BI012096

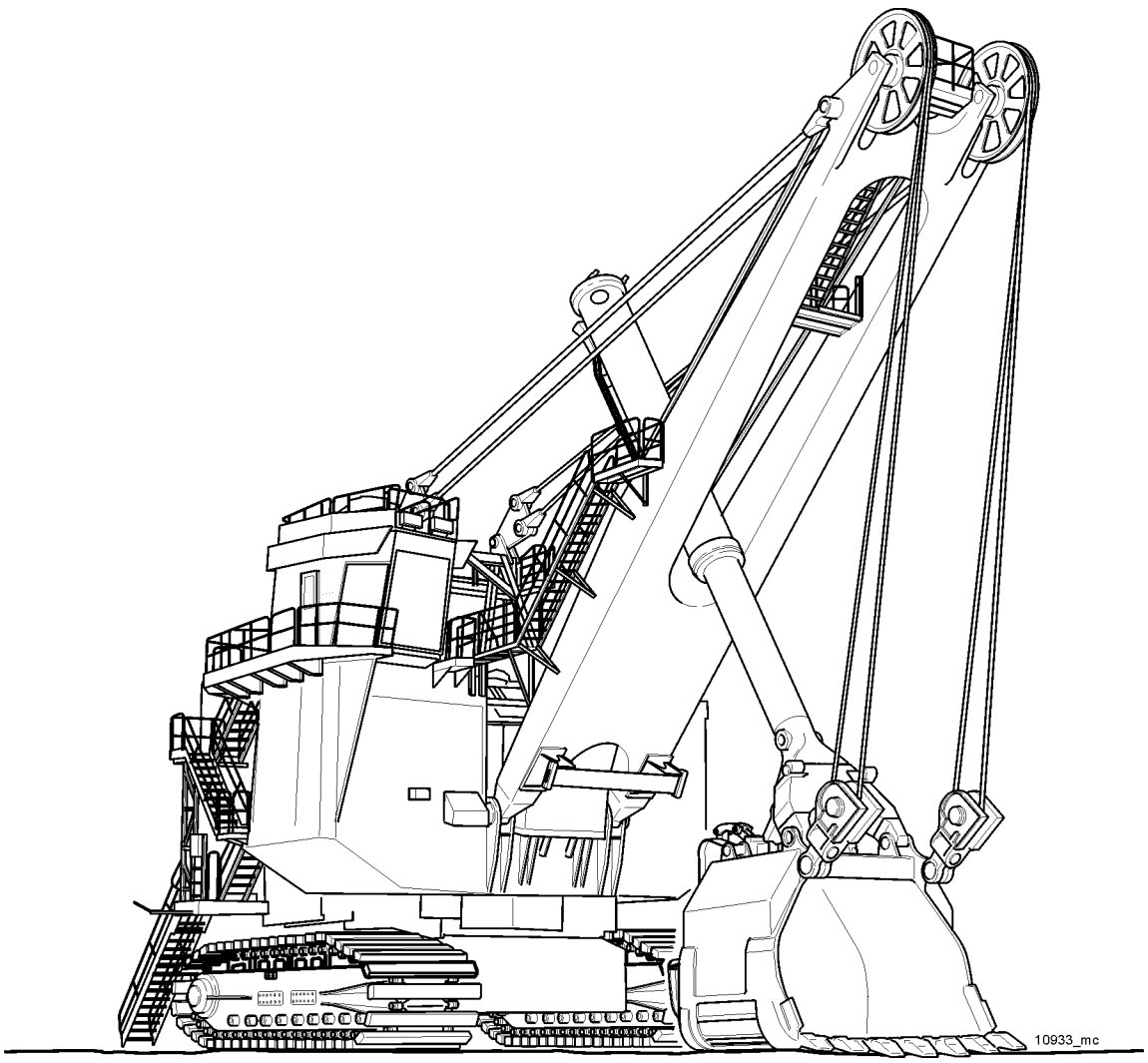
Reliability at work

BUCYRUS®

495HD

Mining Shovel

Operator's Manual



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S.2 Safety Precautions

⚠ DANGER

This manual provides information and data for the maintenance and/or operation of this machine. All electrical equipment must be serviced by qualified individuals who have been properly trained to work with high voltage systems and variable frequency AC drives. Failure to comply could result in personal injury or death.

⚠ DANGER

Do not attempt mechanical or electrical maintenance on this machine without a full understanding of each component's operation and function. Components utilizing electrical power, air pressure, hydraulic pressure and compression or tension springs for operation must be deactivated and isolated prior to disassembly.

⚠ DANGER

The FEEDER CABLE must contain a provision for a ground connection, especially whenever 2,300 volts or greater are used. At the substation, the power line must terminate (see paragraph on ground circuits) to a suitable permanent ground. At the machine, the power line must securely terminate through a bolted connection to the machine frame. This provides a constant ground for the machine and its electrical equipment. Failure to provide this adequate ground endangers employees and equipment.

⚠ DANGER

HIGH VOLTAGE! The need for a power line grounding circuit adequate for the machine cannot be overemphasized. Without a good grounding system, high voltages exist between the machine and the ground. The portable trail cable and power lines supplying electric energy to the machine must have a ground wire, ample in capacity, running parallel to the main wires over the entire distance from the transformer to the machine. A suitable grounding system must be used at the transformer. Consult your local electrical supplier for details.

⚠ DANGER

Due to the inherent dangers in the operation of high voltage electrical equipment, a safe grounding system is required that includes ground conductors in the cable, a neutral grounding resistor, and related relays and switchgear. A ground continuity check system is also recommended.

S.2.5.5 Boarding Stairs

A set of boarding stairs is attached to the machinery house platform - either on the left side of the machine, the right side or both. These stairs must be in their raised and latched position to enable the operator's controls.

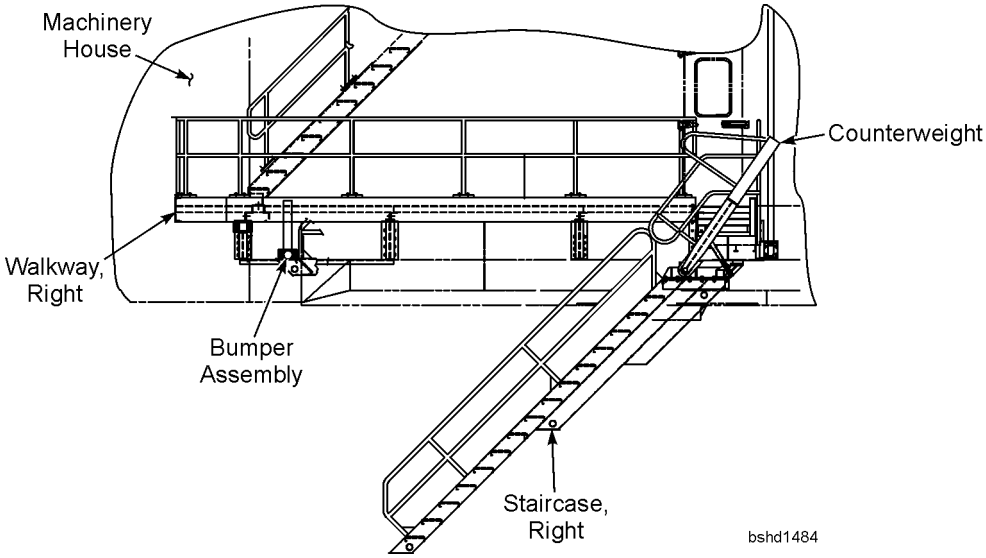


Figure S-7 Right Side Boarding Stair

S.2.5.6 Vertical Boarding Ladder

The vertical boarding ladder is one of the means for boarding the machine, located on the left-hand side of the machine, at the rear of the machinery house. When the ladder is not latched in place the operator's controls are deactivated.

1.3 Lower Works

The lower works is comprised of the truck frame, right and left crawler frames, crawler belts, propel machinery, swing rack and roller circle.

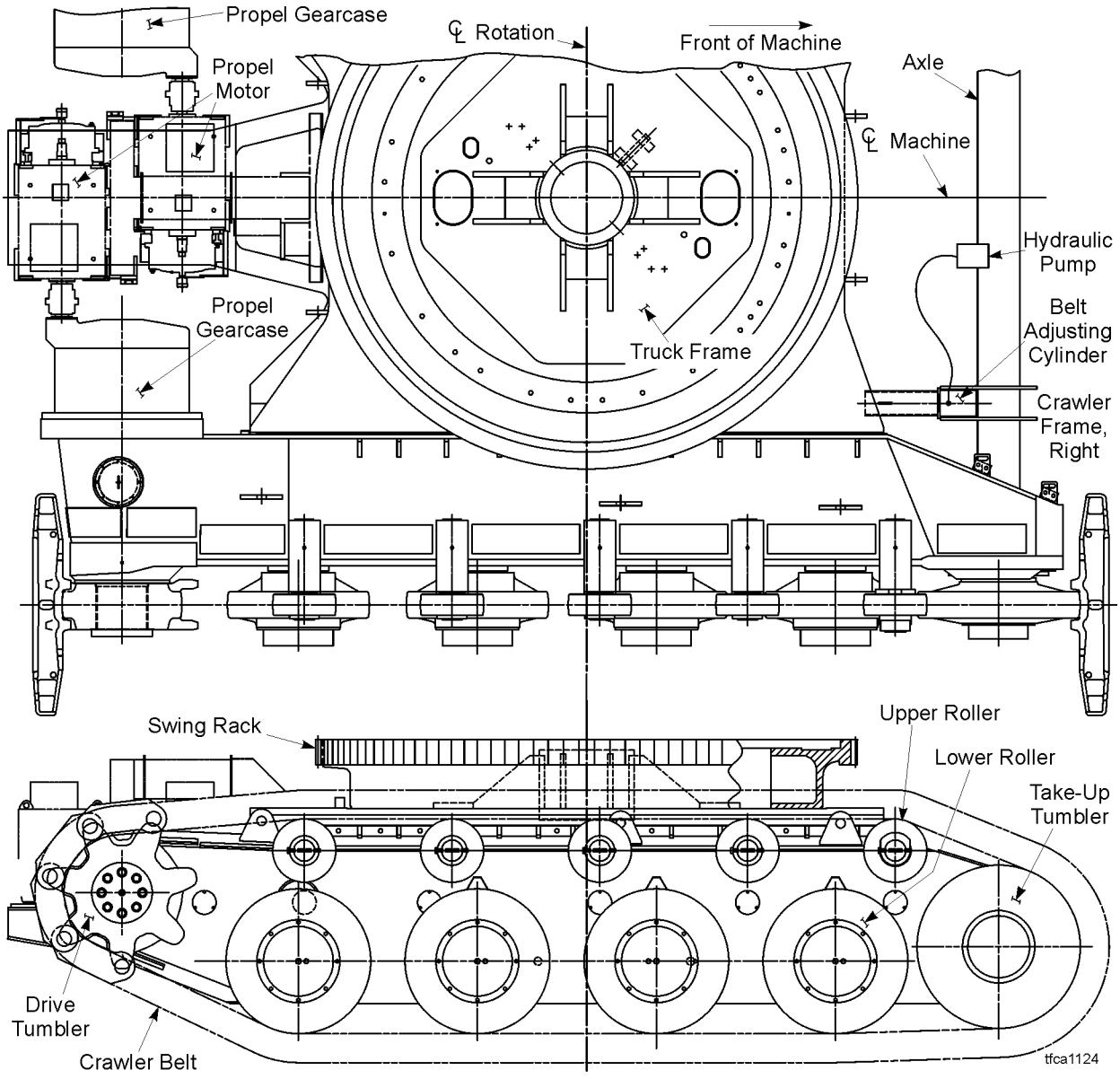
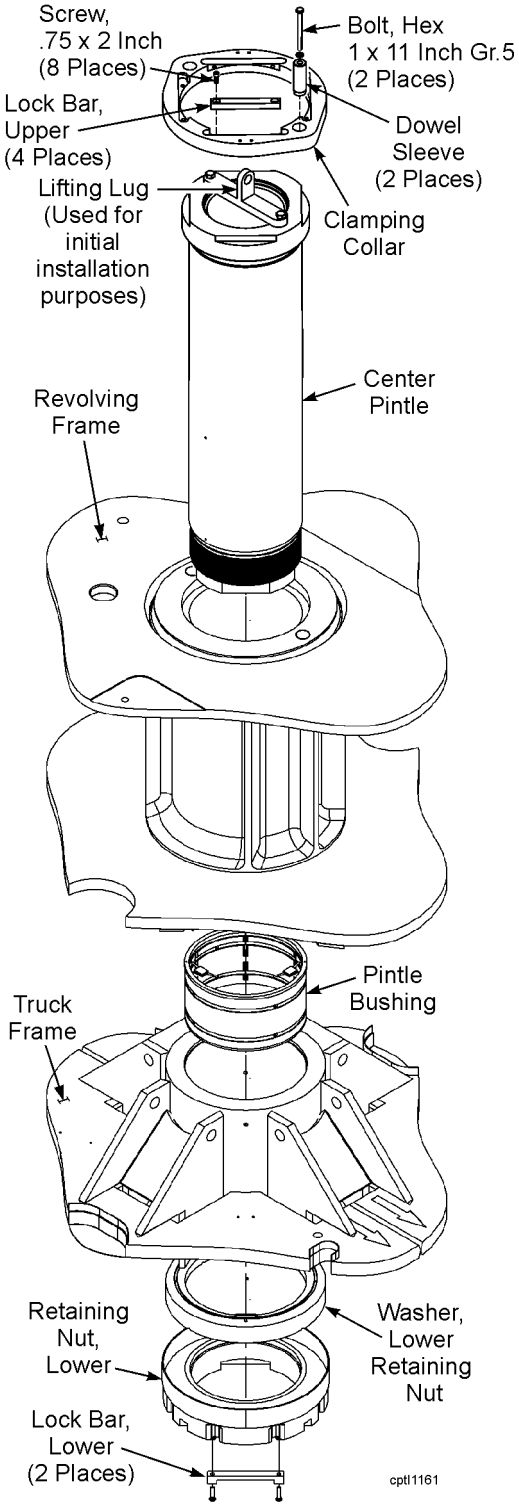


Figure 1-2 Truck Frame and Crawlers


Screw, .75 x 2 Inch (8 Places)
Bolt, Hex 1 x 11 Inch Gr.5 (2 Places)
Lock Bar, Upper (4 Places)
Dowel Sleeve (2 Places)
Lifting Lug (Used for initial installation purposes)
Clamping Collar
Center Pintle
Revolving Frame
Pintle Bushing
Truck Frame
Retaining Nut, Lower
Washer, Lower Retaining Nut
Lock Bar, Lower (2 Places)
cptl1161

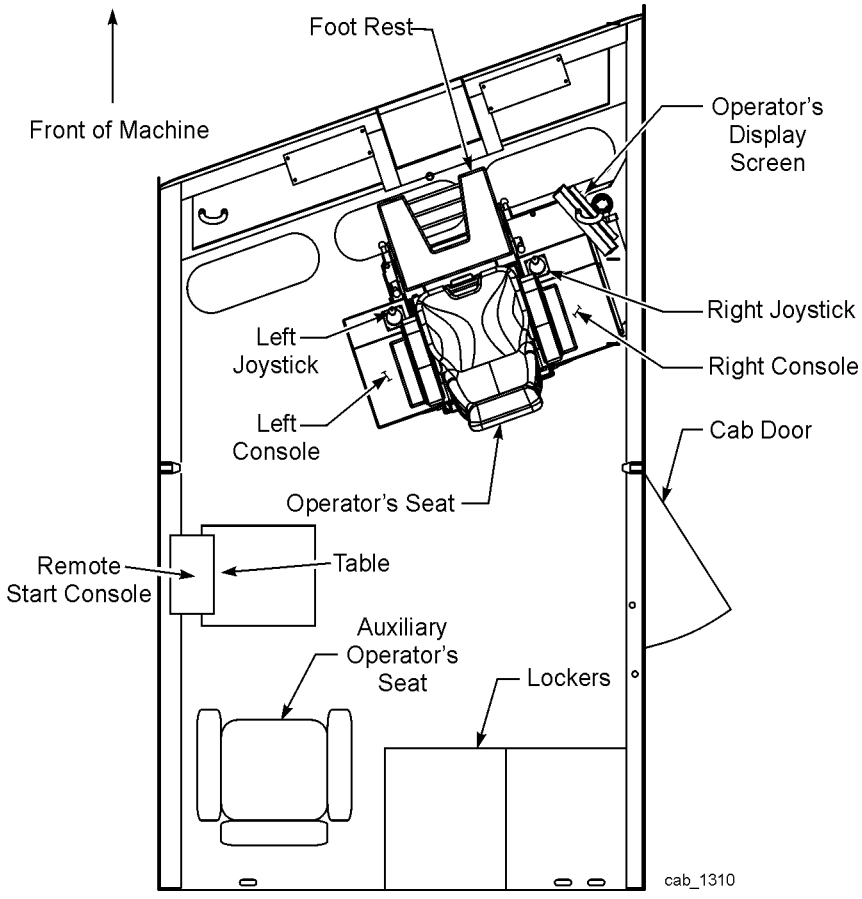
1.4.10 Operator's Cab

The isolated and elevated operator's cab at the right, front of the machinery house provides a comfortable, safe and efficient working environment for the operator. Sufficient space is provided for the fully adjustable operator's seat, a helper's seat and the standard operator's display panel.

The cab is sound and heat insulated with interior walls made of a sound deadening steel-plastic-steel composite. Keeping all doors closed helps to maintain pressurization. Keeping the cab door(s) closed significantly reduces noise levels and exposure to air borne contaminants to the operator. Electric powered windshield wipers are provided for quiet, dependable operation. A one-piece front window is supplied in a rugged, easy-to-change frame. A forward front window slant with over hanging roof helps keep the window clean. Transparent sun shades are provided in front and side windows.

Visibility through both side and front windows is excellent. The operator has the best view in the industry of the digging face and for truck spotting. This view is enhanced by the streamlined sides and top surfaces of the boom, unencumbered by crowd machinery or dipper handles on the outside of the boom.

An air conditioner and pressurizing unit utilizes environmentally friendly R-134a refrigerant in the cooling system. Interior ducting distributes the airflow to best suit the comfort of the operator.



1.5.7 Padlocks

Padlocks connect the hoist ropes to the outer edges of the dipper while still permitting fore and aft and sideways movement.

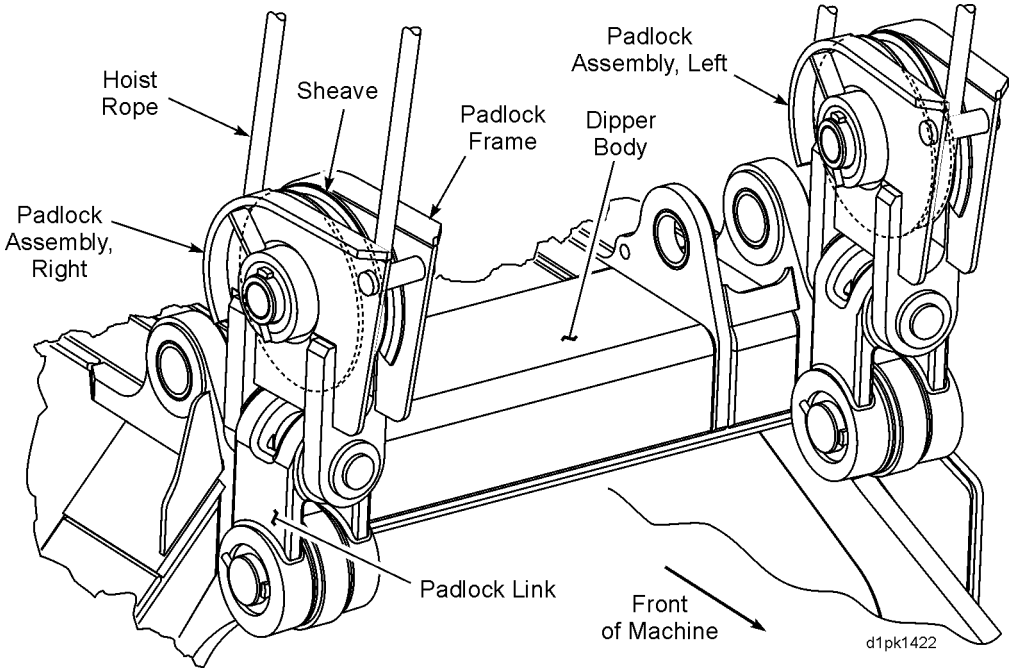
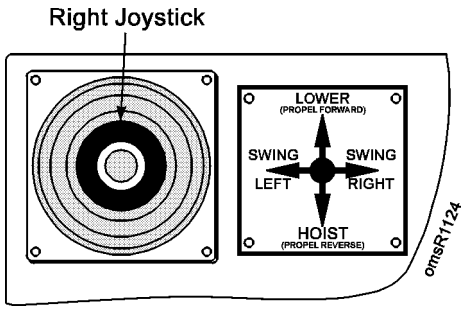


Figure 1-17 Left and Right Padlocks

2.2.1.2.1 Right Joystick



The right joystick controls the hoist/swing and propel. It is a joystick mounted on the right console of the operator's seat. The joystick is used to control the hoist, swing and right crawler motions of the machine. The position of the propel transfer switch will determine whether this switch controls the hoist motion or the crawler motion.

With the propel transfer switch in the dig position, pushing the joystick forward will lower the dipper. Pulling the joystick to the rear will hoist the dipper. The neutral position between the hoist and lower functions is defined by a detent that is easily felt. The speed of moving the dipper is controlled by varying the distance the joystick is moved from the neutral (center) position. The full forward, or full rearward position provides maximum speed to the dipper. Moving the joystick to neutral will cause a braking action slowing the hoisting or lowering motion. Reversing the joystick will cause the motion to stop and if the joystick is held in this position, it will change the direction of the motion.

NOTE: When the right joystick is used in the hoist/lower mode the switch is a spring returned switch. That is, it will return to the neutral position when it is released.

Moving the right joystick to the left from the neutral position will cause the machine to swing to the left. Moving the joystick to the right will cause the machine to rotate to the right. The swing motion is operational throughout the entire movement range of hoisting or lowering the dipper. The swing rate of acceleration is controlled by varying the distance the joystick is moved from the neutral position. Moving the joystick to the neutral position will not stop the swing motion but will allow the machine to coast. To stop or change direction the control joystick is moved past the neutral point in the opposite direction. The rate of deceleration is controlled by varying the distance the joystick is moved from the neutral position in the opposite direction.

Refer to JOYSTICK CONFIGURATION in this section of the manual to view the alternate configurations for the right and left joysticks.

With the propel transfer switch in the propel position, pushing the lever forward will cause the right crawler to move forward. Pulling the lever to the rear will cause the right crawler to move in the reverse direction. The hoist motion is locked out electrically when the machine is in the propel mode.

NOTE: When the right joystick is used in the swing mode the switch is a spring returned switch. That is, it will return to the neutral position when it is released.

NOTE: It is important to remember that messages will appear in this screen that are no longer active alarm messages. All messages will appear since the time of the last reset.

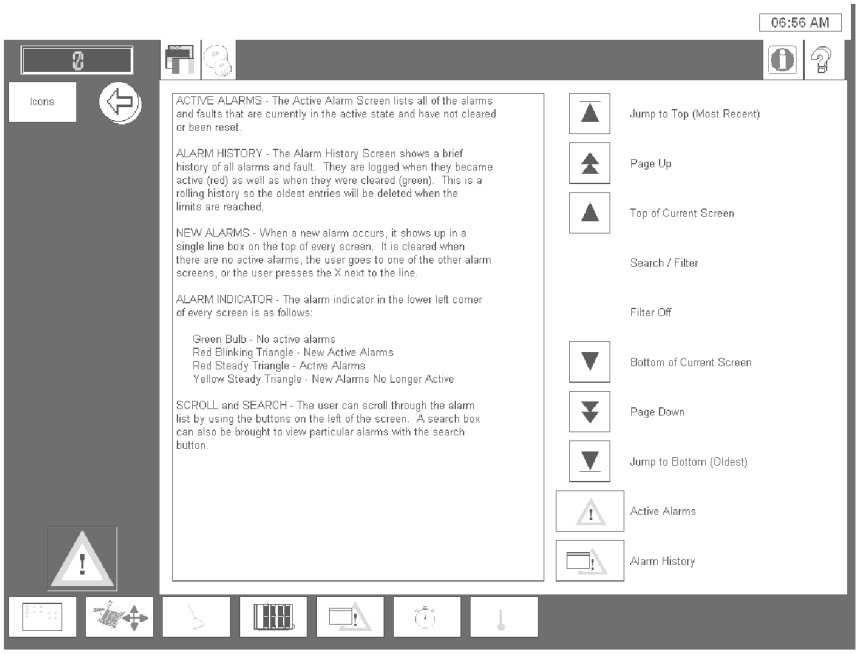


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Figure 2-12 Alarms Help

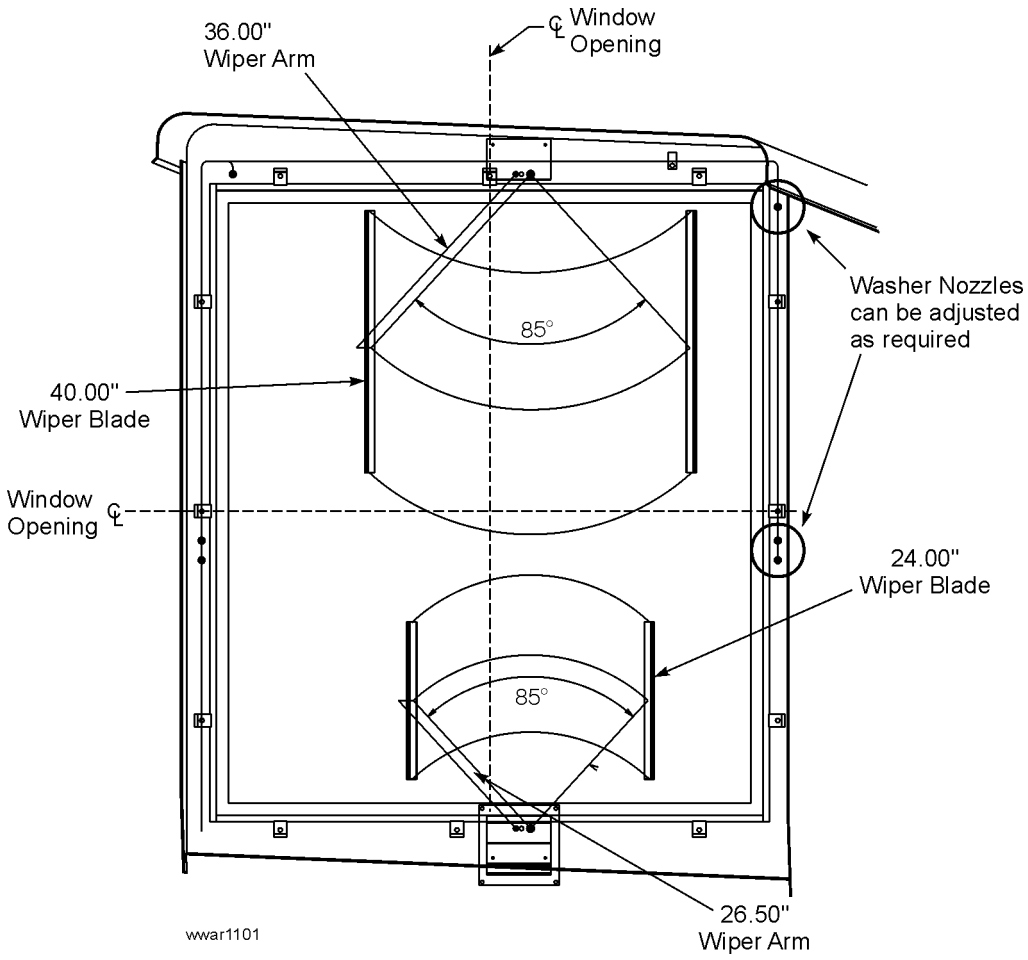
The Alarms Help screen can be reached from any of the alarm message screens at any time. This screen will provide clarifying information related to the alarm system on your machine.

2.5.3 Windshield Wipers

There are two electrically operated windshield wipers on the front window of the cab: one for the lower portion of the window and one for the upper portion of the window.

Check the wiper blades to make sure they swing freely across the window without contacting the window frame. Reposition the pantograph arm on the wiper motor shaft if necessary to prevent contact with the window frame.

Frequently check the condition of the wiper blades and replace if damaged.



2.5.4 Windshield Washer

An optional electric operated windshield washer unit supplies a cleaning agent to the windshield through spray nozzles when activated. When operating in warm climates, water may be used as the agent. In areas where freezing temperatures are encountered, a suitable commercial windshield washer solvent with anti-freezing characteristics is recommended.

4.1 Pre-start Checks

Before starting, inspect the machine to ensure it is ready to be put into operation. Failure to make such a routine check could result in unnecessary downtime. For example: an undetected oil leak could result in a dry gearcase, eventually leading to excessive gear wear or destruction, seized bearings or other mechanical problems. Broken strands in the hoist ropes, crowd rope, retract rope or structural strands could, if undetected, result in serious injury or damage to the machine or haulage unit. A few minutes spent inspecting the machine often results in considerable savings in time and machine efficiency.

4.1.1 Walk-around Ground Level Inspection

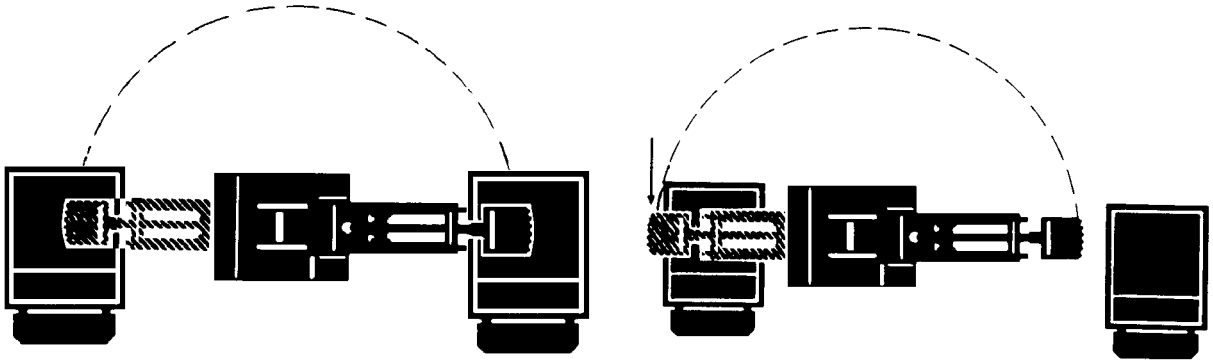
Check the following areas daily during a general walk-around inspection:

1. Check the areas under and around the crawlers for signs of oil leaks. If single droplets are noticed, leakage is minimal. Determine the point of leakage and make a note of it on the log sheet. If pooling of oil is noticed, determine the source and take corrective action immediately. Determine if loose hardware, a defective gasket, a combination of both, or a similar problem is responsible. Tighten hardware or replace defective gaskets.
2. Inspect the crawler belts for missing links or lock pins, excessive belt sag, cracked shoes or other deterioration. Check the oil level in the propel planetary gearcase. Add oil as required.
3. Check the swing rack and pinion guards for rocks, dirt and other debris that will interfere with the operation of the machine. Inspect the swing rack gear and rollers for the proper lubricant film.

⚠ DANGER

HIGH VOLTAGE! THE MACHINE TRAIL CABLE CARRIES A LETHAL VOLTAGE. Handle the cable in an approved manner with appropriate rubber gloves and insulated hooks or tongs.

4. Visually inspect the trail cable for cuts, abrasions and other damage.
5. Visually inspect exterior of machinery house for damage or evidence of internal leakage.
6. Inspect the dipper trip mechanism, rope, latch bar and associated hardware for damage, adjustment and wear.
7. Inspect the dipper door, hardware and bumpers for damage and excessive wear.
8. Inspect fulcrum attachment points, take up cylinders and spacers and dipper handle for damage, excessive wear and evidence of adequate lubrication.
9. Inspect boom bumper for security and damage.
10. Inspect the dipper and tooth adapters for tightness and excessive wear.
11. Inspect padlocks for damage, wear and evidence of adequate lubrication.
12. Check both the running ropes and the boom structural strands for broken strands and loose sockets.



Proper spotting of trucks will result in more efficient load cycles.

Poor spotting of trucks will result in inefficient load cycles and reduced machine production.

trsp1101

NOTE: Improper swing motion results in erratic control, and an inefficient swing cycle.

⚠ DANGER

The dipper should never be swung over personnel, trail cables, related electrical equipment or other equipment. When the dipper is loaded, accidental tripping of the dipper door could result in death or serious injury to personnel, and extensive damage to equipment. Empty dippers may contain small fragments of material that can be extremely dangerous when dropped from a considerable height. On long moves it's best to have the door open on an empty dipper and the dipper lowered to a point that permits moving without striking the ground.

Time is required to accelerate any motion from zero to working speed, and also to decelerate from working speed back to zero. The time expended for accelerating and decelerating the swing represents the major part of the entire dig cycle. Therefore, the swing arcs must be kept to a minimum to obtain maximum operating efficiency. As an example: assuming that a 90° swing results in 100 percent of the maximum output, increasing the swing arc to 180° reduces output to 70 percent, while decreasing the swing arc to 45° increased the output to 126 percent. Therefore, a swing arc of 90° or less should usually be used.

Haulage units should be positioned so their centerline is approximately under or not more than slightly outside the swing path of the boom point. This substantially reduces the amount of dipper maneuvering required of the operator when positioning the dipper for dumping. Positioning of the haulage unit inside or outside the boom point makes it necessary to retract or crowd the dipper handle and dipper, which breaks the operator's natural rhythm.

A clean, level pit floor must be maintained. A good operator will always clean the floor before moving into the bank. A clean and level floor grade is a requisite to safe and stable machine operation, and reduces damage to crawler links and related components.