Types of Wheel Loaders

Wheel Loader

The wheel loader is a self-propelled machine, with either a fixed or swinging loader frame fitted with wheels. The equipment has an operating mass greater than 4,500 kg. Wheel loaders are primarily designed for loading operation with a bucket attachment, which loads or excavates through forward motion of the machine, noting that a loader work cycle normally comprises filling, elevating, transporting, and discharging material. Other attachments can typically be fitted, as per the manufacturer’s instructions.

Compact Wheel Loader

The compact wheel loader is a wheel loader that has an operating mass of 4,500 kg or less. They are designed to work in areas with limited space, with the associated need for greater maneuverability.
One-Call First

Call

Before starting any digging project, contact the local One-Call service to have underground utilities located.

Call before you dig—dial 811
(USA only)
1-888-258-0808
(USA & Canada)

One-Call will notify participating utility companies that you intend to dig. You must also call any utility companies which do not participate in the One-Call service. Always inspect the job site for evidence of unmarked utilities and contact others if necessary.

Plan the Work

Be aware of the lead time for utility marking in the work area. This time may vary among different states, counties, provinces, or locales. If you do not locate utilities, accidents can occur causing injuries, service interruptions, damage to the environment, or job delays. Classify each job site based on the hazards already in place and use the proper work methods and equipment for the job site.

Dig

Most utilities mark their underground facilities using American Public Works Association (APWA) underground color codes. Verify marks before digging.

In the United States, The Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1926.651 requires that the estimated location of underground utilities be determined before beginning an excavation. When actual excavation approaches an estimated utility location, the exact location of the underground installation must be determined by a safe, acceptable and dependable method. Other OSHA regulations may also apply to the job site.

APWA Underground Color Codes

<table>
<thead>
<tr>
<th>Color</th>
<th>Description/Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Electric power lines, cables, conduit, lighting cables</td>
</tr>
<tr>
<td>Yellow</td>
<td>Gas, oil, steam, petroleum, or gaseous materials</td>
</tr>
<tr>
<td>Orange</td>
<td>Communication, alarm or signal lines, cables or conduits</td>
</tr>
<tr>
<td>Blue</td>
<td>Potable water</td>
</tr>
<tr>
<td>Green</td>
<td>Sewers and drain lines</td>
</tr>
<tr>
<td>Purple</td>
<td>Reclaimed water, irrigation, and slurry lines</td>
</tr>
<tr>
<td>White</td>
<td>Proposed excavation</td>
</tr>
<tr>
<td>Pink</td>
<td>Temporary survey markings</td>
</tr>
</tbody>
</table>
Follow a Safety Program

For Safe Operation

You must be a qualified and authorized operator for safe operation of this machine. You must clearly understand the written instructions supplied by the manufacturer, be trained—including actual operation—and know the safety rules and regulations for the job site. It is a good safety practice to point out and explain safety signs and practices to others, and to make sure they understand the importance of following these instructions.

**WARNING!** Death or serious injury could result from operating machinery while impaired by drugs or alcohol. Drugs and alcohol affect operator alertness, coordination, and the ability to safely operate the equipment. **Never operate the machine while impaired by use of alcohol or drugs.** Never knowingly allow anyone to operate the machine when their alertness or coordination is impaired.

An operator taking prescriptions or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to safely operate this equipment.

**Be Alert!**

Know where to get assistance. Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone. Know how to use a first aid kit and fire extinguisher/fire suppression system; know their location and practice getting to them. Ensure they have been properly tested and maintained.

Let others know where you will be working, and what time you will be returning. In case of an emergency, you want others to know where to find you.

**Be Aware!**

Take advantage of training programs offered.

Know the proper response to a fire or chemical spill on your machine.
Follow a Safety Program

Be Careful!

Human error is the result of many factors: carelessness, fatigue, sensory overload, preoccupation, unfamiliarity with the machine or attachments, or drugs and alcohol, to name a few. You can avoid death or serious injury caused by these and other unsafe work practices. Be careful; never assume accidents cannot happen to you.

For your safety and the safety of others, act safely and encourage your fellow workers to act safely as well.

Protect Yourself

Wear all the personal protective clothing and Personal Protective Equipment (PPE) issued to you or called for by job conditions.

You may need:
- Hard hat
- Safety shoes
- Safety glasses, goggles, or face shield
- Heavy duty gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask

Wear whatever is needed to protect yourself—don’t take chances.

⚠️ WARNING! Avoid death or serious injury from entanglement. Do not wear loose or frayed clothing or accessories that could catch on moving parts. Examples of items to avoid include flopping cuffs, dangling neckties and scarves, wallets attached to chains, jewelry and wrist watches.
Follow a Safety Program

Know the Rules

Most job sites have rules governing equipment use and maintenance. Before you start work at a new location, check with the supervisor or safety coordinator. Ask about the rules you will be expected to obey.

OSHA enforces federal laws within the United States that apply to the safe operation, application, and maintenance of equipment on some job sites. It is the employer’s responsibility to comply with these laws. A federal representative may periodically inspect a job site to see that these laws are being followed.

There may be other local, state/provincial, federal laws or international organizations that regulate the use of this equipment, along with specific job site or employer rules. It is important that you know and comply with all applicable laws and rules, including those requiring operator training and certification.

These are some of the rules you must work by:

- Only qualified and authorized individuals may operate this equipment.
- Inspect your machine and attachments before each use as specified by the manufacturer and your employer.
- Know the operating capacity and characteristics of your equipment. Do not misuse it.
- Wear proper clothing and PPE. Check that others are also wearing appropriate clothing.
- All shields, guards, air filters, access panels, and doors must be properly installed before each use.
- Know the rules regarding traffic at your job site. Know what all signs, flags, and markings mean. Know hand, flag, horn, whistle, siren, or bell signals, if used.
- Never modify or remove any part of the machine (except for qualified service personnel; then make sure the part is re-installed or replaced if defective or worn out).
Follow a Safety Program

Know the Rules (cont.)

- **Never allow children to play near, ride on or operate the equipment**
- Keep bystanders away from the machine during operation.
- Know the work area before you use the equipment. Be aware of possible hazards.
- Only use attachments and parts that are approved by the manufacturer.
- Do not allow riders.
- Fasten seat belt or operator restraint before starting.
- Drive forward whenever possible.
- Always look in the direction of travel.
- Look before backing up.
- Carry the load low.
- Whenever you leave your machine, always lower the loader bucket, blade or other attachments to the ground. Follow all safe shutdown instructions (See page 31, Shut Down Safely).
- Use three-point contact (handholds and steps) and face the equipment when mounting or dismounting (See page 19, Mount and Dismount Properly).
Prepare for Safe Operation

Always contact your local One-Call system and any utility companies that do not subscribe to One-Call before doing any digging. (See page 7, One-Call First.)

Mount and Dismount Properly

Always use three-point contact when mounting or dismounting the machine. Three-point contact means one hand and two feet, or two hands and one foot, in contact with the machine at all times.

During mounting and dismounting:
- Use handholds and step plates.
- Never use steering wheels, joysticks or controls as handholds.
- Never jump on or off the machine.
- Never mount or dismount from a moving machine.

Warn Personnel Before Starting

Before starting, walk completely around the machine. Make sure no one is under the machine, on it, or close to it. Let others know you are starting up and don’t start until everyone is completely clear of the machine. As the equipment operator, you are responsible for the safe use of the machine, so always make sure you have communicated your work plans to others on the site.

Never mount or dismount while carrying tools or objects that prevent three-point contact. Put parts or tools down. Maintaining proper contact, climb or dismount, and then pick up the object.

Face the machine when you enter or leave the machine.

Clean shoes and wipe hands. Clean steps and handholds of chemical residue, snow, ice, mud or oil.
Start Safely

Starting the Engine

⚠️ WARNING! Start the engine from the operator’s seat only. Never attempt to start the engine by shorting across starter terminals. The machine may move unexpectedly, which could cause serious injury or death to anyone in its path.

Know the exact starting procedure for your machine. See the manufacturer’s operating manual(s) for starting.

• Sit in the operator’s seat and adjust the seat so you can operate all the controls properly.
• Fasten the seat belt/operator restraint.
• Familiarize yourself with warning devices, gauges and operating controls.
• Lower the operator seat/restraint bar(s) (if equipped).
• Make sure the parking brake is engaged and the controls are in a neutral/locked position.
• Clear the area of all persons.
• Sound horn.
• Start the engine following the instructions in the manufacturer’s operating manual(s).

If necessary to run the engine or operate the machine in an enclosed area, ensure there is adequate ventilation.

⚠️ WARNING! Exhaust fumes can kill. Do not breathe exhaust fumes!

Starting Aids

If you have trouble starting the engine and need to use jumper cables, follow the instructions in manufacturer’s operating manual(s). Jump-starting is a two-person operation. The operator must be in the operator’s seat when jump-starting so the machine will be under control when the engine starts.

⚠️ WARNING! Improper jump-starting procedures may cause serious injury or death from a battery explosion or a run-away machine. Always use proper jump-starting procedure. (See page 40, Battery Hazards.)

To avoid explosion, follow proper jump-starting procedures

Never start engine by shorting across starter terminals
 ether/cold start fluid is HIGHLY FLAMMABLE. Before using it, always read the instructions on the ether/cold start fluid container and the instructions in the manufacturer’s operating manual(s).

⚠️ WARNING! Avoid injury from explosion or fire. If the engine is equipped with a glow plug pre-heater or other intake manifold type pre-heater, follow manufacturer’s instructions before using ether/cold start fluid.

After Starting Engine

Observe gauges, instruments, and warning lights to assure that they are functioning and their readings are within the operating range.

Run an Operating Check

Do not use a machine that is not in proper operating condition. It is your responsibility to check the condition of all systems and to run the check in a safe area.

Test Controls

Loaders come equipped with various control configurations, patterns, and operating modes, each with their own handling characteristics. Some have selectable or configurable controls, to suit personal preferences or specific applications.

Make sure that you know which control pattern you have selected and that you understand how the machine will handle when using that control pattern.

Make sure the machine is operating properly by doing the following:

- With the control levers or joysticks in neutral, test engine speed control.
- Operate each pedal, lever, or joystick and any auxiliary functions to make sure all lift arm and tilt functions are correct.
- Operate the travel control lever(s) or joysticks to ensure correct operation in forward and reverse. Test steering to the right and to the left, while moving slowly in a clear, safe area.

⚠️ WARNING! Before operating the machine under working conditions, be certain you can control both the speed and direction of the machine. Any loss of control could result in death or serious injury.
Operate Safely

Masked Visibility Areas

Machines have areas where the operator’s visibility of the job site can be affected by the machine itself. ROPS posts, attachments, loader bucket, even items in the cab, could limit your view of the surrounding area and possibly mask hazards or people around you. These masked visibility areas vary from machine to machine, and it is very important you be aware of these areas before operating your machine. Refer to the manufacturer’s manual for information regarding various visibility aids that may be installed on the machine.

Follow these safety precautions to reduce the hazards posed by masked visibility areas:

- Pay particular attention when raising or lowering the bucket or other attachment, because masked visibility areas can change.
- Look around the machine before operating. Objects near the machine and close to the ground can be difficult to see from the cab.
- Always look in the direction of travel, including in reverse, or use available visibility aids, if equipped. A back-up alarm is no substitute for looking behind you when operating the machine in reverse.
- Keep bystanders away, even if your machine is equipped with a back-up alarm.

- Place the bucket or other attachment in the transport position and secure all accessory equipment while traveling.
- When traveling, keep the load as low as possible for maximum stability and visibility.

Remember These Rules

If equipped with ROPS, stay in the operator’s seat at all times when operating and keep your seat belt/operator restraint fastened and comfortably snug. Be in control of your machine at all times. In the event of a rollover, stay in the seat with the seat belt fastened.

Remember the Other Person

Never allow an untrained or unqualified person to operate the machine. If operated improperly, this machine can cause serious injury or death.

Know the pinch points and rotating parts on the machine.

⚠️ WARNING! The loader is a one-person machine. Avoid death or serious injury—never permit riders!
Operate Safely

Remember the Other Person (cont.)

Never use the bucket for a work platform or personnel carrier.

⚠️ WARNING! Never move, lift, or swing a load over anyone.

Back up Safely

Check that the back-up alarm and visibility aids, if equipped, are working properly. Remember, a back-up alarm is not a substitute for looking to the rear when operating the machine in reverse. Utilize all visibility aids. Always look around before you back up the machine. Be sure that everyone is in the clear. Drive forward whenever possible. **ALWAYS LOOK IN THE DIRECTION OF TRAVEL.**

Follow Safe Operating Practices

Make these safe practices part of your daily routine:

- Keep your seat belt/operator restraint fastened.
- Operate the controls smoothly—don’t jerk the steering levers or joysticks.
- Avoid sudden stops, starts or turns.
- Use care and good judgment.

- Never attempt to operate the controls unless properly seated in the cab.

⚠️ WARNING! Avoid Serious injury or death! Keep your entire body inside the operator’s cab while operating the machine. Never work with your head, arms, feet, or legs beyond the operator’s compartment.

Use Attachments Safely

Most loaders can be operated with a wide variety of attachments. These include buckets, pallet forks, augers, snow plows and many others. Make sure the attachment is approved by the manufacturer for use on the machine you are operating. If you are not sure, ask your supervisor or contact your dealer. Be sure to read the manufacturer’s operating manuals pertaining to that attachment before using it. Make sure the attachment is properly coupled to the machine before using it.

Stay alert! Should something break, come loose, or fail to operate on your machine, stop work. Lower the lift arm(s), shut off the engine and inspect the machine.
**Operate Safely**

**Watch Out for Hazardous Working Conditions**

Be alert for hazards. Know where you are at all times. Watch for branches, cables, or doorways.

Extreme caution should be used when working along the tops of banks or slopes. Always operate the machine perpendicular to the bank. Keep away from the edge.

⚠️ **WARNING!** Never operate the machine close to the edge of an overhang or gully. The edges could collapse or a slide could occur causing serious injury or death.

Use caution when working along docks, runways, banks and slopes. Keep away from the edges of drop-offs.

When working near hazardous conditions, have a spotter work with you to look for dangers. Make certain they stay a safe distance from your machine.

**Traveling on Job Site**

Take it slow and easy when traveling through congested areas. Traffic courtesy pays off. Use caution when turning and negotiating turns.

Give the right-of-way to loaded machines. Maintain a safe distance from other machines. Pass cautiously.

Don’t obstruct your vision when traveling or working. (See page 22, **Masked Visibility Areas**.)

**Travel Safely**

When traveling over rough terrain, **SLOW DOWN** to prevent losing control.

Avoid steep slopes or unstable surfaces. Do not drive across an excessively steep slope under any circumstances.
Operate Safely

Travel straight up and down the slope. Before operating on slopes, check the surface conditions for adequate traction. Loss of traction can cause the machine to slide and tip.

⚠️ WARNING! Avoid death or serious injury. Travel up and down slopes with the heavy end of the machine pointed uphill.

⚠️ WARNING! Avoid death or serious injury. Keep the load as low as possible for maximum stability AND VISIBILITY.

⚠️ WARNING! Avoid death or serious injury. Make sure you can see where you are going.

Rules of the Road

When traveling on public roads or streets, obey all traffic regulations applicable to your machine.

Place the bucket or blade in the transport position and secure all accessory equipment.

Make sure lights and warning signs are in place and visible. Make sure a Slow Moving Vehicle (SMV) emblem is installed and visible to any vehicle approaching from the rear.

Find out if you must use an escort vehicle. Approach intersections with caution; observe speed and traffic control signs. Avoid panic stops and sharp turns.

Like any responsible operator, be considerate of other drivers. If traffic backs up behind you, it is a good idea to pull over periodically and allow traffic to pass when it is safe to do so.

Stop at all railroad crossings and look both ways before proceeding. Never park in traffic areas. If it is necessary to stop at night, pull off the road and set up flares or reflectors. When driving at night, use appropriate lights.

Watch Out for Obstacles

Adjust your speed to conditions. Go around rocks and stumps. Avoid crossing ditches, curbs or exposed railroad tracks. If obstacles are unavoidable; reduce speed, raise bucket, blade or attachment a short distance if needed for clearance, and cross at an angle.
Operate Safely

Keep your machine under control. Keep speed to a minimum when visibility is poor.

Before entering underpasses, tunnels or bunkers, check for oncoming traffic or obstructions.

Transporting Safety Tips

Always wear your seat belt/operator restraint when loading or unloading your machine from a transport device, such as a flatbed truck.

When transporting a machine, follow the manufacturer’s recommended loading and unloading procedures.

Several precautions are applicable to all machines:

- Keep bystanders away.
- Load and unload on a level surface.
- Maintain proper visibility by loading or unloading in well-lit areas, and away from other vehicles, equipment or buildings.
- Block transport vehicle so it cannot move.
- Ensure trailer bed and ramps are in good condition.
- Use ramps of adequate size and strength, with a low angle and proper height.
- Rear of trailer must be blocked or supported.
- Keep trailer bed and ramps free of clay, oil, ice, snow, and other materials which can become slippery.

- Back the machine up the ramp onto the transport vehicle. If the machine is equipped with a heavy attachment it may be necessary to drive forward onto the transport vehicle.
- Install articulation frame lock.
- Cover or remove rear-facing SMV sign on the machine, if equipped, to avoid confusing drivers following the transport vehicle.
- Chain and block the machine securely for transport. Use tie-down points as marked on the machine by the manufacturer. Follow the manufacturer’s instructions in the operator’s manual for tying down.
- Unload the machine by driving off in the opposite direction; do not turn the machine around.