

GRADALL®



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HYDRAULIC EXCAVATOR **SAFETY** MANUAL

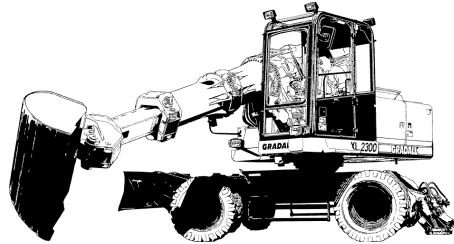
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HYDRAULIC EXCAVATOR SAFETY MANUAL

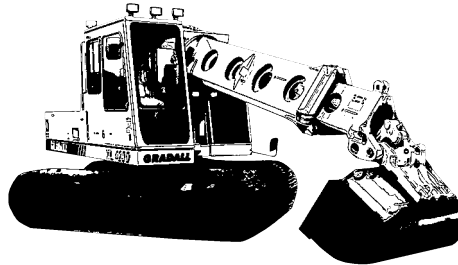
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There are four basic types of Gradall Hydraulic Excavators:

1. Wheel Mounted; Integral Carrier

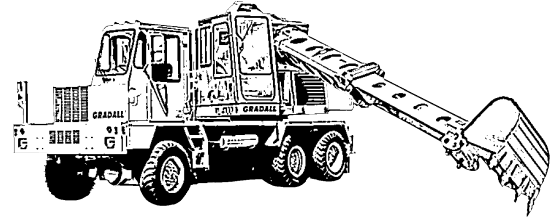


2. Track Mounted; Integral Crawler

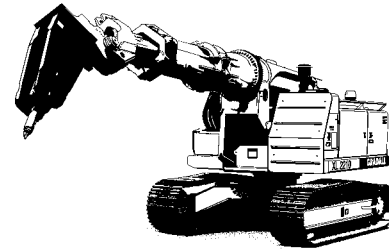


NOTE! The terms "hydraulic excavator" and "excavator" are used interchangeably throughout this Safety Manual.

3. Wheel Mounted; Separate Operation and Transport Cabs



4. Track Mounted IMM's; Truck Mounted Radio Remote Controlled, Scalers, Railroad Guide Wheels and Gentries.

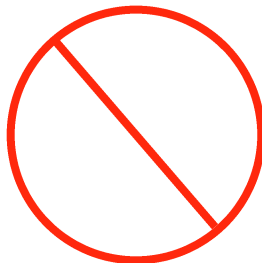


Gradall also manufactures a range of Industrial Maintenance Machines (IMMs) designed less for construction applications and more for specialized industrial applications; primarily steel mills, underground mining, railroad maintenance and gentries. All these machines are covered in this Manual.

NOTE ON ILLUSTRATIONS

Illustrations in red circles overlayed with a diagonal cross-bar indicate prohibitions and could include:

- Unsafe working practices
- Safety violations
- Potential hazards



As far as these are concerned, there is one simple rule: **Just Don't Do It!**

This *Hydraulic Excavator Safety Manual* underlines basic safety issues regarding the normal operation and maintenance of a Gradall Hydraulic Excavator. The Manual recommends certain procedures, precautions and other appropriate actions for safe operation and maintenance of the machine.

This *Safety Manual* is not comprehensive. It does not cover all possible eventualities. Additional precautions may be necessary, depending on the specific conditions of a particular work site.

REMEMBER! It is **YOUR** responsibility to use sensible and appropriate safe practices when operating the excavator.

The information in this Manual supplements specific details about the excavator contained in the appropriate *Gradall Owner/Operator Manual* and the *EMI Excavator Safety Manual*. Other information which may affect the safe operation of the excavator is featured on safety decals affixed to the machine; in your employer's safety programs; in safety codes; in local, state, provincial, and/or federal laws, rules and regulations.

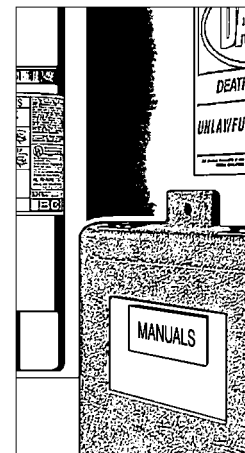


WARNING

This Safety Manual is not comprehensive. It does not cover all possible eventualities. Additional precautions may be necessary, depending on the specific conditions of a particular work site.

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IMPORTANT! Before you operate a Gradall Hydraulic Excavator, make sure you have all the proper manuals. The *Gradall Hydraulic Excavator Safety Manual*, the appropriate *Owner/Operator Manual* for the machine and the *EMI Excavator Safety Manual** should all be contained in the manual holder/tray in the operator's cab. If any manual is missing or illegible, get a replacement from your employer, your equipment distributor or directly from Gradall. Keep all Safety and Instruction manuals with the excavator at all times. Read, understand and comply with the instructions and warnings in these manuals **AT ALL TIMES**.



**Highway speed machines are also furnished with a CIMA Dumper Safety Manual.*

The Safety Alert Symbol means:

ATTENTION!

BE ALERT!

YOUR SAFETY IS AT RISK!



The Safety Alert Symbol spotlights important safety messages on hydraulic excavators, safety signs, in manuals or elsewhere. The symbol will typically appear in one of three dominant colors: Red, Orange, or Yellow. These colors follow a descending hierarchy of hazard or risk. In other words, red indicates the highest level of risk. Yellow the lowest

When you see the Safety Alert Symbol, pay particular attention to the **DANGER**, **WARNING** or **CAUTION** note for the sake of your safety and the safety of others.

SIGNAL WORDS

DANGER . . . WARNING . . . CAUTION . . .

Signal words are distinctive words that are typically found on safety decals on a Gradall Hydraulic Excavator as well as on other equipment on the work site. These words highlight a range of potential hazards and risks.

Typically, the Safety Alert Symbol *and* the appropriate **SIGNAL WORD** will appear as a header bar on a machine decal.



This symbol indicates an extreme hazard which would result in high probability of death or serious injury if proper precautions are not taken.



This symbol indicates a hazard which could result in death or serious injury if proper precautions are not taken.



This symbol indicates a hazard which could result in injury or damage to equipment or property if proper precautions are not taken.



*When you see this symbol, pay particular attention to the **DANGER**, **WARNING** or **CAUTION** note for the sake of your safety and the safety of others.*

**CAUTION****BE A RESPONSIBLE OPERATOR**

For safe operation of a Gradall Excavator, you must be a responsible operator. Make sure you:

- Clearly understand written instructions supplied by Gradall
- Are fully trained, including actual operation of the excavator
- Understand and comply with all safety rules and regulations for the work site

GRADALL**SAFETY AND YOU**

It is **YOUR** responsibility to read and understand this *Safety Manual*. It will help you avoid accidents and keep the excavator in sound operating condition. **ALWAYS THINK SAFETY FIRST!** Follow a carefully constructed plan for inspection, maintenance and safe operation. **REMEMBER!** The Manual is not intended to cover all eventualities.

Any procedure must be thoroughly evaluated from the standpoint of safety before it is put into practice. If you are not sure, contact your Authorized Gradall Distributor for specific recommendations.

To help ensure safe operation, do not modify any Gradall Excavator without written permission and procedures from Gradall.

A WORD ABOUT OPERATORS

All operators must be responsible, reliable and safety-conscious. Inexperienced personnel must not be allowed to operate the excavator. All operators must know all job site safety rules.

PRACTICE MAKES PERFECT

Before operating the excavator, make sure you practice operating all controls. Practice until you are completely familiar and comfortable with the excavator's response. Practice maneuvering the excavator in a safe, open area well away from people, equipment and buildings.

OPERATE SAFELY

A Gradall Hydraulic Excavator must **ONLY** be operated by trained and qualified personnel. Check that all required maintenance is completed before operating the excavator. **NEVER** operate the excavator without a correct and legible Capacity Chart in the operator's cab for the specific excavator/attachment combination you are using.

Note! There are no Capacity Charts in the Industrial Maintenance Machines.

**WARNING****SPECIAL NOTE ON CONTROLLED SUBSTANCES**

Drugs and alcohol affect your alertness, your coordination and therefore your ability to safely operate a Hydraulic Excavator. **NEVER** use drugs or alcohol while operating a hydraulic excavator. If you are taking prescription or over-the-counter medication, consult a medical professional regarding any side effects that would hinder your ability to safely operate this equipment. **NEVER** operate the excavator when your alertness or coordination is impaired.

PROTECT YOURSELF

Wear all the protective clothing and personal safety devices issued to you or called for by job conditions.

You May Need:

- Hard Hat
- Safety shoes
- Safety glasses, goggles, or face shield
- Heavy gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask

Wear whatever is needed.
Take no chances.



WARNING

DO NOT wear loose fitting clothes, flopping cuffs, dangling neckties and scarves, or rings and wrist watches that might get snagged in moving parts.

KNOW WHAT YOU'RE DOING

Most employers have rules governing operation and maintenance of equipment. Before you start work at a new location, check with your supervisor or the safety coordinator. Ask about rules you may be expected to obey.

These are some of the rules you must work by:

- Know the capacity and operating characteristics of the excavator
- Never modify or remove any part of the machine (except for service)
- Never allow riders on the machine
- Keep others away from the operation
- Before leaving the cab, always place the excavator boom in the boom rest or the attachment on the ground. Engage the parking brake, (if the machine is so-equipped) stop the engine, cycle the hydraulic controls, and remove the key, see page 6.0, "Machine Shutdown."

Make sure you understand the rules covering traffic at your jobsite. Know what all signs, flags, and markings mean. Understand hand, flag, horn, whistle, siren, and bell signals. Know when to use lights, turn signals, flashers, and horns.

KNOW THE EQUIPMENT

Get to know the machine. Know how to operate all equipment on your machine. Know the purpose of all the controls, gauges, and indicators. Know the load capacity, speed range, braking and steering characteristics, turning radius, and operating clearances. Keep in mind that rain, snow, ice, loose gravel, soft ground, and uneven terrain, change the operating capabilities of the excavator. Study the DANGER, WARNING, and CAUTION safety signs on the machine. Study all the informational signs too.



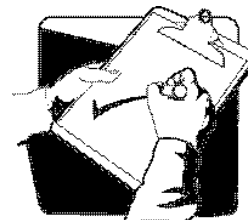
Study the *Owner/Operators Manual* before starting the engine. If there is no Manual with the machine, **GET ONE**. Study it before you start work. If there is something in the Manual you don't understand, ask your supervisor to explain it to you.

IMPORTANT: This Manual covers safe operating practices for Gradall Hydraulic Excavators. If your machine is equipped with other devices or special accessories, read the manufacturer's literature pertaining to that equipment before using it.

CHECK THE SAFETY EQUIPMENT

To protect you and others around you, the excavator may be equipped with the following safety equipment. See that each item is securely in place and in good operating condition.

- Brakes
- Falling Object Guard
- Front Guard
- Lights
- Safety Signs
- Horn
- Guards
- Shields
- Travel Alarm
- Mirrors
- Fire Extinguisher/Fire Suppression System (if equipped)
- First Aid Kit
- Windshield Wipers & Washers
- Reflective Strips



Use Them! Never remove or disconnect any safety device.



WARNING

NEVER remove a falling object guard, or front guard except for service. After service or repair, replace the guard(s) immediately.

KNOW THE RULES OF OPERATION

The Occupational Safety and Health Administration (OSHA) enforces federal laws that apply to the safety of operation, application and maintenance of equipment on a work site. Because it is an employer's responsibility to comply with these laws, an OSHA representative may periodically inspect a work site to see that these laws are being obeyed. There may also be local or state/provincial laws that apply to the excavator and/or its use, as well as specific work site or employer rules. It is important that you understand and comply with all applicable laws and rules.

KEY RULES OF OPERATION

Before starting, operating, or performing maintenance procedures on a Gradall Hydraulic Excavator, there are a number of key

Rules of Operation with which you must comply:

- Conduct a thorough walk-round inspection before starting
- Conduct a complete operational check of the horn before starting the excavator and make sure you can hear the travel alarm inside the operator's cab with the engine running
- Conduct a complete operational check of all controls, brakes and steering
- Know the capacity and operating characteristics of the excavator
- Know the requirement for "line-of-sight" while operating
- Never modify or remove any part of the excavator
- Always wear the safety belt while operating the machine (if equipped)

- Keep all other personnel away from the excavator before starting the engine
- Never use attachments that are not approved by Gradall
- Always make sure the excavator is equipped with a correct and legible Capacity Chart for the specific excavator / attachment combination
- Follow all traffic rules when traveling
- If your visibility is impaired, use a spotter or signal person

CLEAN UP

Clean windshields, mirrors and all lights. Make sure the operator's area, steps and hand holds are clean. Oil, grass, snow, ice or mud in these areas can cause you to slip and fall. Clean the mud off your boots before climbing onto the machine.



Remove all loose personal items or other objects from the operator's area. Secure all items or remove them from the machine. Do not store water cans, signs, tools, chains or any other unauthorized item on the deck of the excavator.

**KNOW THE WORKING AREA**

Before operating the excavator, learn as much as possible about your working area. Check for:

- Location of slopes
- Open trenches
- Drop offs or overhangs
- Soil conditions (soft or hard)
- Standing water and marshy areas
- Rocks and stumps
- Traces of buried foundations, footings or walls
- Traces of buried trash or landfill
- Conditions of haul roads
- Direction of travel on haul roads
- Holes, obstructions, mud or ice
- Heavy traffic
- Thick dust, smoke or fog
- The exact location of any buried and/or overhead electrical, gas, telephone, water, sewer or other utility lines. If necessary, have the utility company mark, shut off, or relocate the line before you begin working

**WARNING**

Never approach power lines with any part of your machine unless all local, state/provincial and federal (OSHA) required safety precautions have been taken. Use extreme caution.

When operating the excavator inside a building, make sure you know what clearance limitations you will encounter overhead and behind you, through doorways and down aisles. Also know the weight limitations of floors and ramps. Make sure the working area is well ventilated.

USE CAUTION WHEN FUELING**WARNING**

Never fill the fuel tank with the engine running, while smoking or when near an open flame.

Never overfill the tank or spill fuel. If fuel is spilled, clean it up immediately.

Ground the fuel funnel or nozzle against the filler neck to prevent sparks and be sure to replace the fuel tank cap.

(For additional information on fire hazards, see "Avoid Fire and Explosion Hazards," page 8.4)



RULES OF THE ROAD

If driving a highway-speed-capable excavator over the road, **DON'T SPEED**. Know your axle weights and machine height and width. Know your stopping distance at any given speed and regulate your travel speed accordingly. Avoid panic stops and sharp turns. If traffic backs up, pull over and allow other vehicles to pass.



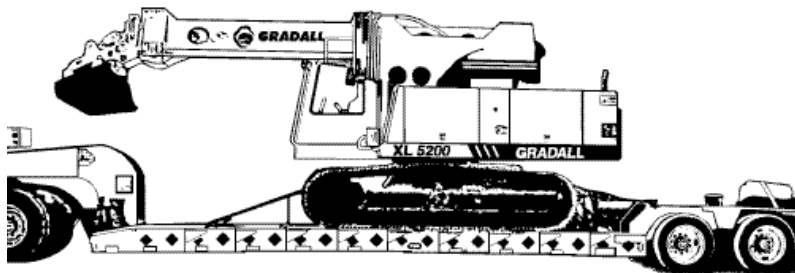
Stop at all railroad crossings and look both ways before proceeding. Never park in traffic areas. If you have to stop at night, pull off the road and set up flares or reflectors. When driving at night, use appropriate lights. If traveling slowly, use hazard lights.

Always use hand signals or turn signals when turning. Approach intersections with caution. Observe speed and traffic control signs. Crawler-mounted machines may damage road surfaces. For over-

the-road travel, transport the machine by truck. Some wheel-mounted Gradall excavators are highway-speed capable. In other words, they can be driven on the road at normal (if lower) highway speeds.

If you are transporting a Gradall excavator over the road, make sure clearance flags, lights and warning signs are all in place, and visible. Place the boom and bucket in the transport position. Fold in mirrors to reduce width and secure all accessory equipment.

While traveling on public roads or streets, obey all local traffic regulations appropriate to local classifications. If required, make sure the "Slow Moving Vehicle" emblem is visible to any vehicle approaching from the rear. Always use hazard warning lights if traveling at a low rate of speed. Find out if you must use an escort vehicle or are required to have a roading permit.



EMERGENCY!

Always know where to get assistance in an emergency.



Know where to find and how to use a first aid kit.



Know where to find and how to use a fire extinguisher/fire suppression system.

Never leave the operator's seat without first safely shutting down the excavator, setting the Park Brake (if equipped), and removing the key. A running, unattended excavator could unexpectedly move or be operated by inexperienced personnel.

NO SMOKING

Never smoke while operating and/or refueling the excavator. Never fill the fuel tank with the engine running or near an open flame. Make sure you have adequate visibility and good ventilation.



MOUNT SAFELY

Whenever you mount or dismount:

- Make sure the steps and handrails are clean
- Maintain three point hand/foot contact with the access system
- Face the machine
- Never jump on or off the machine.
- Never attempt to mount or dismount a moving machine



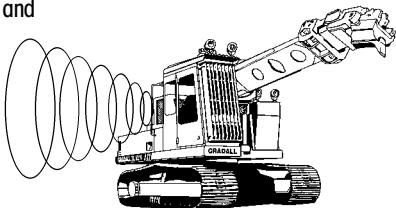
CAUTION

Do not use the steering wheel or any control lever as a hand hold when mounting or dismounting.

The cab must be aligned with the undercarriage centerline and the boom must be properly stowed before you enter or exit the cab.

WARN PERSONNEL BEFORE STARTING

Before starting, walk completely around the machine. Make sure no one is under the machine, on it, or close by and that all guards and covers are in place or closed. Sound the horn to let other workers and bystanders know you are starting up. Don't start up until **EVERYONE** is clear of the machine.



STARTING THE ENGINE

Start the engine while seated in the operator's seat only. Never attempt to start the engine by shorting across starter terminals or reaching the key from the ground or outside the cab. The excavator may start in gear if neutral-start circuitry is bypassed. This could cause the machine to move suddenly and cause serious injury or death to anyone in its path.

Know the exact starting procedure for your excavator. You will find this information in the *Owner/Operator Manual* that shipped with the excavator.

1. Sit in the operator's seat and adjust the seat so you can operate all the controls properly.
2. Familiarize yourself with warning devices, gauges and operating controls.
3. Engage the parking brake (if the excavator is so equipped) and put all controls in the Neutral/Park position.
4. Clear the area of all personnel.
5. Start the engine following the instructions in the *Owner/Operator Manual*.

If it is necessary to run the engine or operate the excavator within an enclosed area, be absolutely certain there is adequate ventilation.



WARNING

Exhaust fumes can kill. Always make sure there is adequate ventilation



NEVER allow passengers to ride with you. A Gradall Hydraulic Excavator is designed for **ONE-PERSON** operation only. **NEVER** allow anyone to occupy the machine other than the operator.



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STARTING AIDS

If jumper cables are used, follow the instructions in the *Owner/Operator Manual*. The operator must be seated in the operator's seat when jump-starting the engine so the machine will be under control when the engine starts. Jump-starting is a two person operation. A battery explosion or run-away machine could result from improper jump starting procedures. Never jump-start a frozen battery.

Ether Cold-Start Fluid is highly flammable and explosive. Before using it, always read the instructions on the ether container and the instructions in the *Owner/Operator Manual*.

DO NOT use ether if the engine is equipped with a glow plug-type pre-heater or other intake manifold-type pre-heater.

AFTER STARTING THE ENGINE

Observe all gauges, instruments, and warning lights to make sure they are functioning and their readings are within the correct operating range.

RUN AN OPERATING CHECK

DO NOT use a machine that is not in proper operating condition. It is the **OPERATOR'S RESPONSIBILITY** to check the condition of all systems and to run the check in a safe area.

TEST THE CONTROLS

Make sure the engine is operating correctly. With the transmission in "Neutral", test the engine speed control. Operate each equipment control lever to make sure all functions are correct.

Operate the shift control(s) to ensure correct operation in "Forward", "Neutral", and "Reverse". Release the swing lock (if the machine is so equipped).

Check the parking brake, service brakes and swing brakes. Test steering—right and left—while moving slowly.



WARNING

Be certain you can control the speed, direction, braking, swing and boom operations before operating the machine.

Look and listen for malfunctions. Stop if a malfunction or erratic operation is detected. Correct or report any trouble **IMMEDIATELY** before further operation.

ONE MACHINE, ONE PERSON

A Gradall Excavator is designed for one-person operation only. **NEVER** allow passengers to ride with you. On wheeled excavators **NEVER** have both the upper and carrier cabs occupied at the same time.

RADIO-REMOTE MACHINES

Some Gradall Industrial Maintenance Machines (IMMs) are operated by radio remote control and have no operators cab. **NEVER** allow passengers to ride on these machines.

ALWAYS THINK SAFETY FIRST!

Never allow an untrained or unqualified person to operate a Gradall Excavator. Handled improperly, this machine could cause severe injury or death. In addition there are several fundamental safety rules which apply in every situation where a Gradall Excavator is being operated;

- Always look around before you back up, hook up, or swing an attachment. Be sure that everyone is in the clear
- Know the pinch points and rotating parts on the machine. Do not allow other personnel to place their arms or hands in boom holes at any time
- Do not allow other personnel to lean on the boom or any other part of the excavator
- Keep your head, arms, and other body parts inside the cab at all times
- Make sure access systems (steps, handrails etc.) are clean and in good condition at all times. If damaged, make sure repairs are made immediately



NEVER use a bucket (or other attachment) on a Hydraulic Excavator as a work platform or personnel carrier. Do not use a Gradall Excavator or Industrial Maintenance Machine to lift personnel.

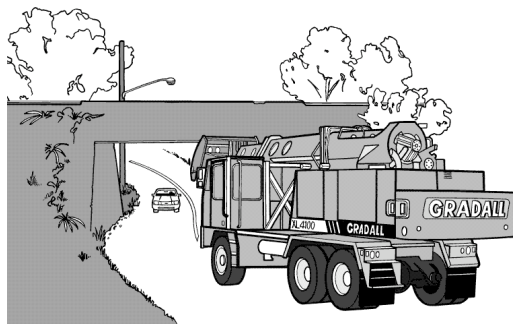


DANGER

Without exception, Gradall explicitly prohibits the use of Hydraulic Excavators to lift personnel.

TRAVELING ON OR TO THE JOBSITE

Take it slow and easy when traveling through congested areas. Traffic courtesy pays off.



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

Don't obstruct your vision when traveling. Carry the bucket or other attachments in the transport position for maximum stability, visibility and adequate clearance. Operate at speeds slow enough so you have complete control at all times. Travel slowly over rough or slippery ground and on hillsides.

Stay in gear when traveling downhill. Do not shift into "Neutral". Maintain engine RPM to provide steering and braking functions so that engine compression can help you control the excavator.

Use the same gear for traveling down a grade as you would for traveling up the grade.

Before entering an underpass, check for hazards or obstructions. Also check the clearance height.

Avoid steep slopes or unstable surfaces. When operating on a slope, keep the bucket and boom low and proceed with extreme caution. Do not drive **ACROSS** a steep slope under any circumstances. Drive straight up and down a steep slope.

Avoid turning on an incline. If turning is unavoidable, use extreme caution and make the turn wide and **SLOW** with the bucket and boom in the retracted and lowered position.

When using Carrier engine to travel on or to the jobsite, do not let upperstructure engine idle to warm hydraulic oil. It could affect steering.

When traveling, always fully raise the stabilizers, if equipped, to minimize machine width.

TRANSPORTING ATTACHMENTS

Always position the attachment for maximum visibility and proper overhead clearance when traveling with the attachment connected to the boom end. In some cases attachments are shipped with additional manuals. Consult attachment manual for additional transport information.

SAFETY PRECAUTIONS

Completely familiarize yourself with the appropriate *Owner/Operator Manual* and *Safety Manual* before you operate a Gradall Hydraulic Excavator.

Make sure the area is clear of all persons before operating.

Before operating the excavator, engage park brake. If equipped, lower the stabilizers, and/or level the machine as much as possible.



DANGER

Never operate the excavator from outside the cab. Severe injury or death can result. Always operate the excavator from the correct seated position.



DANGER

Never lift, move or swing a load over personnel or any other machine.



DANGER

Do not store shovels, water cans, chains, signs, footballs etc. on machine.



DANGER

If machine is equipped with 2 cabs, only one cab is to be occupied at any time.



DANGER

Before starting to excavate, set up safety barriers to the sides and back of machine to prevent anyone from walking into the working area without the operators knowledge.



DANGER

Never enter, or allow anyone else to enter, the excavator swing area. Death or serious injury can result. Be sure there are no obstructions and that there is sufficient clearance for tail swing.

USING ATTACHMENTS

Listed below are some of the more common types of attachments used on a Gradall Hydraulic Excavator.

- Buckets
- Hammers
- Mowers
- Rippers
- Grapples
- Boom Extensions
- Augers
- Teleslick
- Shears
- Blades
- Barrel Handler

In some cases, attachments are shipped with additional manuals. Consult attachment manual for proper operating information.



Keep others clear of swing radius!



WARNING

Pinch Point locations will vary with different types of attachments. Keep clear of all pinch points.



WARNING

Flying debris is a hazard to the operator and all nearby personnel when using power attachments such as Hammers, Augers or Mowers. Ensure that the operator has all windows and guards in place and that all personnel are wearing all the protective clothing and personal safety devices issued to you or called out by job conditions.

**DANGER**

Never undercut a high bank. The edges could collapse and/or a slide might occur causing severe injury or death. Never operate the machine close to the edge of an overhang or stockpile.

**WARNING**

Do not dig under the machine or stabilizers. A cave-in could result and the machine could fall into the excavation.

**DANGER**

Scaling toward the machine could cause scale to land on the machine causing severe injury or death.

FLAGPERSON

It is the operator's responsibility to know where the flagperson is and to establish communication that both the flagperson and operator understand. Don't allow the flagperson out of sight or to remove items from the excavator while it is running or to get in the excavator swing or boom path.

DON'T UNDERMINE YOURSELF

The overall rule of thumb here is that you need to maintain a solid footing underneath the excavator. If you are not careful and attentive while you work, you might inadvertently dig yourself into some serious trouble.

Work the jobsite in such a manner as to avoid creating overhangs or the need to be on top of banks or slopes.

Extreme caution should be used when working along the top of banks or slopes. Keep away from the edge. If possible, level the area before starting work.

When working at the base of a bank, overhang, stockpile or construction, avoid dangers such as rock and/or earth slides, overhanging trees or a cave-in.

When using a mine scaler or scaling attachment, insure there is adequate lighting to perform the task. Always scale while booming toward the rock face.

Be careful that the machine does not roll into the excavation when the stabilizers are raised.

When operating the excavator on a slope, swing to the uphill side to dump the load. If downhill dumping is unavoidable, swing only as far as required to dump the bucket. Use extreme caution. Always drop the spoil a sufficient distance from the trench to avoid a cave in.

Situate the undercarriage parallel to the direction of a slope, (i.e. facing up or down the slope, not "across" the slope).

LIFTING A LOAD WITH THE EXCAVATOR

Before lifting a load, make sure you know the machine's lifting capacity. Do not attempt to lift a load without the proper Capacity Chart. Perform a "trial" lift first



WARNING

Overloading is hazardous. Make certain you are within the safe load and work radius limitations of this machine. Also make sure you are on solid, level ground before lifting any load.

Attach chains and slings to the designated lifting points on the excavator boom. Consult the Owner/Operator Manual for the proper procedure.

When using the excavator to lift and place objects, such as a pipe, position your machine so that lowering is over the rear of the machine rather than either side.

Always lower the stabilizers, if equipped, to the ground before lifting. If the ground is soft, place pads or timbers under each stabilizer.

When lifting, make sure the load is properly balanced. Move slowly so the load does not sway or swing around. If necessary, use a tag line for additional control. Do not lift and carry over sides, stability is reduced.

STAY CLEAR

Check overhead clearances. Know the size of doorways and canopies. Know exactly how much clearance you have under power and telephone lines.

Make sure you know the location of gas lines, water pipes and power cables before excavating. Contact the "diggers hot line" in your area—and/or utility company—and have them mark all underground utilities.

Check overhead clearances. Know your margin of safety. (See note above) Have power to the lines disconnected or de-energized. If de-energizing the lines is not possible, request a signal person for guidance to maintain at least OSHA's minimum clearance.

DO NOT approach power lines, overhead or underground cables or other power sources with any part of the excavator or load unless all local, state/provincial and federal regulations have been met and the appropriate utility company's hotline has been contacted to de-energize the lines.



WARNING

You must maintain the minimum distance required, by law, from underground gas, power, telephone and water utilities.



DANGER

A cut fiber optic cable can cause severe eye injury if you look into the damaged end of the cable.

SELECT A PARKING SITE

Whenever possible, park on level ground. If you *must* park on an incline, position the machine across the slope, engage the parking brake, if equipped, and lower the attachment to the ground and block the machine.

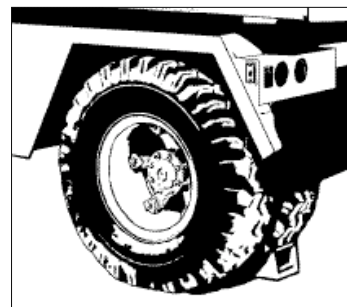
Haul roads are not suitable for parking. If you must park on one—or if your machine is disabled on one—mark the machine with flags in daytime and flares or flashing lights at night, according to federal, state and local regulations.

MACHINE SHUTDOWN

Refer to the appropriate *Owner/Operator Manual* for detailed shutdown procedures. In general, the procedure should include the following:

- Stop the machine using the service brake
- Swing the machine to align upperstructure with the undercarriage
- Engage the swing lock, if equipped
- Lower any attachments or the boom to the ground or place it in a secure position
- Engage the parking brake, if equipped
- Shift controls to “Neutral”/“Park” and if possible lock them
- Idle the engine for a short cool-down period
- Stop the engine

- Cycle all hydraulic controls to relieve system pressure
- Remove the ignition key
- Shut off the master electrical switch (if the machine has one)
- Lock the cab
- When dismounting, always maintain three point contact with the access system and face the machine. Never jump off the machine. And *never* try to dismount a moving machine
- Be careful of slippery conditions on platform, steps, ladders and hand holds when dismounting
- Block the wheels or tracks if the excavator is on a slope



LOADING AND UNLOADING

Not all excavators are loaded onto a trailer the same way. Follow all instructions outlined in the appropriate *Owner/Operator Manual* for your machine.

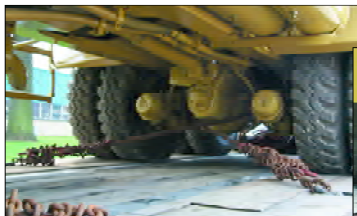
Several precautions are, however applicable to all excavators:

- Know the weight of the machine you are operating
- Know the correct loading and unloading procedures for your machine
- Keep everyone clear of the area
- Load and unload on a level and stable surface
- Block the transport vehicle to prevent it from moving
- Use ramps of adequate size and strength; low angle, and proper height.
- Keep the tires/tracks, trailer bed and ramps clear of mud, oil, ice, snow and all materials which can become slippery
- Engage the swing lock, if equipped
- Back the machine onto the trailer
- Cover or remove the Slow Moving Vehicle emblem
- Chain and block the machine securely
- Secure any boom or attachment in the transport mode.
- Chain machine down using chain of adequate size.

Know the overall height and combined width of the transporter and machine to avoid overhead and narrow obstructions.

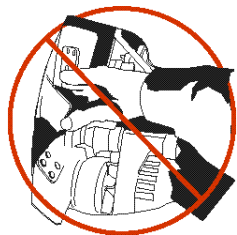
LIFTING AN EXCAVATOR

For lifting instructions and machine weight consult your Machine's Serial Number Plate, Owner/Operator's Manual and/or Gradall Distributor.



**WARNING**

Keep clear of all rotating components. Wrapping or entanglement may result in serious injury or death.

**GENERAL MAINTENANCE SAFETY CONSIDERATIONS**

Do not perform any work on a machine unless you are authorized and qualified to do so. If you have been authorized to do maintenance, Read all applicable *Service* and *Owner/Operator Manuals*. Study the instructions; check the lubrication charts; examine all the warnings and instruction messages on the machine. Maintenance can be dangerous unless performed properly. Be sure you have the necessary skill, information, correct tools and equipment to do the job correctly.

Attach a "Do Not Operate" tag or similar warning tag to the steering controls before performing maintenance on the machine. If the engine should not be started, remove the ignition key.

PREPARE THE WORK AREA

Choose a clean level work area. Make sure you have sufficient room. Check clearances. Make certain there is adequate light and ventilation.

Clean the walking and working surfaces. Remove oil, grease, and water to eliminate slippery areas. Put sand or other absorbent material on slippery areas.

PREPARE YOURSELF

Wear all the protective clothing the job requires. Wear a rubber apron and rubber gloves when working with corrosive materials. Wear gloves and safety shoes when handling wooden blocks, wire rope or sharp-edged metal.

Always wear safety glasses, goggles or a face shield when working with fluids under pressure, while grinding, while servicing batteries, and where there is any possibility of injury from flying debris. Wear a face-shield when you disassemble spring loaded components. Wear a helmet or goggles with special lenses when you weld or cut with a torch.

Do not sand, grind, flame-cut, braze or weld without a NIOSH / MSHA approved respirator or appropriate ventilation. If you are welding on the machine, refer to the *Service Manual* and *Owner/Operator Manual* for instructions.

Keep hands—and clothing—away from all moving parts. Don't tempt fate with dangling ties, loose sleeves, rings or long hair. Keep pockets free of all objects which could fall out, and into the machinery.

**WARNING**

Handle tools and heavy parts carefully, with regard to yourself and other persons. Lower items, don't drop them.

Always use a safety platform (steps, ladders, etc) to service those areas which are slippery or too high reach and where surfaces of the machine cannot support your weight.

PREPARE THE MACHINE

Locate the machine on a level surface. Stop the engine, release all hydraulic pressure. (See Machine Shutdown, page 6.0) Block all hydraulically operated attachments (if they must be in a raised position). Place all controls in "Neutral" and block the wheels/tracks.



WARNING

NEVER work on machinery with the engine running unless you are specifically instructed to do so by the *Service or Owner/Operator Manual*.

NEVER operate any type of engine without proper ventilation – Exhaust fumes can kill.

- If it is necessary to run an engine in an enclosed area, ventilate the exhaust fumes with an exhaust pipe extension. If you do not have an exhaust pipe extension, make sure you open the doors and get outside air into the area. Unless the swing function is required, you must engage the swing lock, if equipped, before performing any maintenance.
- If adjustments must be made with the engine running, always work as a 2-person team, with one person sitting in the operator's seat while the other works on the machine. Know what each person is supposed to be doing at all times. Activate controls slowly and only when directed.

- Remove only guards or covers that provide access. Wipe away excess grease and oil.
- Never leave guards off or access doors open with the machine unattended. Keep bystanders away if access doors are open.
- Make certain all guards, screens or panels, and safety signs are re-installed on the machine.

When servicing an air conditioning system, refer to the freon container for proper use. Use a recovery and recycling system to avoid venting the freon to the atmosphere. Contact with the freon stream can cause severe frost burns.

COMPLETE ALL SERVICES AND REPAIRS BEFORE OPERATING THE MACHINE



WARNING

Inspect all parts during repair and replace if worn, cracked or damaged. Excessively worn or damaged parts can fail and cause injury or death. Replace any damaged or illegible decals.

Tighten all bolts, fittings, and connections to torque specified in the Owner/Operator Manual.

Install all guards, covers, and shields after servicing. Replace or repair if damaged. Refill and recharge pressurized systems only with Gradall approved fluids.

Start the engine and check for leaks. Operate all controls to make sure the machine is functioning properly. Road test the machine if necessary. After testing, shut down, check the work you performed. Re-check all fluid levels before releasing the machine for operation.

DRAIN AIR TANKS DAILY

Drain tanks daily. In cold weather, it is especially important that the air tank(s) be thoroughly drained at least once per shift. Be sure the drain is closed before starting the engine.

USE JACKS AND HOISTS CAREFULLY

If you must work beneath raised equipment, always use wood (NOT CONCRETE) blocks, jack-stands or other rigid and stable supports. When using jacks and hoists, be sure they are adequately supported.



WARNING

Never use concrete blocks for supports. They can collapse under even light loads.

Make sure the hoists and jack stands you use are in good repair. Never use jack stands with cracked, bent or twisted parts. Never use frayed, twisted or pinched cables. Never use bent or distorted hooks.

BRAKE SAFETY TIPS

Carefully follow instructions in the *Service* and *Owner/Operator Manuals* when adjusting brakes. Improperly adjusted brakes could cause a serious accident.



WARNING

On crawler mounted machines, block the tracks before releasing the park brake, if possible. Otherwise, the excavator may roll.

HYDRAULIC SYSTEM HAZARDS

The hydraulic system may be under pressure whenever the engine is running and may hold pressure even after shutdown. Block the cylinders and equipment securely before working on the hydraulic system.

Cycle all hydraulic functions, steering and other controls after shutdown to relieve system pressure. For pilot-actuated systems, follow the instructions in the *Owner/Operator* and *Service Manuals* to relieve the pressure. When venting or filling the hydraulic system, loosen the filler cap slowly and remove it gradually. If the system is equipped with an accumulator, see the *Service Manual* for discharge and recharge instructions.

Keep all open flames away from the hydraulic system.

Clean up spilled fluid immediately.



WARNING

Before loosening any hydraulic fitting be sure there is no trapped hydraulic pressure.

Diesel fuel or hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness or death. Fluid leaks under pressure may not be easily visible. Use a piece of cardboard or wood to find leaks but do not use your bare hand. Wear a face shield or safety goggles for eye protection. If any fluid is injected into the skin, **seek medical attention immediately!**

COOLING SYSTEM HAZARDS

Liquid cooling systems build up pressure as the engine gets hot. Before removing the radiator cap, stop the engine and let the system cool. Remove the radiator cap only after the coolant is cold using a heavy rag for protection.



WARNING

For cooling systems with an overflow tank, the coolant can usually be checked at the tank without removal of the radiator cap.

ELECTRICAL SYSTEM HAZARDS

Disconnect the battery before working on the electrical system. Remove the ground cable first. When re-connecting the battery, connect the ground cable last.

Never work on the electrical system unless you are thoroughly familiar with system details and the special handling required.

AVOID BATTERY HAZARDS**WARNING**

Lead-acid batteries contain sulfuric acid which will damage eyes or skin on contact. Always wear a face shield to avoid acid in eyes. If acid contacts eyes, flush immediately with clean water and get medical attention. Wear rubber gloves and protective clothing to keep acid off skin, wash off immediately with clean water, then seek medical attention.

Lead-acid batteries produce flammable and explosive gasses. Keep arcs, sparks, flames and lighted tobacco away. Use a flashlight to check battery electrolyte level. Always check with the engine stopped.

**WARNING**

For a sealed battery, a bulged end indicates that the battery is frozen. Do not charge a battery or jump-start the engine if the battery is frozen. Warm to 60°F (15°C) or the battery may explode.

AVOID FIRE AND EXPLOSION HAZARDS

Stop the engine and shut off the electrical equipment while filling the fuel tank. Use extra caution when fueling a hot engine. Always ground the fuel nozzle against the filler neck to avoid any sparks.

**WARNING**

Never smoke while handling fuel or working on the fuel system. The fumes in an empty fuel container are explosive. Never cut or weld on fuel lines, tanks or containers.

Handle all solvents and dry chemicals according to procedures identified on manufacturers' containers. Work in a well ventilated area. Make sure you know where fire extinguishers are kept and how to use them.

Remove all trash or debris from the machine. Make sure that oily rags or other flammable material are removed from the machine.

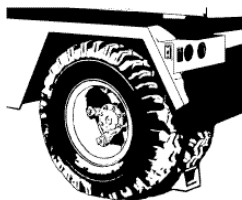
Check for fuel, oil or hydraulic fluid leaks. Repair the leaks and clean the machine before you operate it.

Ether is flammable. Do not smoke when using ether. Always follow the instructions on the ether can and in the *Owner/Operator Manual* for your machine. Do not use ether if the engine is equipped with a glow plug or other type of preheater. Always use a nonflammable solvent when you clean parts. Do not use gasoline, diesel fuel or other flammable fluid.

Store all flammable fluids and materials away from your work area in suitable containers, per local regulations.



Check the readiness of all fire extinguishers, fire suppression systems and fire detectors.



TIRE MAINTENANCE

Check your tires and wheels every day. The stability of the excavator is dramatically reduced by improperly inflated tires.

Check tires for:

- Correct inflation pressure
- Cuts or bulges
- Nails or other punctures
- Uneven or excessive wear
- Condition of valve stems and caps

Check wheels for:

- Damage to the rims
- Missing or loose lug nuts or bolts
- Obvious misalignment

TIRE AND WHEEL HAZARDS

Changing tires is **DANGEROUS**. All tire service should be performed by a qualified tire service center or by an authorized person that has been properly trained in the procedures and use of safety equipment designed for tire servicing. The wheels and tires installed on Gradall Excavators require special care and professional attention. Here are some important factors to remember:

- Always maintain the proper tire pressure. **NEVER** over-inflate a tire as it could explode
- **NEVER** reinflate a tire that has been run flat or seriously under-inflated without removing the tire from the wheel. Have the tire and wheel closely inspected for damage before remounting
- Clean the area around all wheel lug nuts or bolts and periodically check the torque per Gradall specifications. After torque has stabilized at the proper rated value, check at regularly scheduled intervals
- **NEVER** weld on a Gradall wheel
- Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.
- Inspect tires and wheels daily. Do not operate with low pressure, cuts, bubbles, damaged rims or missing lug nuts or bolts
- Never cut or weld the rim or rim parts. This could cause explosive decompression

- An increase in tire pressure during operation is normal. It should **NOT** be reduced. High speeds during transport may produce excessive tire pressure due to heat. **REDUCE YOUR SPEED** or stop and let the tires cool down.
- When adjusting tire pressure, do so from a distance. Use a long hose with self-attaching chuck. Always stand behind the tread when adjusting tire pressure. Be sure the area to the side of the tire is clear of other people.
- Do not inflate tires with flammable gasses or from a system utilizing an alcohol injector.

Explosive separation of a tire and/or rim parts can cause serious injury or death. Always follow the manufacturer's recommendations or see your tire supplier.

TRACK MAINTENANCE

Maintain proper track tension. When operating in mud, snow, etc., material will stick to the track parts and cause the tracks to become too tight. Refer to the *Service Manual* and/or *Owner/Operator Manual*.



WARNING

The pins and bushing in a dry joint can become very hot. Wear gloves to prevent burns.

Check tracks for loose, bent or broken track shoes and bolts, worn or damaged pins and bushings. Check the carrier and idler rollers.



WARNING

Never strike or pound on track tension springs; they may be under tremendous compression and could shatter explosively.

SPECIAL NOTE: ASBESTOS

Some machines (especially older ones) may have components containing asbestos in friction and gasket materials. These precautions pertain to these machines.

Avoid exposure to asbestos dust.

**CAUTION**

Extreme caution must be used to avoid breathing dust that may be generated when handling components containing asbestos fibers. If this dust is inhaled, it can be hazardous to your health. Components that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates and some gaskets. The asbestos used in new components is bound in a resin or sealed. Normal handling is usually not hazardous as long as airborne dust which contains asbestos is not generated.

If dust which may contain asbestos is present, there are several common sense guidelines that should be followed:

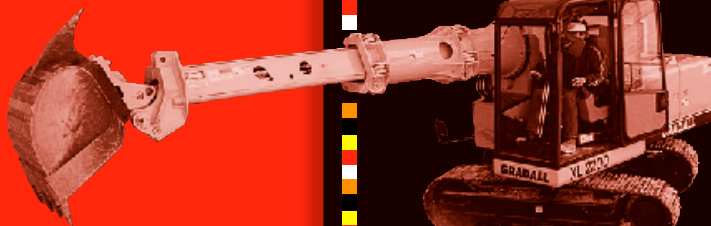
1. Never use compressed air for cleaning (such as blowing out brakes prior to repair).
2. Avoid brushing or grinding of asbestos containing materials.
3. For clean up, use wet methods or a vacuum equipped with a High Efficiency Particulate Air (HEPA) filter.
4. Use exhaust ventilation on permanent machine installations.
5. Wear an approved respirator.
6. Comply with applicable rules and regulations for the work place (for example in the U.S.A., OSHA requirements as set forth in 29 CFR 1926.58).
7. Follow environmental rules and regulations for disposal of asbestos.
8. Avoid areas where asbestos particles may be in the air.
9. Shower after any contact.
10. Store food, drink and personal belongings away from the work area.
11. Never eat, drink or smoke where asbestos is in the area.

NOW THAT YOU HAVE READ THIS SAFETY MANUAL, DO YOU UNDERSTAND . . .

- Your safety program?
- The *Owner/Operator Manual* for the particular machine you are operating.
- Proper clothing and personal safety equipment?
- The excavator controls, warning signs, devices, and safety equipment?
- How to properly inspect, mount, and start the excavator?
- How to check the excavator for proper operation?
- The work area and special hazards that may exist?
- Proper operating procedures?
- Operating safety precautions?
- Proper loading and unloading procedures for transporting?
- Under what conditions you should not operate the excavator?
- Proper parking, shutdown, and dismounting procedures?
- Proper maintenance procedures?

A FINAL WORD TO THE USER

You have just finished reading the Gradall Hydraulic Excavator Safety Manual. It is impossible for this Manual to cover every hazardous situation you may encounter. But, your knowledge of these safety precautions and your compliance with the basic rules of safety will help build good judgement. Our objective is to help you develop good safety habits and make you a safer Hydraulic Excavator Operator.



GRADALL® Hydraulic Excavators

406 Mill Ave. SW, New Philadelphia, Ohio 44663 USA
Phone (330) 339-2211 Fax (330) 339-8468
www.gradall.com



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