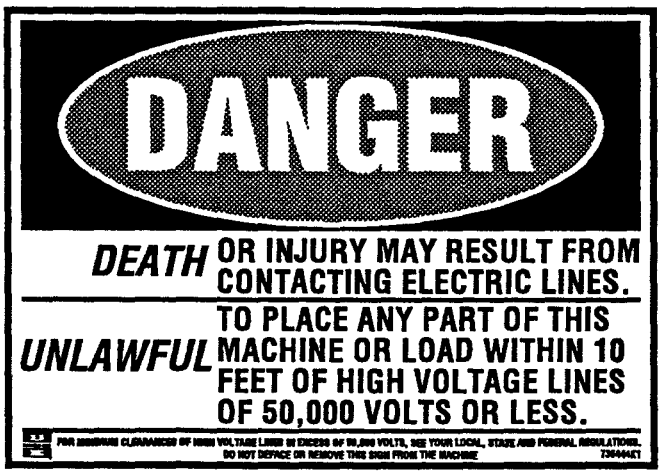
Technical Manual

SAFETY DECALS

Shown below and on the following page are samples of various safety decals found on the 295-BII Electric Mining Shovel. These decals are for the protection of all personnel who have contact with the machine. If the decals on your machine are defaced, unreadable or missing, they should be replaced immediately. Duplicates of the decals are available from the Bucyrus-Erie Part Sales Department. When ordering the decals, use the part numbers listed below the decals.



P/N 61350021 (Spanish)
P/N 61350001 (English)
Size: 10 x 14 inches
Color: White on red on black and black on white.
Location: Located in operator's cab on right side of cab.

P/N 61349574
Size: 7 x 10 inches
Color: White on red on black and black on white.
Location: Located on doors of electrical cabinets.

P/N C100323-01 (Spanish)
P/N 61361022 (English)
Size: 14 x 20 inches
Color: White on red on black and black on white.
Location: Located on right and left read corners of revolving frame.

P/N C107801-01 (Spanish)
P/N 61350187 (English)
Size: 7 x 10 inches
Color: White on red on black and black on white.
Location: Located on two sides of propel collector ring box.

WARNING: If the propel transfer switch is moved during operation, the hoist or propel motions will automatically brake to a stop and set all brakes. The transfer will then take place normally. Under this condition the swing and crowd will remain under the operator's control at normal speed. The above procedure can be used for transfer but all motions should be slowed or stopped first to prevent excessive strain. Transferring during operation allows the operator to swing away from the bank during the time it takes to complete the transfer.

13. CONTROL STOP PUSHBUTTON

The Control Stop Pushbutton is a pushbutton located on the right operator's console. Normally it is used to de-energize controls after the machine has been safely stopped by placing motion controls in neutral.

Actuation of this pushbutton when motions are running will cause all motions to automatically electrically brake to a stop and, when the motion speed has reached less than 5% speed, set all mechanical brakes. If the motions are already stopped, the brakes will be set and power is removed immediately. A similar switch is located on the front panel of the PLC control cabinet that can be used during testing of the machine.

⚠ CAUTION: The operator should never leave his seat unless he has first pressed this button. Setting the mechanical brakes with individual switches in not a sufficient safe guard to prevent machine damage and/or personnel hazards.

14. MACHINE STOP/EMERGENCY STOP PUSHBUTTON

The Machine Stop/Emergency Stop Pushbutton is located on the right operator's console. It is used to remove power from the machine motions after the motions have been stopped in the normal manner. A second purpose of the pushbutton is to stop the machine under operational emergency conditions. Pushing this button will provide electrical and immediate mechanical braking simultaneously. Therefore, this button should only be used if the operator intends the harshest braking of all motions. If the machine is in motion, power will remain on the motions in order to provide electrical braking for a few seconds. If the machine is in motion or stopped, this button will power the DC bus to approximately zero voltage quickly after the time delay.

A second pushbutton that also provides the functions as described above is located in the Remote Start Console and is labeled "Machine Stop."

15. MAIN POWER OFF PUSHBUTTON

The Main Power Off Pushbutton is located on the right operator's console. It is used only to immediately remove power from the drives in case of an electrical emergency involving component failure of fire.

WARNING: Pushing the "Power Off" pushbutton while in motion will immediately set the mechanical brakes and remove incoming high voltage from the drives. This action may result in component damage. It will also result in the inability to power the DC bus voltage down to a low value. This voltage will decay slowly, taking several minutes.

Pushbuttons performing these identical functions are located on the PLC control cabinet and the operator's remote start console. Here the buttons are labeled "Emergency Stop/Power Off" since the likely emergency situation in these locations will be as a result of component failure

All of these pushbuttons will latch in the off position and must be pulled out before the machine can be run.

16. PANELVIEW MONITOR

The Panelview Monitor is a video display which consists of a viewing screen (CRT) and associated key pads. The monitor allows a large number of messages to be sent to the operator from all parts of the control system. These messages fit into four basic categories:

1. Normal routine operational messages
2. Alarms only
3. Delayed shutdown messages
4. Immediate faults and shutdowns

The monitor also allows machine personnel to set certain operational parameters by means of the operator's key pad on the monitor.

5. **UNINTERRUPTABLE POWER SUPPLY OFF PUSHBUTTON**

This button is used to shutdown the UPS motor. A like button is located on the UPS control box door.

6. **UNINTERRUPTABLE POWER SUPPLY START PUSHBUTTON**

This button is used to start the UPS motor. The Phase Sequence Light must be on before this button can start the motor. A like button is located on the UPS control box door.

7. **INCOMPLETE SEQUENCE LIGHT**

This red indicator light, when lit, indicates automatic start-up sequence did not complete in a preset time period. Have an electrician troubleshoot the sequence. If this indicator does not light up, then the sequence so far is correct and the start-up of the machine can continue.

8. **AUXILIARY GROUND FAULT LIGHT**

This green indicator light, when lit, indicates that no auxiliary power ground fault exists. If the light is off, alert an electrician as soon as possible.

9. **PHASE SEQUENCE LIGHT**

This green indicator light, when lit, indicates that incoming power sequence is correct. If the light is off, have electrical maintenance change trail cable phase sequence.

10. **PLC CABINET TEMPERATURE LIGHT**

This green indicator light, when lit, indicates that the PLC cabinet is at the correct operating temperature. Too low or too high cabinet temperature will not allow the machine to start.

11. **DRIVE CABINET TEMPERATURE LIGHT**

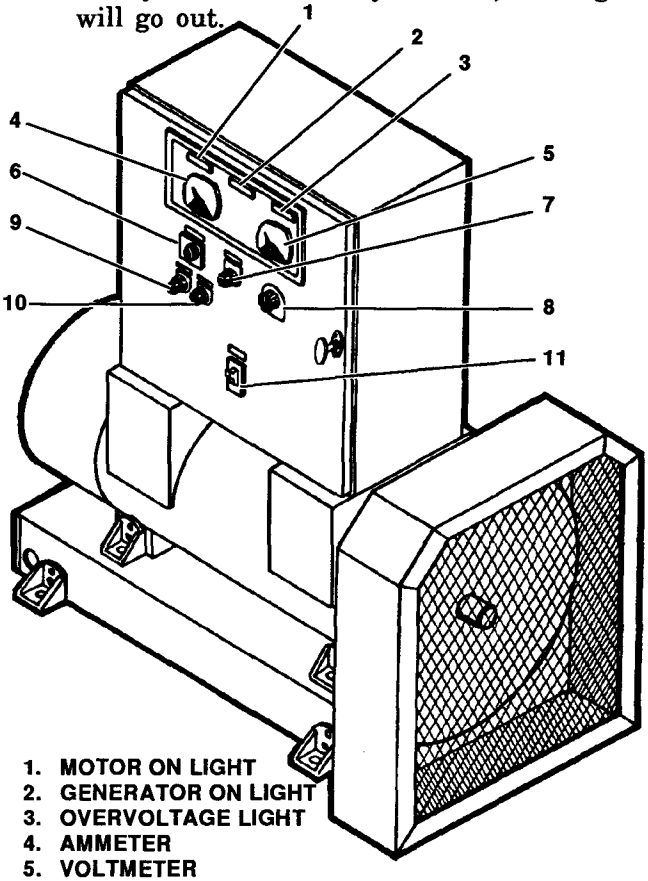
This green indicator light, when lit, indicates that the drive electronic cabinets are at the correct operating temperature. Too low or too high cabinet temperatures will not allow the machine to start.

12. **PLC POWER ON LIGHT**

This green indicator light, when lit, indicates that PLC and drive control power is on. This light should be lit about 20 seconds after the UPS MG set is started.

13. **SYSTEM READY LIGHT**

This green indicator light, when lit, indicates the system is ready to start. When the System Run Pushbutton is pressed and the system successfully started, this light will go out.



1. MOTOR ON LIGHT
2. GENERATOR ON LIGHT
3. OVERVOLTAGE LIGHT
4. AMMETER
5. VOLTMETER
6. AM-VM SELECTOR SWITCH
7. O.V. RESET BUTTON
8. AUTO VOLTAGE ADJUSTMENT
9. START BUTTON
10. STOP BUTTON
11. OUTPUT CIRCUIT BREAKER

UNINTERRUPTABLE POWER SUPPLY AND CONTROL BOX
FIGURE 2-8

UPS CONTROL BOX

The UPS Control Box is mounted to the top of the UPS MG set and contains the controls as shown on figure 2-8.

HOUSE LIGHT CIRCUIT BREAKERS

The House Light Circuit Breakers (figure 2-9) are located on the right side wall of the machinery house next to the remote start console. A main light circuit breaker is located on the auxiliary control cabinet. The breakers protect the lights from over-current loads.

j. For machines with pushbuttons inplace of a switch to control the air compressor, depress the START pushbutton.

6. At this point return to the Operator's Cab (figure 3-4) and position yourself in the operator's seat. Check the air pressure gauge for correct air pressure. The machine cannot be operated until the air pressure is at the specified rating.

7. Again verify that the brake switches are in the SET position, the levers are in the NEUTRAL position, and the air pressure is at the correct pressure. Sound the signal horn and be sure personnel are clear of machine.

8. Turn the Propel Transfer Switch to the DIG position. When the Panelview lights indicate that the process is complete, press the control reset pushbutton to activate the controls.

9. Turn the hoist, crowd, swing and propel brake switches to the RELEASED position.

10. Briefly actuate swing, crowd, hoist and propel controls to make sure each motion is operational (figure 3-4)

RESTARTING AFTER AN ELECTRICAL FAULT

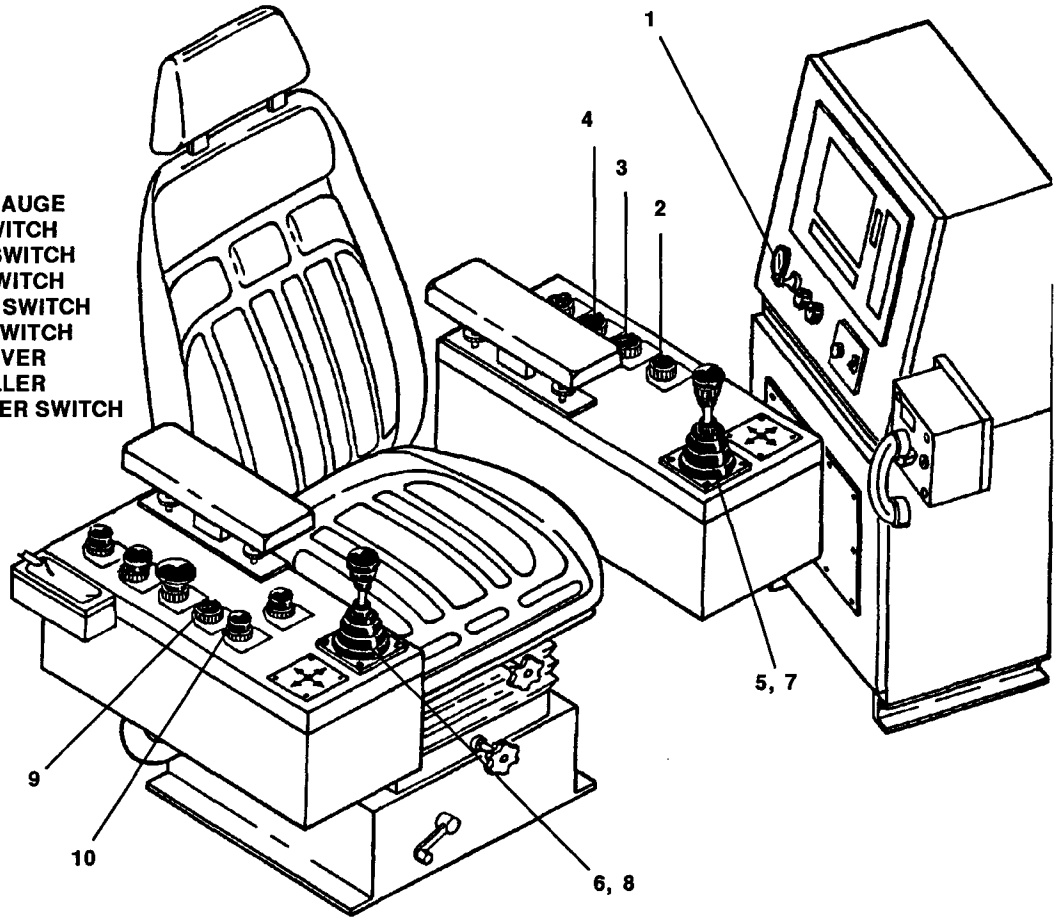
To restart the machine after the electrical control system has gone into a fault condition, proceed as follows:

NOTE: Before any or all motions can be reset, the following conditions must be met:

A. No operator's monitor special screens are activated.

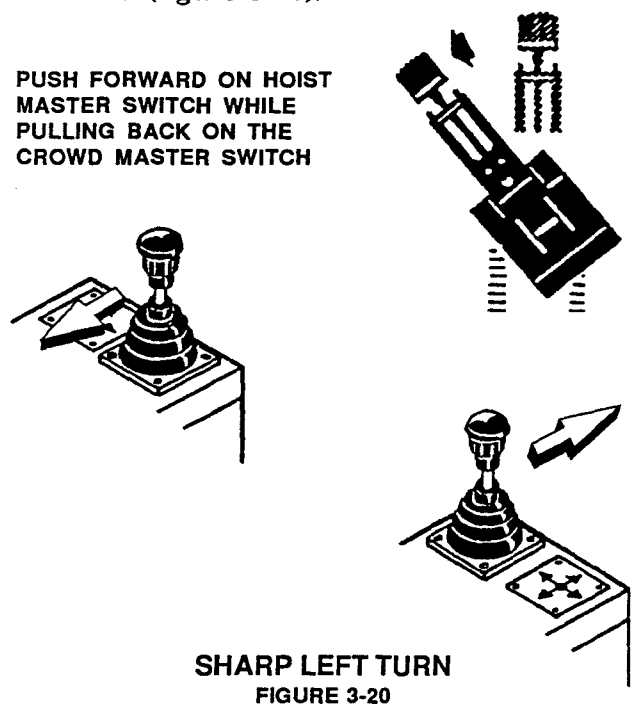
B. For hoist/propel motion the hoist/propel transfer switch is in the position called for by the operator's mode selector switch.

1. AIR PRESSURE GAUGE
2. HOIST BRAKE SWITCH
3. CROWD BRAKE SWITCH
4. SWING BRAKE SWITCH
5. CROWD MASTER SWITCH
6. HOIST MASTER SWITCH
7. SIGNAL HORN LEVER
8. SWING CONTROLLER
9. PROPEL TRANSFER SWITCH
10. CONTROL RESET PUSHBUTTON



OPERATOR'S STATION
FIGURE 3-4

To make a sharp left turn, push the Hoist Joystick FORWARD and pull the Crowd Joystick to the REAR (figure 3-20).



SHARP LEFT TURN
FIGURE 3-20

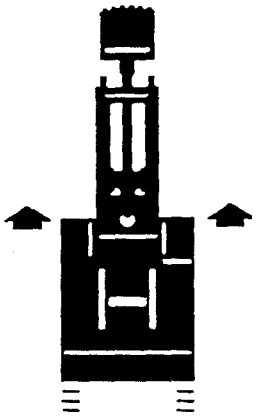
WARNING: When using the counter-rotation method for turning, have a helper available who can watch that the trail cable does not get fouled and/or torn from the machine.

WARNING: The ability of the machine to turn sharply is dependent on the surface on which the machine is setting. A soft surface will cause the crawlers to dig-in and machine to bog-down.

WARNING: The propel brakes are released whenever either joystick is moved from the NEUTRAL detent. The propel brakes are set when both joysticks are returned to their NEUTRAL detent.

When straight propelling (figure 3-21), propel FORWARD, which is in the direction of the take-up axle, instead of reverse, to reduce strain on the crawler belts and propel mechanism. However, it is not always possible to propel only forward. When propelling to the rear, make sure the trail cable is clear of the machine, and follow the signals given by the signal man. The machine should be swung so the operator is facing the direction of travel.

NOTE: Turning when propelling to the rear requires that the steering switch be positioned in a direction opposite the actual direction in which the turn takes place.



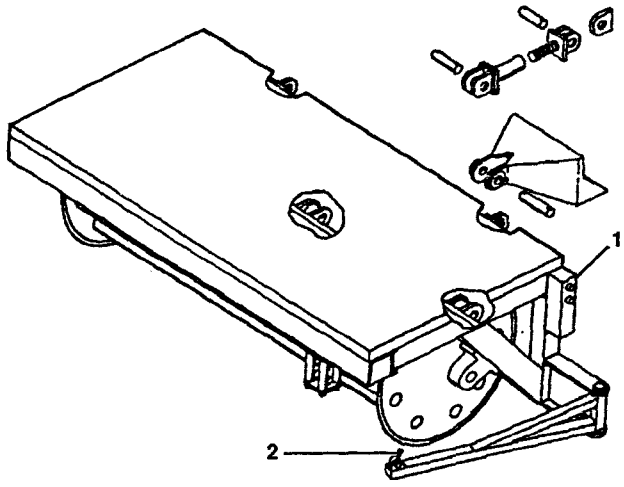
STRAIGHT PROPEL
FIGURE 3-21

The excavator should be moved close to the bank in short and frequent moves, to maintain digging efficiency. Movement should occur between loadings of haulage units.

CABLE REEL OPERATION (Optional)

The Cable Reel (figure 3-22) is designed to pick up trail cable as the shovel moves toward its power source. It is not designed to drag the trail cable over the ground.

The "line pull" of the cable is proportional to operating pressure. The correct line pull is when there is sufficient pull on the cable to wind it on the reel but not too great to put unnecessary strain on the trail cable.



1. START/STOP PUSHBUTTONS
2. CONTROL VALVE

CABLE REEL
FIGURE 3-22

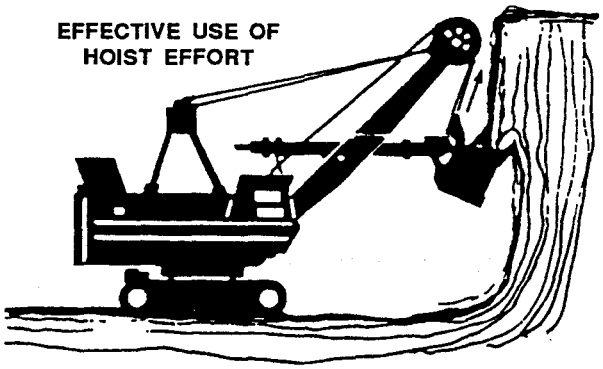


FIGURE 3-38

INEFFECTIVE USE OF AVAILABLE HOIST EFFORT. HOIST FORCE IS OPOSING CROWD FORCE.

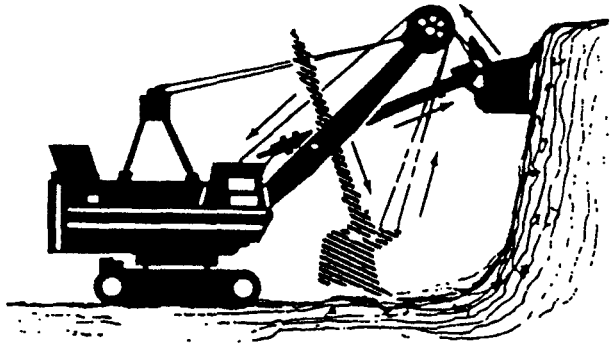


FIGURE 3-39

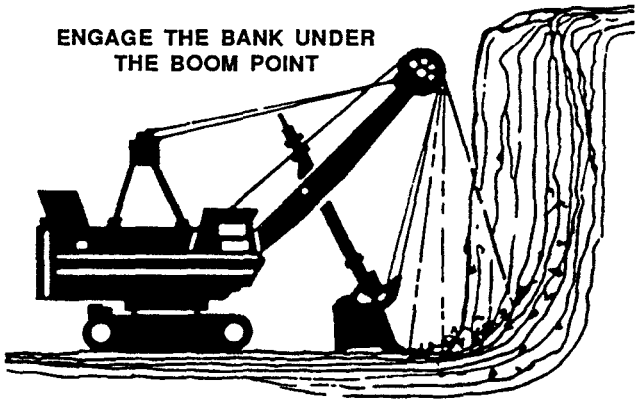


FIGURE 3-40

MINIMIZE DISTANCE BETWEEN BANK AND BOOM POINT. MINIMUM TOOTH FORCE IS AVAILABLE WHEN HOIST FIGHTS CROWD.

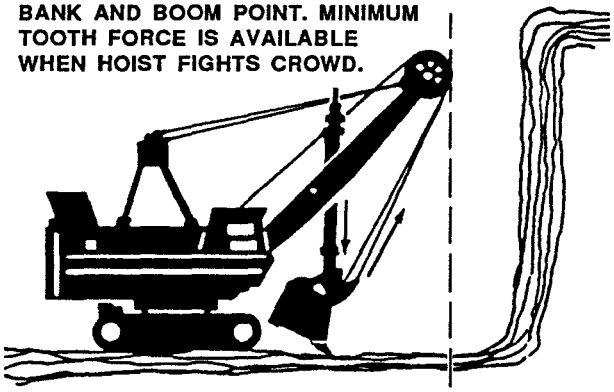
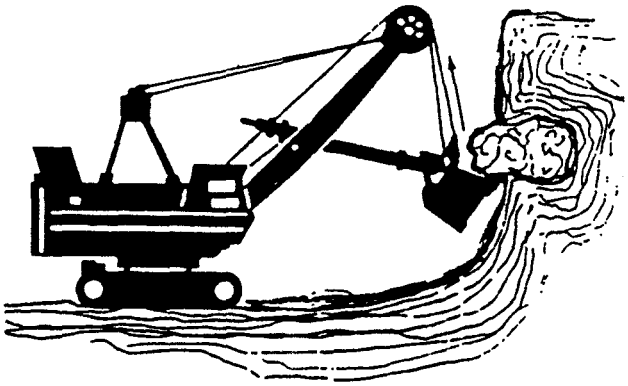


FIGURE 3-41

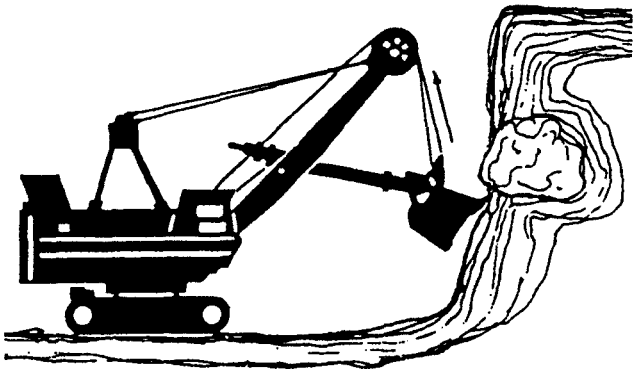
An excavator dipper capacity rating is the struck measure cubic yard capacity. When digging, a load greater or less than the rated capacity may be obtained, depending on the type of material. An efficient operation can be measured by the number of dipper loads required to load a haulage unit. When the dipper capacity is efficiently sized to the truck capacity, not less than three or more than five dippers full should be required to load a unit. Other factors such as improper sizing of haulage units to dipper, improper material break-up, etc., also must be considered.

In all types of digging the skilled operator must carefully control the desired depth of cut, and control the hoist power requirements. Often, digging situations are encountered which require hoist and crowd motions to maneuver around oversize or lodged obstructions in the bank, rather than attempting to lift the entire bank. See figures 3-42 and 3-43.



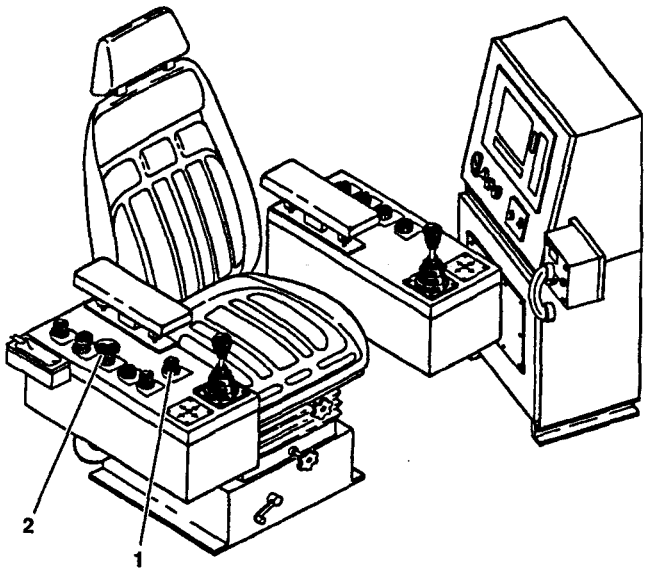
AVOID STALL CONDITIONS

FIGURE 3-42



CONTROL THE DEPTH OF CUT
FOR PROPER HOIST CONTROL

FIGURE 3-43



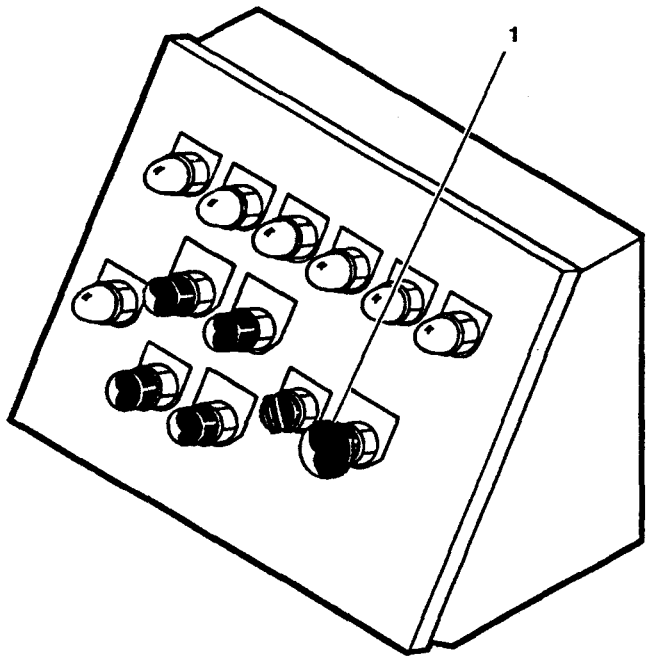
1. CONTROL STOP PUSHBUTTON
2. POWER OFF PUSHBUTTON

OPERATOR'S STATION
FIGURE 3-54

SHUT DOWN

When shutting down the machine at the end of a shift proceed as follows:

1. Park the machine on firm ground in a position where it cannot be damaged by a slide, falling rocks or flooding. In cold climates, be sure the crawler belts will not freeze into the ground.
2. Place the dipper firmly on the ground (figure 3-56).
3. Make sure Hoist Control Lever and Crowd Control Lever are in their CENTER positions.
4. Make sure all brake switches are in the set position (figure 3-57).
5. Depress the Control Stop Pushbutton (figure 3-57). All primary controls should be de-energized.
6. To de-energize the DC bus, depress the Machine Stop Pushbutton (figure 3-55) on the remote start console or the machine stop/emergency stop pushbutton on the operator's console (figure 3-57).



1. MAIN POWER OFF/EMERGENCY STOP PUSHBUTTON

REMOTE START CONSOLE
FIGURE 3-55

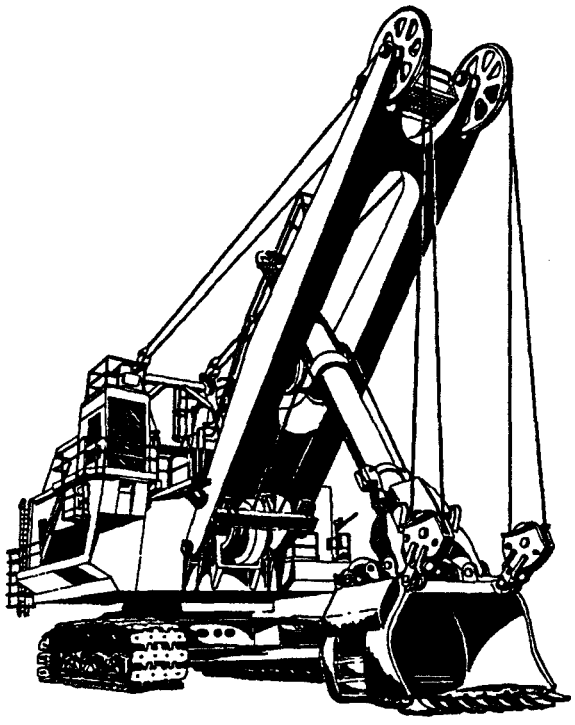


FIGURE 3-56

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