

# Technical Manual

EX33Mu, 58Mu

# INTRODUCTION

## TO THE READER

- This manual is written for an experienced technician to provide technical information needed to maintain and repair this machine.

- Be sure to thoroughly read this manual for correct product information and service procedures.
- If you have any questions or comments regarding the contents of this manual.

- Two types of manual are available. One is Technical Manual(T/M). The other is Workshop Manual(W/M).

Use the manuals according to purpose.

- Information included in the T/M:  
technical information needed for redelivery and delivery, operation and activation of all devices and systems, operational performance tests, and troubleshooting procedures.

Please contact using "Service Manual Revision Request Form" at the end of this manual.  
(Note: Do not tear off the form. Copy it for usage.):

Publications Marketing & Product Support  
Hitachi Construction Machinery Co. Ltd.  
TEL: 81-298-32-7173  
FAX: 81-298-31-1162

- Information included in the W/M:  
technical information needed for maintenance and repair of the machine, tools and devices needed for maintenance and repair, maintenance standards, and removal/installation and assemble/disassemble procedures.

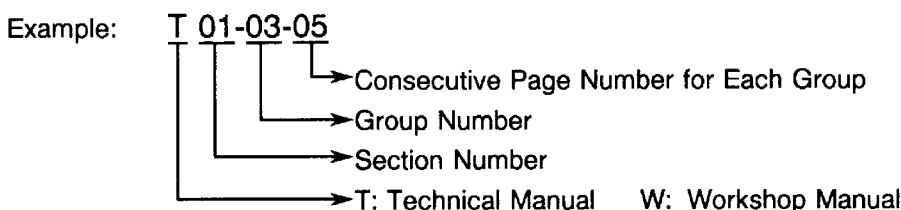
## ADDITIONAL REFERENCES

- Please refer to the materials listed below in addition to this manual.

- The Operator's Manual
- The Parts Catalog
- Operation Manual of the Engine
- Parts Catalog of the Engine
- Hitachi Training Material

## PAGE NUMBER


- Each page has a number, located on the center lower part of the page, and each number contains the following information:



## INTRODUCTION

### SAFETY ALERT SYMBOL AND HEADLINE NOTATIONS


In this manual, the following safety alert symbol and signal words are used to alert the reader to the potential for personal injury or machine damage.

 This is the safety alert symbol. When you see this symbol, be alert to the potential for personal injury.

Never fail to follow the safety instructions prescribed along with the safety alert symbol.

The safety alert symbol is also used to draw attention to component/part weights.

To avoid injury and damage, be sure to use appropriate lifting techniques and equipment when lifting heavy parts.

-  **CAUTION:** indicated a potentially hazardous situation which could, if not avoided, result in personal injury or death.
- **IMPORTANT:** indicates a situation which, if not conformed to the instructions, could result in damage to the machine.
- **NOTE:** indicates supplementary technical information or know-how.

### UNITS USED

- SI Units (International System of Units) are used in this manual.

MKSA system units and English units are also indicated in parentheses just behind SI units.

Example: 24.5 MPa ( 250 kgf/cm<sup>2</sup>, 3 560 psi )

A table for conversion from SI units to other system units is shown below for reference purposes.

Quantity	To Convert From	Into	Multiply By	Quantity	To Convert From	Into	Multiply By
Length	mm	in	0.039 37	Pressure	MPa	kgf/cm <sup>2</sup>	10.197
	mm	ft	0.003 281		MPa	psi	145.0
Volume	L	US gal	0.264 2	Power	kW	PS	1.360
	L	US qt	1.057		kW	HP	1.341
	m <sup>3</sup>	yd <sup>3</sup>	1.308	Temperature	°C	°F	°C × 1.8 + 32
Weight	kg	lb	2.205	Velocity	km/h	mph	0.621 4
Force	N	kgf	0.101 97		min <sup>-1</sup>	rpm	1.0
	N	lbf	0.224 8	Flow rate	L/min	US gpm	0.264 2
Torque	N·m	kgf·m	1.019 7		mL/rev	cc/rev	1.0
	N·m	lbf·ft	0.737 5				

## SAFETY

### RECOGNIZE SAFETY INFORMATION

- This is the **SAFETY ALERT SYMBOL**.
  - When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.
  - Follow recommended precautions and safe operating practices.



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### UNDERSTAND SIGNAL WORDS

- On machine safety signs, signal words designating the degree or level of hazard – **DANGER**, **WARNING**, or **CAUTION** – are used with the safety alert symbol.
  - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
  - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
  - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
  - **DANGER** or **WARNING** safety signs are located near specific hazards. General precautions are listed on **CAUTION** safety signs.
- **CAUTION** also calls attention to safety messages in this manual.
- To avoid confusing machine protection with personal safety messages, a signal word **IMPORTANT** indicates a situation which, if not avoided, could result in damage to the machine.
- **NOTE** indicates an additional explanation for an element of information.



**IMPORTANT**

**NOTE**

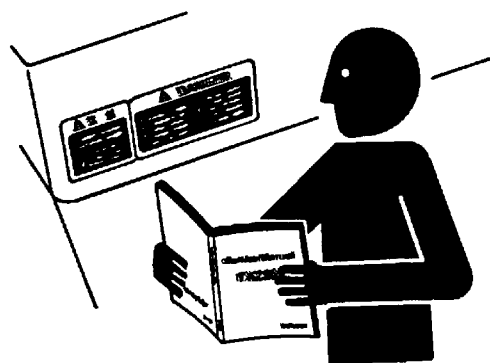
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## SAFETY

### FOLLOW SAFETY INSTRUCTIONS

- Carefully read and follow all safety signs on the machine and all safety messages in this manual.
- Safety signs should be installed, maintained and replaced when necessary.
  - If a safety sign or operator's manual is damaged or missing, replace it with new one.
- Learn how to operate the machine and its controls correctly and safely.
- Allow only trained, qualified, authorized personnel to operate the machine.
- Keep your machine in proper working condition.
  - Unauthorized modifications of the machine may impair its function and/or safety and affect machine life.
- The safety messages in this SAFETY chapter are intended to illustrate basic safety procedures of machines. However it is impossible for these safety messages to cover every hazardous situation you may encounter. If you have any questions, you should first consult your supervisor and/or your authorized dealer before operating or performing maintenance work on the machine.

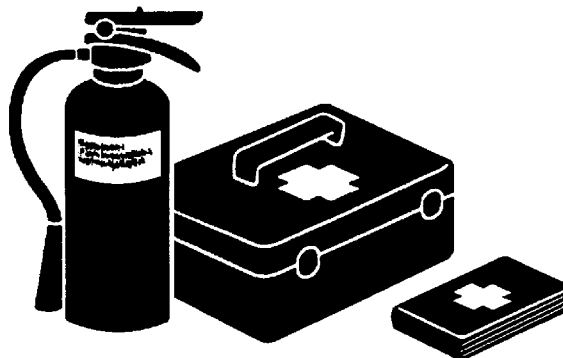


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### PREPARE FOR EMERGENCIES

- Be prepared if a fire starts or if an accident occurs.
  - Keep a first aid kit and fire extinguisher on hand.
  - Thoroughly read and understand the label attached on the fire extinguisher to use it properly.
  - Establish emergency procedure guidelines to cope with fires and accidents.
  - Keep emergency numbers for doctors, ambulance service, hospital, and fire department posted near your telephone.



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# SAFETY

## WEAR PROTECTIVE CLOTHING

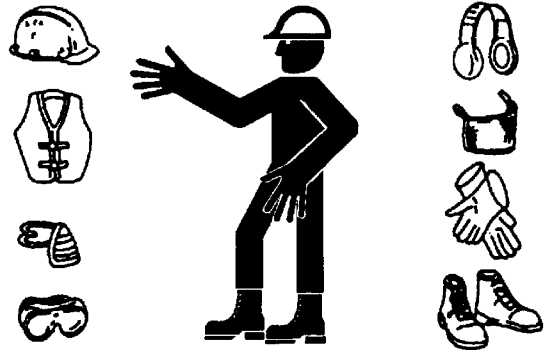
- Wear close fitting clothing and safety equipment appropriate to the job.

You may need:

- A hard hat
- Safety shoes
- Safety glasses, goggles, or face shield
- Heavy gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask.

Be sure to wear the correct equipment and clothing for the job. Do not take any chances.

- Avoid wearing loose clothing, jewelry, or other items that can catch on control levers or other parts of the machine.
- Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



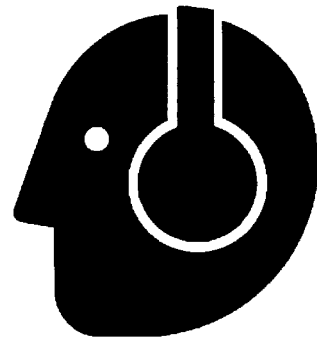
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## PROTECT AGAINST NOISE

- Prolonged exposure to loud noise can cause impairment or loss of hearing.

· Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortably loud noises.



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## INSPECT MACHINE

- Inspect your machine carefully each day or shift by walking around it before you start it to avoid personal injury.

· In the walk-around inspection be sure to cover all points described in the "PRE-START INSPECTION" chapter in the operator's manual.



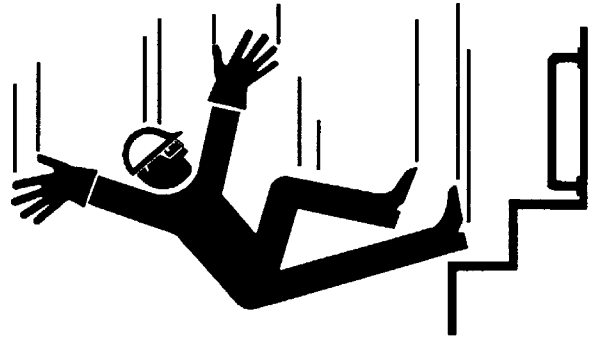
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## SAFETY

### USE HANDHOLDS AND STEPS

- Falling is one of the major causes of personal injury.
  - When you get on and off the machine, always face the machine and maintain a three-point contact with the steps and handrails.
  - Do not use any controls as handholds.
  - Never jump on or off the machine. Never mount or dismount a moving machine.
  - Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.



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### ADJUST THE OPERATOR'S SEAT

- A poorly adjusted seat for either the operator or for the work at hand may quickly fatigue the operator leading to misoperations.
  - The seat should be adjusted whenever changing the operator for the machine.
  - The operator should be able to fully depress the pedals and to correctly operate the control levers with his back against the seat back.
  - If not, move the seat forward or backward, and check again.



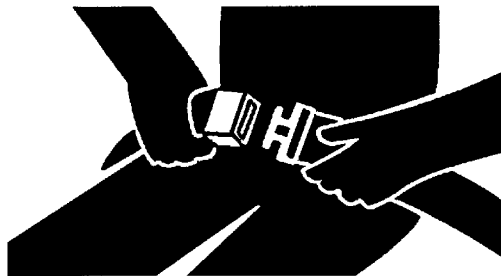
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## SAFETY

### FASTEN YOUR SEAT BELT (IF EQUIPPED)

- If the machine should overturn, the operator may become injured and/or thrown from the cab. Additionally the operator may be crushed by the overturning machine, resulting in serious injury or death.
- Prior to operating the machine, thoroughly examine webbing, buckle and attaching hardware. If any item is damaged or worn, replace the seat belt or component before operating the machine.
- Be sure to remain seated with the seat belt securely fastened at all times when the machine is in operation to minimize the chance of injury from an accident.
- We recommend that the seat belt be replaced every three years regardless of its apparent condition.

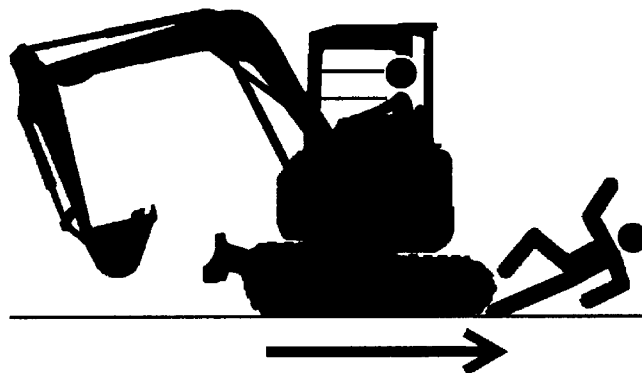


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### MOVE AND OPERATE MACHINE SAFELY

- Bystanders can be run over.
- Take extra care not to run over bystanders. Confirm the location of bystanders before moving, swinging, or operating the machine.
- Always keep the travel alarm and horn in working condition (if equipped). It warns people when the machine starts to move.
- Use a signal person when moving, swinging, or operating the machine in congested areas. Coordinate hand signals before starting the machine.



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## SAFETY

### OPERATE ONLY FROM OPERATOR'S SEAT

- Inappropriate engine starting procedure may cause the machine to runaway, possibly resulting in serious injury or death.
- Start the engine only from the operator's seat.
- NEVER start the engine while standing on the track or on ground.
- Do not start engine by shorting across starter terminals.
- Before starting the engine, confirm that all control levers are in neutral.



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### JUMP STARTING

- Battery gas can explode, resulting in serious injury.
- If the engine must be jump started, be sure to follow the instructions shown in the "OPERATING THE ENGINE" chapter in the operator's manual.
- The operator must be in the operator's seat so that the machine will be under control when the engine starts. Jump starting is a two-person operation.
- Never use a frozen battery.
- Failure to follow correct jump starting procedures could result in a battery explosion or a runaway machine.



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### KEEP RIDERS OFF MACHINE

- Riders on machine are subject to injury such as being struck by foreign objects and being thrown off the machine.
- Only the operator should be on the machine. Keep riders off.
- Riders also obstruct the operator's view, resulting in the machine being operated in an unsafe manner.



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SA-530

## SAFETY

### PROVIDE SIGNALS FOR JOBS INVOLVING MULTIPLE NUMBERS OF MACHINES

- For jobs involving multiple numbers of machines, provide signals commonly known by all personnel involved. Also, appoint a signal person to coordinate the job site. Make sure that all personnel obey the signal person's directions.

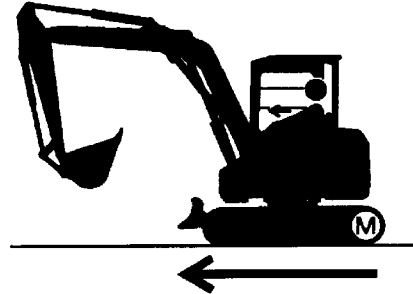


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SA-481

### CONFIRM DIRECTION OF MACHINE TO BE DRIVEN

- Incorrect travel pedal/lever operation may result in serious injury or death.
- Before driving the machine, confirm the position of the undercarriage in relation to the operator's position. If the travel motors are located in front of the cab, the machine will move in reverse when travel pedals/levers are operated to the front.



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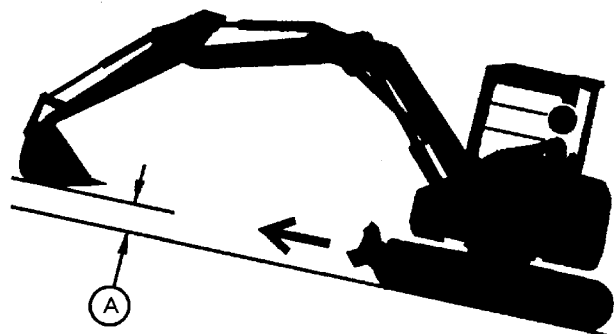
SA-532

# SAFETY

## DRIVE MACHINE SAFELY

- Before moving the machine, confirm which way to move travel pedals/levers for the corresponding direction you wish to go.

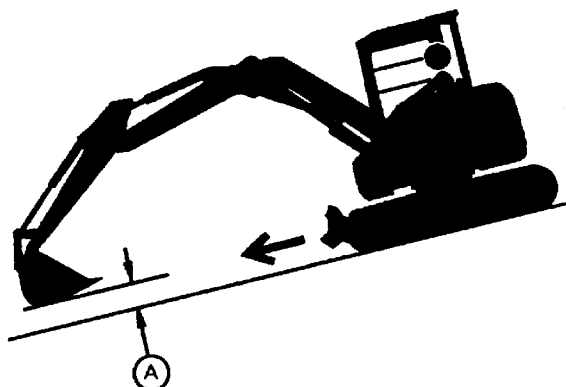
- Pushing down on the front of the travel pedals or pushing the levers forward moves the machine towards the idlers. (Refer to the Steering the Machine Using Pedals/Levers section in the operator's manual for correct travel operation.)



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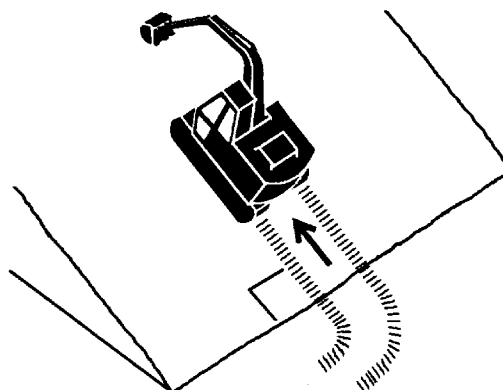
- Traveling on a grade may cause the machine to slip or to overturn, possibly resulting in serious injury or death.

- When traveling up or down a grade, keep the bucket in the direction of travel, approximately 200 to 300 mm ( 8 to 12 in )(A) above the ground.
- If machine starts to skid or becomes unstable, lower the bucket immediately.



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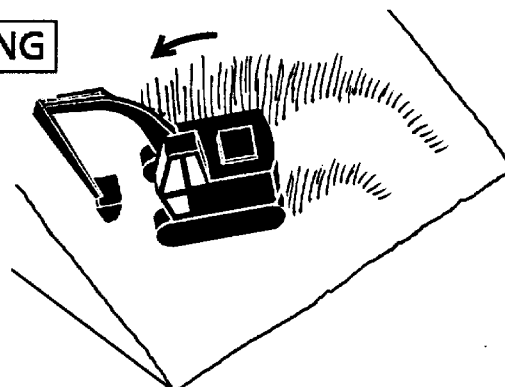
- Traveling across the face of a slope may cause the machine to skid or to turnover. When traveling (ascending/descending) on a slope, be sure to point the tracks uphill/downhill.



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- Turning on an incline may cause the machine to tip over. If turning on an incline is absolutely unavoidable, do so at a place where the slope is gentle and the surface is firm.

**WRONG**



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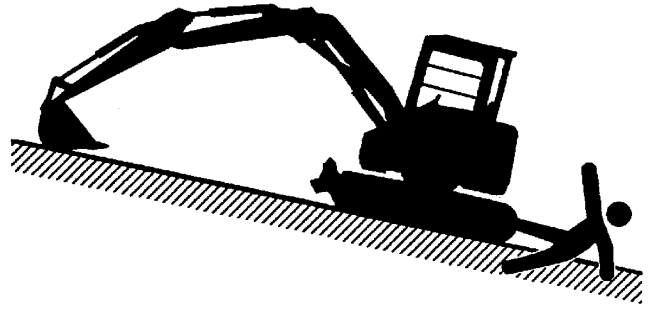
## SAFETY

### AVOID INJURY FROM ROLLAWAY ACCIDENTS

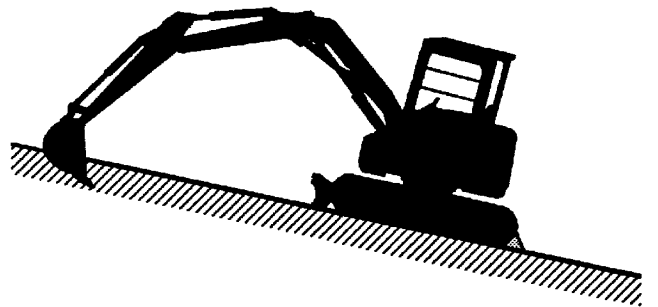
- Death or serious injury may result if you attempt to mount or stop a moving machine.

To avoid rollaways:

- Select level ground when possible to park machine.
- Do not park the machine on a grade.
- Lower the bucket and/or other work tools to the ground.
- Turn the auto-idle switch off (if equipped).
- Run the engine at slow idle speed without load for 5 minutes to cool down the engine.
- Stop the engine and remove the key from the key switch.
- Pull the pilot control shut-off lever to LOCK position.
- Block both tracks and lower the bucket to the ground. Thrust the bucket teeth into the ground if you must park on a grade.
- Position the machine to prevent rolling.
- Park a reasonable distance from other machines.



SA-535



SA-536

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## SAFETY

### AVOID INJURY FROM BACK-OVER AND SWING ACCIDENTS

- If any person is present near the machine when backing or swinging the upperstructure, the machine may hit or run over that person, resulting in serious injury or death.

To avoid back-over and swing accidents:

- Always look around **BEFORE YOU BACK UP AND SWING THE MACHINE**. BE SURE THAT ALL BYSTANDERS ARE CLEAR.

- Keep the travel alarm in working condition (if equipped).

**ALWAYS BE ALERT FOR BYSTANDERS MOVING INTO THE WORK AREA. USE THE HORN OR OTHER SIGNAL TO WARN BYSTANDERS BEFORE MOVING MACHINE.**

- USE A SIGNAL PERSON WHEN BACKING UP IF YOUR VIEW IS OBSTRUCTED. ALWAYS KEEP THE SIGNAL PERSON IN VIEW.

Use hand signals, which conform to your local regulations, when work conditions require a signal person.

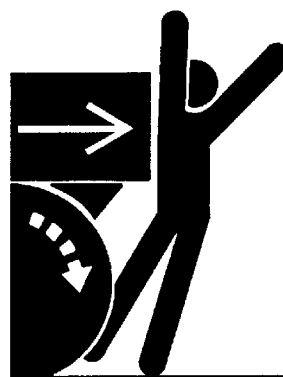
- No machine motions shall be made unless signals are clearly understood by both signalman and operator.

- Learn the meanings of all flags, signs, and markings used on the job and confirm who has the responsibility for signaling.

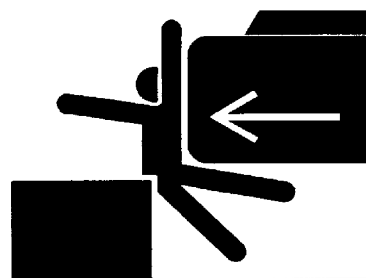
- Keep windows, mirrors, and lights clean and in good condition.

- Dust, heavy rain, fog, etc., can reduce visibility. As visibility decreases, reduce speed and use proper lighting.

- Read and understand all operating instructions in the operator's manual.



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SA-384

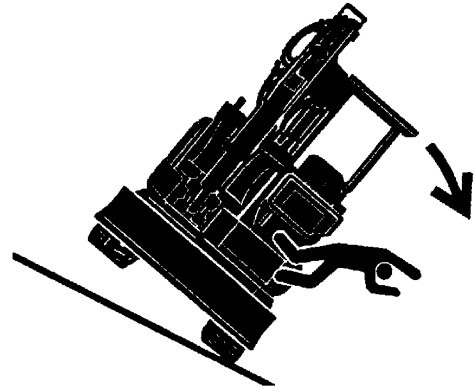
# SAFETY

## AVOID TIPPING

- DO NOT ATTEMPT TO JUMP CLEAR OF TIPPING MACHINE---SERIOUS OR FATAL CRUSHING INJURIES WILL RESULT
- MACHINE WILL TIP OVER FASTER THAN YOU CAN JUMP FREE
- FASTEN YOUR SEAT BELT
- The danger of tipping is always present when operating on a grade, possibly resulting in serious injury or death.

To avoid tipping:

- Be extra careful before operating on a grade.
  - Prepare machine operating area flat.
  - Keep the bucket low to the ground and close to the machine.
  - Reduce operating speeds to avoid tipping or slipping.
  - Avoid changing direction when traveling on grades.
  - NEVER attempt to travel across a grade steeper than 15 degrees if crossing the grade is unavoidable.
  - Reduce swing speed as necessary when swinging loads.
- Be careful when working on frozen ground.
  - Temperature increases will cause the ground to become soft and make ground travel unstable.

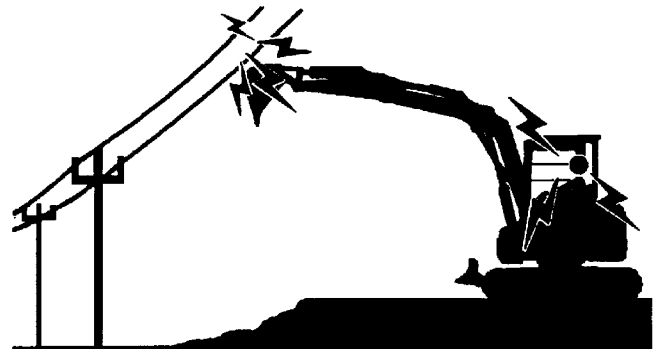


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## AVOID POWER LINES

- Serious injury or death can result if the machine or front attachments are not kept a safe distance from electric lines.
  - When operating near an electric line, NEVER move any part of the machine or load closer than 3 m (10 ft) plus twice the line insulator length.
  - Check and comply with any local regulations that may apply.
  - Wet ground will expand the area that could cause any person on it to be affected by electric shock. Keep all bystanders or co-workers away from the site.



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## SAFETY

### OBJECT HANDLING

- If a lifted load should fall, any person nearby may be struck by the falling load or may be crushed underneath it, resulting in serious injury or death.
- When using the machine for craning operations, be sure to comply with all local regulations.
- Do not use damaged chains or frayed cables, cables, slings, or ropes.
- Before craning, position the upperstructure with the travel motors at the rear.
- Move the load slowly and carefully. Never move it suddenly.
- Keep all persons well away from the load.
- Never move a load over a person's head.
- Do not allow anyone to approach the load until it is safely and securely situated on supporting blocks or on the ground.
- Never attach a sling or chain to the bucket teeth. They may come off, causing the load to fall.

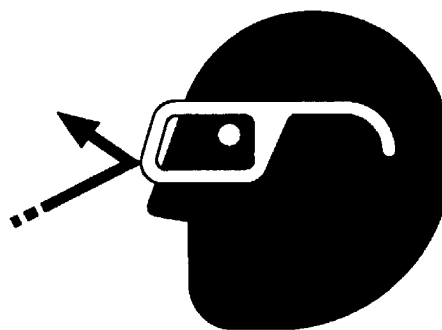


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### PROTECT AGAINST FLYING DEBRIS

- If flying debris hit eyes or any other part of the body, serious injury may result.
- Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.
- Keep bystanders away from the working area before striking any object.



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SA-432

## SAFETY

### PARK MACHINE SAFELY

To avoid accidents:

- Park machine on a firm, level surface.
- Lower bucket and/or other work tools to the ground.
- Turn auto-idle switch off (if equipped).
- Run engine at slow idle speed without load for 5 minutes.
- Turn key switch to OFF to stop engine.
- Remove the key from the key switch.
- Pull the pilot control shut-off lever to the LOCK position.
- Close windows, roof vent, and cab door.
- Lock all access doors and compartments.



SA-545

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### HANDLE FLUIDS SAFELY – AVOID FIRES

- Handle fuel with care; it is highly flammable. If fuel ignites, an explosion and/or a fire may occur, possibly resulting in serious injury or death.
  - Do not refuel the machine while smoking or when near open flame or sparks.
  - Always stop the engine before refueling the machine.
  - Fill the fuel tank outdoors.
- All fuels, most lubricants, and some coolants are flammable.
  - Store flammable fluids well away from fire hazards.
  - Do not incinerate or puncture pressurized containers.
  - Do not store oily rags; they can ignite and burn spontaneously.



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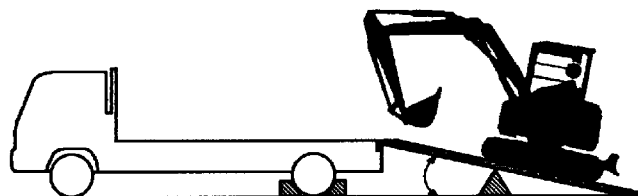


# SAFETY

## SAFETY TRANSPORTING

- The danger of tipping is present when loading/unloading the machine onto/from a truck or trailer bed.

- Be sure to observe local regulations when transporting the machine on public roads.
- Provide an appropriate truck or trailer for transporting the machine.



Take the following precautions when loading/unloading the machine:

- 1) Select firm level ground.
- 2) Be sure to use a loading dock or ramp.
- 3) Be sure to have a signal person when loading/unloading the machine.
- 4) Always turn the auto-idle switch OFF (if equipped) when loading or unloading the machine, to avoid unexpected speed increase due to unintentional operation of a control lever.
- 5) Be sure to load/unload the machine at slow speed.
- 6) Avoid steering while driving up or down the ramp as it is extremely dangerous. If steering is unavoidable, first move back to the ground or flatbed, modify traveling direction, and begin to drive again.
- 7) Do not operate any levers besides the travel levers when driving up or down the ramp.
- 8) The top end of the ramp where it meets the flatbed is a sudden bump. Take care when traveling over it.
- 9) Prevent possible injury from machine tipping while the upperstructure is rotating.
- 10) Keep the arm tucked under and rotate the upperstructure slowly for best stability.
- 11) Securely fasten chain or cables to the machine frame. Refer to "transporting" chapter in the operator's manual for details.

SA-546

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# SAFETY

## PRACTICE SAFE MAINTENANCE

To avoid accidents:

- Understand service procedures before doing work.
- Keep work area clean and dry.
- Do not spray water or steam inside cab.
- Never lubricate or service the machine while it is moving.
- Keep hands, feet and clothing away from power-driven parts.
  
- Before servicing the machine:
  - 1) Park the machine on a firm, level surface.
  - 2) Lower the bucket and/or other work tools to the ground.
  - 3) Turn the auto-idle switch off (if equipped).
  - 4) Run the engine at slow idle speed without load for 5 minutes.
  - 5) Turn the key switch to OFF to stop engine.
  - 6) Relieve the pressure in the hydraulic system by moving the control levers several times.
  - 7) Remove the key from the switch.
  - 8) Attach a "Do Not Operate" tag on the control lever.
  - 9) Pull the pilot control shut-off lever to the LOCK position.
  - 10) Allow the engine to cool.
  
- If a maintenance procedure must be performed with the engine running, do not leave machine unattended.
- If the machine must be raised, maintain a 90 to 110° angle between the boom and arm. Securely support any machine elements that must be raised for service work.
- Never work under a machine raised by the boom.
- Inspect certain parts periodically and repair or replace as necessary. Refer to the section discussing that part in the "MAINTENANCE" chapter in the operator's manual.
- Keep all parts in good condition and properly installed.
- Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.
- Disconnect battery ground cable (-) before making adjustments to electrical systems or before welding on the machine.
- Illuminate your work area adequately but safely.
- Use a portable safety light for working inside or under the machine.
- Make sure that the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



SA-028



SA-527



SA-037

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## SAFETY

### WARN OTHERS OF SERVICE WORK

- Unexpected machine movement can cause serious injury.
- Before performing any work on the machine, attach a "Do Not Operate" tag on the control lever.



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SA-287

### SUPPORT MACHINE PROPERLY

- Never attempt to work on the machine without securing the machine first.
- Always lower the attachment to the ground before you work on the machine.
- If you must work on a lifted machine or attachment, securely support the machine or attachment. Do not support the machine on cinder blocks, hollow tires, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack.

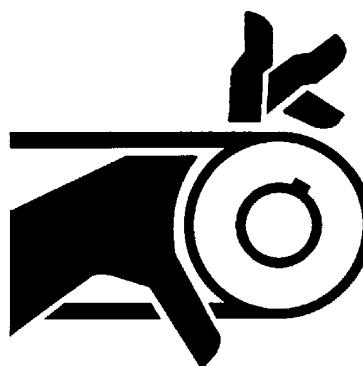


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### STAY CLEAR OF MOVING PARTS

- Entanglements in moving parts can cause serious injury.
- To prevent accidents, care should be taken to ensure that hands, feet, clothing, jewelry and hair do not become entangled when working around rotating parts.



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SA-026

## SAFETY

### USE TOOLS PROPERLY

- Use tools appropriate for the work to be done.
  - Makeshift tools, parts, and procedures can create safety hazards.
  - For loosening and tightening hardware, use the correct size tools to avoid injury caused by slipping wrenches.
  - Use only recommended replacement parts. (See the parts catalog.)



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### PREVENT PARTS FROM FLYING

- Grease in the track adjuster is under high pressure. Failure to follow the precautions below may result in serious injury, blindness, or death.
  - Do not attempt to remove GREASE FITTING or VALVE ASSEMBLY.
  - As pieces may fly off, be sure to keep body and face away from valve.
- Travel reduction gears are under pressure.
  - As pieces may fly off, be sure to keep body and face away from AIR RELEASE PLUG to avoid injury. GEAR OIL is hot.
  - Wait for GEAR OIL to cool, then gradually loosen AIR RELEASE PLUG to release pressure.

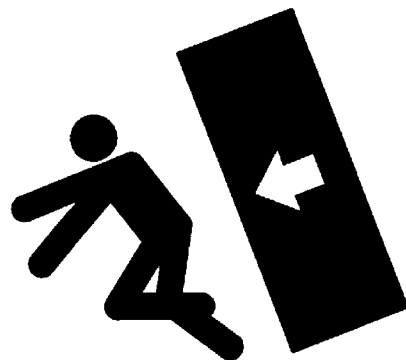


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### STORE ATTACHMENTS SAFELY

- Stored attachments such as buckets, hydraulic hammers, and blades can fall and cause serious injury or death.
  - Securely store attachments and implements to prevent falling. Keep children and bystanders away from storage areas.



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