



Earth-moving Equipment Reference Card (Backhoe-Loader/Excavator)

Earth-moving Equipment – any mobile powered-propelled machine designed to dig, load, spread, carry or move earth material

- Earth-moving equipment can vary in size, shape, and function
- Know the capacities and operating characteristics of the equipment
- Read the Operator's Manual before operating
- Be aware of people around the equipment at all times
- Always wear a seatbelt
- Locate utilities before digging
- Know the rules governing traffic at your site
- Never attempt to dismount (leave the cab) during a "roll-over"

Manuals
All earth-moving equipment should be equipped with Operator's and Safety Manuals. Read the manuals before operating any machine. If the manuals are missing, contact a supervisor, equipment dealer, or the manufacturer directly for more copies.



Recognize safety decals:

And safety symbols:



DANGER This signal word indicates an imminently hazardous situation which, if not avoided, will result in death.

WARNING This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION This signal word indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Personal Protective Equipment (Always be aware of "site" PPE requirements)

*Hard hat	*Safety gloves	*Safety glasses
*Safety shoes	*Reflective clothing	*Hearing protection

- Always know where to get assistance in case of an emergency.
- Also, know where to find a fire extinguisher and first aid kit.
- Be familiar with all site-specific safety markings and posted signs.
- Make sure all parties involved in the equipment's operation are familiar with basic hand signals.

Automobile vs. Earth-moving Equipment (Although equipment and automobiles operate similarly, they are quite different)



Automobile

- *70+ Mph
- *Prepared roads
- *Transport people
- *Two or more occupants

Equipment

- *Max 5-20 Mph
- *Varied terrain
- *Transport materials
- *Operator only

Automobile

- *Relative comfort
- *Maximum visibility
- *Limited turning radius
- *Weight (2-4K)

Equipment

- *Functional seating
- *Visibility obscured
- *Tight turning radius
- *Weight (5-100K)

Site Inspection

Before operating any equipment, learn as much about the work area as possible. Walk around the worksite and inspect the surface(s) over which you will be expected to travel and work.

Inspect for:

- | | |
|--------------------|------------------------|
| -Slippery surfaces | -Confined areas |
| -Trees | -Underground utilities |
| -Holes | -Speed considerations |
| -Overhead hazards | -Moving equipment |
| -Slopes | -Scattered materials |
| -Deep ditches | -Pedestrian traffic |
| -Obstructed vision | -Deep mud |
| -Narrow aisles | -Oil spills |
| -Large rocks | -Water hazards |

Check the site regularly for condition changes.

Equipment Inspection

Before each shift, the operator should always inspect the equipment. Be sure to check the following:

- | | |
|-------------------|--------------------------|
| -Fluid levels | -ROPS |
| -Tires/Tracks | -Boom/Arm |
| -Horn and alarms | -Brakes |
| -Leaks | -Outriggers/Stabilizers |
| -Safety equipment | -Grease fittings |
| -Steering | -Hoses, belts and cables |
| -Lights | -Seatbelt |
| -Loader bucket | -Digging bucket |
| -Back-up alarm | -Horn |

If your inspection reveals damage or a potential hazard, do not operate the equipment.

Backhoe Operation

Getting Started

- Read the operator's manual to become familiar with the backhoe
- Do inspections, Site/Equipment
- If the machine is to be operated on the road, make sure it has all proper traffic apparatus
- Mount the equipment using three points of contact (two hands, one foot)
- Make sure all items in the cab are secure
- Adjust the seat and mirrors, put the seatbelt on and adjust accordingly
- Attach foot brakes if unattached (if applicable)
- Make sure the unit is in neutral and start the engine
- Observe gauges and instruments, familiarize with and test controls
- Be aware of pedestrians in the area
- Always operate from the operator's seat
- Never give a ride to anyone (operator only)

Traveling

- Keep the load/bucket tilted back slightly and as low to the ground as possible
- When traveling, be sure the backhoe boom is in the transport position
- An operator's visibility is always restricted, watch for pedestrians
- Drive at a safe speed, slowing down when going around corners
- Keep machine in low gear when traveling down or up a slope
- Sound the horn when approaching intersections and corners
- Stay away from edges and banks
- Always be alert for low branches or other overhead obstructions
- Avoid steep slopes or unstable surfaces
- If you must drive on a slope, keep the load low and drive slowly
- DO NOT drive across a steep slope, avoid turning on an incline
- Never touch a machine that has come in contact with an electrical current

Loading

- Make sure no one is near your loading area
- Never allow an individual to pass under the load
- Never swing a bucket over a truck cab
- Make sure your loads are stable
- Be careful when handling objects such as bales, poles, stumps, sheets of plywood or other unstable items
- Keep the work area as flat and level as possible
- Avoid loading on slopes and inclines
- Never use a bucket to raise a person
- Never undercut a high bank

Digging

- Make sure the area is clear of all persons before you start digging
- Set the parking brake, lower the front bucket to the ground, shift to neutral, and lower the outriggers/stabilizers onto stable ground
- Be aware of overhead obstructions (power lines)
- Make sure you know the location of utility lines and cables before digging
- Never allow anyone to enter the boom swing pivot area
- Always look around before backing up or swinging the boom
- Never operate the machine's controls from the ground
- Do not dig under or near the machine's outriggers
- When digging on a slope, swing to the uphill side to dump
- Never use a bucket for hammering purposes
- Use extreme caution when backfilling, the machine becomes much heavier
- Be careful that the machine doesn't roll into a trench when outrigger is lifted
- When working at the base of a bank, be aware of earth slides
- Never operate the machine close to an edge, a collapse is possible
- If lifting with either bucket, know machine's capacities
- Lower outriggers before lifting with digging bucket
- Never allow anyone under a raised load

Shutdown

- Park on a level surface, lower bucket(s)
- Shift to neutral, set parking brake, remove ignition key

Maintenance

Equipment malfunctions can often be attributed to improper or lack of regularly scheduled maintenance. Follow a regular maintenance schedule as defined in the manufacturer's Operators manual(s).

A properly maintained piece of equipment is much less likely to be involved in an accident!

Excavator Operation

Getting Started

- Read the operator's manual to become familiar with the excavator
- Do inspections, Site/Equipment
- Mount the equipment using three points of contact (two hands, one foot)
- Make sure all items in the cab are secure
- Adjust the seat and mirrors, put the seatbelt on and adjust accordingly
- Be aware of pedestrians in the area
- Observe gauges and instruments, familiarize with and test controls
- Raise the bucket off the ground
- Always operate from the operator's seat
- If the unit has a 360-degree cab spin, coordinate controls
- If a machine has a blade, make sure that it is off the ground
- Never give a ride to anyone (operator only)
- Never leave a cab with the engine running
- Never attempt to modify a machine without the written approval of the manufacturer

Traveling

- Before traveling, know surface support limitations
- Keep the load/bucket as low to the ground as possible
- Always watch for pedestrians and other traffic
- Drive at a safe speed, slowing down when going around corners
- Always cross obstacles at an angle
- Keep machine in low speed when traveling down or up a slope
- Sound the horn when approaching intersections and corners
- Stay away from edges and banks
- Always be alert for low branches or other overhead obstructions
- Avoid steep slopes or unstable surfaces
- Keep a safe stopping distance at all times
- If you must drive on a slope, keep the bucket low and drive slowly
- DO NOT drive across a steep slope (avoid turning on an incline)
- Never touch a machine that has come in contact with an electrical current
- Before entering an underpass or tunnel check for overhead obstructions

Loading

- Make sure no one is near your loading area
- Always stay clear of pinch points
- Avoid impact loading
- Never exceed the capacity of the excavator
- Never allow an individual to pass under the load
- Never swing a bucket over a truck cab
- Make sure your loads are stable
- Be careful when handling objects such as bales, poles, stumps, sheets of plywood or other unstable items
- Keep work the area as flat and level as possible
- Avoid loading on slopes and inclines, machine's stability is stressed
- Avoid working with tracks across the slope
- Never use a bucket to raise a person
- Refer to the operator's manual when using the excavator for lifting

Digging

- Make sure the area is clear of all persons before you start digging
- Stay clear of overhead obstructions (power lines)
- Make sure you know the location of utility lines and cables before digging
- Always contact the owners of gas lines
- Be sure there is adequate clearance for tail swing (barricade if necessary)
- Never allow anyone to enter the boom swing pivot area
- Always look around before backing up or swinging the boom
- Never operate the machine's controls from outside the cab
- When digging on a slope, swing to the uphill side to dump
- Never undercut a high bank
- Never use a bucket for hammering purposes
- Use extreme caution when backfilling, the machine becomes much heavier
- When working at the base of a bank, be aware of earth slides
- Never operate the machine close to an edge, a collapse is possible
- Never allow anyone under a raised load
- Avoid digging or lifting from the side of the excavator

Shutdown

- Park on a level surface, lower bucket(s)
- Shift to neutral, set parking brake, remove ignition key

This reference card should only be used as a supplement to the Manufacturer's Operator's Manual.