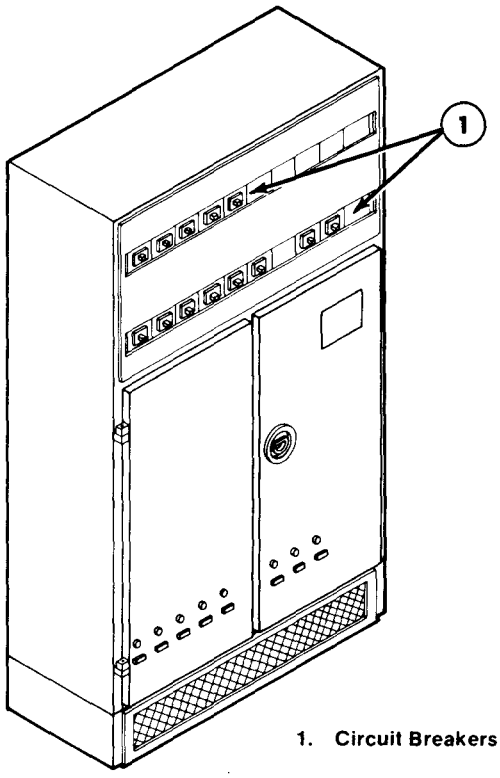
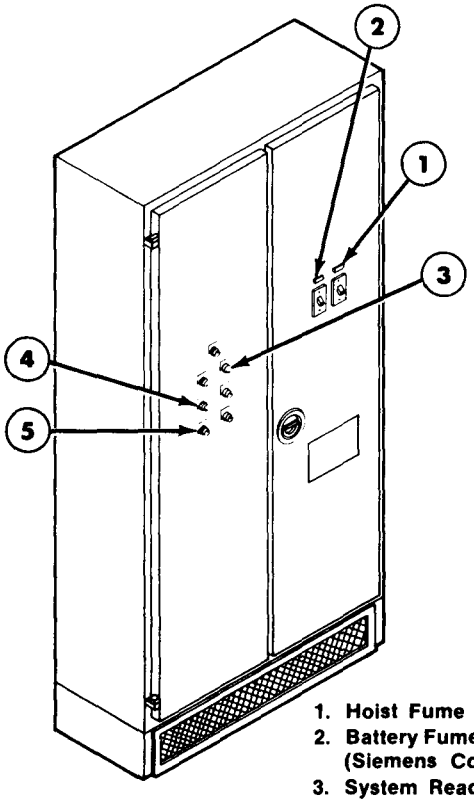
Technical Manual



1. Circuit Breakers

LOW VOLTAGE CONTROL CABINET

FIGURE 10



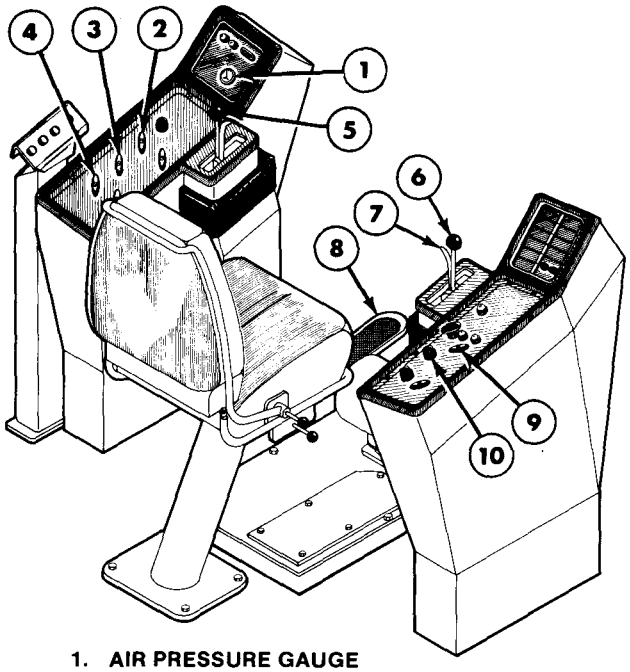
1. Hoist Fume Blower Switch
2. Battery Fume Blower Switch (Siemens Controls Only)
3. System Ready Indicator
4. Main Power Start Pushbutton
5. Fan Start Pushbutton

AC CONTROL CABINET

FIGURE 11

until the air pressure is at the specified rating.

7. Again verify that the brake switches are in the set position, the levers and pedals 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 and then press the control reset pushbutton to activate the controls.
9. Turn the hoist, crowd, and swing brake switches to the released position.
10. Briefly actuate swing, crowd, hoist, and propel controls to make sure each motion is operational (figure 12).



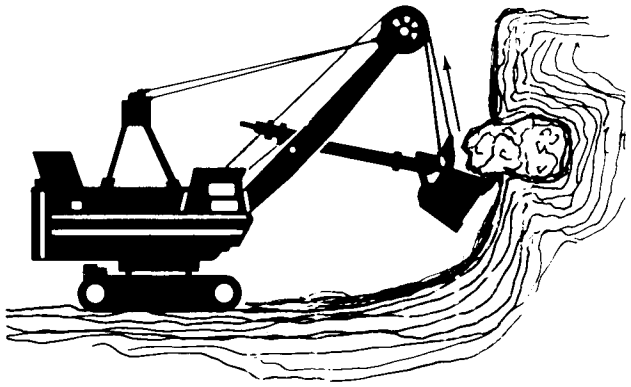
1. AIR PRESSURE GAUGE
2. HOIST BRAKE SWITCH
3. CROWD BRAKE SWITCH
4. SWING BRAKE SWITCH
5. CROWD MASTER SWITCH
6. HOIST MASTER SWITCH
7. SIGNAL HORN LEVER
8. SWING CONTROLLER
9. PROPEL TRANSFER SWITCH
10. CONTROL RESET PUSHBUTTON

OPERATOR'S STATION

FIGURE 12

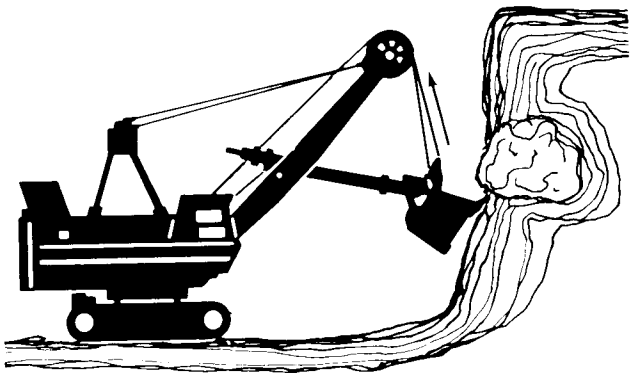
RESTARTING AFTER AN ELECTRICAL FAULT

To restart the machine after the electronic control system has gone into a fault condition, follow this sequence:



AVOID STALL CONDITIONS

FIGURE 50



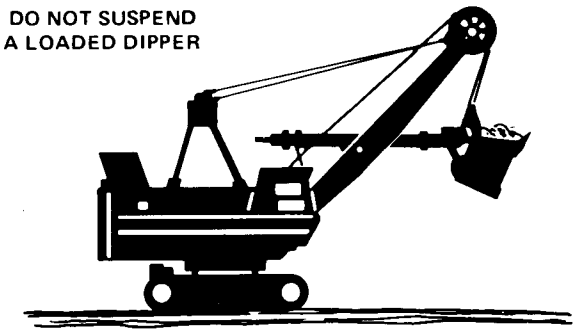
CONTROL THE DEPTH OF CUT
FOR PROPER HOIST CONTROL

FIGURE 51

⚠ CAUTION: Maintain a digging face which avoids any major slides which could cause an accident. Examine the digging face for large boulders, large rocks, or frozen material which could slide and cause an accident. Avoid overhanging material.

The experienced operator does not repeatedly stall the dipper in the bank, nor maintain a stall condition. The life expectancy of the hoist machinery and hoist ropes is directly related to the operator's skill in avoiding stalling. Whenever stall conditions are encountered, back off on the hoist motion, retract the dipper, or do both. *Avoid stall conditions at all times.*

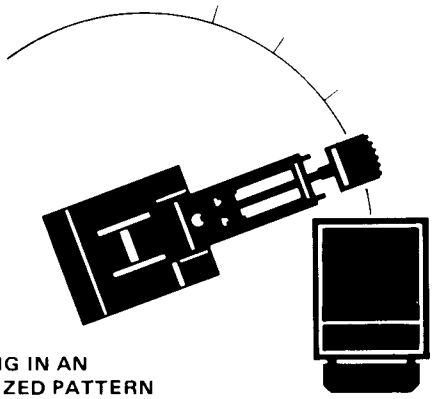
⚠ CAUTION: Do not suspend a loaded or empty dipper in the air with the brakes set for long time periods (figure 52). Lower the dipper to the ground if the machine is to be idle or unattended for any length of time. Failure to comply can result in severe personal injury or death of anyone beneath the dipper.



DO NOT SUSPEND
A LOADED DIPPER

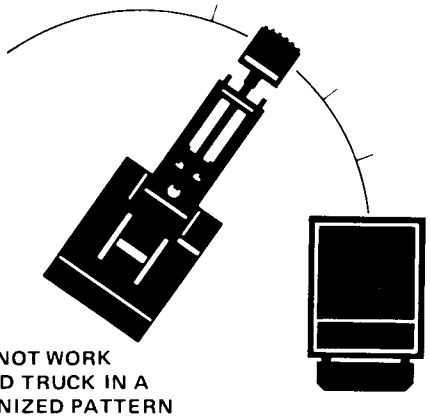
FIGURE 52

For most efficient production, the dipper should be loaded from the most remote point while waiting for a truck. When the truck is positioned excavating should begin close to the haulage unit, progressively working away from the unit (figure 53 and 54). This technique saves time by allowing smooth short cycles, and eliminates excessive crowd and retract motions for uneven bank surfaces.



DIG IN AN
ORGANIZED PATTERN

FIGURE 53



DO NOT WORK
TOWARD TRUCK IN A
DISORGANIZED PATTERN

FIGURE 54

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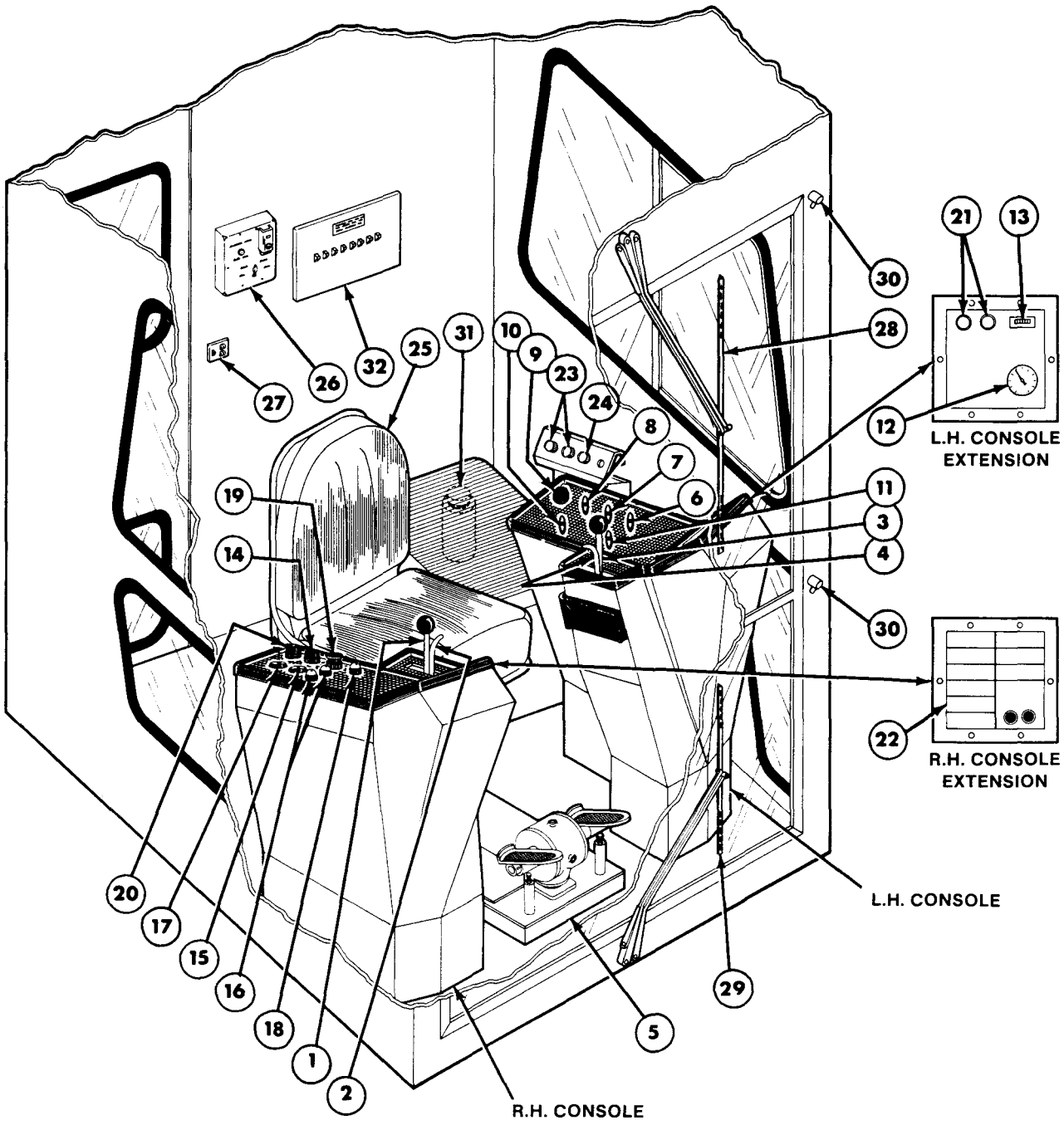


TYPICAL OPERATOR'S STATION

FIGURE 4

zation fans. The pushbuttons are located on the door of the AC cabinet.

NOTE: One ventilating fan will start automatically when the main power start pushbutton is pressed. The other fan may be started or stopped as needed.

8. & 9. HOIST AND BATTERY FUME MOTOR SWITCHES

The hoist and battery fume motor switches are located on the right-hand door of the AC control cabinet. The switches control the start up and shut down of the fume motors. ***(NOTE: Machines equipped with GE control systems will not have a battery fume blower).***

LOW VOLTAGE CONTROL CABINET

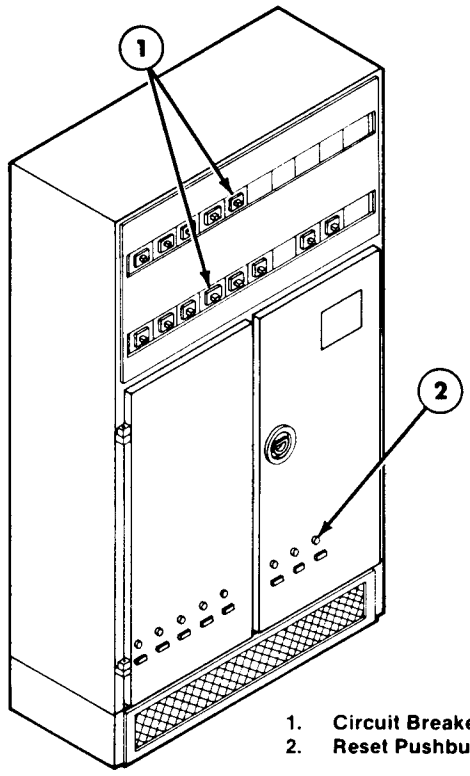
The low voltage control cabinet (figure 7) is located in the machinery house, in the rear of the machine. Located on the front panel of the cabinet are all of the circuit breakers for the auxiliary motors and control systems.

1. BREAKERS

The breakers for most of the electrically operated units on the machine are located on the doors of the low voltage control cabinet. These breakers protect the units from short circuit current loads. The breakers must be in the "on" position in order to operate the machine.

2. RESET PUSHBUTTONS

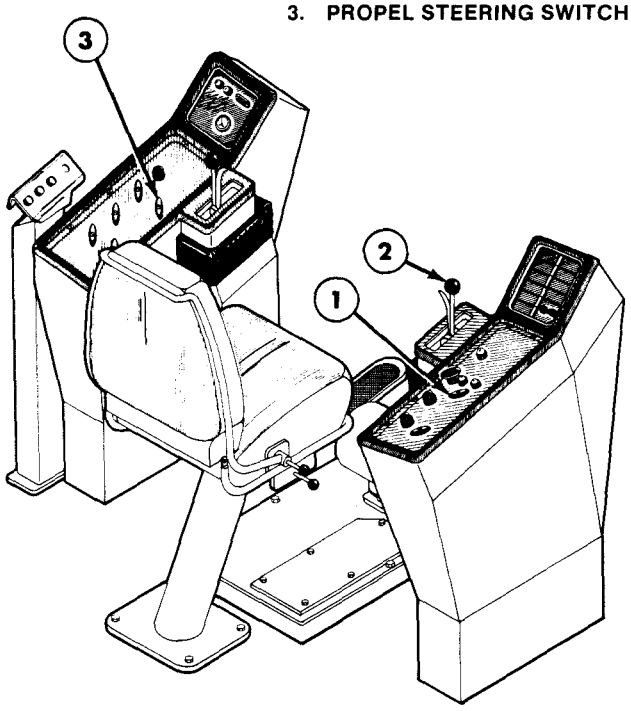
Also located on the cabinet doors are reset pushbuttons for the various functions. These reset pushbuttons are used to reset contactors which have tripped for some reason.



1. Circuit Breakers
2. Reset Pushbuttons

LOW VOLTAGE CONTROL CABINET
FIGURE 7

1. PROPEL TRANSFER SWITCH
2. HOIST MASTER SWITCH
3. PROPEL STEERING SWITCH



OPERATOR'S STATION

FIGURE 24

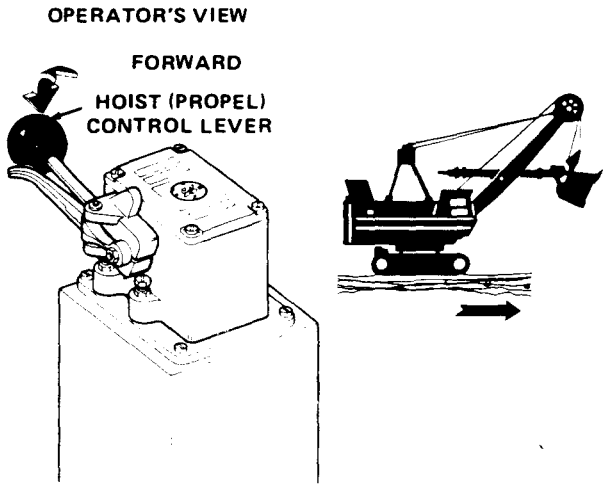


FIGURE 25

NOTE: When turning while propelling to the rear, the direction opposite the turn must be selected. Practice the propel and turn motions until a "feel" for these functions is attained.

CAUTION: The hoist brake should be set whenever in the propel mode.

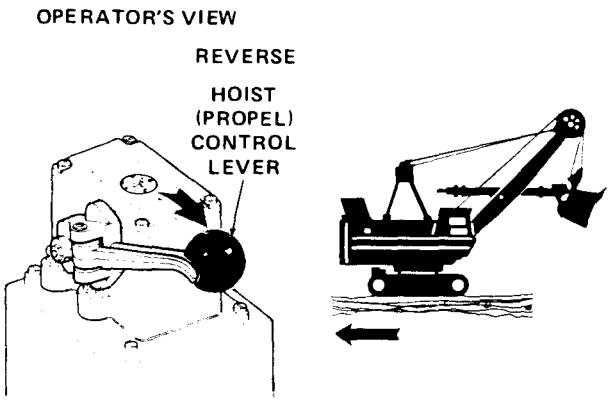


FIGURE 26

STEERING

To turn left while propelling forward, set the steering switch in the left position. This will electrically and pneumatically release the left clutch and set the left brake (figure 27). To turn right, set the steering switch to the right position. This will electrically and pneumatically release the right clutch and set the right brake (figure 28).

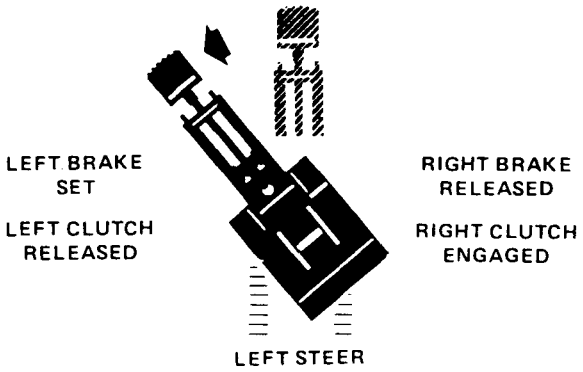


FIGURE 27

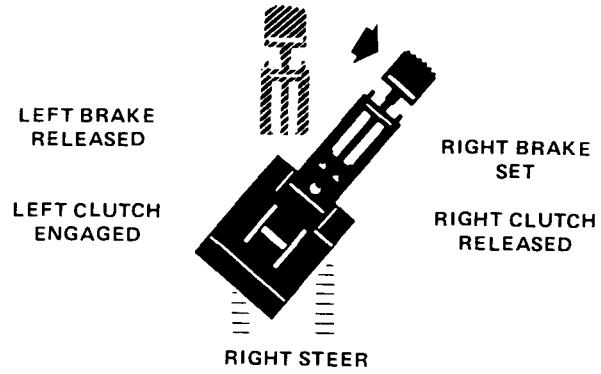


FIGURE 28

PROPER SWING MOTION

Proper swing motion means smooth control and an efficient swing cycle. The swing motion is begun toward the haulage unit when the dipper is filled and is clear of the bank vertically and laterally.

WARNING: Extensive damage to the dipper handle and dipper can occur if the machine is swung before the dipper clears the bank.

The swing motion begins with smooth acceleration to an optimum point at which the excavator is brought to a stop over the haulage unit (figure 55). Maximum efficiency and minimum swing machinery wear are direct results of mastering the swing motion.

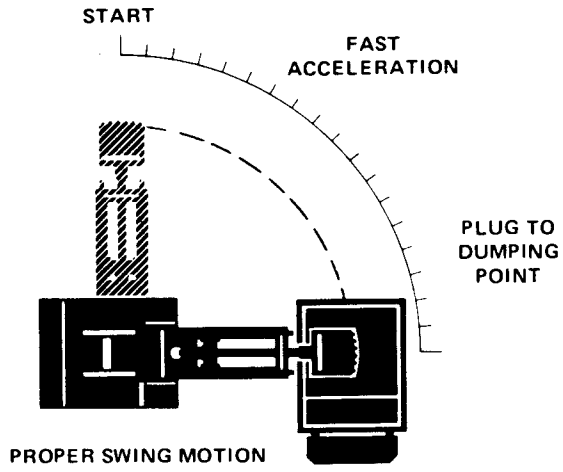


FIGURE 55

CAUTION: Improper swing motion results in erratic control, and an unsafe, inefficient swing cycle. If the cycle begins with fast acceleration and maximum speed is maintained to the dump point, it is necessary to stop very suddenly. Stopping the swing under these conditions results in jerky swing motion and unnecessary spillage onto the haulage unit and pit floor. The spillage can result in injury to personnel and damage to the haulage unit tires.

CAUTION: The dipper should never be swung over personnel, trail cables, related electrical equipment or other equipment (figure 56). 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 to avoid the door from opening accidentally.

FIGURE 56

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 (figure 57). As an example; assuming that a 90 degree swing results in 100 percent of the maximum output, increasing the swing arc to 180 degrees reduces output to 70 percent, while decreasing the swing arc to 45 degrees increases the output to 126 percent. Therefore a swing arc of 90 degrees or less should always be used.

Haulage units should be positioned so their center line is approximately under or not more than slightly outside the swing path of the boom point (figure 58). This substantially reduces the amount of dipper maneuvering required of the operator when positioning the dipper for dumping. It is a good practice to "spot" the haulage units by positioning the dipper over the unit at the proper loca-