

PART NO. TT8R8-E-02

HITACHI

Technical Manual

Troubleshooting

EH

3500ACII

Rigid Dump Truck

EH3500ACII RIGID DUMP TRUCK TECHNICAL MANUAL TROUBLESHOOTING

 **Hitachi Construction Machinery**

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Service Manual consists of the following separate Part No.
Technical Manual (Operational Principle) : Vol. No.TO8R8-E
Technical Manual (Troubleshooting) : Vol. No.TT8R8-E
Workshop Manual : Vol. No.W8R8-E

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, at if you found any errors regarding the contents of this manual, 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.):
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ADDITIONAL REFERENCES

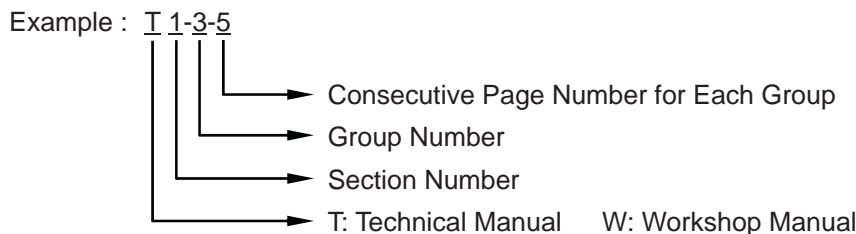
- Please refer to the other materials (operator's manual, parts catalog, engine technical material and Hitachi training material etc.) in addition to this manual.

MANUAL COMPOSITION

- This manual consists the Technical Manual and the Workshop Manual.
- Information included in the Technical Manual: technical information needed for redelivery and delivery, operation and activation of all devices and systems, operational performance tests, and troubleshooting procedures.
- Information included in the Workshop Manual: 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.

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 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/cm², 3560 psi)

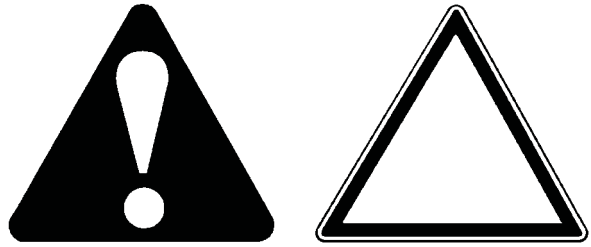
A table for conversion from SI units to other system units is shown below for reference purposes.

Quantity	To Convert From	Into	Multiply By	Quantity	To Convert From	Into	Multiply By
Length	mm	in	0.03937	Pressure	MPa	kgf/cm ²	10.197
	mm	ft	0.003281		MPa	psi	145.0
Volume	L	US gal	0.2642	Power	kW	PS	1.360
	L	US qt	1.057		kW	HP	1.341
	m ³	yd ³	1.308	Temperature	°C	°F	°C×1.8+32
Weight	kg	lb	2.205	Velocity	km/h	mph	0.6214
Force	N	kgf	0.10197		min ⁻¹	rpm	1.0
	N	lbf	0.2248	Flow rate	L/min	US gpm	0.2642
Torque	N·m	kgf·m	0.10197		mL/rev	cc/rev	1.0
	N·m	lbf·ft	0.7375				

SAFETY

RECOGNIZE SAFETY INFORMATION

- These are the **SAFETY ALERT SYMBOLS**.
 - When you see these symbols on your machine or in this manual, be alert to the potential for personal injury.
 - Follow recommended precautions and safe operating practices.



001-E01A-0001

SA-688

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.
 - Some safety signs don't use any of the designated signal words above after the safety alert symbol are occasionally used on this machine.



IMPORTANT



SA-1223

- 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.

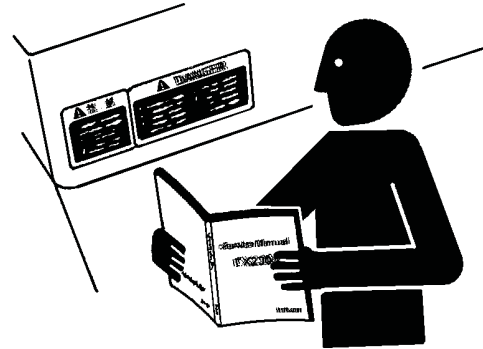
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SAFETY

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 this manual is damaged or missing, order a replacement from your authorized dealer in the same way you order other replacement parts (be sure to state machine model and serial number when ordering).
- 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.

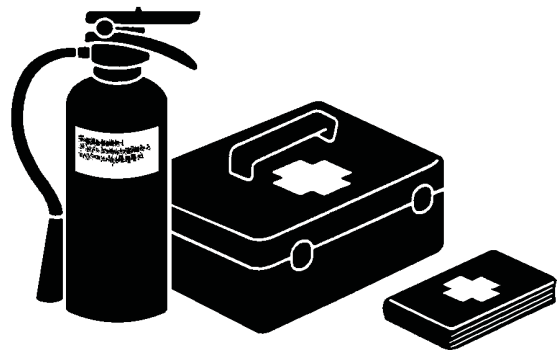
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SA-003

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.
 - To ensure that a fire-extinguisher can be always used when necessary, check and service the fire-extinguisher at the recommended intervals as specified in the fire-extinguisher manual.
- 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.



SA-437

004-E01A-0437

SAFETY

WEAR PROTECTIVE CLOTHING

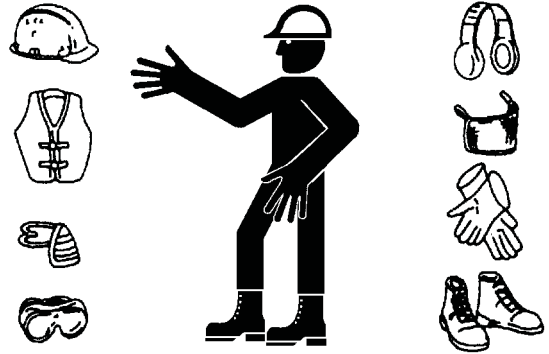
- Wear close fitting clothing and safety equipment appropriate to the job.

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 the machine.



SA-438

005-E01A-0438

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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SA-434

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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SA-435

SAFETY

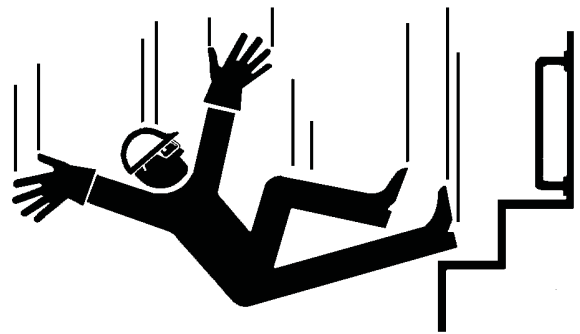
GENERAL PRECAUTIONS FOR CAB

- Before entering the cab, thoroughly remove all dirt and/or oil from the soles of your work boots. If any controls such as a pedal is operated while with dirt and/or oil on the soles of the operator's work boots the operator's foot may slip off the pedal, possibly resulting in a personal accident.
- Don't leave parts and/or tools lying around the operator's seat. Store them in their specified locations.
- Avoid storing transparent bottles in the cab. Do not attach any transparent type window decorations on the windowpanes as they may focus sunlight, possibly starting a fire.
- Refrain from listening to the radio, or using music headphones or mobile telephones in the cab while operating the machine.
- Keep all flammable objects and/or explosives away from the machine.
- After using the ashtray, always cover it to extinguish the match and/or tobacco.
- Do not leave cigarette lighters in the cab. When the temperature in the cab increases, the lighter may explode.

524-E01A-0000

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.
 - Do not step or climb on surfaces, which are not intended for walking. Step only on the areas provided with the slip resistant surfaces.



SA-439

008-E01A-0439

SAFETY

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 steering wheel with his back against the seat back.
- If not, move the seat forward or backward, and check again.
- Adjust the mirror position so that the best rear visibility is obtained from the operator's seat. If the mirror is broken, immediately replace it with a new one.



SA-462

009-E01A-0378

FASTEN YOUR SEAT BELT

- 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.



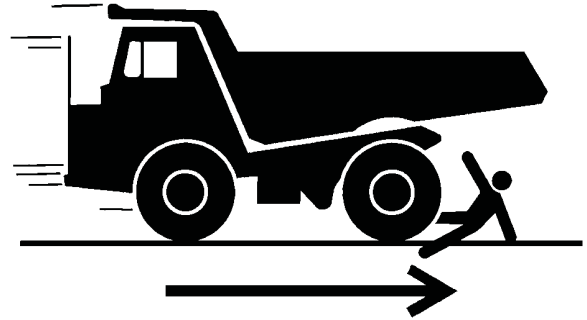
SA-237

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SAFETY

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, 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, or operating the machine in congested areas. Coordinate hand signals before starting the machine.
 - Use appropriate illumination. Check that all lights are operable before operating the machine. If any faulty illumination is present, immediately repair it.
 - Always keep the cab door closed while operating the machine.



SA-1598

011-E01A-0426

HANDLE STARTING AIDS SAFELY

Starting fluid:

- Starting fluid is highly flammable.
 - Keep all sparks and flame away when using it.
 - Keep starting fluid well away from batteries and cables.
 - Remove container from machine if engine does not need starting fluid.



SA-293

SAFETY

OPERATE ONLY FROM OPERATOR'S SEAT

- Inappropriate engine starting procedures 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 platform.
 - Do not start engine by shorting across starter terminals.
 - Before starting the engine, confirm that shift lever and hoist lever are in neutral.
 - Before starting the engine, confirm the safety around the machine and sound the horn to alert bystanders.



012-E01B-0444

SA-1599

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.
 - 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.

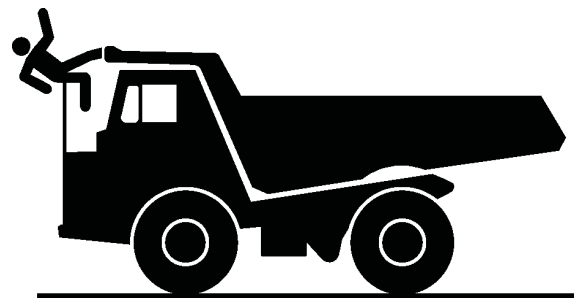


SA-032

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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 allow the operator on the machine. Keep riders off.
 - Riders also obstruct the operator's view, resulting in the machine being operated in an unsafe manner.
 - If there are riders, do not allow riders other than on the trainer's seat. Riders should also have their seat belt fastened.



SA-1600

014-E01B-0379

SAFETY

AVOID INJURY CAUSED BY HIGH TENSION ELECTRIC SHOCK

- Never attempt to open any electrical component covers displaying a decal with the words “HIGH VOLTAGE.” You may receive an electric shock, possibly resulting in personal injury or death.
- Never attempt to touch or grab any high tension electrical components or the power cable with wet hands. You may receive an electric shock, possibly resulting in personal injury or death.



SA-112

INVESTIGATE JOB SITE BEFOREHAND

- When working on a road shoulder, the machine could tip over, possibly resulting in serious injury or death.
 - Investigate the configuration and ground conditions of the job site beforehand to prevent the machine from falling and to prevent the ground, stockpiles, or banks from collapsing.
 - Make a work plan. Use machines appropriate to the work and job site.
 - Reinforce ground, edges, and road shoulders as necessary. Keep the machine well back from the edges of excavations and road shoulders.
- When working on an incline or on a road shoulder, employ a signal person as required.
- When the footing is weak, reinforce the ground before starting work.
- When working on frozen ground, be extremely alert. As ambient temperatures rise, footing becomes loose and slippery.
- Beware the possibility of fire when operating the machine near flammable objects such as dry grass.
- Driver should try to travel the road once to understand potential danger.



SA-1601

015-E01A-0380

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.



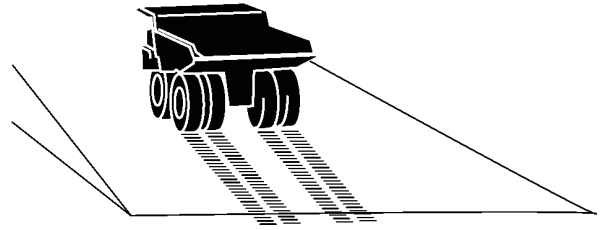
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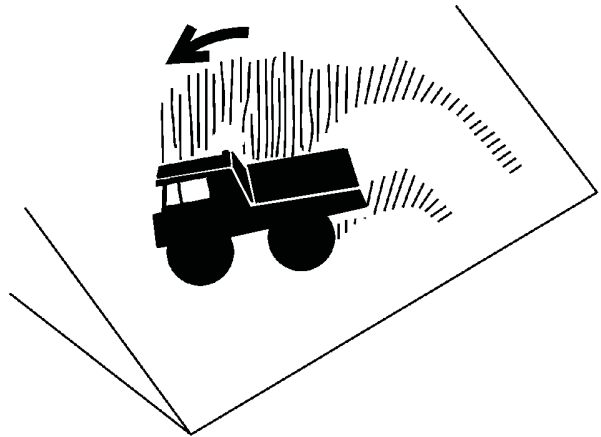
SAFETY

DRIVE MACHINE SAFELY

- Before driving the machine, always confirm that the shift lever direction corresponds to the direction you wish to drive.
 - Be sure to detour around any obstructions.
 - Avoid driving over obstructions. Soil, fragments of rocks, and/or metal pieces may scatter around the machine. Don't allow personnel to stay around the machine while driving.
- Driving on a slope may cause the machine to slip or overturn, possibly resulting in serious injury or death.
 - Driving across the face of a slope or steering on a slope may cause the machine to skid or overturn. If the direction must be changed, move the machine to level ground, then, change the direction to ensure safe operation.



SA-1602

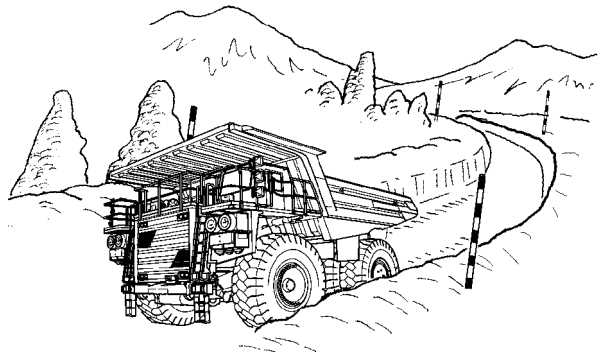


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SA-1603

DRIVE ON SNOW SAFELY

- Beware of the possibility of slipping or overturning the machine when traveling on frozen snow surfaces.
 - The machine may slip more easily than expected on frozen snow surfaces even if the inclination is small. Reduce speed when driving. Avoid fast starts, stops and quick turns.
 - Road shoulder and/or set-up utilities covered with snow are difficult to locate. Be sure where they are before removing snow.
 - Avoid applying the brake for quick stops on snow.

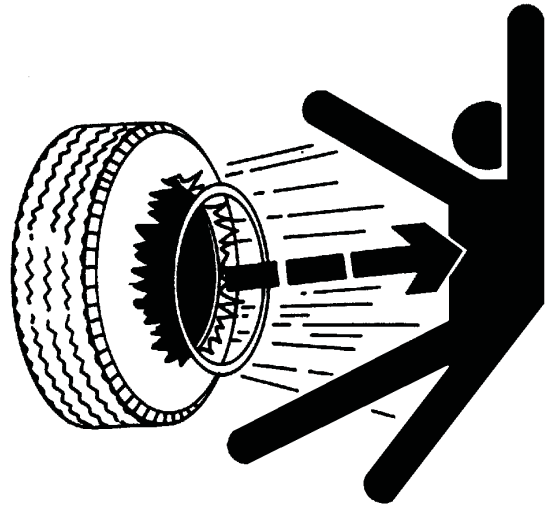


SA-1578

SAFETY

WHEEL MAINTENANCE

- Explosive separation of a tire and rim parts can cause serious injury or death.
 - Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. Have it done by your authorized dealer or a qualified repair service.
 - Always maintain the correct tire pressure. **DO NOT** inflate tire above the recommended pressure.
 - When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and not in front of or over the tire assembly. Use a safety cage if available.
 - Inspect tires and wheels daily. Do not operate with low pressure, cuts, bubbles, damaged rims, or missing lug bolts and nuts.
 - Never cut or weld on an inflated tire or rim assembly. Heat from welding could cause an increase in pressure and may result in tire explosion.



SA-249

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AVOID INJURY FROM ROLLAWAY ACCIDENTS

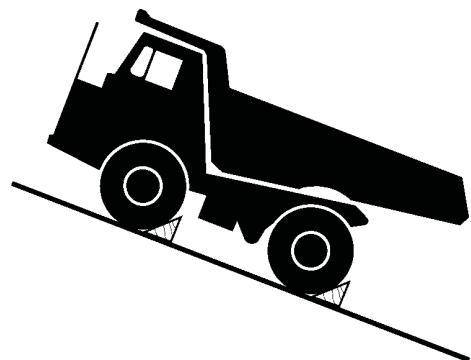
- Death or serious injury may result if you attempt to mount or stop a moving machine.

To avoid rollaways:

- Select level ground when possible to park machine.
- Do not park the machine on a grade.
- Lower the dump body to the frame.
- Place the shift lever in the Neutral position and apply the parking brake.
- 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.
- Chock the wheels if you must park on a grade.
- Position the machine to prevent rolling.
- Park a reasonable distance from other machines.



SA-1579



SA-1580

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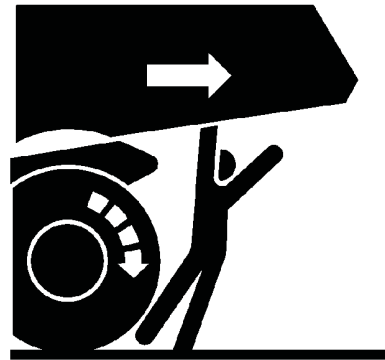
SAFETY

AVOID INJURY FROM BACK-OVER ACCIDENTS

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

To avoid back-over accidents:

- Always look around **BEFORE YOU BACK UP 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.



SA-1581



SA-1582

021-E01A-0494

KEEP PERSON CLEAR FROM WORKING AREA

- A person may be hit severely by the machine and/or may be crushed against another object, resulting in serious injury or death.
- Keep all persons clear from the area of operation and machine movement.
- Before operating the machine, set up barriers to the sides and rear area of the working area to prevent anyone from entering the work area.



022-E01A-0386

SA-1583

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
THEREFORE, HOLD FIRMLY ONTO THE STEERING WHEEL IF THE MACHINE SHOULD TIP OR ROLL OVER. DO NOT JUMP.

FASTEN YOUR SEAT BELT

- The cab is designed for the protection of the operator and it meets the requirements for rollover protection structures (ROPS) according to the adopted standard for this machine.

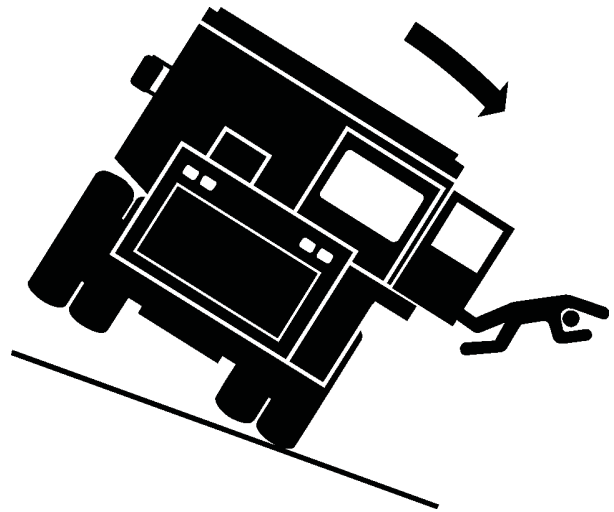
IMPORTANT: Never make any unauthorized modifications or alterations to the Rollover Protective Structure (ROPS) such as; welding on fire extinguisher brackets, CB antenna brackets, or fire suppression systems. Such unauthorized modifications will affect the structural limits of the ROPS and will void the certification and could result in loss of protection to the operator.

The Rollover Protective Structure (ROPS) has been certified to meet specified requirements according to ISO 3471.

- 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.
 - Keep the machine a safe distance from the edge of cliffs and slide areas
 - Reduce operating speeds to avoid tipping or slipping.
 - Avoid changing direction when driving on grades.
 - Use the seat belt during operation.
 - When operating the machine, both doors should be closed at all times.
- Be careful when working on frozen ground.
 - Temperature increases will cause the ground to become soft and make ground travel unstable.




SA-1584

SAFETY

PROTECT AGAINST FALLING STONES AND DEBRIS

- Stay in your cab while truck is being loaded. Stepping out of the cab could result in possible injury.
- Do not place your head and/or arms outside of the window.

 **NOTE:** The cab is for the protection of the operator and it meets the requirements for Falling-Object Protective Structure (FOPS) according to the adopted standard for this machine.



SA-1585

OPERATE WITH CAUTION

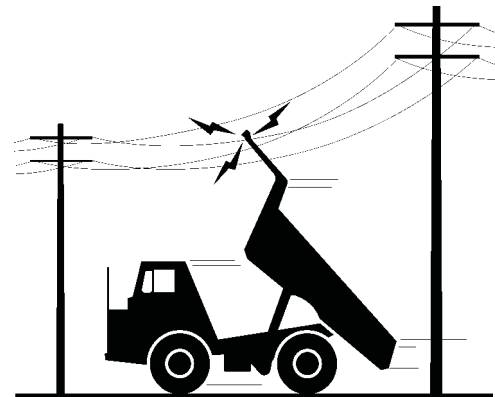
- If the dump body (Vessel) of the machine hits against an overhead obstacle, such as a bridge, both the machine and the overhead obstacle will be damaged, and personal injury may result as well. Do not drive the machine while the dump body is raising or raised.
- Take care to avoid hitting overhead obstacles with the dump body.



SA-1604

AVOID POWER LINES

- Serious injury or death can result if the machine or dump body 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 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.



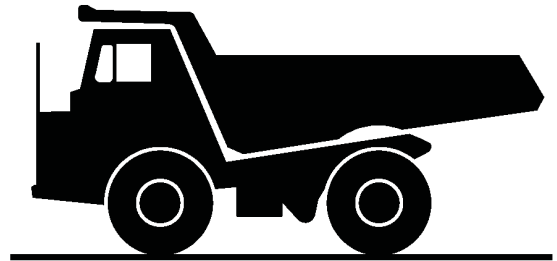
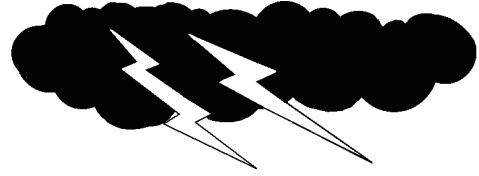
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SAFETY

PRECAUTIONS FOR LIGHTENING

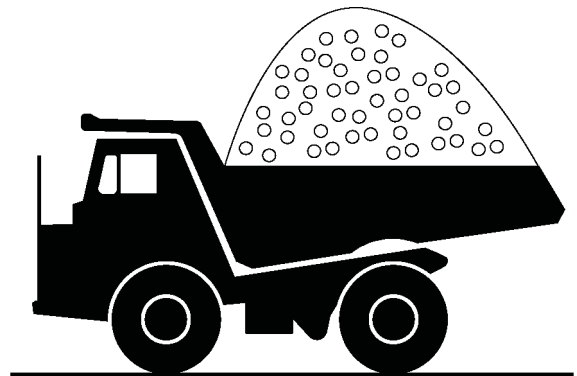
- The machine is vulnerable to lightning strikes.
 - In the event of an electrical storm, immediately stop operation, and lower the dump body to the frame. Evacuate to a safe place far away from the machine.
 - After the electrical storm has passed, check all of the machine safety devices for any failure. If any failed safety devices are found, operate the machine only after repairing them.



SA-1798

AVOID OVERLOADING

Do not exceed the maximum payload. The overloading raises the center of gravity position and may cause overturning or long braking distance. It is very dangerous and serious injury or death may result.

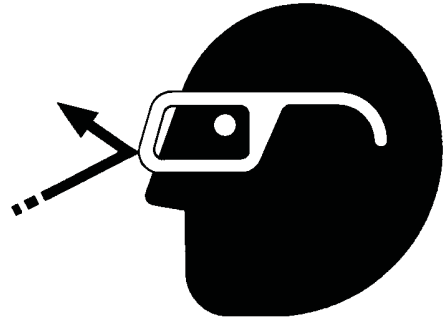


SA-1797

SAFETY

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 any working area before striking any object.



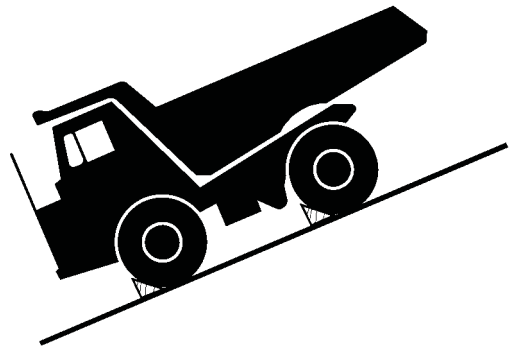
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SA-432

PARK MACHINE SAFELY

To avoid accidents:

- Park machine on a level surface. When parking on a grade cannot be avoided, chock blocks must also be used for extra security.
- Lower dump body to the frame rail.
- Place shift lever in the NEUTRAL position.
- Apply the parking brake to ensure that the parking brake is holding the machine.
- Run engine at slow idle speed without load for 5 minutes.
- Make sure the hoist lever is in the **Float** position.
- Check that all switches and controls are in the **OFF** position.
- Turn key switch to the **OFF** position to stop engine.
- Remove the key from the key switch.
- Turn the Battery Disconnect Switch to the **OFF** position to prevent battery consumption.
- Close windows and cab doors.
- Lock all access doors and compartments.
- Park a reasonable distance from other machines.



SA-1587

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SAFETY

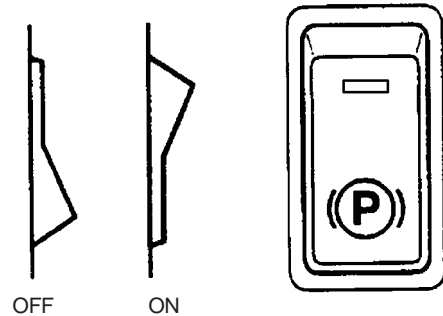
PREVENT UNINTENDED MACHINE MOVEMENT

Be careful not to accidentally actuate controls when co-workers are present.

Ensure that the dump body is lowered during work interruptions.

Place shift lever in neutral, engage park brake and stop engine before allowing anyone to approach the machine.

Follow these same precautions before standing up, leaving the operator's seat, or exiting the machine.



M8R8-01-054

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.
 - Securely tighten the fuel and oil filler cap.



SA-018



034-E01A-0496

SA-019

SAFETY

PRACTICE SAFE MAINTENANCE

To avoid accidents:

- Understand service procedures before doing work.
- Keep the 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 level surface.
2. Lower the dump body to the frame.
3. Place shift lever in the NEUTRAL position.
4. Apply the parking brake to ensure that the parking brake is holding the machine.
5. Run the engine at slow idle speed without load for 5 minutes.
6. Make sure the hoist lever is in the FLOAT position.
7. Check that all switches and controls are in the OFF position.
8. Turn the key switch to the OFF position to stop engine.
9. Ensure hydraulic system pressure relieves to tank.
10. Remove the key from the switch.
11. Attach a "Do Not Operate" tag to the steering wheel.
12. Allow the engine to cool.

- If a maintenance procedure must be performed with the engine running, do not leave the machine unattended.
- If the dump body must be raised, securely support the dump body by using the prop pins.
- Inspect certain parts periodically and repair or replace as necessary. Refer to the section discussing that part in the "MAINTENANCE" chapter of this 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.
- When cleaning parts, always use nonflammable detergent oil. Never use highly flammable oil such as fuel oil and gasoline to clean parts or surfaces.
- Disconnect battery ground cable (-) before making adjustments to electrical systems or before performing welding on the machine.



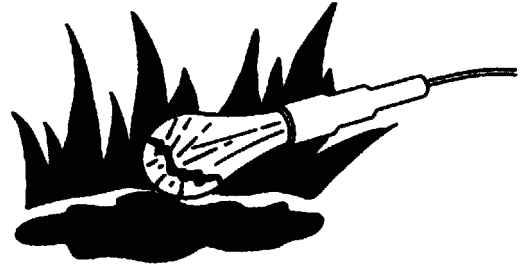
SA-028



SA-527

SAFETY

- Sufficiently illuminate the work site. Use a maintenance work light when working under or inside the machine.
- Always use a work light protected with a guard. In case the light bulb is broken, spilled fuel, oil, anti-freeze fluid, or window washer fluid may catch fire.



SA-037

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 steering wheel. This tag is available from your authorized dealer.



501-E01A-0287

SA-287

SUPPORT MACHINE PROPERLY

- Never attempt to work on the machine without securing the machine first.
- Always lower the dump body to the frame before you work on the machine. If you must work on a raised dump body, securely support the dump body by using the prop pins.
- If you must work on a lifted machine or dump body, securely support the machine or dump body. Do not support the machine on cinder blocks, hollow tires, or props that may crumble under continuous load.

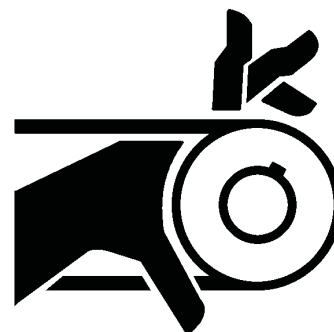


519-E01A-0527

SA-527

STAY CLEAR OF MOVING PARTS

- Entanglement 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.



502-E01A-0026

SA-026

SAFETY

PREVENT PARTS FROM FLYING

- Accumulators and hydraulic components are under high pressure. Failure to follow the precautions below may result in serious injury, blindness, or death.
 - Do not attempt to remove plugs or hoses until pressure is fully relieved.
 - As pieces may fly off, be sure to keep body and face away from accumulator and hydraulic components to avoid injury.
- 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.
- Tires are under pressure. When removing the air valve, as pieces may fly off, be sure to keep body and face away from tires to avoid injury.



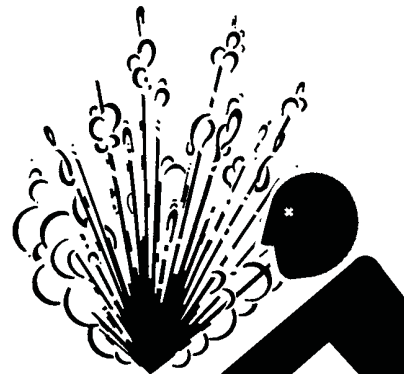
SA-344

503-E01B-0344

PREVENT BURNS

Hot spraying fluids:

- After operation, engine coolant is hot and under pressure. Hot water or steam is contained in the engine, radiator and heater lines. Skin contact with escaping hot water or steam can cause severe burns.
 - To avoid possible injury from hot spraying water. DO NOT remove the radiator cap until the engine is cool. When opening, turn the cap slowly to the stop. Allow all pressure to be released before removing the cap.
- The hydraulic oil tank is pressurized. Again, be sure to release all pressure before removing the cap.



SA-039

Hot fluids and surfaces:

- Engine oil, gear oil and hydraulic oil also become hot during operation. The engine, hoses, lines and other parts become hot as well.
 - Wait for the oil and components to cool before starting any maintenance or inspection work.



SA-225

505-E01B-0498

SAFETY

REPLACE RUBBER HOSES PERIODICALLY

- Rubber hoses that contain flammable fluids under pressure may break due to aging, fatigue, and abrasion. It is very difficult to gauge the extent of deterioration due to aging, fatigue, and abrasion of rubber hoses by inspection alone.
- Periodically replace the rubber hoses. (See the page of "Periodic replacement of parts" in the operator's manual).
- Failure to periodically replace rubber hoses may cause a fire, fluid injection into skin, or the dump body to fall on a person nearby, which may result in severe burns, gangrene, or otherwise serious injury or death.

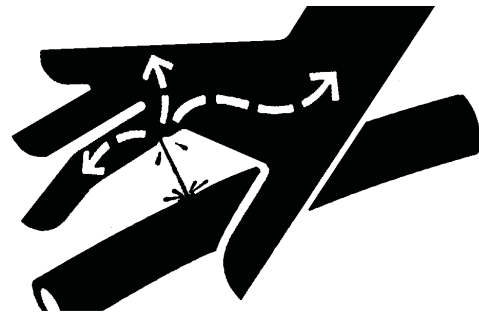


SA-019

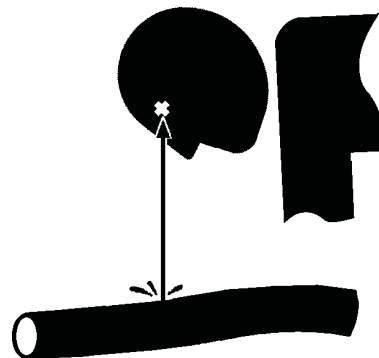
S506-E01A-0019

AVOID HIGH-PRESSURE FLUIDS

- Fluids such as diesel fuel or hydraulic oil under pressure can penetrate the skin or eyes causing serious injury, blindness or death.
- Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines.
- Tighten all connections before applying pressure.
- Search for leaks with a piece of cardboard; take care to protect hands and body from high-pressure fluids. Wear a face shield or goggles for eye protection.
- If an accident occurs, see a doctor familiar with this type of injury immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

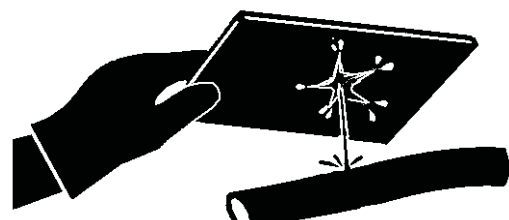


SA-031



SA-292

507-E03A-0499



SA-044

SAFETY

PREVENT FIRES

Check for Oil Leaks:

- Fuel, hydraulic oil and lubricant leaks can lead to fires.
 - Check for oil leaks due to missing or loose clamps, kinked hoses, lines or hoses that rub against each other, damage to the oil-cooler, and loose oil-cooler flange bolts.
 - Tighten, repair or replace any missing, loose or damaged clamps, lines, hoses, oil-cooler and oil-cooler flange bolts.
 - Do not bend or strike high-pressure lines.
 - Never install bent or damaged lines, pipes or hoses.



SA-019

Check for Shorts:

- Short circuits can cause fires.
 - Clean and tighten all electrical connections.
 - Check before each shift or after eight (8) to ten (10) hours operation for loose, kinked, hardened or frayed electrical cables and wires.
 - Check before each shift or after eight (8) to ten (10) hours operation for missing or damaged terminal caps.
 - DO NOT OPERATE MACHINE if cable or wires are loose, kinked, etc..

Clean up Flammables:

- Spilled fuel, oil, antifreeze fluid and window washer fluid, and trash, grease, debris, accumulated coal dust, and other flammables may cause fires.
 - Prevent fires by inspecting and cleaning the machine daily, and by removing spilled or accumulated flammables immediately.

Check Key Switch:

- If fire breaks out, failure to stop the engine will escalate fire, hampering fire fighting.
Always check key switch function before operating the machine every day:
 1. Start the engine and run it at slow idle.
 2. Turn the key switch to the OFF position to confirm that the engine stops.
- If any abnormalities are found, be sure to repair them before operating the machine.

508-E02B-0019

SAFETY

Check Emergency Engine Stop Switch:

- If a fire breaks out, failure to release pressurized air inside the hydraulic tank will escalate fire, hampering fire fighting.
 - Check the emergency engine stop switch function every 250 hours:
 - 1) Start the engine and run it at slow Idle.
 - 2) Turn the emergency engine stop switch to the EMERG. STOP position.
 - 3) Confirm that engine stops and that pressurized air inside the hydraulic oil tank is released (a hissing sound should be heard).
 - If any abnormalities are found, be sure to repair them before operating the machine.

Check Heat Shields:

- Damaged or missing heat shield may lead to fires.
 - Damaged or missing heat shields must be repaired or replaced before operating the machine.

508-E02A-0393

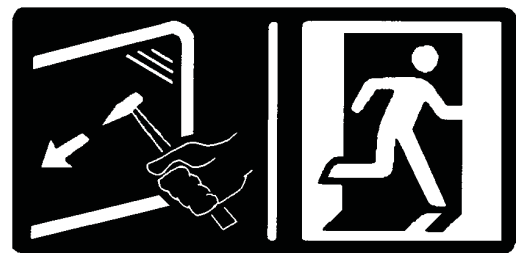
EVACUATING IN CASE OF FIRE

- If a fire breaks out, evacuate the machine in the following way:
 - Stop the engine by turning the key switch to the OFF position or pushing the emergency stop switch if there is time.
 - Use a fire extinguisher if there is time.
 - Exit the machine.
- In an emergency, if the cab doors can not be opened, break the left or right window panes with the emergency evacuation hammer to escape from the cab. Refer the explanation pages on the Emergency Evacuation Method.

518-E02B-0393



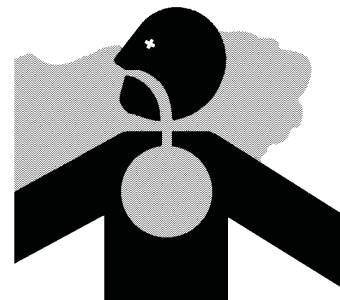
SA-393



SS-1510

BEWARE OF EXHAUST FUMES

- Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.
 - If you must operate in a building, be sure there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.



509-E01A-0016

SA-016

SAFETY

PRECAUTIONS FOR WELDING AND GRINDING

- Welding may generate gas and/or small fires.
 - Be sure to perform welding in a well ventilated and prepared area. Store flammable objects in a safe place before starting welding.
 - Only qualified personnel should perform welding. Never allow an unqualified person to perform welding.
- Grinding on the machine may create fire hazards. Store flammable objects in a safe place before starting grinding.
- After finishing welding and grinding, recheck that there are no abnormalities such as the area surrounding the welded area still smoldering.



SA-818

523-E01A-0818

AVOID HEATING NEAR PRESSURIZED FLUID LINES

- Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders.
 - Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.
 - Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install temporary fire-resistant guards to protect hoses or other materials before engaging in welding, soldering, etc..



SA-030

AVOID APPLYING HEAT TO LINES CONTAINING FLAMMABLE FLUIDS

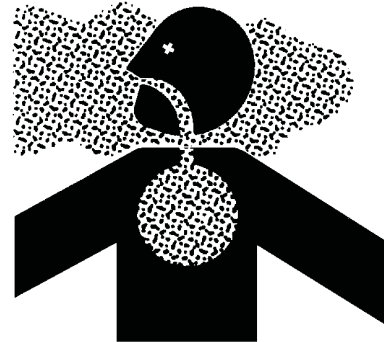
- Do not weld or flame cut pipes or tubes that contain flammable fluids.
- Clean them thoroughly with nonflammable solvent before welding or flame cutting them.

510-E01B-0030

SAFETY

REMOVE PAINT BEFORE WELDING OR HEATING

- Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch. If inhaled, these fumes may cause sickness.
 - Avoid potentially toxic fumes and dust.
 - Do all such work outside or in a well-ventilated area. Dispose of paint and solvent properly.
- Remove paint before welding or heating:
 1. If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
 2. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



SA-029

511-E01A-0029

BEWARE OF ASBESTOS DUST

- Take care not to inhale dust produced in the work site. Inhalation of asbestos fibers may be the cause of lung cancer.
 - Depending on the work site conditions, the risk of inhaling asbestos fiber may exist. Spray water to prevent asbestos from becoming airborne. Don't use compressed air.
 - When operating the machine in a work site where asbestos might be present, be sure to operate the machine from the upwind side and wear a mask rated to prevent the inhalation of asbestos.
 - Keep bystanders out of the work site during operation.
 - Asbestos might be present in imitation parts. Use only genuine Hitachi Parts.

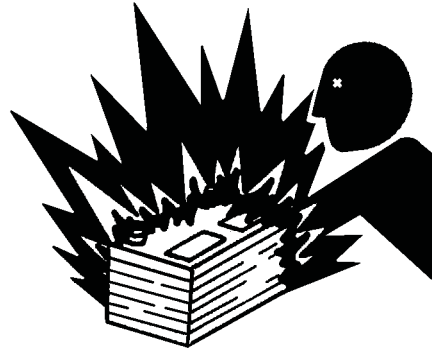


SA-029

SAFETY

PREVENT BATTERY EXPLOSIONS

- Battery gas can explode.
 - Keep sparks, lighted matches, and flame away from the top of battery.
 - Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.
 - Do not charge a frozen battery; it may explode. Warm the battery to 16 °C (60 °F) first.
 - Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.
 - Loose terminals may produce sparks. Securely tighten all terminals.
- Battery electrolyte is poisonous. If the battery should explode battery electrolyte may be splashed into eyes, possibly resulting in blindness.
 - Be sure to wear eye protection when checking electrolyte specific gravity.



SA-032

512-E01B-0032

SERVICE AIR CONDITIONING SYSTEM SAFELY

- If spilled onto skin, refrigerant may cause a cold contact burn.
 - Refer to the instructions described on the container for proper use when handling the refrigerant.
 - Use a recovery and recycling system to avoid leaking refrigerant into the atmosphere.
 - Never touch the refrigerant.



513-E01A-0405

SA-405

SAFETY

HANDLE CHEMICAL PRODUCTS SAFELY

- Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with your machine include such items as lubricants, coolants, paints, and adhesives.
- A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.
- Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and use recommended equipment.
- See your authorized dealer for MSDS's (available only in English) on chemical products used with your machine.

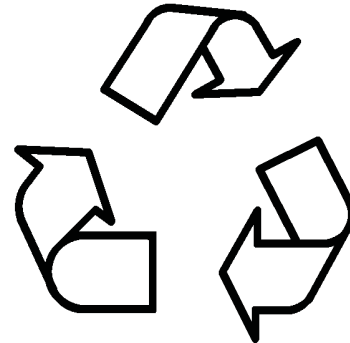


SA-309

515-E01A-0309

DISPOSE OF WASTE PROPERLY

- Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with HITACHI equipment includes such items as oil, fuel, coolant, brake fluid, filters, and batteries.
- Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.
- Do not pour waste onto the ground, down a drain, or into any water source.
- Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.
- Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your authorized dealer.



SA-226

516-E01A-0226

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