

**YANMAR**

OPERATION & MAINTENANCE  
MANUAL

# EXCAVATOR

**Vi030-6B**

**Vi035-6B**

Vi030-6B: S/N 60501 & Above

Vi035-6B: S/N 60501 & Above

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**APPENDIX TABLE ..... 317**

# SAFETY

Basic Precautions

Operating Precautions

Precautions for Servicing

Safety Messages (Warning Labels)

## WARNING

Never attempt to operate or service this Excavator until you have first read and understood all of the applicable Safety Instructions that are set forth in this Manual.

The failure to comply with all relevant Safety Instructions could result in bodily injury.

This “SAFETY” Part includes safety instructions for optional parts and attachments.

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# 1. Basic Precautions

## Follow safety rules at your workplace

- The operation and servicing of this machine is restricted to qualified persons.
- When operating or servicing the machine, follow all the safety rules, precautions and procedures.
- Any work performed by a team or with a signal person should be conducted in accordance with signals agreed on beforehand.

## Install safety devices

- Make sure that all guards and covers are installed in their correct position. If any of them are damaged, repair them immediately.
- The proper use of all safety devices, such as lock lever, should be well understood by the machine operator.
- Never remove the safety devices. Always make sure that they operate properly.  
**For lock lever, refer to Section "2.3 Control levers and pedals" on page 115.**
- Incorrect operation of the safety devices could cause serious bodily injury.

## Wear proper clothing and safety items

- Do not wear loose clothing or jewelry that can be caught on the control levers and other machine parts. Also avoid wearing working clothes stained with oil as they can ignite.
  - Be sure to wear a helmet, safety goggles, safety shoes, a mask, gloves and other protective items, as appropriate.
- Take particular precautions when generating metal debris, when striking metal objects with a hammer or when cleaning components with compressed air.



Also make sure there are no persons near the machine.

**For driving the pins, refer to Section "3.23 Replacing the bucket without the quick coupler" on page 202.**

**For cleaning the elements, refer to Section "8.2 Nonperiodic services" on page 252.**

## Alcohol

- Never operate the machine while you are under the influence of alcohol or when you are ill or feel unwell as this results in accidents.

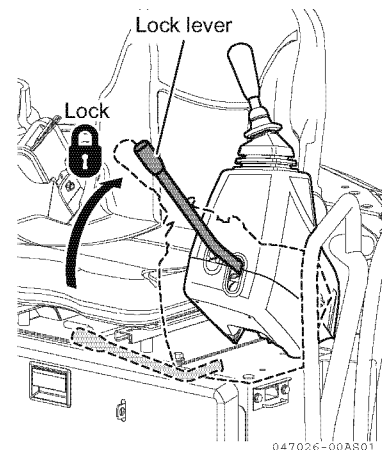
### Avoid unauthorized modifications

- Modifications not recommended by YANMAR may cause safety hazards.
- When you wish to modify your machine, contact your dealer. The implementation of unauthorized modifications or the use of unauthorized attachments could result in bodily injury, since those actions would also violate, the terms of YANMAR's Warranty, it would be voided

### Always lock up your machine when leaving the operator's seat

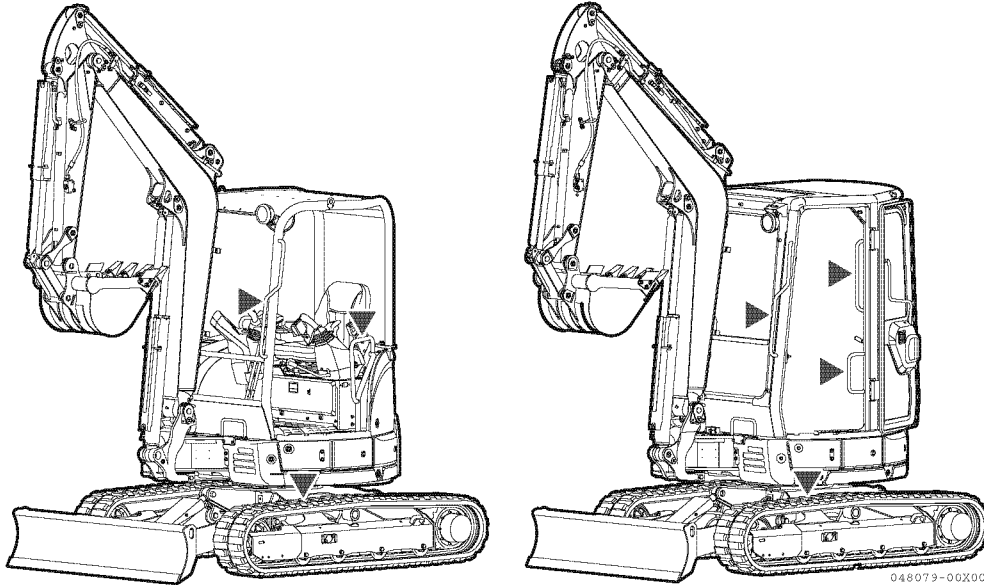
- When leaving the operator's seat, be sure to place the lock lever in the lock position, to prevent accidental machine movement which could result in bodily injury.
- When you leave the machine:
  - (1) Lower the bucket to the ground.
  - (2) Place the lock lever in the lock position.
  - (3) Stop the engine.
  - (4) Set all the locks in to the lock position.
  - (5) Be sure to take the key out of the starter switch.
- Be sure to store the key in a designated place so that unauthorized personnel cannot operate the machine.

**For information on parking the machine, refer to Section "3.15 Parking the machine" on page 186.**



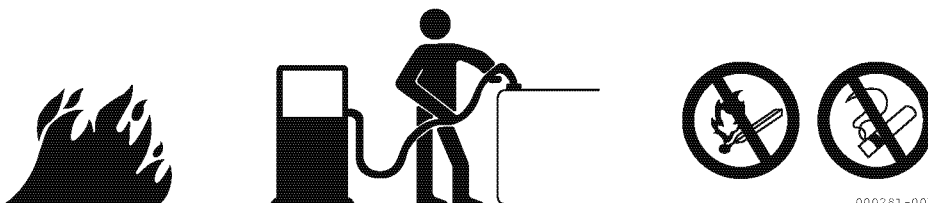
**Use handrails and steps when getting on and off**

- Do not jump on or off the machine. Never get on or off a machine in motion as it may result in bodily injury.
  - When getting on and off the machine, face the machine and use the handrails and steps.
  - Do not use control levers as handrails.
  - Make sure that you maintain three point contact with the handrails or the steps.
  - If the handrails and the steps are soiled with oil or dirt, clean them off immediately.
- Repair any damaged parts and retighten any loose bolts.



**Keep fuel and oil away from sources of ignition**

- Open flames can ignite fuel, oil, hydraulic oil or antifreeze solutions, which are flammable and dangerous.
- Special attention must be paid to the following matters.
- Keep flammable materials away from lighted cigarettes or matches, or any other sources of ignition.
  - Never refuel while the engine is running. Smoking during refueling must be strictly prohibited.
  - Firmly tighten the caps on the fuel and oil tanks.
  - Store fuel and oil in a cool and well-ventilated place where they are not subjected to direct sunlight.
  - Fuel and oil must be stored in a place which meets all applicable safety regulations. Unauthorized persons should not be allowed entry.



### Avoid removing filler caps while temperatures are high

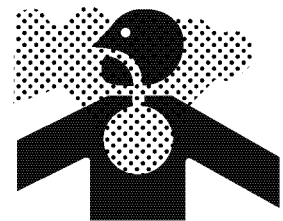
- The engine coolant, engine oil and hydraulic oil are hot and under pressure immediately after the machine stops operation. Removing caps, draining coolant or oil, or replacing a filter at such a time may cause burns. Allow temperatures to cool down and follow the procedures in this manual.
- When removing the radiator cap, stop the engine and allow the coolant to cool down, then turn the cap slowly to relieve all pressures.
- Before removing the cap from the hydraulic oil tank, stop the engine and turn the cap slowly to relieve all pressure to prevent oil from spouting out.



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### Avoid harmful asbestos dust

- Air containing asbestos dust is carcinogenic and is hazardous to humans. Inhalation of the air may cause lung cancer. When handling materials that may contain asbestos, keep in mind that:
  - Compressed air must not be used for cleaning.
  - Water must be used to clean the machine to prevent asbestos from scattering in the air.
  - You must work on the windward side when operating the machine in a place where there may be asbestos dust.
  - You should wear breathing apparatus as necessary.



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### Prevent crush injuries by the implements

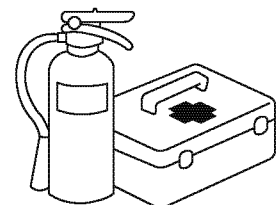
- Keep hands, arms and all other parts of your body away from all the moving parts, particularly between the implements and the machine and between the hydraulic cylinder and the implements, as pinch points are created in those areas.



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### Keep a fire extinguisher and first aid kit handy

- The workplace must be provided with a fire extinguisher. Read instructions on the label to familiarize yourself with how to use it.
- Keep a first aid kit in a prescribed place.
- Advise what to do in the event of fire or accidents.
- Indicate who to contact in an emergency and keep their telephone number in a prominent place.



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**Precautions for installing optional parts and attachments**

- When installing or using optional attachments, read the operating instructions for the attachments and the Manual Sections relating to the installation of attachments.
- Use only attachments authorized by YANMAR. The use of unauthorized attachments may affect not only the safety of the machine but also the proper operation and life of the machine.
- The use of unauthorized attachments would also violate the terms of YANMAR's Warranty, so that it would be voided.

**Caution for cabin glass**

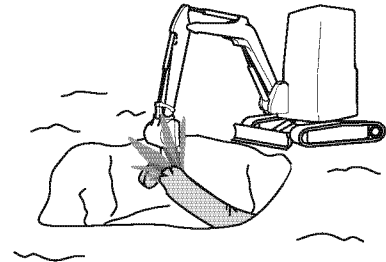
- If the glass of the cabin should be broken by accident, it is very dangerous since the operator's body might contact the implement directly.  
Immediately stop working to replace the broken glass with a new one.

## 2. Operating Precautions

### 2.1 Precautions before starting the engine

#### Ensure the safety of your workplace

- Before starting the machine, check to see if there are any hazards in your working area.
- Examine the terrain and soil, and decide the best way to do the work.
- When working on the street, provide a signal person or fence for the safety of vehicles and pedestrians.
- If there are underground utilities at the work site, such as water pipes, gas pipes, high-voltage conduits or others, contact the responsible companies to locate them exactly, so as not to damage them.
- Before operating the machine in water, or crossing a creek, confirm the condition of the submerged ground, the water depth and the water flow speed, and make sure that the depth is within the allowable level.



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**For allowable water depth, refer to Section "3.10 Precautions for working" on page 171.**

#### Prevent fire

- Wood chips, dead leaves, trash and other flammable materials in proximity to the engine are hazardous as they may cause fire. Always check and keep your machine clear of these flammable materials.
  - Check for any leaks from fuel, lube oil or hydraulic oil lines. Repair faults and clean spilled oil as necessary.
- For additional information, refer to Section "3.1 Checking before starting the engine" on page 138.**
- Check to see where fire extinguishers are located and know how to use them.



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#### Inspect around the operator's seat

Dirt, oil and snow on the floor, levers, handrails or steps are slippery and hazardous. Remove them all completely.

Keep parts and tools away from the operator's seat as they may damage the control levers or switches or create any other hazards.

**Provide adequate ventilation when working in an enclosed area**

Engine exhaust fumes are harmful to the human body and their inhalation is extremely hazardous. When starting the engine in an enclosed area, open the windows and doors for ventilation. Also do not idle the engine unnecessarily or leave the engine running while the machine is not in use.



**Keep the cabin window clean**

- Keep the surface of the cabin windows and the headlights clean for clear view.
- Make sure that your machine is equipped with headlights and all required working lamps, and that they work properly.

**Fasten the seatbelt**

- For your safety, ROPS (Roll-Over Protective Structure)/FOPS (Falling Objects Protective Structures) with a seatbelt is installed.
- Always fasten the seatbelt across the pelvic region and adjust snugly before you operate the machine.  
Never fasten a seatbelt across the abdomen.
- The seatbelt must be replaced after an accident.
- In addition the seat and seat mounting must be checked by your dealer after an accident has occurred.
- If the seat and seat mounting are damaged, they must be replaced.

**ROPS/FOPS**

- Never modify the structural member of ROPS/FOPS.
- If ROPS/FOPS is damaged, replace it immediately to prevent bodily injury.  
Never repair or modify it.

**Caution for the protection of plants from hot wind**

The hot wind of the high temperature is exhausted from the muffler and the radiator. If this hot wind hits plants directly, they will die. Give a cover board to protect plants from the hot wind when working near the arranging fence or plant.

## 2.2 Precautions for starting the engine, working and parking

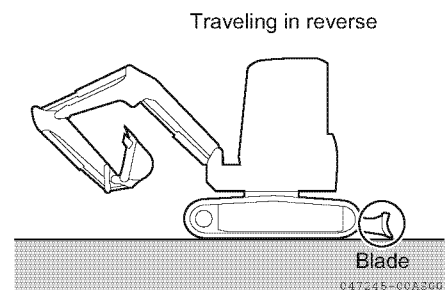
### Signal before starting the engine

- Check the machine carefully before initial start up for the day.
- Make sure there are no persons near the machine before getting on it.
- Never start the engine when the "SERVICING IN PROGRESS" tag is attached to the control system.
- Sound the horn to alert people nearby before starting the engine.
- Be sure to start the engine and operate the machine from the operator's seat only.
- Do not allow any other persons to get on the machine.

### Check the position of the blade before operating the machine

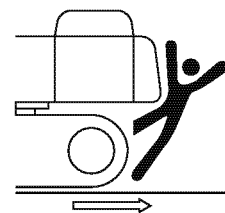
- Check the position of the blade before operating the travel levers. When the blade is located in the back, the operation of the travel levers is reversed.

**For instructions on How the machine travels, refer to Section "3.4 Traveling" on page 156.**



### Make sure there are no persons nearby when turning or reversing the machine

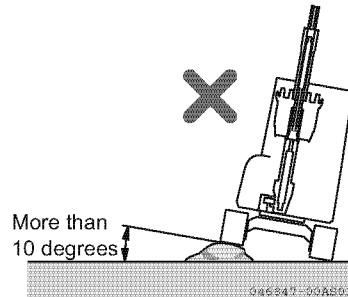
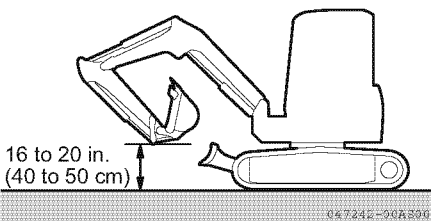
- A signal person should be provided for safety when the work site is hazardous or when visibility is poor.
- Keep all other persons away from the work site or the traveling path of the machine.
- Alert persons nearby with a horn or other signal before starting the machine.
- The machine permits a limited range of vision toward the rear. Make sure there are no persons behind the machine before reversing.



**Precautions for traveling**

- When traveling with the machine, keep the bucket 16 to 20 in. (40 to 50 cm) above the ground with boom and arm folded as illustrated below.
- If you need to operate the control levers while traveling, never move them abruptly.
- Travel the machine at a low speed and slow down when turning on rough terrain.
- Avoid running over obstacles if possible. If unavoidable, run the machine at a low speed while keeping the implement close to the ground. Never run over obstacles that may cause the machine to tilt more than 10 degrees.

Orientation in travel



**Running the machine on a slope**

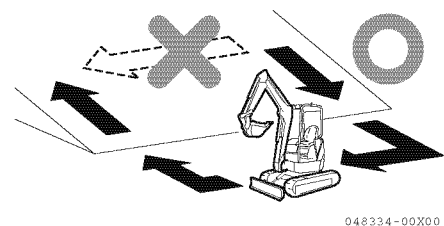
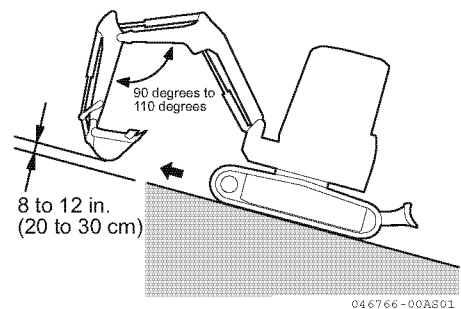
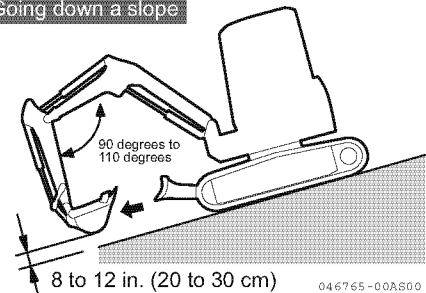
- Run the machine carefully on a slope to avoid overturning or skidding sideways.
- When running the machine on a slope, keep the bucket 8 to 12 in. (20 to 30) cm above the ground so that you can immediately lower it to the ground and stop the machine in an emergency.
- Never turn the machine on a slope or run it across the slope.

Move down to flat ground and then make a turn.

**For instructions on how to run the machine on a slope, refer to Section "3.11 Precautions for going up and down a slope" on page 172.**

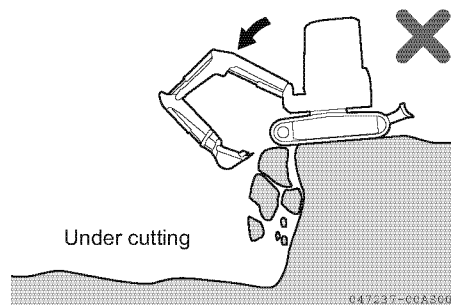
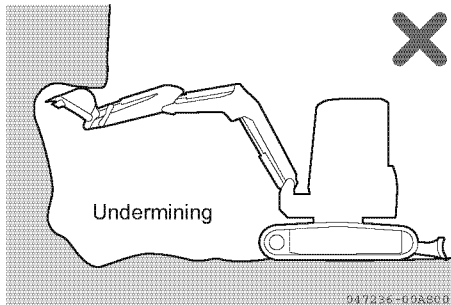
- On grasses, dead leaves or a wet metal plate, even with a slight gradient, the machine will easily slip. Under those circumstances, run the machine carefully at low speed to prevent it from skidding.

Going down a slope



**Avoid hazardous work**

- Undermining a cliff is dangerous as it may cause a rockslide or landslide.
- Undercutting the machine is dangerous as it may cause a cave-in, resulting in the machine overturning and falling into the excavation.



**Never suspend loads without a hooked bucket**

- Suspending loads without a hooked bucket is extremely hazardous.
- To suspend loads, the machine must be equipped with a hooked bucket specifically designed for the purpose.

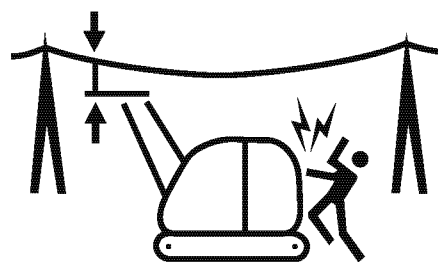
**For information on suspending loads, refer to Section "3.9 Precautions for operating the implement" on page 168.**

**⚠️ DANGER**

**Keep away from electric power lines**

- Working in the vicinity of overhead electric power lines presents a very serious hazard and special precautions must be taken. For purposes of this manual you are considered to be working in the vicinity of overhead power lines when the attachment or load of your excavator, in any position, can reach to within the minimum distances shown below.
- The following procedures are effective in preventing accidents or injuries.
  - 1) Wear shoes with rubber or leather soles.
  - 2) Use a signal person to warn the operator when the machine is getting too close to a power line.
- If the machine should contact a wire, the operator must not leave the seat.
- When working near power lines, caution all ground personnel to stand clear of the machine.
- To determine the transmission voltage at the working site, contact the electric utility concerned.

	Transmission voltage (V)	Minimum safe distance [ft. (mm)]
Power distribution	100/200 or less	6.6 (2000) or more
	6600 or less	6.6 (2000) or more
Transmission line	22000 or less	9.8 (3000) or more
	66000 or less	13.1 (4000) or more
	154000 or less	16.4 (5000) or more
	275000 or less	23.0 (7000) or more



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#### Prevent bumping the implements

- When traveling through tunnels or under bridges, or working at a site near other overhead obstacles, operate the machine carefully so as not to bump the boom, arm, or the implement against those overhead obstacles.

#### Work only where visibility is good

- When working in a dark place, light up the area with the work lights and head lights, and prepare extra lighting equipment as necessary.
- Stop working when fog, snow or rain impedes your view.

#### Work carefully in a snow-covered areas

- A snow-covered ground and icy roads are dangerous as they may cause the machine to skid even on a slight slope. Run the machine at low speed, and never start, stop or turn abruptly on such ground or under such road conditions.
- Be careful removing snow as road shoulders or other hazards may be buried under snow.

#### Unstable ground creates a high possibility of overturn

- Keep away from cliffs, road shoulders or trenches if possible as the ground near them is unstable. The ground may crumble due to the weight or vibrations of the machine, resulting in an overturn or fall of the machine. Be particularly careful when working immediately after rain-storm or after blasting as the ground may be unstable.
- Ground-fills or ground near a ditch may be unstable and may crumble due to the weight or vibrations of the machine, causing the machine to tilt. Much caution must be taken in working in these areas.
- When working in an area where is a high possibility of falling rocks, wear a hard-hat and stay under the canopy.

#### Using the quick coupler

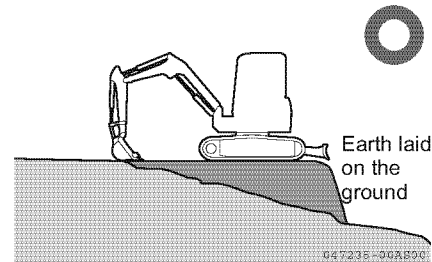
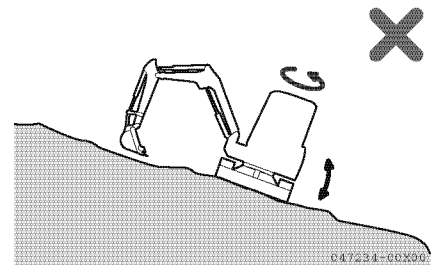
- Observe the procedures of mounting and dismounting the bucket.
- Always securely and correctly install the lock pin when the bucket is mounted on the quick coupler.
- Replace the lock pin whenever it is damaged or lost.

**For information of handling the quick coupler, refer to Section "3.14 Handling quick coupler (for quick coupler spec.)" on page 176.**

### Working on a slope

- Be aware that the machine may tip over when swinging the upperstructure or swinging the implement on a slope.
- Never swing the upperstructure toward the downward side of the slope with earth loaded in the bucket. (See the illustration at upper right.)
- If swinging is unavoidable, level off a work area to maintain the machine as horizontal as possible, then swing. (See the illustration at lower right.)

**For levelling off a work area, refer to Section "3.11 Precautions for going up and down a slope" on page 172.**



### Parking the machine

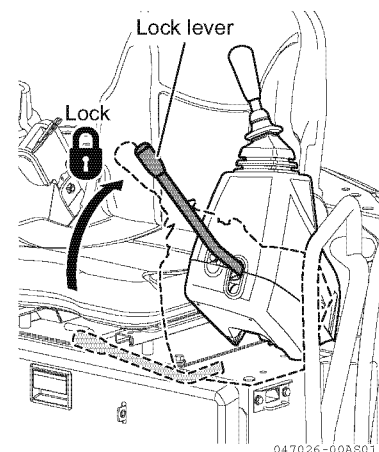
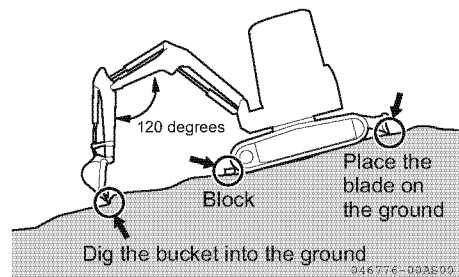
- Park on level ground. If park on a slope is unavoidable, block the tracks with solid pieces of wood and dig the bucket into the ground. (See the illustration at right.)
- If necessary to park the machine on the side of a road, set up a warning flag, fence, or lamp that can be easily recognized by passing cars and pedestrians but does not impede them.

**For parking procedures, refer to Section "3.15 Parking the machine" on page 186.**

- When leaving the operator's seat, do the following:
  - (1) Be sure to place the bucket on the ground.
  - (2) Set the lock lever to the lock position.
  - (3) Stop the engine.
  - (4) Set all the locks to the lock position.
  - (5) Be sure to take the key out of the starter switch.

**For information about parking procedures, refer to Section "3.15 Parking the machine" on page 186.**

**For information about the parts to be locked, refer to Section "3.19 Locking" on page 189.**



## 2.3 Precautions for transportation

### Precautions for loading and unloading the machine

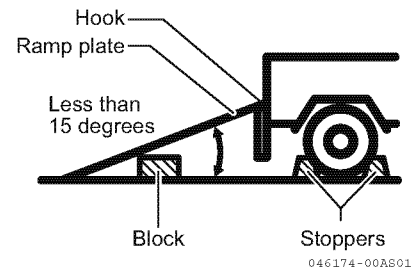
- Be careful in loading and unloading the machine, because it is a job of high hazard potential.
- Load or unload the machine at a low engine speed, and low travel speed.
- Load or unload the machine on the level, solid ground away from the shoulder of the road.
- Use ramp plates of adequate strength with hooks on their ends.

Check to see that the ramp plates are wide, long, and thick enough to sustain the load so that you can load or unload the machine safely. Support the ramp plates with blocks, to provide additional strength.

- Securely hook the ramp plates to the deck of the truck so that they will not come off.
- Remove grease, oil, and other slippery deposits from the ramp plates, and remove mud from the tracks to prevent the machine from skidding on the ramp plates.
- Do not load or unload the machine if the ramp plates are slippery because of rain, snow or ice.
- Never change travel direction while on the ramp plates. If you need to change travel direction, go down the ramp plates, and change direction on the ground.
- After loading the machine, block it with lumber and secure the machine with a chain or a wire rope so that the machine will not move during transit.

**For instructions on loading and unloading the machine, refer to Section "4. Transportation" on page 204.**

**For instructions on securing the machine, refer to Section "4. Transportation" on page 204.**



### Precautions for transporting

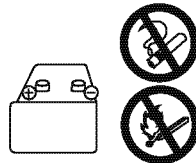
- Transport the machine safely in accordance with the laws associated with applicable law.
- Select a travel route consistent with the width, height and weight of the machine loaded on the truck.

## 2.4 Precautions for the battery

### ⚠ DANGER

#### Be careful in handling the battery

- The battery electrolyte contains dilute sulfuric acid, which can severely burn the eyes or skin. Always wear safety goggles and protective clothing when servicing the battery. If contact with the eyes or skin should occur, flush with a large amount of water and obtain prompt medical treatment.
- Because flammable hydrogen gas is produced by the battery, ignition and explosion may occur. Keep flames and sparks away from the battery.
- Do not use or charge the battery if the battery electrolyte level is below the lower limit. Doing so may cause the battery to explode. Always check the battery electrolyte level before starting the engine. If the electrolyte level is low, add distilled water to the upper limit.
- If you swallow battery electrolyte by mistake, drink a large amount of water, milk, or fresh eggs, and obtain medical treatment immediately.
- Before checking or handling the battery, be sure to stop the engine and turn the starter switch to the "OFF" position.
- Be careful not to cause a short circuit by placing a tool across the terminals of the battery.
- If a terminal connection is loose, sparks may be generated due to contact failure, causing possible ignition and explosion. Be sure to connect the terminals securely.



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