3-1. The Pivot Block notches should fit against the top plate on the Front Leg.

WARNING:
ENSURE BOLT THROUGH THE PIVOT BLOCK IS IN GOOD CONDITION AND IS HELD SECURELY IN PLACE WITH A LOCKNUT. ENSURE PIVOT SHEAVE CAN ROTATE FREELY.

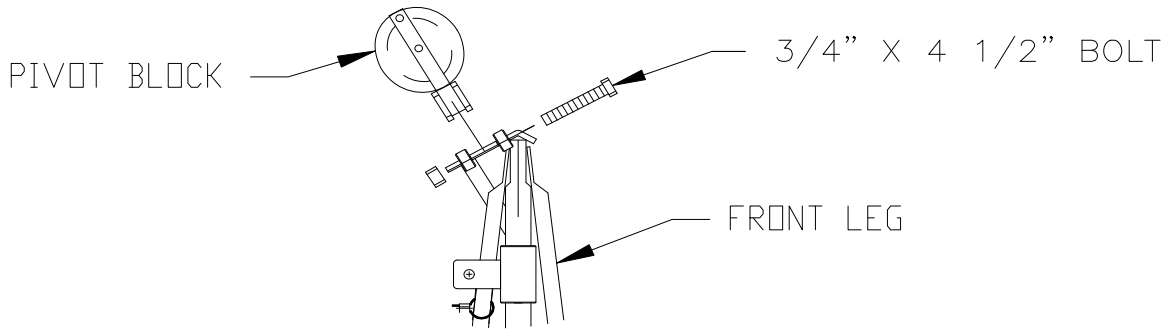


Figure 3-1.
Pivot Block Installation

3.2 FRONT LEG PRE-ASSEMBLY

WARNING:

NEVER ASSEMBLE THE FRAME NEAR A ROOF EDGE. ANY ACCIDENT NEAR A ROOF EDGE CAN CAUSE DEATH OR SERIOUS PERSONAL INJURY.

1. Raise Front Leg and hold upright as shown in Figure 3-2.

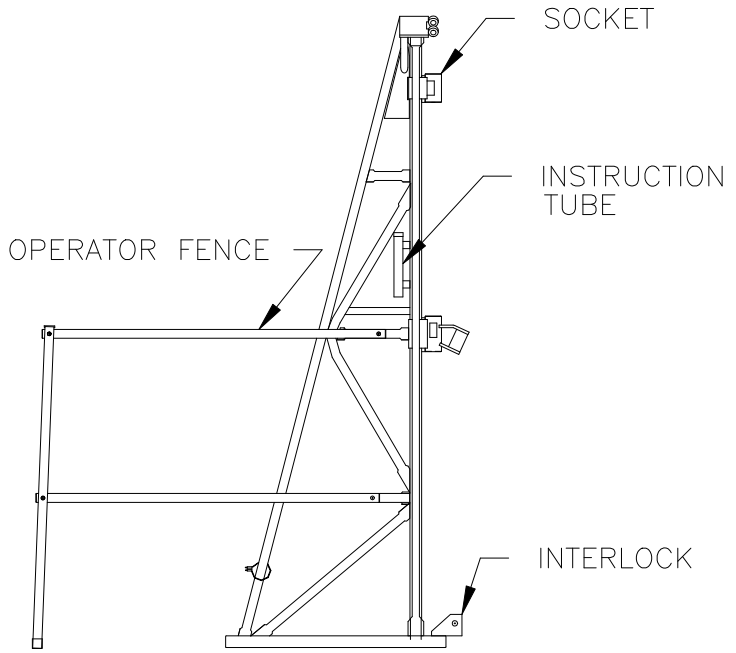


Figure 3-2.
Front Leg

2. Slide end of Stabilizer Leg into base of Front Leg as shown in Figures 3-3 and 3-4.

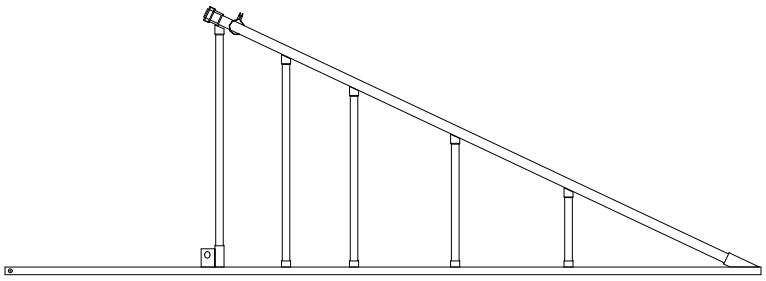


Figure 3-3.
Stabilizer

3. Holding Stabilizer at an angle, slide completely into Front Leg.

4. Swing Stabilizer high enough to engage the interlock as shown in Figure 3-4.

5. Connect the upper pin and hairpin at point “A” between the Front Leg and Stabilizer. Connect the lower pin and hairpin at point “B” between the Front Leg and Stabilizer. These connections are shown in Figure 3-4.

WARNING:

ENSURE PINS AND HAIRPINS AT POINTS "A" AND "B" ARE PROPERLY CONNECTED AND IN GOOD CONDITION.

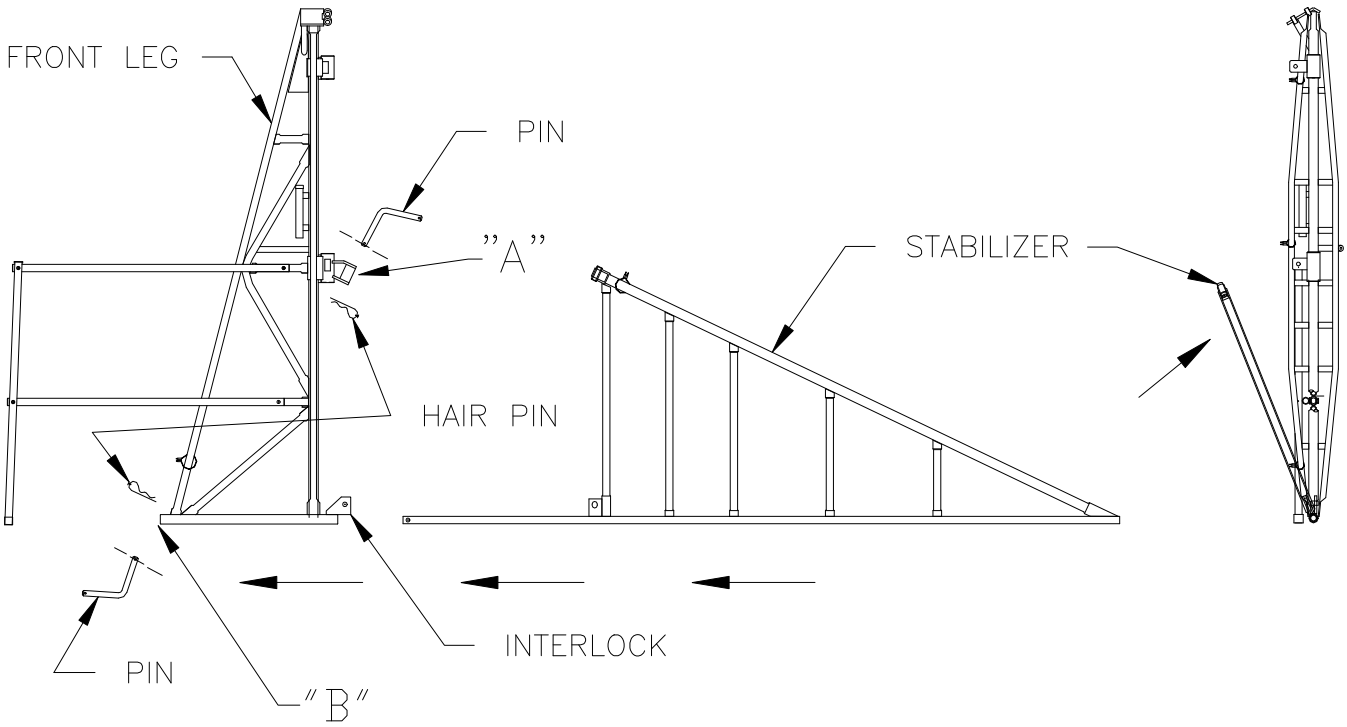


Figure 3-4.
Front Leg/Stabilizer Assembly

3.3 COUNTERWEIGHT LEG PRE-ASSEMBLY

1. Align the upper and lower sections of the Counterweight Leg as shown in Figure 3-5.

2. Fasten upper and lower counterweight sections together with 1/2" x 1-1/4" Grade 5 bolts and nuts with shake washers as shown in Figure 3-5.

WARNING:

ENSURE ALL BOLTS BETWEEN UPPER AND LOWER SECTIONS OF COUNTERWEIGHT LEG ARE TIGHT (60-75 FT-LBS.) AND IN GOOD CONDITION.

3.4 FRAME ASSEMBLY

1. With parts laying on the deck, insert Boom pins into Front Leg sockets and position assembly as shown in Figure 3-6. Fit in the bottom Boom pin first.

WARNING:

ENSURE BOOM PINS ARE COMPLETELY ENGAGED IN THE FRONT LEG SOCKETS.

2. Connect the Counterweight Leg to the Front Leg using the pin and hairpin as shown in Figure 3-7.

WARNING:

ENSURE PIN AND HAIRPIN BETWEEN FRONT LEG AND UPPER COUNTERWEIGHT LEG ARE PROPERLY CONNECTED AND IN GOOD CONDITION.

3. Stand the unit upright to bring the Front Leg assembly to a vertical position. To do this, have one person pull at the counterweight box and another person push up at the top of the Front Leg. When pushing up at the Front Leg, make sure the Boom does not come out of the Front Leg sockets. See Figure 3-8. Have one person steady unit and ensure the Front Leg is vertically plumb.

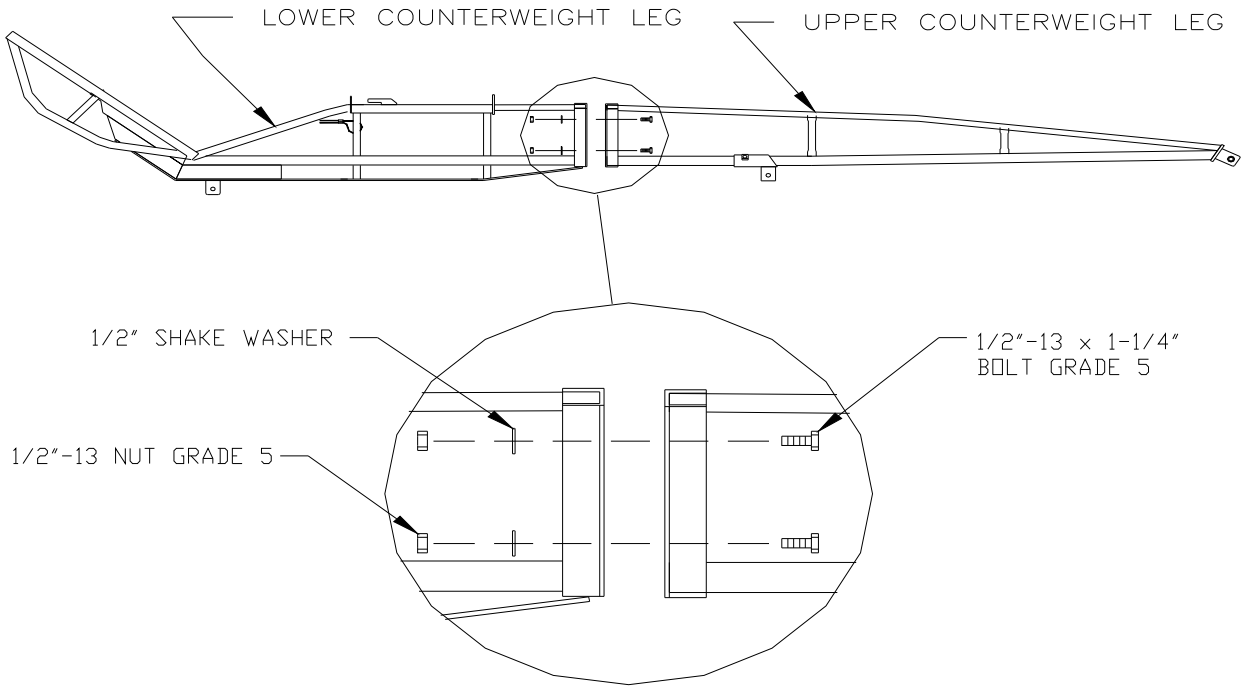


Figure 3-5.
Upper and Lower Counterweight Leg Assembly

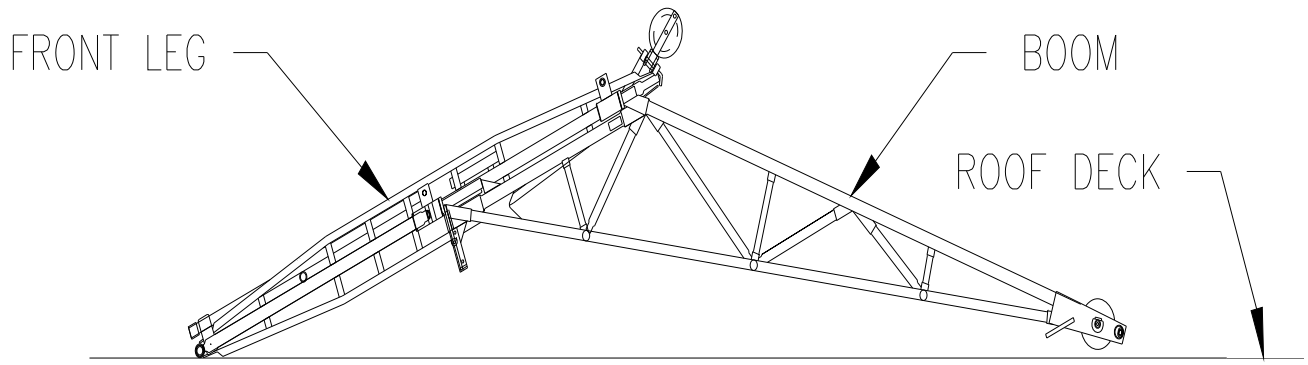


Figure 3-6.
Boom Installation With Parts On Deck

4. Connect the Cylinder Mount to the Front Leg at point "E" using the pin and hairpin as shown in Figure 3-9. Connect the Cylinder Mount to the Counterweight Leg via the sliding tube at point "D" using the pin and hairpin. The flat face of the Cylinder Mount must point toward the Front Leg. Tighten the two lockscrews at point "F" on the sliding tube connecting the Cylinder Mount to the Counterweight Leg.

5. Slide the Socket into the Brace at point "B" as shown in Figure 3-9. Note that this Socket comes with the block carton.

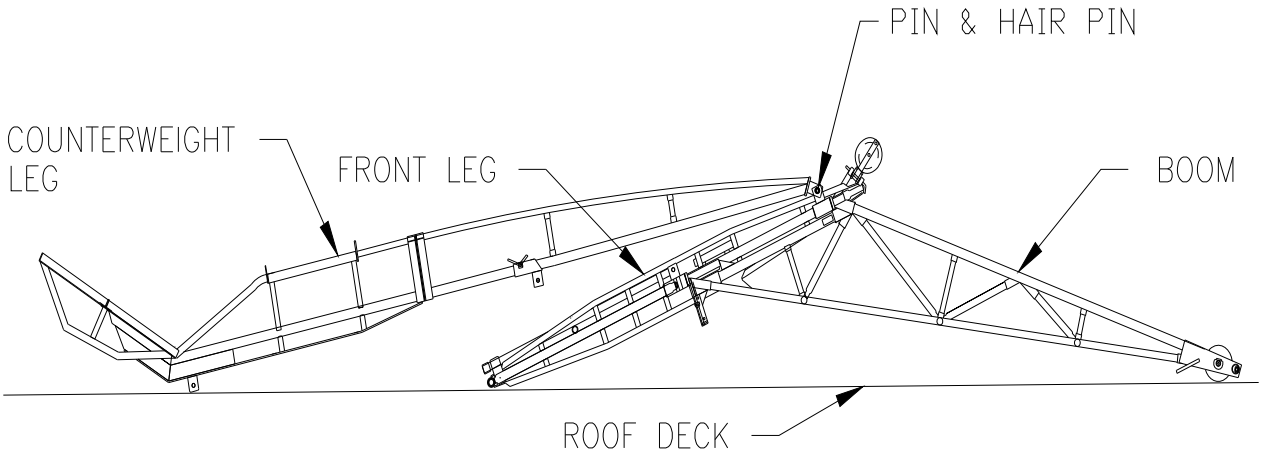


Figure 3-7.
Counterweight Leg/Front Leg/ Boom Assembly

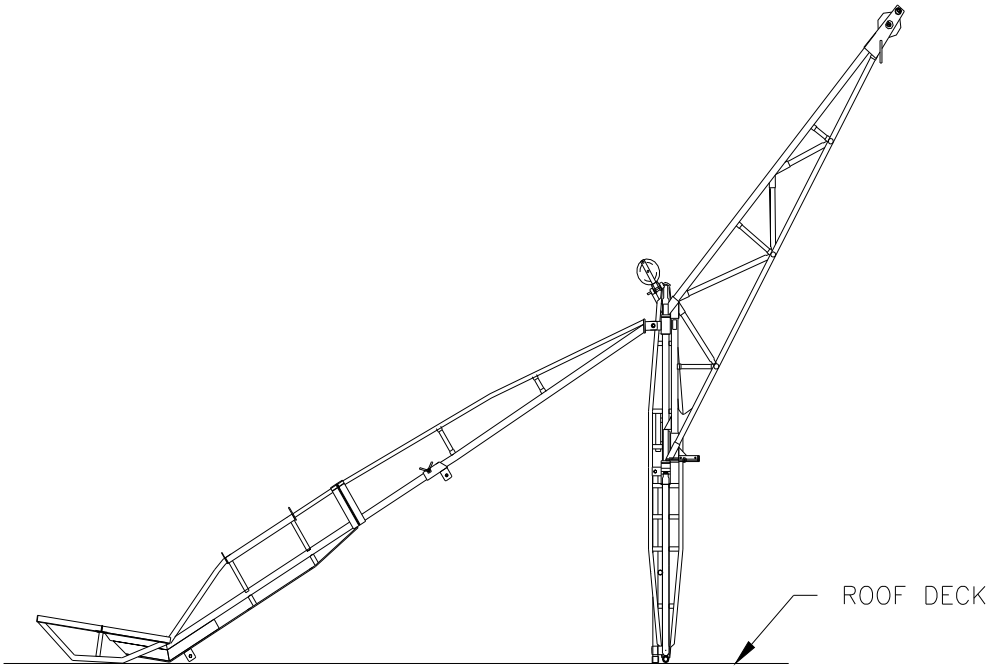


Figure 3-8.
Raising the Frame

6. Connect the Brace to the Counterweight Leg at point "A" using the pin and hairpin as shown in Figure 3-9. Connect the Socket to the Front Leg at point "C" using the pin and hairpin. Tighten the two lockscrews near point "B".

WARNING:

ENSURE PINS AND HAIRPINS AT POINTS "A", "C", "D", AND "E" ARE PROPERLY CONNECTED AND IN GOOD CONDITION. ENSURE LOCKSCREWS AT POINTS "B" AND "F" ARE TIGHTENED.

CAUTION:

DO NOT MOUNT THE HYDRAULIC CYLINDER UNTIL AFTER THE HYDRAPAK IS RAISED TO THE ROOF.

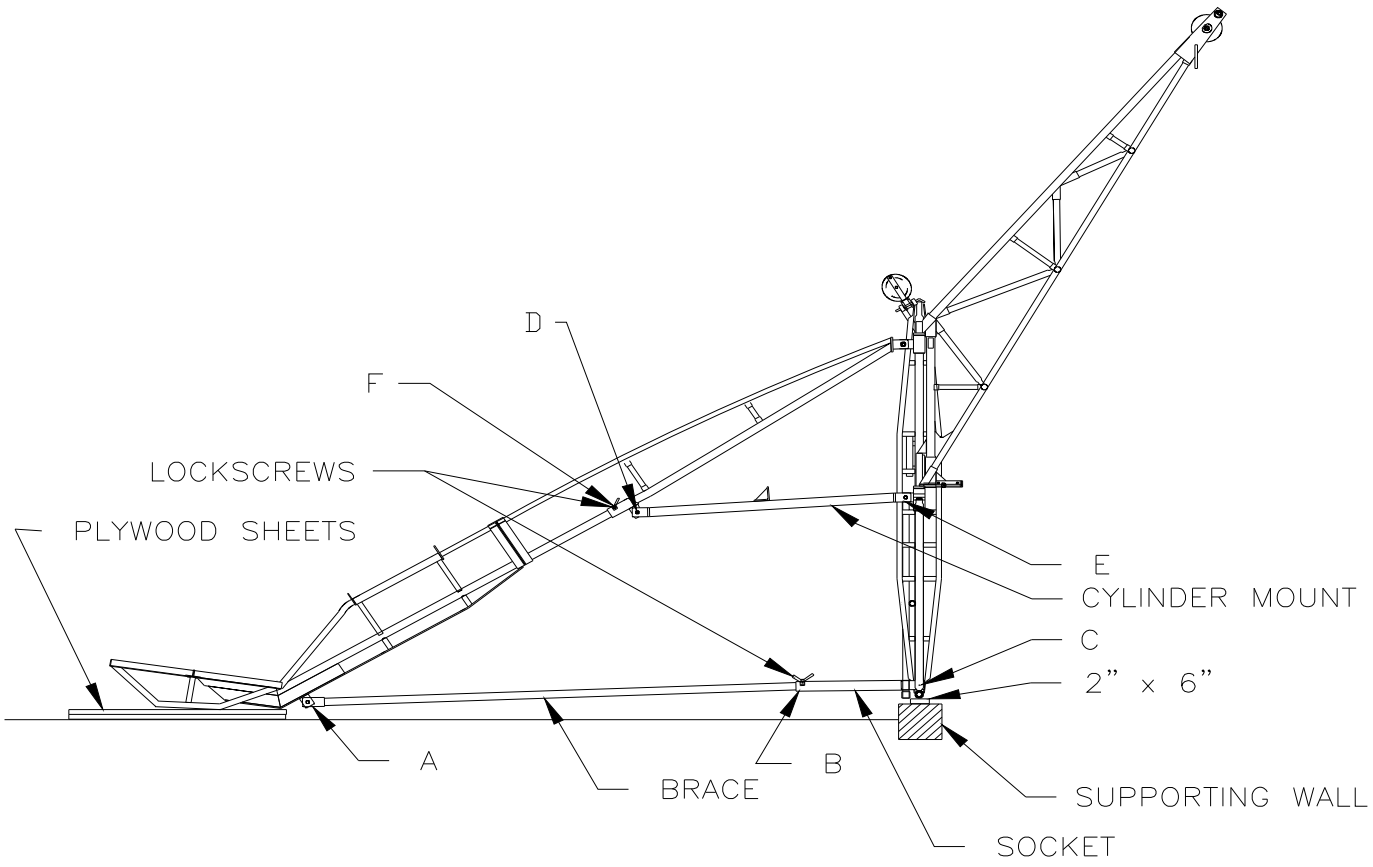


Figure 3-9.
Completed Frame Assembly

7. Move hoist assembly near roof edge of supporting wall. Ensure the Front Leg is mounted to 2"x 6" board to distribute the load and the board fastened to the supporting wall. See Figure 3-9. Ensure 3/4" plywood is placed under Counterweight Basket to distribute the weight. Lower Operator Fence on Front Leg to operating position.

8. Mount 40 Ballast Blocks (2000 lbs.) as counterweight and tie securely to ballast box frame with rope. For equipment protection and safety of personnel, the counterweight Ballast Blocks must be prepared properly. Follow the detailed procedures given in section 3.8.

WARNING:

ENSURE 2000 LBS. (ONTARIO OHSA: 1140 KG.) OF REIMANN & GEORGER CORPORATION APPROVED BALLAST BLOCKS ARE SECURED PROPERLY IN THE LOWER COUNTERWEIGHT BASKET WITH ROPE BEFORE OPERATING THE HOIST.

3.5 MOUNTING THE CYLINDER

1. The cylinder assembly, or block carton, is labeled #0700068 and contains the following parts:

Part Number	Quantity	Description
5000057	1	Cable Weight
5000214	4	Screw Lock
7300222	1	Block W / Hook
0700292	1	HS2000P Socket
7300428	1	Pivot Block
5100713	2	Bearing
0704926	1	Cylinder Assy Hydr HS
5806329	1	HHCS 3/4-10 X 4-1/2
5806372	1	Locknut 3/4-10 22UTA3

2. Mount the Cylinder assembly to the Cylinder Mount Brace and Boom using the 3/8" x 1-1/2" bolt, washer, star washer, and hex nut hardware provided. If mounting the Cylinder Pillow Blocks separately (as in a replacement situation), mount these blocks with the center hub protruding upward. The extending part of the Cylinder must be toward the Boom. See Figure 3-10.

WARNING:
ENSURE PIN AND HAIRPIN BETWEEN CYLINDER AND CYLINDER MOUNT PILLOW BLOCK BEARING ARE PROPERLY CONNECTED AND IN GOOD CONDITION.

WARNING:
ENSURE PIN AND HAIRPIN BETWEEN CYLINDER ROD AND BOOM PILLOW BLOCK BEARING ARE PROPERLY CONNECTED AND IN GOOD CONDITION.

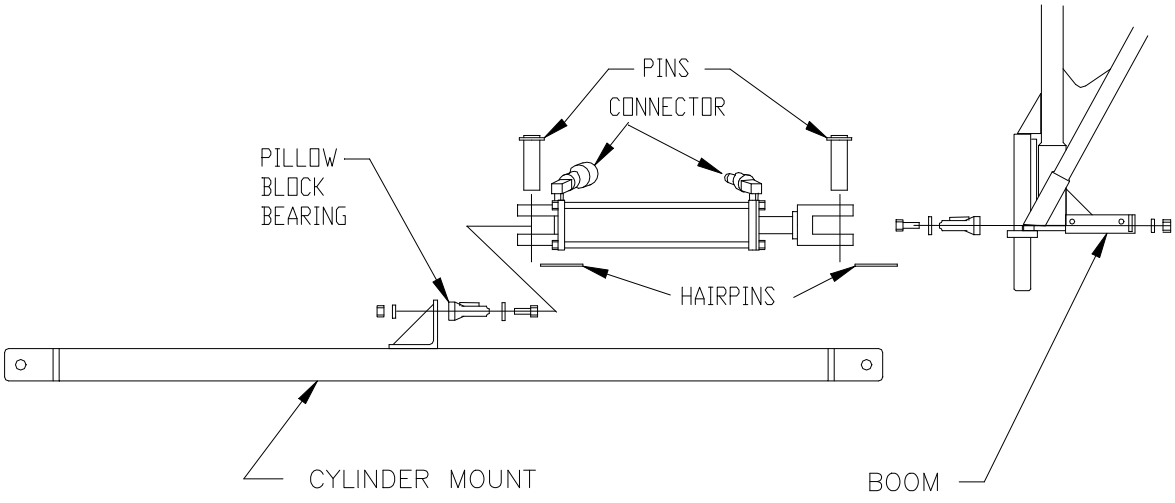


Figure 3-10.
Cylinder Mounting Position

3. Swing the Boom over the roof with a tether line for installing the Boom end of the Cylinder. Use the HydraPak, if necessary, to release cylinder pressure while making this Boom connection. This can be accomplished by connecting hydraulic lines between Cylinder and Power Unit. With engine off, actuate valve and manually pull Cylinder out or in to connect.

3.6 MOUNTING THE WINCH

1. Remove hydraulic connections from Winch before mounting.

2. Place the Winch in position on the Counterweight Leg as shown in Figure 3-11.

3. Secure Winch to Counterweight Leg using the two pins and hairpins.

WARNING:
ENSURE THE TWO PINS AND HAIRPINS BETWEEN THE WINCH AND COUNTERWEIGHT LEG ARE PROPERLY CONNECTED AND IN GOOD CONDITION.

4. Do not connect the hydraulic hoses until you are ready to reeve the wire rope.

3.7 REEVING THE WIRE ROPE

1. Insure that the HydraPak is fully operational and that you have read the separate operating instructions for the HydraPak.

2. Ensure that the bolt securing the wire rope end loop to the drum flange is tight and in good condition. Pull out at least 5 feet of wire rope manually off the Winch to prevent any accidental drawing of the operator's hand into the Winch during HydraPak operation. Ensure wire rope is unwinding from the top and not the bottom of the Winch drum. See the separate Winch operating instructions for details.

3. Attach the 1/2" hydraulic hoses from HydraPak to the Winch. Attach the 1/4" hydraulic hoses from HydraPak to the Cylinder. After starting HydraPak, run at an idle in the 5 GPM position and "feather" the valve to start the Winch. Operate the Winch to unwind about 23 feet of wire rope for 1 part reeving or about 30 feet of wire rope for 2 part reeving. These lengths will place the lifting hook at about eye level at the completion of the reeving procedure. Rotate the boom in over the roof deck to reeve the wire rope.

4. Using a step ladder (not an extension ladder) with OSHA compliant fall protection, reeve wire rope through guide on Winch and then through pivot block. At top of Boom, unlock cable keeper by pulling out handle and rotating it counterclockwise as shown in Figure 3-12. Insert wire rope between cable keeper and sheave. Lock cable keeper in position by pulling out handle and rotating it clockwise as shown in Figure 3-12. This handle is spring loaded and has to be pulled out to rotate in either direction.

WARNING:
NEVER CLIMB ON THE HOIST FRAME.

5. Before applying any load, inspect the wire rope for wear as detailed in Chapter 6.

WARNING:
DISCARD DEFECTIVE WIRE ROPE IMMEDIATELY.

6. For single line lifting, attach shackle and safety hook as shown in Figure 3-13. For double line lifting, reeve wire rope through block and attach shackle and safety hook. Secure to lifting hook on Boom as shown in Figure 3-14.

WARNING:
ENSURE BLOCK, SHACKLE, AND HOOK HAVE A RATED CAPACITY OF AT LEAST 2000 LBS. AND ARE IN GOOD CONDITION.

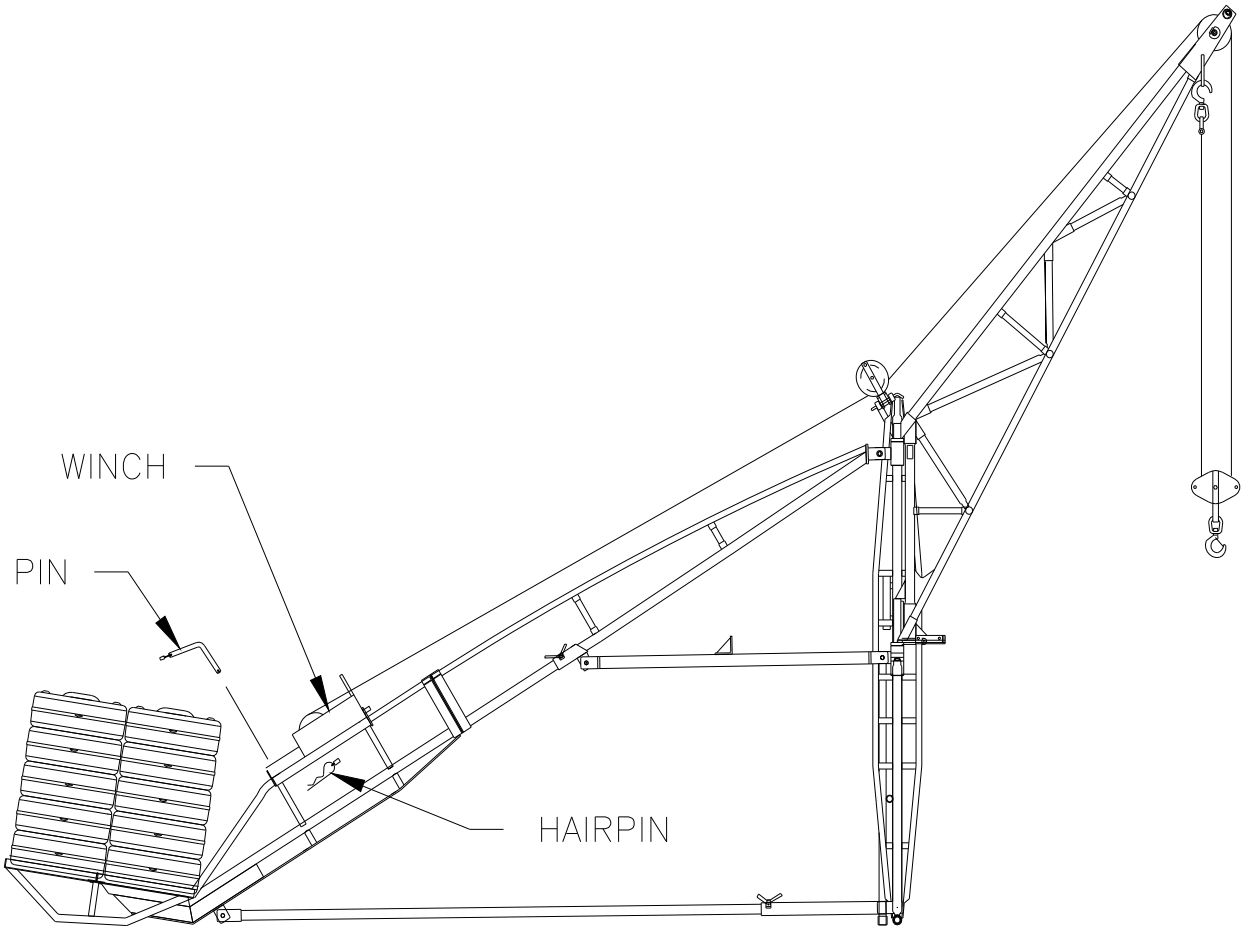


Figure 3-11.
Winch Mounting Position

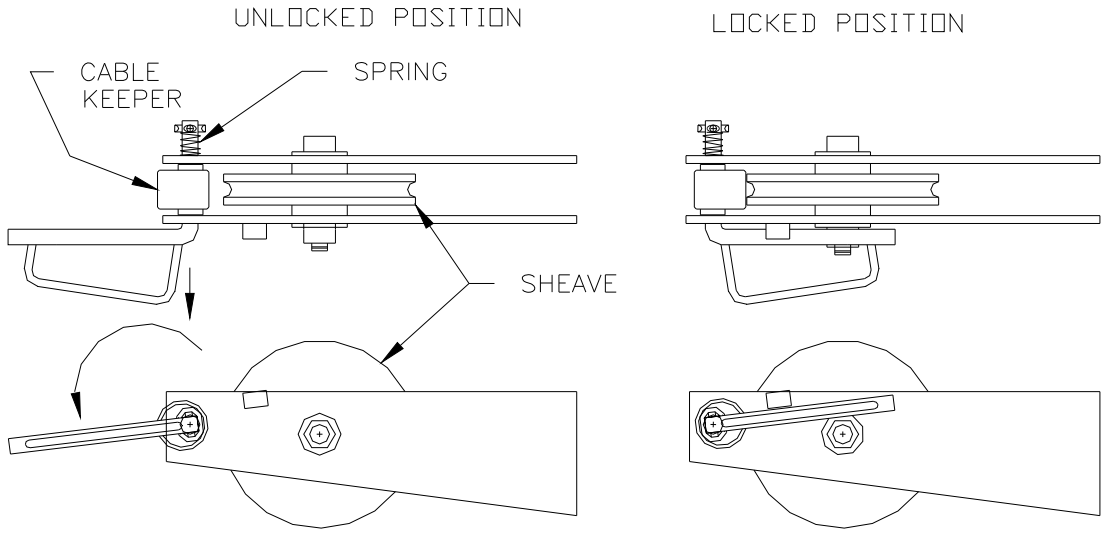


Figure 3-12.
Cable Keeper Operation

7. When replacing or rewinding wire rope, insure wire rope is feeding onto top side of the drum. If the wire rope feeds onto the bottom of the drum, the HydraPak up/down winch control lever will operate in the reverse sense. The winch will operate with an audible ratcheting noise and will not function properly.

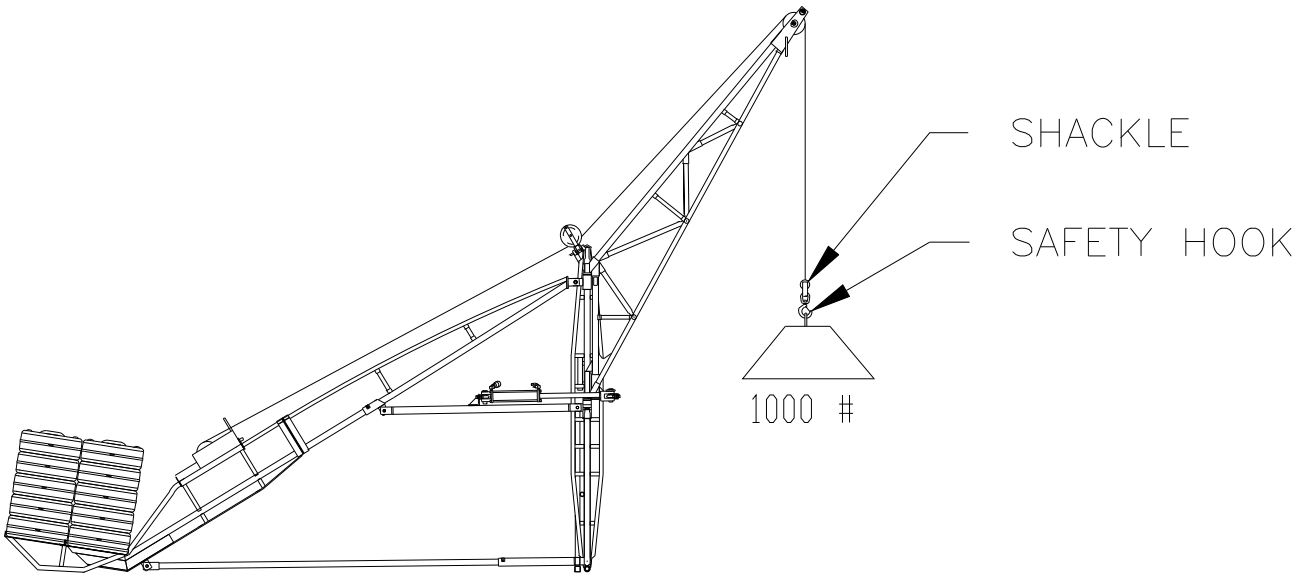


Figure 3-13.
Single Line Operation Up to 1000 Pounds

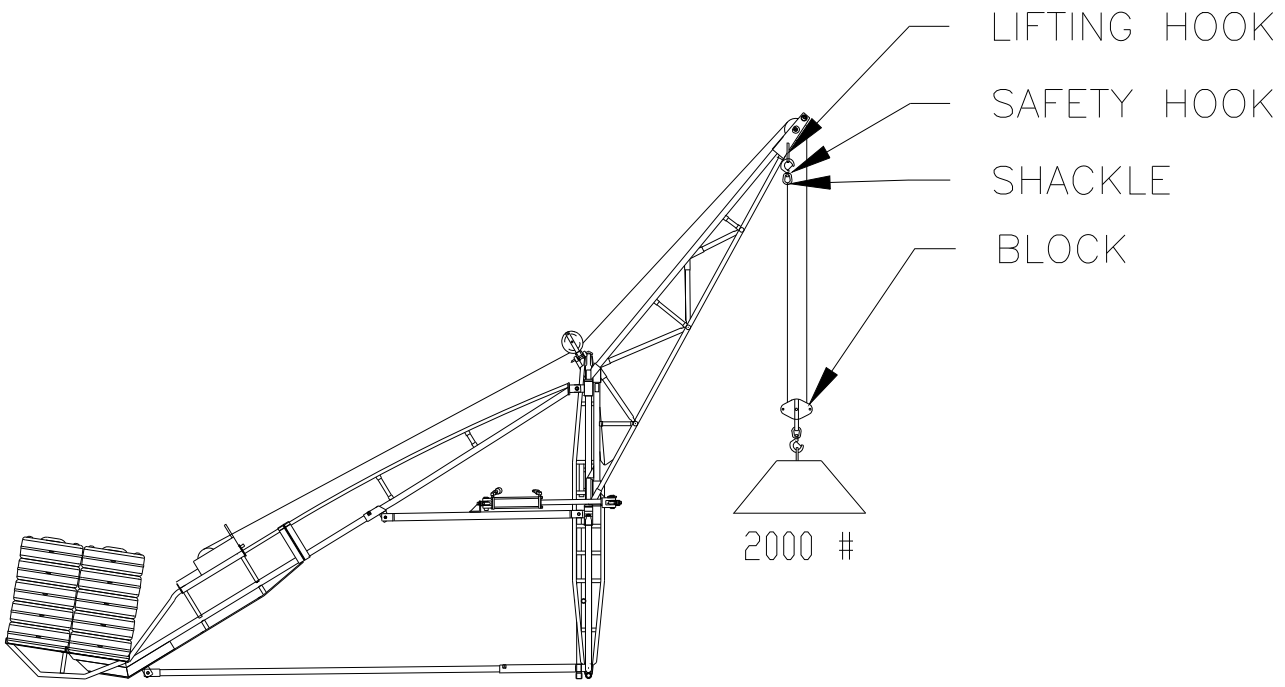


Figure 3-14.
Double Line Operation Up to 2000 Pounds

3.8 BALLAST BLOCK ASSEMBLY

Before using the Ballast Blocks, they must be filled with the proper amount of concrete. Prepare the Ballast Blocks as follows:

1. Place the Ballast Block handle in the base section of the ballast weight. (This is the section without the filling hole.) This handle can stand upright by itself. Position top section of Ballast Block over base section, push down and snap into position. See Figure 3-15.

2. Place a funnel into the opening and pour a loosely mixed, flowing concrete into the box. Funnel may require slitting to fit opening of Ballast Block. To achieve the required Ballast Block weight of 50 pounds, fill it completely by positioning it on an angle. See Figure 3-16. The weight of the ballast block may vary due to the consistency of the concrete mix. Do **not** use mortar mix. This will not give the required minimum Ballast Block weight of 50 pounds. Use a scale to determine the weight of the ballast.

WARNING:

THE BALLAST BLOCK WEIGHT MUST BE AT LEAST 50 POUNDS.

3. Allow the concrete to set 10 minutes; then remove excess concrete from handle area to allow hand clearance. Wipe off top and base of box to allow nesting into the Counterweight Basket.

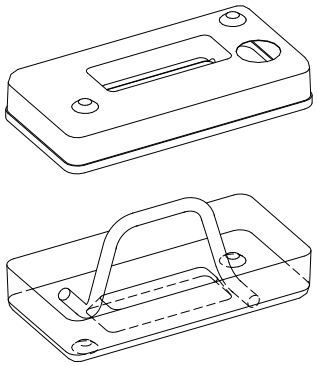


Figure 3-15.
Ballast Block Assembly

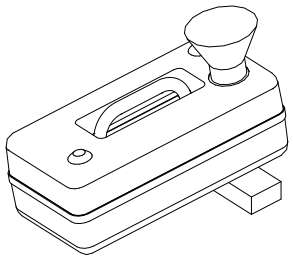


Figure 3-16.
Ballast Block Filling

3.9 RAISING THE HYDRAPAK TO THE ROOF USING THE OPTIONAL HAND WINCH

If a freight elevator or other transporting medium is not available to raise the HydraPak to the roof, it may be done using the hand winch as follows:

WARNING:

THE HAND WINCH IS NOT A MATERIAL HOIST. USE ONLY FOR RAISING AND LOWERING THE HYDRAPAK. DO NOT HOIST CONSTRUCTION OR DEMOLITION MATERIAL.

1. Before raising the HydraPak to the roof, check the following:

   a. The hoist should be fully assembled except for the winch and cylinder. If the cylinder is installed, remove it because the boom will be locked in position.

   b. Ensure that 40 ballast blocks (2000 lbs.) are secured in the counterweight basket.

WARNING:

BEFORE RAISING THE POWER UNIT, ENSURE 2000 LBS. OF REIMANN & GEORGER CORPORATION APPROVED BALLAST BLOCKS ARE SECURED IN THE LOWER COUNTERWEIGHT BASKET.

WARNING:

NEVER USE HUMAN BEINGS AS COUNTERWEIGHT.

c. Install a tether line to the boom for swinging it over the rooftop to unload the HydraPak.

2. Mount the hand winch on the hoist so the crank is located on the right-hand side. Locate the winch on the lower counterweight leg by sliding the front lip of the winch mounting plate under the frame of upper/lower counterweight leg joint. Align the mounting holes and secure with the provided hardware. See Figure 3-17.

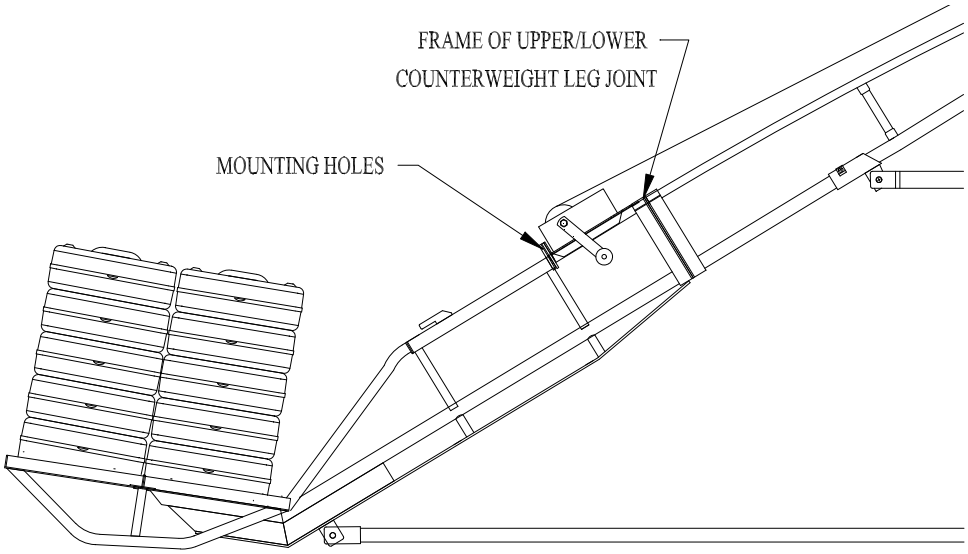


Figure 3-17.
Mounting Hand Winch on HS2000

3. Before reeving the wire rope, rotate the boom in over the deck and tie securely to the counterweight leg. Using a step ladder with OSHA compliant fall protection, reeve the wire rope through the pivot sheave and then between the cable keeper and the boom sheave. Always wear heavy leather gloves when handling wire rope.

4. Inspect the wire rope for signs of wear and damage. Replace defective wire rope immediately.

WARNING:

NEVER CLIMB THE HOIST FRAME TO REEVE THE WIRE ROPE. USE A STEP LADDER (NOT AN EXTENSION LADDER) WITH OSHA COMPLIANT FALL PROTECTION.

5. Connect the wire rope to the lifting eye on the HydraPak. Insure the hook fastens securely to the lifting eye.

6. Attach a tag line to the HydraPak frame to control swaying during the raising of the power unit.

7. The operator on the roof cranks the winch to raise the HydraPak.

WARNING:

ALWAYS STAND CLEAR OF THE SUSPENDED UNIT.

8. Use the boom tether to swing the HydraPak over to the roof top.

9. The roof operator lowers the HydraPak to the roof by cranking the winch in the opposite direction.

4 OPERATION

4.1 BEFORE OPERATING THE HOIST

WARNING:

ONLY TRAINED PERSONNEL SHALL OPERATE THIS EQUIPMENT. A TRAINED PERSON IS ONE WHO HAS READ AND THOROUGHLY UNDERSTANDS THIS INSTRUCTION MANUAL AND RELATED EQUIPMENT MANUALS AND, THROUGH TRAINING AND EXPERIENCE, HAS SHOWN KNOWLEDGE REGARDING THE SAFE OPERATIONAL PROCEDURES.

WARNING:

FOLLOW THE PRE-HOISTING CHECKLIST IN THE FRONT OF THIS MANUAL BEFORE OPERATING.

1. Read the safety labels provided with your hoist and HydraPak. These labels warn you of potential hazards that can cause serious injury. If a label comes off or becomes hard to read, contact Reimann & Georger Corporation for a replacement.

2. Before starting operation, you should thoroughly read your HydraPak and HydraWinch instruction manuals for complete safety, operating and maintenance information.

WARNING:

THE HOISTING OPERATION MUST BE CLEAR OF ALL ELECTRICAL LINES AND OBSTRUCTIONS. CONSULT POWER COMPANY BEFORE WORKING NEAR POWER LINES.

3. Hoisting area is to be kept clear of unauthorized personnel. Place barricades or secure the area in such a manner that if there were an equipment failure, no personnel would be injured.

4. Ensure that all hoisting accessories such as forks, buckets and slings are commercially manufactured, are in good condition, and have a rated load capacity. When using a sling, note that its capacity decreases as the angle increases.

5. Before making any hydraulic connections, inspect all hoses for leaks and risks of rupture as follows:

    a. Inspect each hose for cuts, cracks, worn spots, bulges, chemical attack, kinks or any other damage. Never stop any detected leak with your hand.

    b. Replace a damaged hose immediately. Never repair the hose.

WARNING:

LIQUID UNDER HIGH PRESSURE CAN PIERCE THE SKIN, CAUSING DEATH OR SERIOUS INJURY. IN CASE OF INJURY, GET IMMEDIATE MEDICAL ATTENTION.

6. Connect the hydraulic hoses from the HydraPak to the HydraWinch. To connect, retract sleeve on the female coupling and insert male coupling. To disconnect, retract sleeve on female coupling and remove male coupling.

7. Ensure hydraulic hoses are connected from the HydraPak to the cylinder.

8. Use caution when handling fuel for the HydraPak. Make sure the gas caps on the HydraPak and fuel can are properly tightened. Move the HydraPak at least 10 feet from the fueling point before starting the engine.

4.2 RAISING AND LOWERING THE LOAD

WARNING:

ENSURE 2000 LBS. (ONTARIO OHSA: 1140 KG.) OF REIMANN & GEORGER CORPORATION APPROVED BALLAST BLOCKS ARE SECURED PROPERLY IN THE LOWER COUNTERWEIGHT BASKET WITH ROPE BEFORE OPERATING THE HOIST.

WARNING:

NEVER EXCEED THE RATED LOAD CAPACITY OF 2000 LBS.

WARNING:

NEVER USE HUMAN BEINGS AS COUNTERWEIGHT.

1. The 5/8 lever provides an output of either 5 or 8 GPM. See Figure 4-1. This selection allows the hydraulic winch to operate at two different speed ranges. Within these ranges, engine speed can be varied to further adjust hoisting speeds. Speeds vary to about 165 fpm with a single part of line. A speed of up to 80 fpm occurs when using two parts of line. As wire rope is wound onto the drum, the effective drum diameter increases which increases lifting speed and decreases lifting capacity.

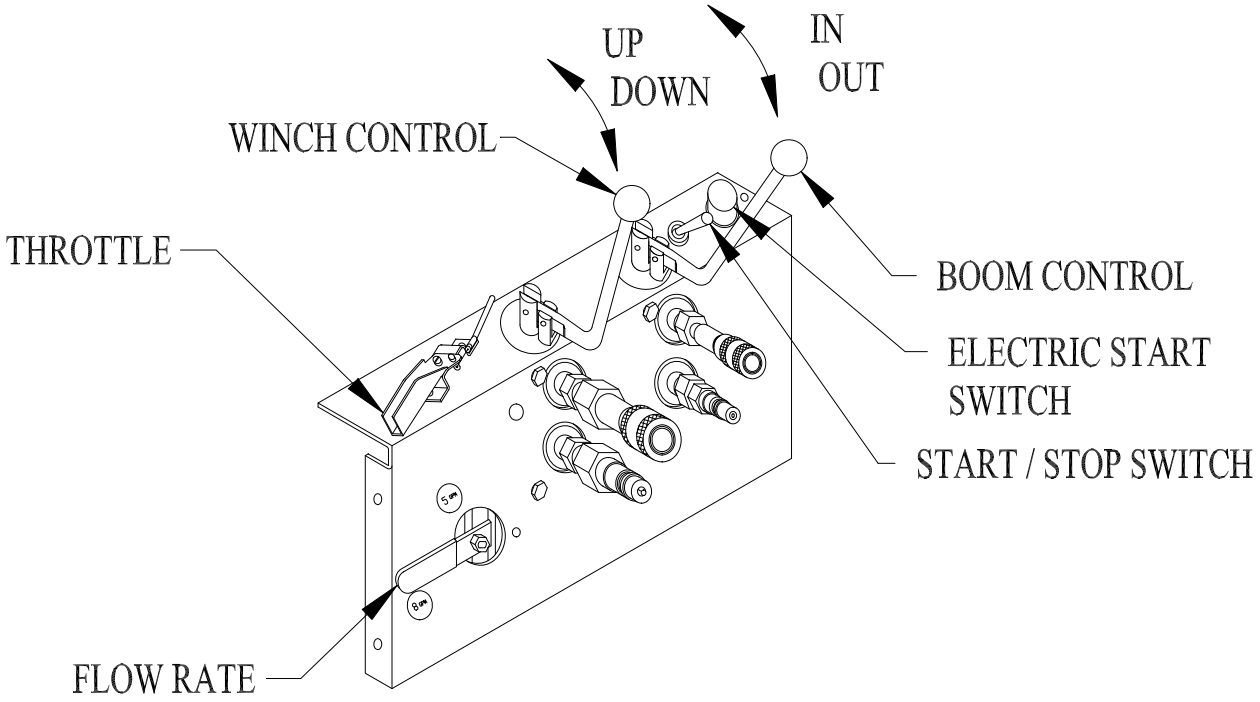


Figure 4-1.
HydraPak Controls

a. The 8 GPM setting is used for light loads, less than 1000 lbs., with two parts of a line or 500 lbs. with a single part of a line. At the 8 GPM setting, the line speed is 165 feet per minute with a single part of line or 83 feet per minute with two parts of a line.

b. The 5 GPM setting is used when lifting heavy loads (up to 2000 lbs. capacity) with two parts of a line. If lifting speed must be further slowed, run the engine at reduced throttle.

2. The hoist operator must remain behind the operator fence when operating the hoist. All personnel must be protected by OSHA compliant fall protection when handling loads at the roof edge. See Figure 4-2.

WARNING:

ALL PERSONNEL SHALL BE PROTECTED BY OSHA COMPLIANT FALL PROTECTION.

WARNING:

PERSONNEL MUST NEVER SECURE A LIFE LINE TO THE HOIST FRAME STRUCTURE.

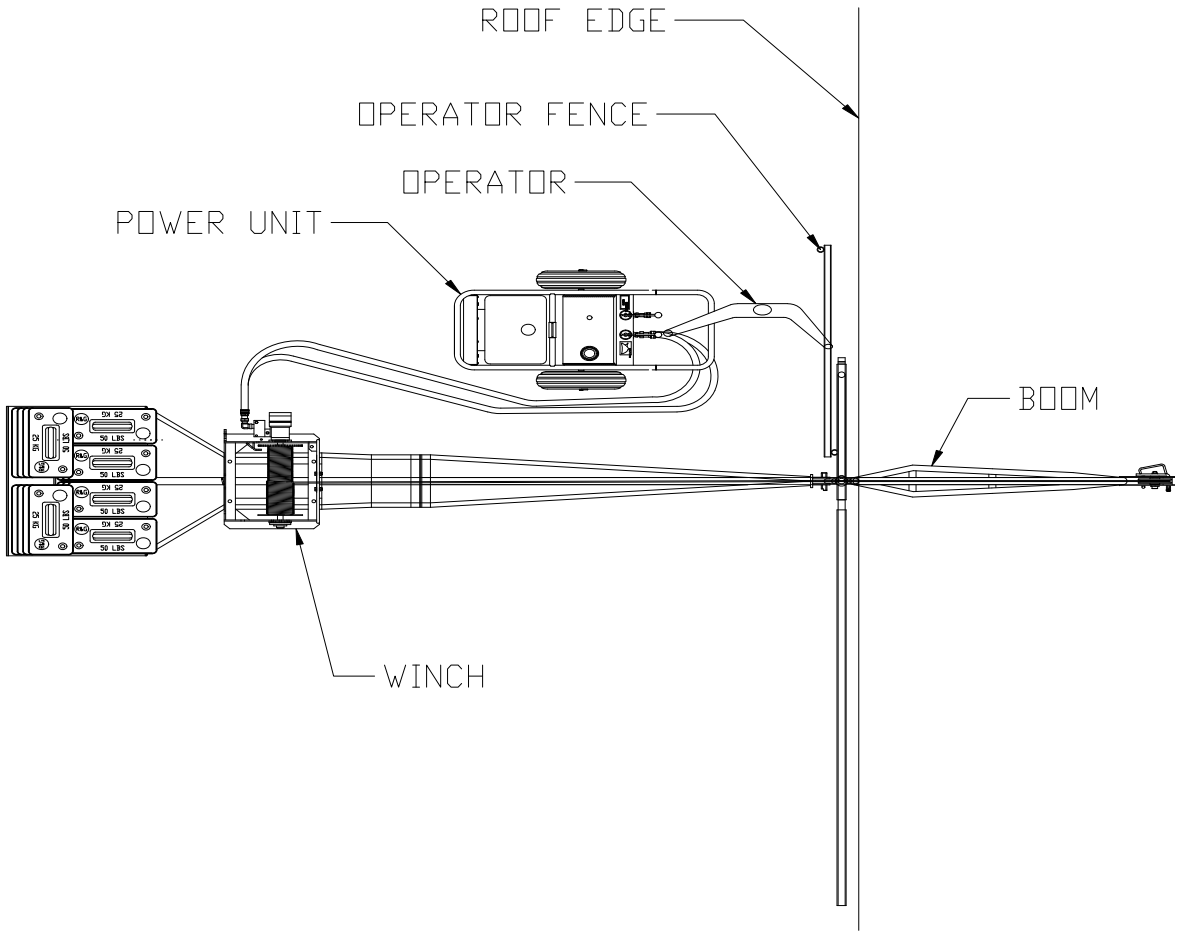


Figure 4-2.
Typical HydraPak/Hoist Positioning

3. With control levers in neutral, start the HydraPak and allow to warm up.

4. Put the throttle in the middle position when starting and slow when stopping the engine. This provides a warming and cooling period. Know how to stop your HydraPak quickly in case of emergency. Consult the engine manual for detailed operation of engine controls.

5. Pull winch control lever up to raise a load and down to lower a load. See Figure 4-1. Never allow anybody to ride on the hoist. Make a few "dry runs" (without load, but **with** ballast) to become familiar with operation, controls, and HydraPak, and to test hoisting clearance. Always maintain 10-20 pounds of wire rope tension with a cable weight. Do NOT attempt to make any equipment adjustments during operation.

6. Before lifting, secure the load from shifting and insure the safety latch on the hook is not supporting any load. Use tag lines to control all loads. Never hoist over an open doorway.

WARNING:

AVOID SIDE LOADS, SHOCK LOADS, AND SUDDEN STOPS.

WARNING:

KEEP OUT FROM UNDER A RAISED LOAD.

7. Use the boom control lever shown in Figure 4-1 to swing the boom 135° to load or unload material on the roof deck where you are working.

8. When lowering the load, gradually decelerate it as it nears the ground.

CAUTION:

THE WINCH DRUM MUST ALWAYS HAVE AT LEAST THREE TURNS OF WIRE ROPE WHEN THE LOAD IS AT THE LOWEST POINT OF TRAVEL.

4.3 HAND SIGNALS

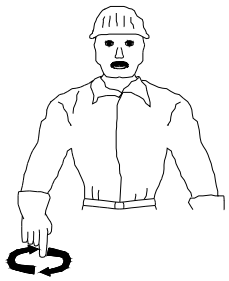
Hand signals have an important advantage over voice commands in high noise environments. Using hand signals insures proper synchronization of actions between the roof personnel and the ground operator and can give immediate warning of a potentially unsafe condition. All persons must be familiar with hand signals. Use the hand signals as shown in Figures 4-3 through 4-7.

WARNING:

A GOOD LINE OF COMMUNICATION MUST BE MAINTAINED BETWEEN THE HOIST OPERATOR AND ALL PERSONNEL FOR SAFETY. AT THE MINIMUM, ALL CREW MEMBERS MUST BE FAMILIAR WITH HAND SIGNALS.

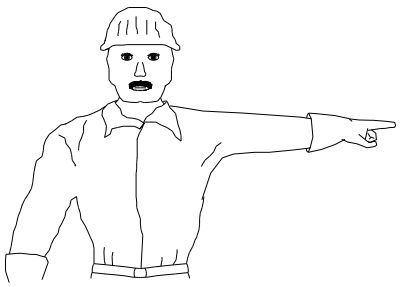
With forearm vertical, forefinger pointing up, move hand in small horizontal circle.

Figure 4-3.
"Hoist" Signal



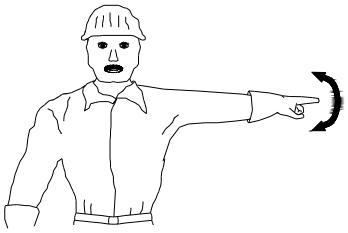
With arm extended downward, forefinger pointing down, move hand in small horizontal circle.

Figure 4-4.
"Lower" Signal



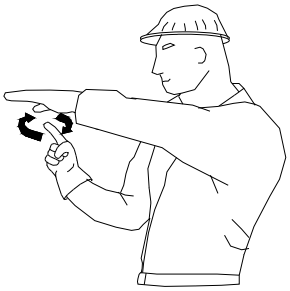
Arm extended, palm down, hold position rigidly

Figure 4-5.
"Stop" Signal



Arm extended, palm down, move hand rapidly right and left.

Figure 4-6.
"Emergency Stop" Signal



Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist Slowly shown as example.)

Figure 4-7.
"Move Slowly" Signal

4.4 PREPARING HOIST FOR SHUTDOWN

At the end of operation, secure the equipment to prevent unauthorized use. **Never** assume you will find the equipment in the same condition that you left it. Proceed as follows:

1. Swing the Boom to the 135° position over rooftop. Insure that all lifting tension has been removed from the wire rope.

2. Shut off HydraPak and take necessary action to prevent its unauthorized use.

3. If the hoist is being permanently disassembled, at the end of a project for example, follow the detailed disassembly procedures in Chapter 5.

5 DISASSEMBLY

5.1 PRIOR TO DISASSEMBLY

WARNING:

ONLY TRAINED PERSONNEL SHALL DISASSEMBLE THE HOIST. A TRAINED PERSON IS ONE WHO HAS READ AND THOROUGHLY UNDERSTANDS THIS INSTRUCTION MANUAL AND RELATED EQUIPMENT MANUALS AND, THROUGH TRAINING AND EXPERIENCE, HAS SHOWN KNOWLEDGE REGARDING THE SAFE OPERATIONAL PROCEDURES.

5.2 REWINDING THE WIRE ROPE

1. Swing Boom to the 135° position over rooftop.

2. Insure that all lifting tension has been removed from the wire rope.

3. Using a step ladder (not an extension ladder) with OSHA compliant fall protection, unlock the cable keeper at the top of the Boom by pulling out on the handle and rotating it in the direction shown in Figure 3-12. Remove the cable block, shackle, and safety hook. Remove wire rope between cable keeper and sheave. Lock cable keeper in position by pulling out on handle and rotating handle in the direction shown in Figure 3-12. This handle is spring loaded and has to be pulled out to operate.

WARNING:

NEVER CLIMB ON THE FRAME FOR ANY REASON. AN ACCIDENT WHILE DOING THIS CAN CAUSE DEATH OR SERIOUS PERSONAL INJURY.

4. Tie a safety line at least 5 feet long to the wire rope end to prevent any accidental drawing of the operator's hand into the Winch during rewinding.

5. Start the HydraPak and put it in idle at 5 GPM. "Feather" the valve to start the Winch. Operate the Winch to rewind enough wire rope to bring the wire rope end to near the top of the Boom. Insure that the wire rope is rewinding evenly on the drum.

6. "Feather" the HydraPak valve to rewind the wire rope through the pivot block and then the guide on the Winch. As the wire rope end approaches the drum, handle the wire rope only by the safety line described in Step 4.

7. When the wire rope end reaches the Winch, shut off the HydraPak and remove the safety line. Safely anchor the wire rope end for convenient future access.

8. Disconnect the hydraulic lines between the Winch and HydraPak.

5.3 REMOVING THE CYLINDER

1. Insure the Boom is in the 135° position.

2. Disconnect the hydraulic lines between the Cylinder and power unit.

3. Remove Cylinder assembly from the Cylinder Mount brace and Boom by removing the 1" pins and hairpins.

5.4 REMOVING THE WINCH

Remove the two pins and hairpins securing the Winch to the Counterweight Leg. Then remove the Winch from its mounting position.

5.5 REMOVING PARTS FROM DECK

When removing any parts from the deck, observe the following safety rules:

1. Use a hoist beam, swing beam or freight elevator to lower the disassembled parts of the hoist to the ground.

2. Safely secure the hoist parts on the transporting medium without overloading before lowering to the ground.

3. The HydraPak can be lowered to the ground using the procedure in Section 5.6.

5.6 LOWERING THE POWER UNIT TO THE GROUND USING THE OPTIONAL HAND WINCH

If a freight elevator or other transporting medium is not available to lower the HydraPak to the ground, it may be done using the hand winch as follows.

WARNING:

THE HAND WINCH IS NOT A MATERIAL HOIST. USE ONLY FOR RAISING AND LOWERING THE HYDRAPAK. DO NOT HOIST OR LOWER CONSTRUCTION OR DEMOLITION MATERIAL.

WARNING:

ENSURE 2000 LBS. (ONTARIO OHSA: 1140 KG.) OF REIMANN & GEORGER CORPORATION APPROVED BALLAST BLOCKS ARE SECURED PROPERLY IN THE LOWER COUNTERWEIGHT BASKET WITH ROPE BEFORE LOWERING THE HYDRAPAK.

WARNING:

NEVER USE HUMAN BEINGS AS COUNTERWEIGHT.

1. Insure that the Boom is in the 135° position. Install a tether line to the Boom for swinging it into the hoisting position for lowering the HydraPak to the ground.

2. Mount the hand winch on the hoist and reeve the wire rope as described in Section 3.9 of Chapter 3.

3. Connect the wire rope to the lifting eye on the HydraPak. Insure the hook fastens securely to the lifting eye.

4. Attach a tag line to the HydraPak frame to control swaying during the lowering of the power unit.

5. The operator on the roof cranks the winch to raise the HydraPak enough to suspend it over the rooftop.

WARNING:

ALWAYS STAND CLEAR OF THE SUSPENDED UNIT.

6. Use the Boom tether to swing the HydraPak into the hoisting position over the roof edge.

7. The roof operator lowers the HydraPak to the ground by cranking the winch in the opposite direction.

8. After the HydraPak is on the ground with no remaining wire rope tension, remove the winch from the hoist.

5.7 DISASSEMBLING THE FRAME

WARNING:

NEVER DISASSEMBLE THE FRAME NEAR A ROOF EDGE.

1. Insure that the hoist is not supporting any load before proceeding.

WARNING:

NEVER DISASSEMBLE THE HOIST WITH WEIGHT SUSPENDED FROM THE BOOM.

2. Untie the rope securing the ballast blocks in the Lower Counterweight basket. Remove the ballast blocks and place them where they will not impede dismantling procedures.

3. Raise the Operator Fence on Front Leg. Remove the plywood from underneath the Counterweight Basket. Remove the Front Leg from its 2"x 6" lumber mounting and unfasten from the supporting wall. Move hoist assembly away from the roof edge on supporting wall.

4. Remove the Boom by lifting upwards to disengage Boom pins from Front Leg sockets.

5. Loosen the lockscrews at point B (Figure 5-1).

6. Remove Brace from Counterweight Leg by removing the pin and hairpin at point A. See Figure 5-1.

7. Remove the Socket from the Front Leg by removing the pin and hairpin at point C. Then slide the socket out of the brace. See Figure 5-1.

8. Remove the Cylinder Mount by removing the pins and hairpins at points D and E. See Figure 5-1. Loosen lockscrews as necessary on sliding tube connecting Cylinder Mount to Counterweight Leg. Have one person steady the frame while doing this.

9. Remove assembled Counterweight Leg from Front Leg by removing the pin and hairpin between the Front Leg and Upper Counterweight Leg. Have one person steady the Front Leg while another person rests the Counterweight Leg onto the roof deck.

10. Remove the pin and hairpin assembly from the end of the Stabilizer Interlock Leg and the bolt and nut from the Upper Stabilizer connection.

11. Swing Stabilizer to disengage the interlock.

12. Holding Stabilizer at an angle, slide completely out of the Front Leg.

13. Separate the upper and lower sections of the Counterweight Leg by removing the 1/2" x 1-1/4" grade 5 bolts and nuts with shake washers as shown in Figure 3-5 in Chapter 3.

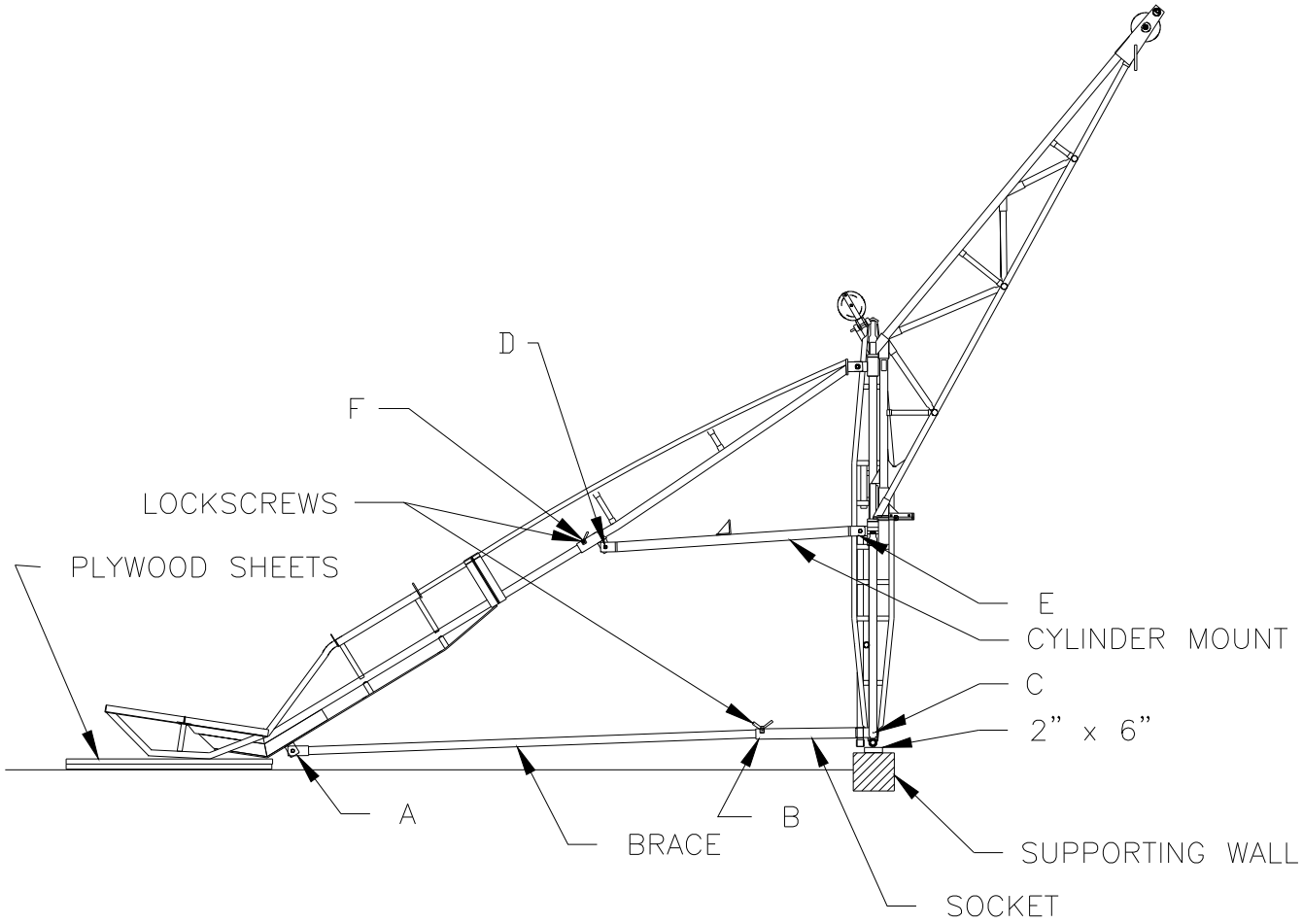


Figure 5-1.
Completed Frame Assembly

6 INSPECTION AND MAINTENANCE

6.1 GENERAL MAINTENANCE RULES

Maintenance information for the associated HydraPak and HydraWinch is in the respective specific manuals for these units.

1. Proper maintenance of the hoist and related equipment consists of adhering to all the guidelines given in this chapter and in the Pre-Hoisting Checklist in the front of this manual. Proper maintenance is required to maintain the system in good condition, which is defined as each part being free of rust or other corrosion, bends, breaks, or other defects.

2. Review and follow all the safety rules given in Chapter 1 before attempting any maintenance.

3. Only authorized personnel should be allowed in the maintenance area. Authorized personnel are the trained people as defined below and their supervision. Place barricades or secure the area in such a manner that if there was an equipment failure, no personnel would be injured.

4. Repairs must be made only by trained personnel. A "trained person" is one who has read and thoroughly understands this instruction manual and related equipment manuals and, through training and experience, has shown knowledge regarding the safe operational procedures.

5. All authorized maintenance personnel should be wearing, as a minimum, hard hats, safety glasses, and safety shoes.

WARNING:
WEAR HEAVY LEATHER GLOVES WHEN HANDLING WIRE ROPE.

6. Do not weld or otherwise modify the hoist. Such alterations may weaken the structural integrity of the hoist and invalidate your warranty.

WARNING:
DO NOT ATTEMPT ANY HOISTING DURING ANY ERECTION, MAINTENANCE, OR REPAIR PROCEDURES.

WARNING:
SHUT DOWN AND LOCK OUT THE HYDRAPAK TO PREVENT ACCIDENTAL STARTUP. RELIEVE OR RENDER SAFE ALL THE POTENTIALLY HAZARDOUS ENERGY.

WARNING:
THE LOAD MUST BE AT THE LOWEST POSITION WHEN WORKING ON ANY PART OF THE HOIST.

WARNING:
DO NOT ADJUST OR REMOVE HYDRAULIC COMPONENTS, LINES, OR FITTINGS WHILE THE HYDRAPAK IS RUNNING OR WHENEVER THE HYDRAULIC FLUID IS HOT.

WARNING:
LIQUID UNDER HIGH PRESSURE CAN PIERCE THE SKIN, CAUSING DEATH OR SERIOUS INJURY. IN CASE OF INJURY, GET IMMEDIATE MEDICAL ATTENTION.

6.2 INITIAL INSPECTION

Hoist erection and dismantling must be done by trained personnel only as defined in Section 6.1. Each time after setting up the hoist and before placing it in service, all parts of the structure, boom, hoisting machine, and other equipment must be thoroughly inspected by trained personnel as described in the remainder of this chapter.

6.3 DAILY INSPECTION

It is important that all the maintenance procedures outlined in the Pre-Hoisting Checklist in the front of this manual be done daily. Details on inspecting the wire rope are given in Section 6.4.

All broken, worn or defective parts that may affect operational integrity must be repaired or replaced before startup.

6.4 WIRE ROPE INSPECTION PROCEDURE

Inspect the wire rope prior to each use and at least daily for signs of wear, damage, or pinching. Inspect the entire wire rope working length. Thoroughly inspect the rope sections that pass over sheaves or drums, or that make opposing turns. Inspect wire rope and end attachments carefully. While inspecting, examine sheaves, guards, guides, drums, flanges, and other surfaces contacting wire rope during operation. Correct any condition harming the rope in use or other damage or worn surfaces at this time.

Remove or replace immediately wire rope with one or more of the following defects:

1. Corrosion

2. Broken wires:

   (a) One or more valley breaks. A valley break is a wire break occurring in the valley between two adjacent strands.

   (b) Six randomly distributed broken wires in one rope lay. A rope lay is the length of rope along which one strand makes a complete revolution around the rope. See Figure 6-1. Keeping the rope clean and wound evenly on the drum will increase its life and efficiency.

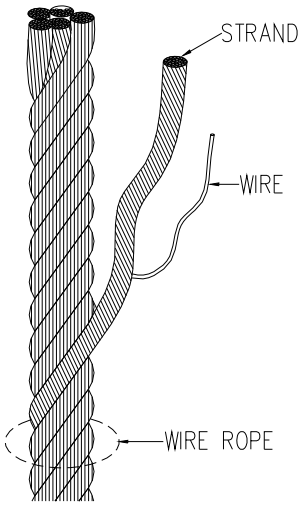


Figure 6-1.
Wire Rope Components

3. Abrasion: Scrubbing, flattening or peening causing loss of more than one-third of the original diameter of the outside wires.

4. Kinking: Severe kinking, crushing, bird caging or other damage causing distortion of the rope structure. Bird caging is a bulging in the wire rope caused by the individual wires becoming untwisted. This untwisting of individual wires is usually caused by impact loading on the wire rope (such as a sudden stop).

5. Heat damage: Evidence of any heat damage caused by a torch or by contact with electrical wires.

6. Reduction of more than 1/64 inch from the nominal 1/4 inch diameter wire rope. Marked reduction in diameter indicates core deterioration.

7 TROUBLESHOOTING

The following chart is intended to assist with troubleshooting the HS2000 swing hoist. While not all inclusive, the chart outlines the most common causes of a problem and the recommended course of action.

Troubleshooting guides for the associated HydraPak and HydraWinch are in the instruction manuals specifically for these units.

SYMPTOM	**CAUSE AND CORRECTIVE ACTION**
Winch operating slowly or not at all--HydraPak engine operating normally.	Hoses from HydraPak to winch leaking fluid in line or have a poor connection. HydraPak hydraulic system malfunctioning—refer to Troubleshooting chapter in HydraPak manual.
Boom operating slowly or not at all--HydraPak engine operating normally.	Hoses from HydraPak to cylinder leaking fluid in line or have a poor connection. HydraPak hydraulic system malfunctioning—refer to Troubleshooting chapter in HydraPak manual.
Boom operates in one direction only.	Hoist frame not set up properly—Front Leg must be vertical. If it is not vertical, the hydraulic cylinder does not have sufficient force to swing Boom in.
Load drifts down.	Wire rope is coming off bottom of drum instead of top.
Hoist won't lift load or is lifting it very slowly.	Engine speed too slow—increase throttling. Hydraulic oil flow too high for load—reduce flow from 8 gpm to 5 gpm. Single line operation being attempted for more than a 1000 pound load—use double line operation for loads up to 2000 pounds. Hoist attempting to lift more than stated capacity of unit—check capacity rating and reduce load weight as needed. Load not moving freely—check for block or wire rope malfunctions. Problem with HydraPak hydraulics or related engine operation—refer to Troubleshooting chapter of the HydraPak manual for details. Too much wire rope on drum—hoisting capacity decreases as wire rope diameter increases.

8 PARTS LIST

The following parts list applies to the hoist assembly only. The parts lists for the HydraWinch and HydraPak units are in the separate manuals for these items. Each item number on this parts list can be matched with the item number shown on the Figure 8-1 assembly drawing.

Item Number	Part Number	Quantity	Description
1	0700297	1	Boom
2	0700291	1	Front Leg/Stabilizer Assembly
3	0700290	1	Upper/Lower Counterweight Assembly
4	0700294	1	Cylinder Mount
5	0700288	9	Pin & Cable Assembly
6	0700293	1	Brace
7	0700292	1	Socket
8	7300428	1	Pivot Block
9	7304141	1	Sheave Assembly
10	7300222	1	Block with Hook
11	7300348	1	Shackle
12	7314700	1	Swivel Hook with Latch
13	5000214	4	Lockscrew
14	0700299	1	Stabilizer
15	0700298	1	Front Leg
16	0700289	1	Cable Keeper
17	6000426	1	Cylinder
18	6000969	1	Connector, Female
19	6000967	1	Connector, Male
20	6007429	2	Pin
21	5800387	2	Hairpins
*22	0706750	2	Bearing
*23	0700287	1	Upper Counterweight Leg
*24	0700286	1	Lower Counterweight Leg
26	0700890	2	Fitting
**	0704926	1	Cylinder Assembly
27	0132000	40	Ballast Weights
***	0700499	1	HOSE ASSY 10'X1/2" W/QD'S (PR) Winch
***	0700500	1	HOSE ASSY 10'X1/4" W/QD'S (PR) Swing

* Includes hardware

** Includes items #17, 18, 19, and 26 and can be ordered as a unit.

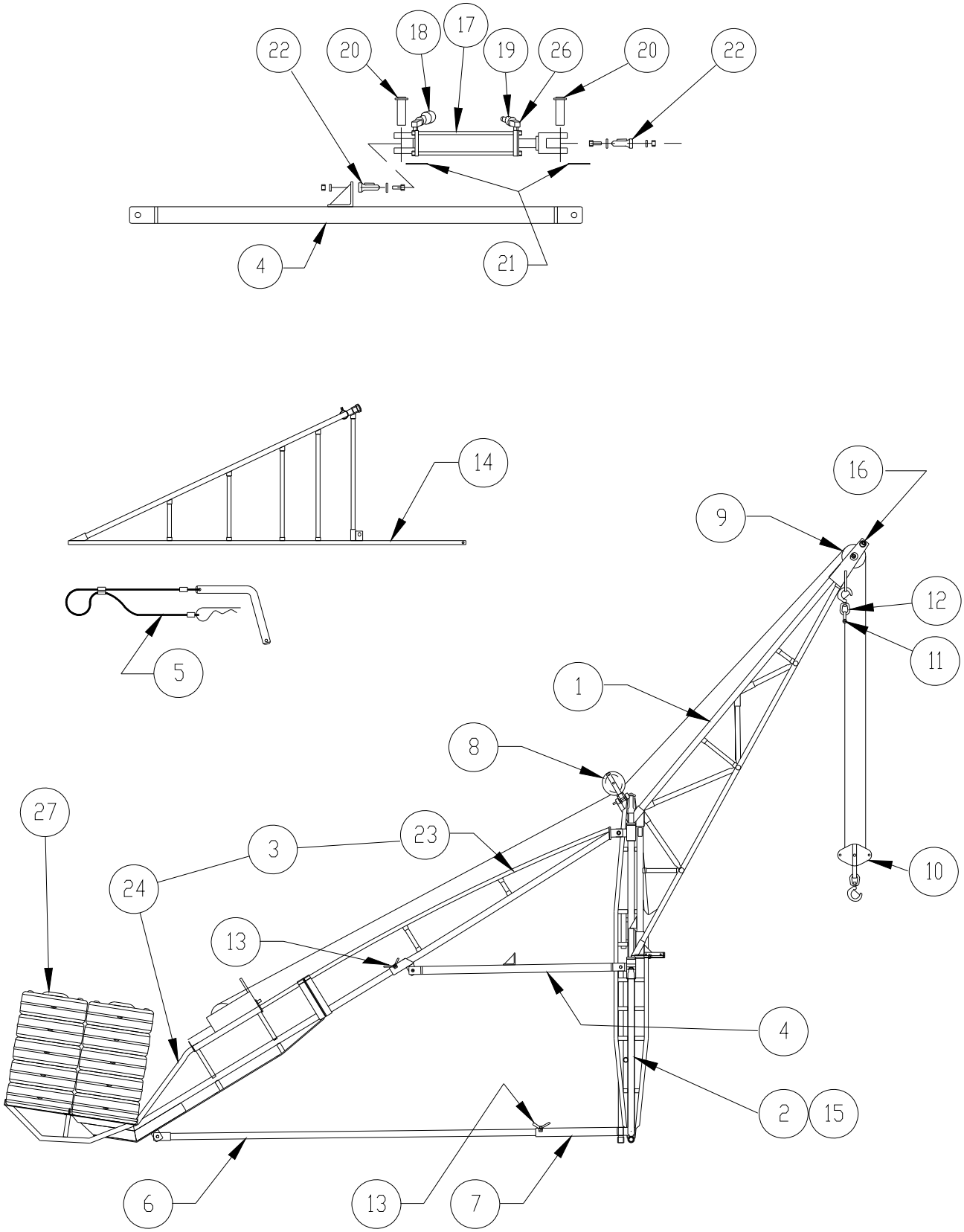


Figure 8-1.
HS2000 Assembly Drawing

LIMITED PRODUCT WARRANTY

Reimann & Georger Corporation
Hoisting and Construction Products

A. LIMITED WARRANTY

Reimann & Georger Corporation (the "Manufacturer") warrants to the original purchaser (the "Buyer") that all Reimann & Georger Hoisting and Construction products shall be free of defects in material and workmanship for a period of one (1) year from date of original purchase.

B. MANUFACTURER'S OBLIGATIONS

The Manufacturer's sole obligation under this Limited Warranty is the repair or, at the Manufacturer's discretion, the replacement of parts found to be defective. Parts and equipment must have authorization from the Manufacturer prior to return to the Manufacturer or repair by an authorized service person. Costs of transportation and other expenses connected with replacing or repairing parts are not covered under this Limited Warranty.

C. PARTS MANUFACTURED BY OTHERS

This Limited Warranty does not cover any parts manufactured by others. Such parts are subject to the warranty, if any, of their respective manufacturers, and are to be repaired only by a respective authorized service person for such parts. The Manufacturer shall have no obligation to undertake repairs of parts manufactured by others.

D. NO SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES

IN NO EVENT SHALL THE MANUFACTURER BE LIABLE TO THE BUYER OR ANY OTHER PERSON FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL LOSSES OR DAMAGES CONNECTED WITH THE USE OF THE PRODUCT UNDER THIS LIMITED WARRANTY. SUCH DAMAGES FOR WHICH THE MANUFACTURER SHALL NOT BE RESPONSIBLE INCLUDE, BUT ARE NOT LIMITED TO, LOST TIME AND CONVENIENCE, LOSS OF USE OF THE PRODUCT, THE COST OF A PRODUCT RENTAL, COSTS OF GASOLINE, TELEPHONE, TRAVEL, OR LODGING, THE LOSS OF PERSONAL OR COMMERCIAL PROPERTY, AND THE LOSS OF REVENUE.

E. NO LIABILITY IN EXCESS OF PURCHASE PRICE

IN NO EVENT SHALL THE MANUFACTURER'S OBLIGATIONS UNDER THIS LIMITED WARRANTY EXCEED THE PURCHASE PRICE OF THE PRODUCT.

F. NO EXTENSION OF STATUTE OF LIMITATIONS

ANY REPAIRS PERFORMED UNDER THIS WARRANTY SHALL NOT IN ANY WAY EXTEND THE STATUTES OF LIMITATIONS FOR CLAIMS UNDER THIS LIMITED WARRANTY.

G. WAIVER OF OTHER WARRANTIES

THE EXPRESS WARRANTIES SET FORTH IN THIS LIMITED WARRANTY ARE IN LIEU OF AND EXCLUDE ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

H. PROCEDURE FOR WARRANTY PERFORMANCE

If the product fails to perform to the Manufacturer's specifications, the Buyer must provide the Manufacturer with the applicable model and serial numbers, the date of purchase, and the nature of the problem.

I. ADDITIONAL EXCLUSIONS FROM THIS LIMITED WARRANTY. THIS LIMITED WARRANTY DOES NOT COVER ANY OF THE FOLLOWING:

1. Equipment which has been abused, damaged, used beyond rated capacity, or repaired by persons other than authorized service personnel.

2. Damage caused by acts of God which include, but are not limited to, hailstorms, windstorms, tornadoes, sandstorms, lightning, floods, and earthquakes.

3. Damage under conditions caused by fire or accident, by abuse or by negligence of the user or any other person other than the Manufacturer, by improper installation, by misuse, by incorrect operation, by "normal wear and tear", by improper adjustment or alteration, by alterations not completed by authorized service personnel, or by failure of product parts from such alterations.

4. Costs of repairing damage caused by poor or improper maintenance, costs of normally scheduled maintenance, or the cost of replacing any parts unless done as the result of an authorized repair covered by the one (1) year Limited Warranty.

5. Costs of modifying the product in any way once delivered to the Buyer, even if such modifications were added as a production change on other products made after the Buyer's product was built.

J. NO AUTHORITY TO ALTER THIS LIMITED WARRANTY

No agent, representative, or distributor of the Manufacturer has any authority to alter the terms of this Limited Warranty in any way.