

MINI CRAWLER EXCAVATOR USER MANUAL



Read Carefully Before Use
Keep for Future Reference

Preface

Congratulations on your new mini excavator!

Welcome to the user manual for the mini excavator. We are thrilled to provide you with a comprehensive guidance on operating and maintaining this powerful and versatile excavator. Whether you're a seasoned professional or a newcomer to the world of construction and excavation, this manual is designed to be your reliable companion throughout your journey with the mini excavator.

Within these pages, you'll find detailed instructions, safety guidelines, and valuable tips to ensure that you operate the mini excavator efficiently, effectively, and most importantly, safely. Our aim is to empower you with the knowledge and confidence needed to harness the full potential of this equipment while prioritizing the well-being of both yourself and those around you. From assembling and starting up the mini excavator to executing complex digging and lifting tasks, we've covered every aspect to make your experience seamless. Additionally, you'll discover insights into routine maintenance procedures that will keep your mini excavator in prime condition, prolonging its lifespan and optimizing its performance.

Safety is paramount, and we emphasize the importance of adhering to the provided guidelines. This manual includes clear explanations of safety protocols, operational best practices, and hazard mitigation techniques. By prioritizing safety, you're not only protecting yourself but also creating a secure environment for your team and job site.

Remember, this manual is not just a technical document; it's a guide tailored to your needs. We encourage you to familiarize yourself with its content, explore its sections, and refer back to it whenever needed. Our commitment is to empower you with the knowledge necessary to make the most of your mini excavator, elevating your capabilities and contributing to successful projects.

Thank you for choosing our mini excavator. Your journey starts here, and we're excited to embark on it together. Let's dig in!

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1. Overview

1.1 Introduction

This mini-excavator is versatile and applicable to farming, landscaping, ditching and fertilization in gardens, vegetable greenhouses, agricultural transformation, indoor demolition, small earthwork, civil engineering, road recovery, basement and indoor construction, concrete breaking, burying of cable, laying of water supply line, garden cultivation, desilting and the likes.

Your excavator is designed for lasting performance, featuring a robust BRIGGS & STRATTON gasoline engine. With this trusted engine, you can expect durability and consistent power for your operations.

Moreover, the versatility of this excavator extends to its compatibility with a wide range of work equipment. Whether you require a quick hitch, log grapple, ripper, leveling bucket, auger, or narrow bucket, this excavator can be equipped to serve your needs.

1.2 Work Equipment Compatibility



Quick Hitch



Narrow Bucket



Log Grapple



Auger



Ripper



Rake

1.3 Specifications

Engine	Model		BRIGGS & STRATTON 25T2	
	Rated Power		13.5 hp	
	Rated Speed		3060 rpm	
	Rated Torque		21 ft lb. / 28.5 Nm @ 3060 rpm	
	Displacement		25.6 in ³	420 cm ³
	Oil	Fill	37.2 fl oz	1.1 L
Type		10-30W		
Fuel	Tank Volume		1.74 gal.	6.6 L
	Consumption		0.26 gal/h	1 L/h
	Type		#90 or over	
Main Pump	Rated Pressure		2610.28 psi	18 MPa
	Max. Pressure		3626.43 psi	25 MPa
	Nominal Flow		0.2 fl oz/r	6 ml/r
	Hydraulic Oil		AW 46	
	Oil Flow		4.76 gal/min	18 L/min
Speed	Traveling		1.9 m/h	3 km/h
	Slewing		11 rpm	
Hydraulic Tank Volume		3.9 gal.	14.7 L	
Track Width		36.22 in.	920 mm	
Supporting Wheel No.		2		
Overall Track Length		3.97 ft.	1210 mm	
Platform Ground Clearance		17.3 in.	440 mm	
Min. Swing Radius		2.8 ft.	840 mm	
Bucket Volume		0.883 ft ³	0.025 m ³	
Bucket Width		15.8 in.	400 mm	
Overall Height		7.22 ft.	2200 mm	
Max. Digging Depth		5 ft.	1550 mm	
Maximum Dumping Height		8.16 ft.	2490 mm	
Max Slope Grade		30°		
Max. Dozer Depth		9.8 in.	250 mm	
Max. Dozer Elevation		5.5 in.	140 mm	
Net Weight		2161 lb.	980 kg	

2. Safety Information

2.1 General Safety

- **ALWAYS** follow federal, state and local laws, codes and regulations concerning the use of construction machinery.
- Read this manual before actually operating the excavator. Familiarize yourself with the instructions that provide crucial information about the specific model's controls, maintenance requirements, and safety precautions.
- **ONLY** guarantee or allow persons with holistic knowledge of the safe operation of an excavator to operate, inspect or maintain the excavator.
- Strictly follow all the precautions and safety information as mentioned below when operating, inspecting and maintaining the excavator.
- **DO NOT** operate, inspect or maintain the excavator when your faculties or judgement are impaired by alcohol, drugs, medicines and fatigue or lack of sleep. **NEVER** allow any persons under such conditions to operate, inspect or maintain this heavy machinery.
- Operating heavy equipment requires your full attention. Avoid distractions and remain focused on the task at hand at all times.
- **IMMEDIATELY** cease use and contact Customer Service if the excavator shows any sign of anomalies or malfunctions, say noise, vibration, odor, leakage, error alarm, etc. **NEVER** attempt to resume using the excavator if the issues remain unsolved.

2.2 Operation Temperature Safety

Warning!

- For proper functioning and expected performance of the excavator, **DO NOT** operate the excavator if the ambient temperature is higher than 113 °F (45°C) or lower than 5°F (–15°C).
- Being operated under an ambient temperature higher than 113 °F (45°C) can cause the engine to overheat, compromise your energy efficiency, and shorten the service life of the hydraulic system.
- If the excavator works under an ambient temperature below 5°F (–15°C), the gaskets and other rubber parts **WILL** be frozen and hardened, causing early and excessive wear to the excavator.
- Under cold temperatures, the excavator may take some time to warm up before working normally. After starting the engine, let it run idle for a couple of minutes and allow all systems a few minutes to get ready.
- **ONLY** use the rubber track at the temperature between –13 to 131°F (–25 to 55°C)
- If the excavator must work in such conditions, consult the customer service before operating.

2.3 Personal Safety

Warning!

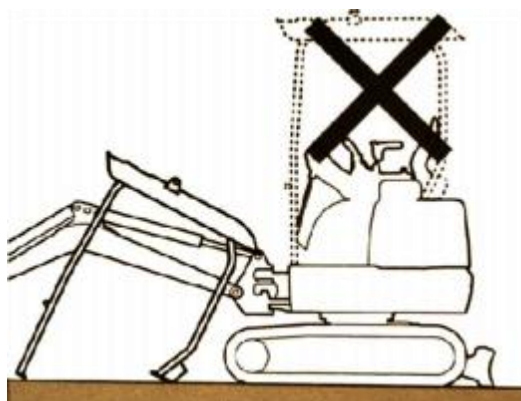
- **DO NOT** wear loose clothes or accessories that may get caught into the moving parts of your excavator in operation. Wear clothes that are oil-repellent. Replace them if grim or grease start to build up. Fabrics coated or soaked with grim can burn in proximity to heated machinery.



- **ALWAYS** use personal protective equipment (PPE) suitable to your task. Always wear ANSI and OSHA-approved eye, breathing, and hand protection while using this product. Nonslip and steel-toe footwear is also highly recommended. Other equipment such as ear, head, and body protection may also be necessary depending on your work, work environment, and other equipment.
- **ALWAYS** keep a fire extinguisher and first-aid kit at an easily accessible place.



- Familiarize yourself with the protocols for using the first-aid kit and operating the fire extinguisher. Ensure that you provide training to other individuals who will be operating the excavator. This ensures that everyone is prepared to handle potential emergencies effectively.
- Display the contact details of the nearest Emergency Room (ER) prominently in the operator's area. Make sure that all personnel operating the excavator are well-informed about this information.
- Do not operate with the cover removed. Make sure the protective barriers, guards, screens, or covers are properly installed and secured before operating the excavator. Do not remove any safety devices except when inspecting and servicing the excavator. Always check that the safety devices are in good condition before operating.



2.4 Operation Safety

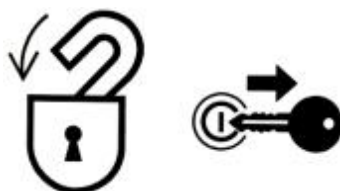
Warning!

2.4.1 General Operation Safety

- Due to the nature of construction work, the use of a signalman or flagman is necessary. Always make sure that you fully understand the gestures and signals used by your signalman or flagman and so do all the persons involved in the work. If at any time such a way of communication fails, use an intercom communication.



- Prior to commencing any operations, run a comprehensive drill rehearsal to ensure that every participant comprehends, can effectively respond to, and proficiently practice both the designated signals and emergency protocols.
- Clean the soles of your shoes of any dirt, grease, or gravel before going into the cab. Operating the excavator with dirt and grease on the soles may result in uncontrollable throttle or accidental falling from the cab.
- **NEVER** place any plastic or glass bottle in the cab, which could catch on fire.
- **ALWAYS** lower your working device to the ground and shut the engine down before leaving the driver's seat. Store the key (s) in a designated place inaccessible to unauthorized use.



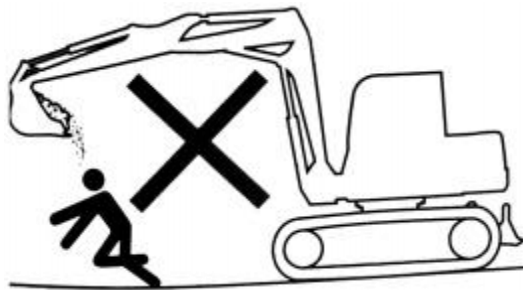
- **ALWAYS** check that the control rod/joystick is set at neutral before starting or stopping the engine.
- Do not enter or exit the excavator by jumping. **ALWAYS** mount the excavator as depicted. **NEVER** attempt to get on and off a moving excavator. **NEVER** use the control rod/joystick as a handle.



- **NEVER** carry any persons with the excavator.



- **ALWAYS** circle around the excavator to check for any anomalies before getting into the cab and operating.
- **ONLY** start the excavator when no one is within its operation radiuses.
- **NEVER** start the engine if you see a “**DO NOT OPERATE**” warning label or similar signs in the driver’s cab, on the control rod, or the start switch.
- **NEVER** move the bracket over any person. Debris falling off could cause serious injuries or even death.



- **ALWAYS** visually check that the dozer is in front of the driver's seat before operating. If the dozer is at the rear of the driver’s seat, the controls for turning and traveling will operate in reverse, contrary to the intended direction for the excavator’s movement.



- **DO NOT** operate on soft or damp soil ground, on which this excavator may tilt or fall over. **DO NOT** operate on unstable ground. If the ground vibrates or shakes as your drive over, cease driving and exit the excavator immediately.

Safety Information

- This excavator is designed for digging, bulldozing, and ditching. It has no compatible apparatus for hoisting. Seek professional advices before operating this excavator for that purpose.

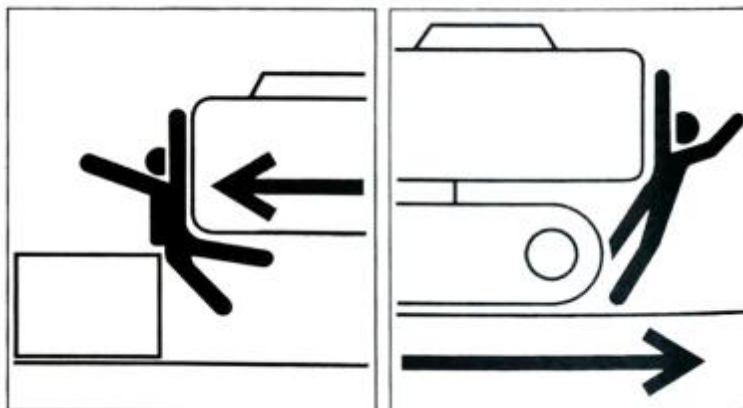


- **ALWAYS** know the locations of obstacles such as ditches, utility lines such as gas, power, and water lines, and things that might fall such as trees, overhead wires or stones on a cliff.

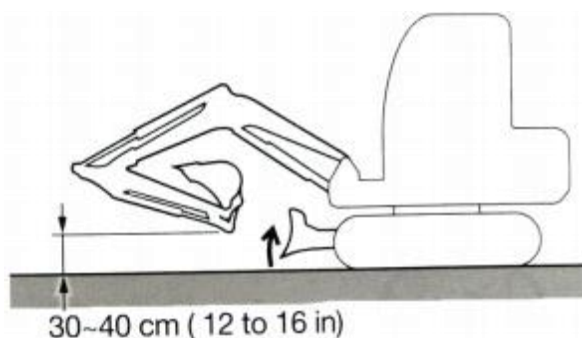


2.4.2 Travel Safety

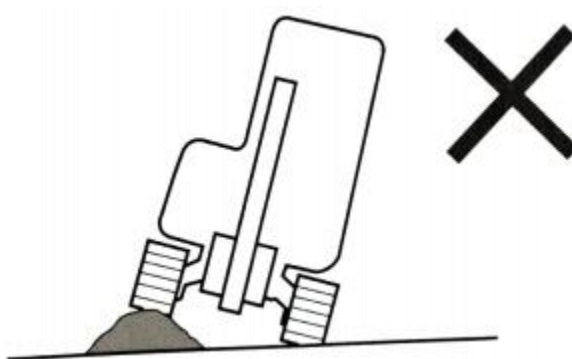
- **ALWAYS** check with the signalman or flag man that there is no person standing within the operating radius of the excavator.



- **ALWAYS** confirm that there is no obstruction before the dozer that may topple the excavator while traveling. Raise the bucket as shown above the ground by 12–16 inches (30–40 cm) depending on the specific terrain. Raise the dozer to its maximum height.



- **AVOID** traveling as shown below. If you must, lower the dozer close to the ground and travel slowly. **DO NOT** get onto obstacles that will tilt the excavator to an angle of 10° or higher.

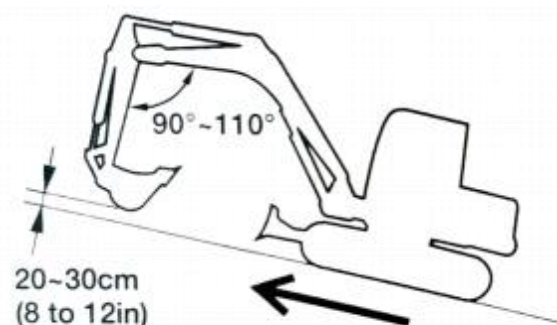
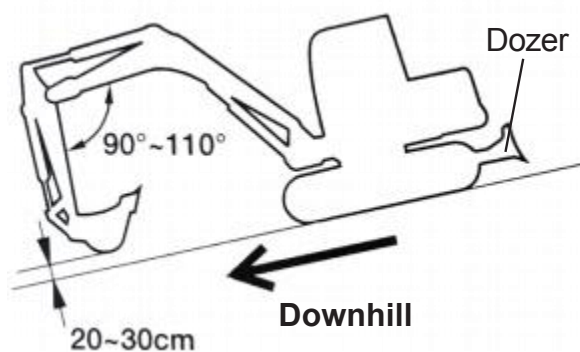


- Maintain a low speed while traversing rough terrain; avoid abrupt starts, stops, or sudden changes in direction. Such actions could lead the working device to come into contact with the ground, jeopardizing the excavator's balance and potentially causing harm to nearby structures.

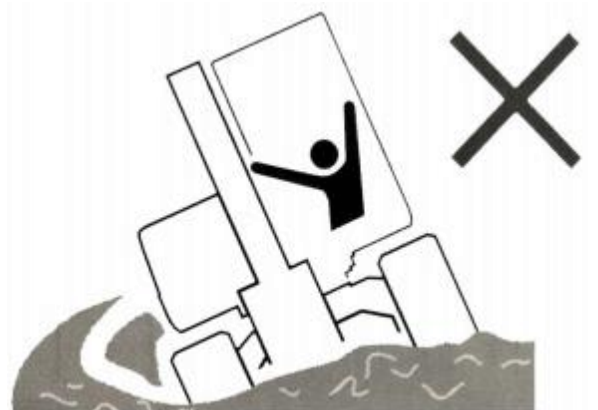
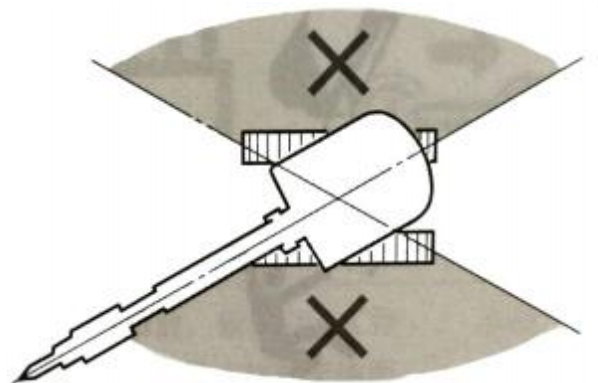
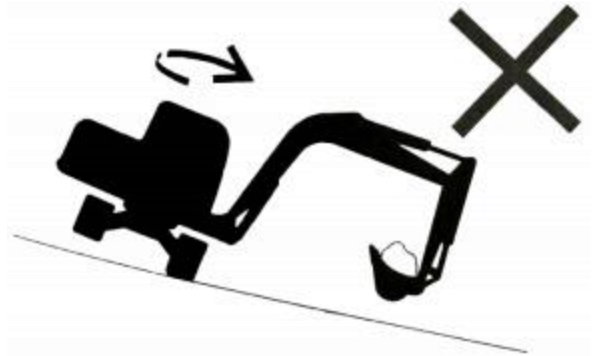
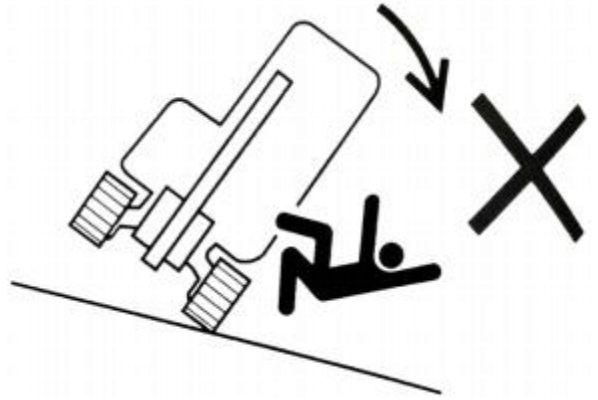
- Exercise caution when navigating slopes. When moving on slopes or inclines, ensure the excavator's stability is upheld. Refrain from operating on excessively steep slopes where the excavator's stability is compromised (maximum angle: 30°, lateral tilt: 10°). Be aware that the excavator's stability can vary depending on the specific work conditions, potentially falling below the mentioned values.

- Before traveling downhill, swing the cab 180° so that the dozer is at your back. Adjust the arm and boom in the position as shown and pay close attention to the slope ahead.

- Before traveling uphill, lower the bucket to 7.9–11.9 inches (20–30 cm) above the ground and ensure the dozer is ahead. Lower the dozer into the ground and shut down the excavator in case of emergency.



- **NEVER** go backwards on slopes. Equipped with crashing hammer, crusher or a long bucket rod, the arm and boom are heavier than the cab. **DO NOT** dig or operate laterally with rod (boom) toward the downhill direction.
- Avoid altering your direction while on a slope or a cross slope. Instead, navigate back to level ground before selecting a new path. This approach helps maintain stability and safety during directional changes.
- **NEVER** swing the cab on slopes. The excavator is more susceptible to rolling over in the lateral direction compared to the longitudinal direction. When the bucket is bearing a heavy load, exercise caution when executing lateral turns (swings). **NEVER** swing the cab abruptly when the bucket is carrying a heavy load even on level ground.
- While moving across gentle slopes covered with grass, leaves, or on wet metal plates or frozen ground, be cautious of potential slipping hazards. Ensure that the excavator is not positioned sideways on the slope to prevent any unintended slipping incidents.
- **EXERCISE EXTREME** caution when operating the excavators on snow or ice. Objects situated on the road shoulder or roadside may be concealed beneath the snow, rendering them invisible. This poses a risk of the excavator overturning or colliding with these snow-covered objects. Therefore, exercise caution while operating the excavator in such conditions. Consult professional advice on operating an excavator under extreme weather conditions.
- Steer clear of entering areas with soft ground, as the excavator's weight may induce tilting, leading to the risk of collapse or sinking. If you find it necessary to operate in such conditions, it's advisable to seek professional guidance or assistance beforehand.



- **ALWAYS AVOID** walking and turning on gravels, highly uneven hard rock, steel beams, scrap iron, or near the edge of a plate, which can result in damage to the rubber track.



- Navigating across riverbeds or ground with numerous gravels could lead to gravel becoming lodged in the track, potentially causing track damage or derailment. Refrain from utilizing this excavator in marine environments. The salty water corrodes the core of the steel track.



- **DO NOT** travel on newly paved asphalt roads or other similarly heated surfaces, as this **WILL** compromise the service life of the rubber track. **NEVER** travel with the rubber track removed for better traction, as this **WILL** shorten the service life of the sprockets.



- Due to the rubber construction of the entire track, it may not offer the same stability as steel tracks. Exercise caution during lateral turns and swings.



Safety Information

- When the vehicle encounters obstacles like pebbles, rocks, or other substantial steps (7.9 inches or higher), ascend at a perpendicular angle without changing direction on the steps.



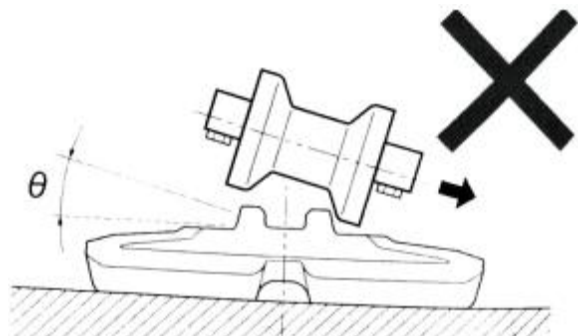
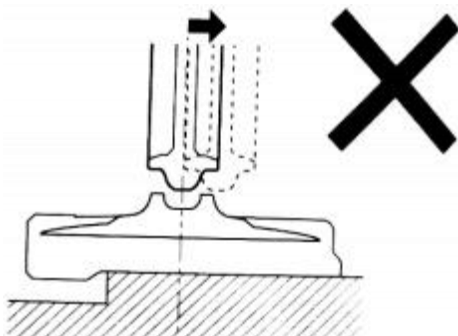
- DO NOT** change the direction as you start to go up a slope.



- Refrain from positioning one track on a slope or protruding surface while the other track is on a flat area (where the excavator inclines at an angle of 10° or higher). Travel with both tracks on the flat surfaces.

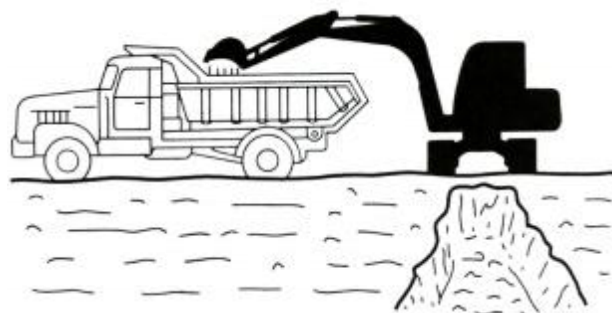


- NEVER** change direction or swing the cab when the track is loose as shown. In such case, if the excavator travels in reverse, the sprockets **WILL** derail from the rubber track. Similarly, if you swing the cab in any direction, the track **WILL** detach.



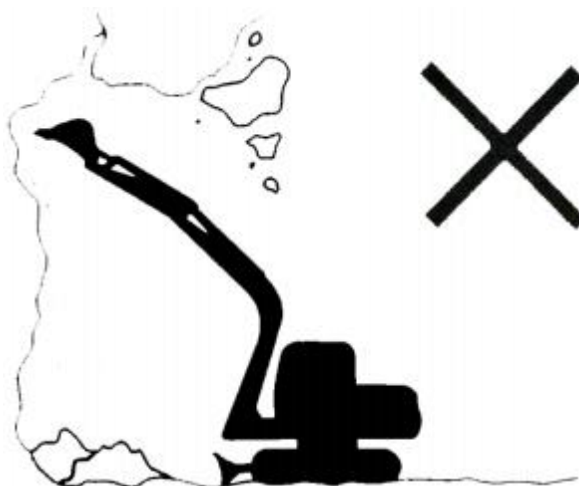
2.4.3 Load & Unload Safety

- **NEVER** raise the bucket over any persons, not even a driver sitting in the cockpit.
- **ALWAYS** ensure the driver's safety when loading. Do not apply load until the driver arrives at a safe place. **ONLY** load/unload from the back of a vehicle.

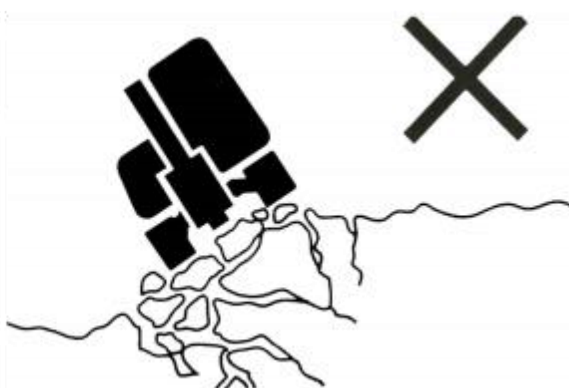
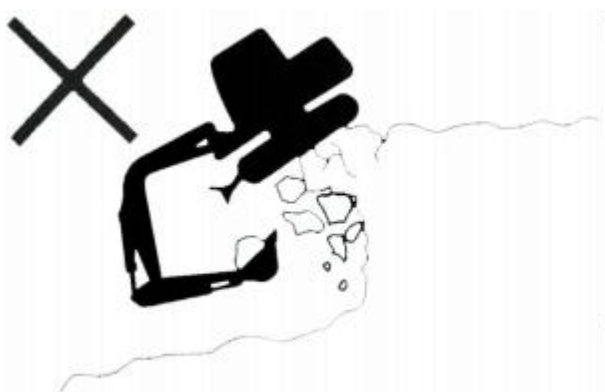


2.4.4 Excavation Safety

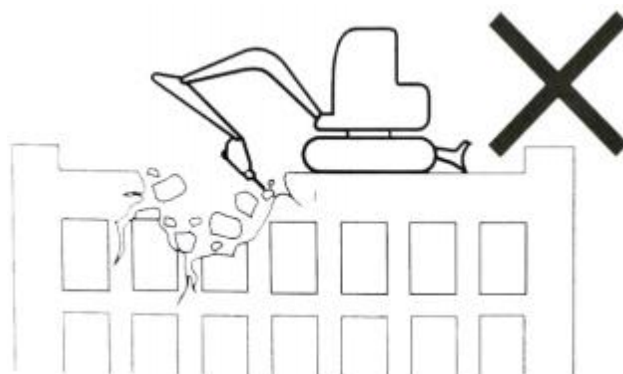
- **NEVER** excavate at the base of steep embankments, as this can trigger the ground above to collapse and pose significant risks. Refrain from operating the excavator in areas prone to falling rocks or debris, as this presents hazards.
- Keep a safe distance between the excavator and the edge of the site. **NEVER** dig the ground in front of the excavator when near an edge.



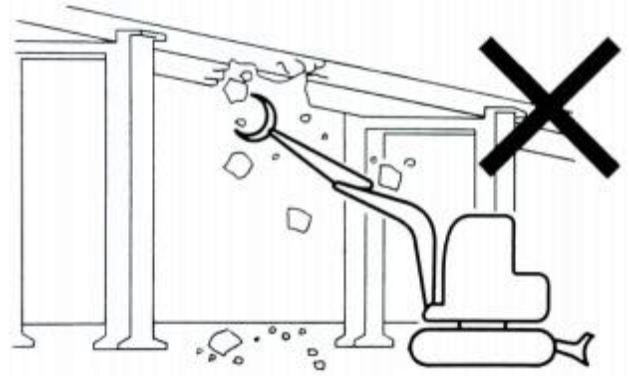
- Refrain from disassembling components underneath the excavator. An unstable ground could result in the excavator rolling over. Before undertaking any operation atop a building or other structure, thoroughly assess their strength and structural integrity.



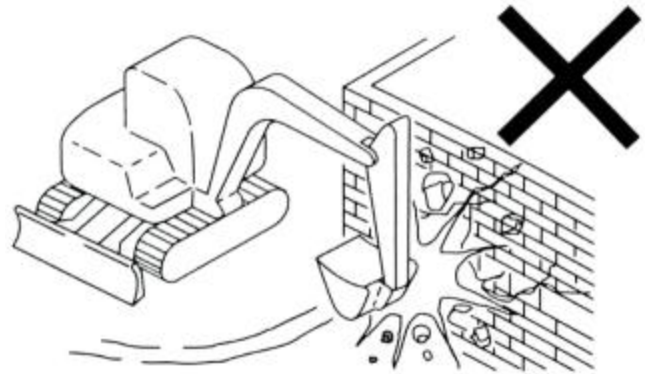
- Avoid disassembling or demolishing from elevated positions. This practice poses a risk of objects falling and buildings collapsing, potentially causing severe injuries or significant destruction.



- **NEVER** disassemble from under a bridge or similar structures. This wrong practice risks getting crushed by falling debris, causing severe injuries, death, or significant destruction.



- **NEVER** use the boom and arm to swing and smash against structures for demolition purposes. This wrong practice can propel heavy debris forcefully, leading to substantial property damage, severe personal injuries, or even loss of life.

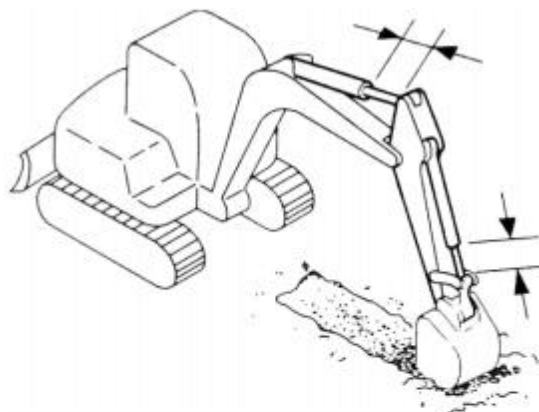


2.4.5 Hoisting Safety

- The lifting capacities of the excavator was measured under the assumption of stable and level ground conditions. For secure lifting, incorporate appropriate safety precautions for specialized work conditions, such as soft or uneven terrain, non-horizontal surfaces, lateral loads, sudden or dynamic loads, hazardous environments, and insufficient personnel experience. **ALWAYS** make sure all operators are familiar with the procedures.
- **ALWAYS** ensure the chain or hoisting device are securely connected.
- While using the excavator as a crane, abstain from attempting to extract tree stumps from the ground, as the load on the excavator becomes uncertain under such circumstances.
- It is strictly prohibited for anyone to be positioned above, below, or near the object being lifted, or within the vicinity of the working area. Limit the access to the work area before the actual work.
- This excavator lacks protective equipment to shield the operator from airborne debris. Hence, refrain from using this excavator in hazardous locations where the operator is susceptible to being struck by flying debris. **ALWAYS** wear protective helmet and stay alert to airborne debris.

2.4.6 Hydraulic Cylinders Safety

- **DO NOT** extend the hydraulic cylinders to their extreme lengths.



- **NEVER** raise the whole excavator by pressing the dozer against a hard surface. The full mass of the excavator and driver **WILL** damage the dozer cylinder. **NEVER** use the dozer for digging.



- **AVOID** forcefully striking the bucket against hard surfaces. This **WILL** damage the boom and arm cylinders, along with other crucial connections.

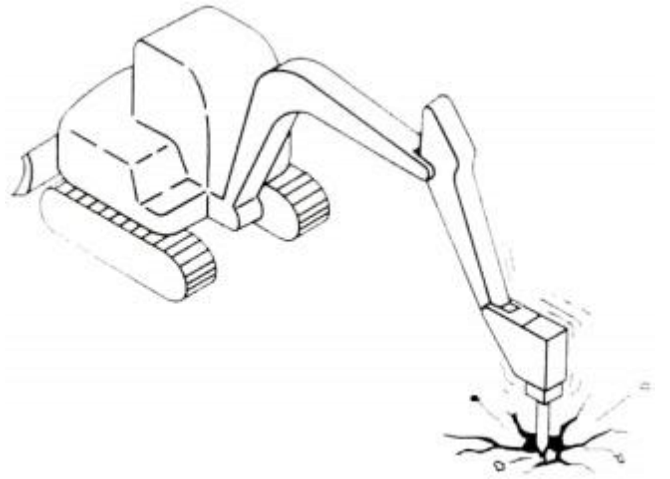


- **DO NOT** use the boom and arm to support the full weight of the excavator, as this **WILL** damage the hydraulic systems as well as pose hazard to the operator and other personnel.



Safety Information

- When dealing with hard rock, employ a concrete crusher (not included) to break the rock into smaller fragments. This approach safeguards the excavator from potential damage and proves to be cost-effective.



- Striking rocks with the dozer can lead to damage of both the dozer and its cylinder. Take caution when retracting the dozer.



- Pay attention to the position of your dozer's control rod when digging. Make sure the dozer doesn't drop accidentally.

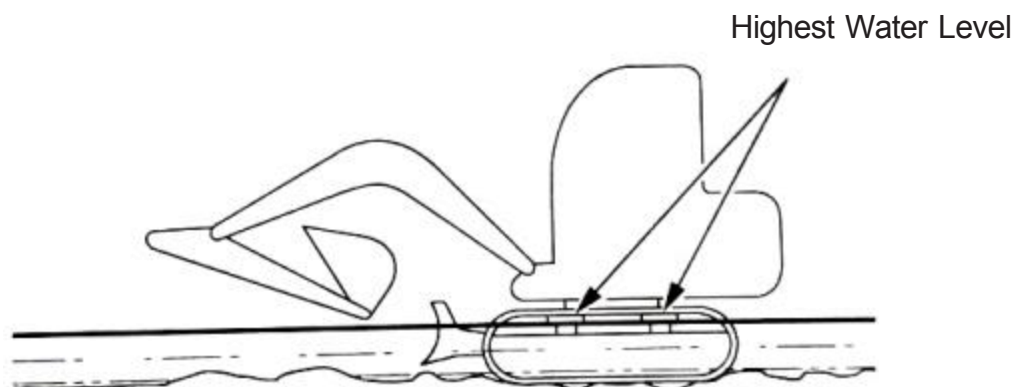


- When engaged in deep digging with the blade positioned at the front, exercise caution to prevent any collision between the boom, dozer, and the bucket. Swing the cab so the dozer is at the rear. Exercise caution as you dig, being careful not to carry too heavy a load.

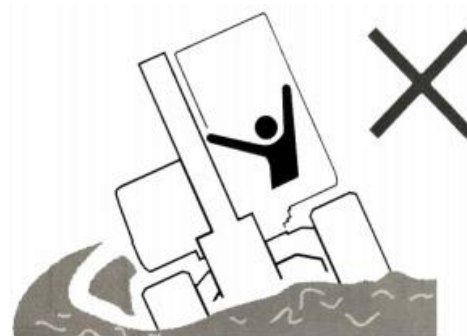


2.4.7 Water Safety

- **NEVER** submerge the cab in water. This will immerse the radiator and burn it. If you must operate in water, make sure the water doesn't cover the whole track. Apply sufficient lubricating oil for those parts that have been operated underwater when on land.



- **ONLY** wade into water whose depth you know cannot compromise the safe operation of the excavator and your personal safety. Drive through at a stable slow speed.



2.4.8 Mud Escaping

One-Track Entrapment

- **NEVER** submerge the cabin water. This will immerse the radiator and burn it. If you must operate in water, make sure the water doesn't cover the whole track. Apply sufficient lubricating oil for those parts that have been operated underwater when on land.



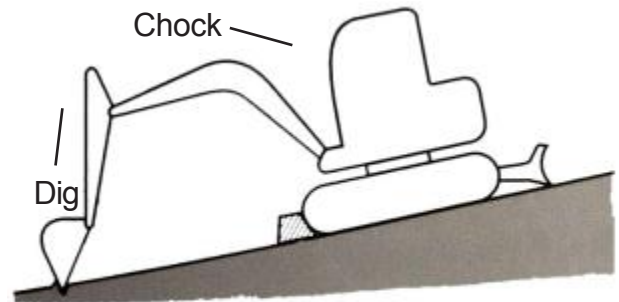
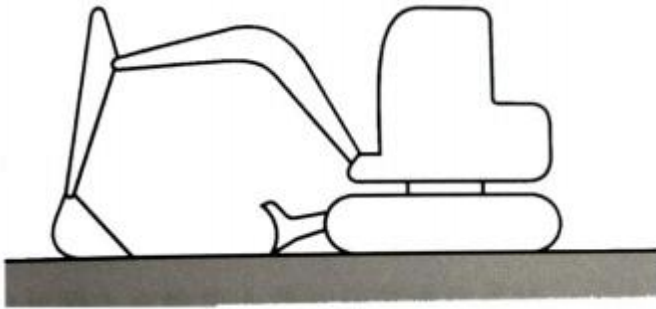
Two-Track Entrapment

1. Repeat steps 1–3 in One-Track Entrapment.
2. Lay two sturdy planks or similar shaped objects under the lifted tracks, being sure the planks are inserted to the end of the tracks.
3. Use the bucket as leverage point while travel out the entrapment.



2.4.9 Parking Safety

- Park the excavator on a flat, solid and safe ground if possible. If such parking surface is unavailable. Make sure you park it as shown.



2.4.10 Worksite Safety

Danger!

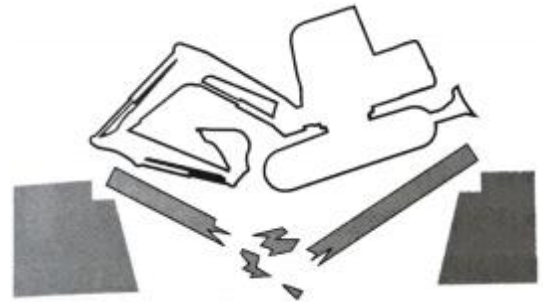
- **ALWAYS** void your worksite of any sparks or flame. The fuel, lubricating oil, grease, and anti-freeze inside the excavator are flammable. Keep the welding and soldering devices away from the excavator.
- **ALWAYS** forbid smoking at and around your worksite.
- **NEVER** use your cellphone or any other similar device when filling the fuel or lubricating oil.
- Keep your worksite well-lit at all times. Use additional illumination when necessary. **DO NOT** operate the excavator if you don't have a clear vision.
- Keep your worksite well-ventilated. **NEVER** operate your excavator in a closed area with poor ventilation. If you must and natural ventilation is impossible, install a ventilation fan and lengthen the exhaust pipe to make sure the fume doesn't get denser inside the closed worksite.
- Some construction materials may contain asbestos. Exercise **EXTREME** care and discretion when dealing with the material. Make sure all the personnel involved wear either a half-face or full-face respirator paired with a **NIOSH-rated N100, R100**, or the more common **P100** filter.
- Do not use compressed air to clean your worksite. **DO NOT** polish or grind materials containing asbestos. If working indoors and there is asbestos dust, require all the personnel involved to wear the respirator mentioned above and install a ventilation system with polymer filter before actually working on material containing asbestos. Limit access to the worksite to authorized personnel and follow the national and local codes and regulations concerning the disposal and handling of asbestos.



- **DO NOT** put any body part of your body near any moving parts of the excavator. The clearance may change when the excavator moves. Train the ground personnel about this, evacuate your worksite of any bystanders, and enclose your worksite with barriers or hurdles before operation.



- **ALWAYS** inspect the terrain and the ground in the worksite before operation. Inspect the building structure for indoor operation, being sure the structure can bear the operating mass of the excavator. When walking on a structure like a bridge, make sure the structure can bear the operating mass of the excavator. For the specific operating mass, check the label on the excavator.



- **DO NOT** operate on soft or damp soil ground, on which this excavator may tilt or fall over. **DO NOT** operate on unstable ground. If the ground vibrates or shakes as your drive over, cease driving and exit the excavator immediately.
- **ALWAYS** know the locations of obstacles such as ditches, utility lines such as gas, power, water lines, and things that might fall such as trees, overhead wires or stones on a cliff.



2.5 Oil Safety

- **DO NOT** remove the fuel tank cap or fill the fuel while the engine is running or still hot. When filling oil, watch out not to splash the oil onto the excavator's hot surfaces or electronic components.
- Forbid smoking in the worksite.
- **IMMEDIATELY** clean the fuel or lubricating oil overspills.
- **AWLAYS** wait till the engine has cooled before refueling. Always fill the fuel tank in a well-ventilated location. Refuel carefully and clean overspills or splashed **IMMEDIATELY**.
- Avoid filling the fuel tank to its maximum capacity; leave room for oil expansion. Immediately address any fuel spillage. Ensure the fuel tank is securely fastened. If the tank cover is absent, replace it with an identical one. Refrain from using unauthorized tank covers that lack proper ventilation, as they could lead to internal pressure buildup.

- For a better engine performance and longer service life, consistently use clean and high-quality fuel. In cold weather conditions, opt for diesel oil that can function efficiently at temperatures at least 53.6°F (12°C) lower than the anticipated minimum outdoor temperature to prevent freezing.
- Select diesel oil with a cetane value of 45 or higher. In cold regions or areas at high altitudes, opt for fuel with a higher cetane value.
- Ensure that the fuel used contains sulfur content below 0.05–0.0015%. In the United States or Canada, use ultra-low sulfur fuel. The use of high-sulfur fuel may result in acid corrosion of the engine cylinder.
- Avoid the use of kerosene. Refrain from mixing kerosene, used lubricating oil, residual fuel, or other additives with diesel oil. Poor-quality fuel can undermine engine performance or cause damage.
- It is not recommended to use fuel additives, as some additives may degrade engine performance. Additionally, metals like zinc, sodium, magnesium, silicon, and aluminum should be limited to one part per million (1 ppm mass) or less.
- When utilizing bio-diesel, adhere to safety guidelines. Warranty provisions from the engine manufacturer may become void if the excavator does not meet the required standard or if deteriorated bio-diesel is used.

2.6 Maintenance Safety

- **ONLY** have this excavator maintained and serviced by a certified mechanist following the specific maintenance cycles stated in this manual.



- **ONLY** replace damaged parts with identical ones. If such parts can't be procured locally, contact the Customer Service.
- **DO NOT** modify the excavator. Unauthorized retrofitting of the excavator may cause injury or even death, for which the manufacturer and importer of the excavator will not be held liable.
- **ALWAYS** check that the labels and signages are legible. If damaged, replace them with identical ones.

- **ALWAYS** keep the excavator clean, especially parts that the driver steps on or holds on to. Wipe grim, grease, dirt, snow or ice off of them to prevent accidental falling.
- **ALWAYS** check the inlets and outlets of the engine for any obstructions.



- Prevent fuel, lubricating oil, salt, or chemical solvents from coming into contact with the track. These substances can corrode the welding seams of the track steel core, leading to rust or detachment. Should any of these substances adhere to the track, promptly rinse it off with water.



- **ALWAYS** mark the excavator with a “**DO NOT OPERATE**” sign if any malfunction arises. Hang the sign on a prominent location, preferably on the joysticks.



- **ONLY** explosion-proof lamps when examining fuel, lubricating oil, coolant, or battery electrolyte. Failure to do so could lead to severe injuries or fatalities caused by an explosion.



- **NEVER** use damaged tools or tools with poor performance or tools with other purposes to service this excavator.



- **ALWAYS** be mindful of the rotating and moving parts. **NEVER** drop or insert any objects into a fan or fan belt, which could tear the objects into pieces and send them flying.



- **ALWAYS** lower all the movable working equipment onto the ground or at the lowest position before maintenance or repair under the excavator.
- **ALWAYS** make sure to immobilize the tracks using chocks before performing any work beneath the raised excavator or equipment.
- Always use a sturdy and stable support such as a wooden block or jack to ensure secure fixation. Do not engage in any work under the excavator or the working device if the equipment isn't stably fixed.
- **ALWAYS** secure the hood before servicing under it.



- When handling heavy objects or accessories during removal or installation, ensure they are placed in a secure and stable location. Restrict unauthorized individuals from accessing the area where such tasks are stored.
- Refrain from lubricating or mechanically adjusting the excavator when the engine is active even though the excavator is not operating. If maintenance must be carried out, use at least two operators. One should be seated in the driver's seat, prepared to promptly shut down the engine if required. The one in the driver's seat should never touch the control rods/joysticks. The other person performing maintenance should stay clear of moving parts.
- The salt, potassium chloride, ammonium sulfate, potassium sulfate and lime superphosphate can damage the track. If any such substances stick to the track, clean immediately with water.
- If the excavator will not be used for a prolonged period (three months or longer), disassemble the rubber tracks and store them away from direct sunlight or rain. Or completely cover them with water-repellent canvas.

3. Assembly

3.1 Installing the Cover


Tools Needed: M10 Hex Wrench

1. Use at least 3 people to unpack the package. Check that the excavator is intact and free of any damage.
2. Remove the hex bolts located around the four corners of the driver's seat if they are already there. There should be 4 on each of the rear right and left corners.
3. Have two people lift the cover and its frame to where it should be installed. Align the holes on the frame base with the ones on the excavator.
4. Tighten the bolts using an M10 hex wrench (not included).

 **WARNING! NEVER** operate the excavator with its cover removed.



3.2 Changing the Work Attachment

 The bucket is fastened to the arm through two bolts and nuts. Installation and removal of the bolts requires strength and care. Always wear protection and exercise care. Use at least two people to handle the bucket.

1. Ensure the excavator is parked on level ground. Lower the bucket's flat surface onto the ground to prevent bucket movement.
2. Remove the two nuts at the upfront as shown. Remove the bolts and keep them where they won't be compromised by metal debris or sand grains.
3. Have two people carry the work attachment to be installed and align its holes with the two holes on the arm. If its working requires hydraulic oil, connect its hydraulic connector(s) to the excavator's hydraulic supply on the arm.
5. Replace the bolts and tighten the nuts.



3.3 Using Alternative Hydraulic Attachments

When equipped with an alternative attachment, the pedal on the **LEFT** controls the attachment extension and contraction.

4. Operation

4.1 Starting the Engine


1. Circle around the excavator, checking for any anomalies, informing the coworkers of the imminent task, and telling the signalman/flagman to standby.
2. Enter the cab in the way as depicted. Sit on the driver's seat, checking that there's no obstructions on the dashboard or around the joysticks. If you see any signs indicating the excavator is out of order, exit the cab.




3. Check all control rods/joysticks are in neutral position. If not, reset them to neutral.
4. Locate the red power switch, located on your left near the seat. Turn while pulling the switch in the direction as indicated by the label around the switch.



5. Insert your ignition key and turn it in the direction as indicated.

 **Warning! NEVER** Start or operate the excavator from a place other than the driver's seat.

 If you are operating at a high altitude or the specific conditions make it hard for the engine to start, pull the knob marked **CHOKE** a little bit to facilitate the ignition. Remember to replace it when the engine has started.





4.1.1 Shutting the Engine

1. Check all control rods/joysticks and buttons are in neutral or "OFF" position. If not, reset them so.
2. Remove the ignition key to shut off this engine.

4.2 Using the Headlights

1. Locate the headlights button. It looks as shown.
2. Press it on and off to check that the headlights light up and shut off.

 The headlights may not be bright enough for all working conditions. Use additional illumination when needed. Remember to turn off the lights when you stop the engine.

 Remember to reinstate the button every time when the headlight is not needed, especially when you shut off the engine.



4.3 Using the Excavation Timer

Located at the left corner of the dashboard is the excavation timer. The timer works automatically soon as you start the engine, recording the total working hours of the whole system. Be aware that the timer is not resettable and it keeps increasing.



4.4 Travelling

4.4.1 Forward Travelling

1. After running the routine safety checks and starting the engine following the protocols stated in **Starting the Engine**, wait for a couple of minutes for the engine and hydraulic oil to warm up.
2. Push the two adjacent rods in the middle away from you, and the excavator starts to move forward.

4.4.2 Backward Travelling

1. After running the routine safety checks and starting the engine following the protocols stated in **Starting the Engine**, wait for a couple of minutes for the engine and hydraulic oil to warm up.
2. Pull the two adjacent rods in the middle towards you, and the excavator starts to move backward.



4.4.3 Making a Left Turn

To turn left while traveling, push the right rod of the travel rods while releasing the left one.

4.4.4 Making a Right Turn

To turn right while traveling, push the left rod of the travel rods while releasing the right one.

Caution! When mobile, **NEVER** push one rod while pulling the other, which **WILL** topple the excavator.

4.4.5 Speeding Up

1. To move faster, use the lever throttle. Locate the lever throttle, which should look as shown on the right.
2. Hold its end, hold down the button located atop, and push the lever away from you. This will increase the output power of the engine.



Warning! **ONLY** adjust the throttle right after starting up the engine. **NEVER** do this when the excavator is mobile, as you should focus on the work at hand.



4.5 Slewing

Pushing the left long joystick to the left makes the cab slowly spin left. Pushing it to the right makes the cab slowly spin right.

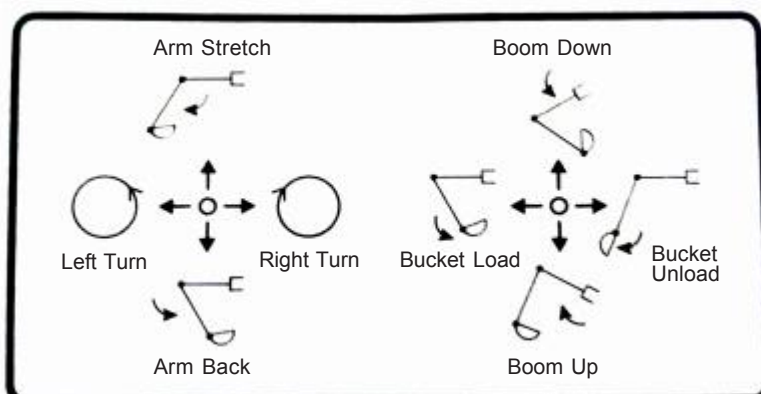


Warning! **ALWAYS** push the joystick slowly and gradually or otherwise you may be tossed out of the cab.



4.6 Basic Excavation

1. Follow the normal safety protocols and start the engine. Steer the excavator to where the digging is expected to be carried out, being sure the surface you are driving on is strong enough to handle the operating mass of your excavator.
2. Refer to the figure below for a basic understanding of the excavation control rods/joysticks



3. Locate and identify the grey long rods. The one on your left controls the dipper (aka arm, stick, or crowd) cylinder. Pushing it forward raises the dipper. Pulling it toward you retracts the dipper.

4. The joystick on your right controls the boom and bucket cylinder. Pushing it forward retracts the boom. Pulling it toward you raises the boom.

5. To control the bucket, push the right joystick left or right. Pushing it to your left controls the bucket to excavate or load. Pushing it to your right controls the bucket to dump or unload.



For better results on hard ground, angle the dipper (aka arm, stick, or crowd) cylinder roughly perpendicular to the dipper and bucket 30° to the ground so that you exert the largest excavating force. For soft ground, angle the bucket 60° to the ground.



Achieving a seamless mastery of excavation demands consistent practice, honed skills, and proficient handling of the excavator. Prior to actual operation, engage in practice sessions at an open area that is robust enough to support the excavator's movement safely and devoid of any onlookers. For optimal outcomes, consider seeking guidance from an experienced excavator owner or enrolling in professional training.



4.7 Basic Bulldozing

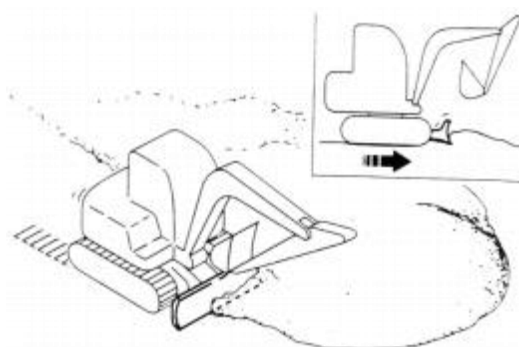
Locate the control rod for bulldozing, which should be the shortest control rod on the right.

Pulling it toward you raises the dozer while pushing away lowers the dozer.



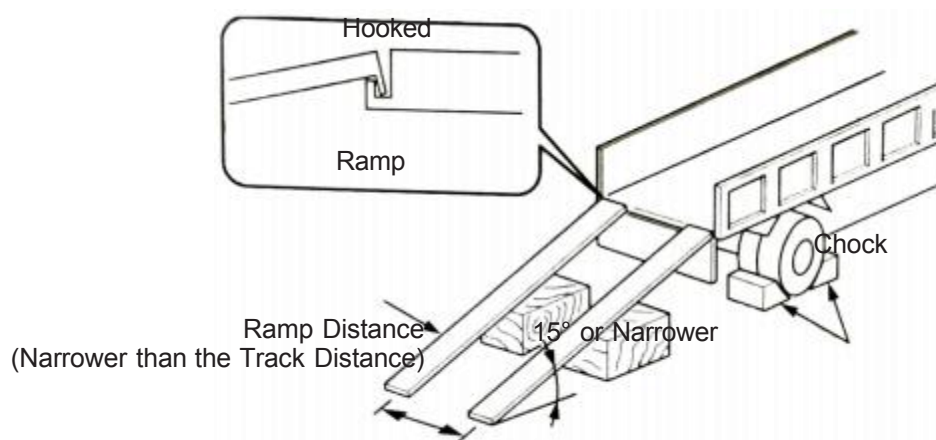
4.8 Leveling


1. Position the dozer working device in proximity to the excavator.
2. Gradually push the soil from the side of the mound to be levelled.
3. As the mound reduces in height, shift the topsoil from the peak. If the load places excessive strain on the excavator, adjust by raising or lowering the dozer.




4.9 Transportation

1. Select a sturdy, level ground area at a safe distance from the roadside.
2. Securely fasten two ramps with adequate strength and dimensions to the truck bed. The incline angle must not exceed 15°. If the ramp is too steep, utilize a support pillar or block underneath them. Make certain that the ramps are wide enough for full contact with both tracks. Refer to the picture right for the truck and ramp preparation.



 Do not use the working device for loading or unloading the excavator, as this **WILL** result in rolling or falling.

 Ensure the truck and loading surface are clean, devoid of oil, sand, ice, snow, or any foreign materials to prevent the excavator from sliding. Clear the tracks.

3. Steer the excavator to travel slowly onto the ramps, being sure the tracks are fully on the ramp.

 **Danger! DO NOT** change direction when on the ramps. Travel slowly and steadily.

4. Stop when the whole excavator is inside the truck bed. Cut the engine, ensure all control rods/ joysticks are at neutral. Remove the ignition keys.
5. Use chocks to immobilize the tracks and prevent movement. Secure the excavator to the truck using a cable or chain if possible. Lock the trunk doors and lids if any.

5. Maintenance

Referring to the excavation timer, maintain your excavator according to the schedules below.



5.1 Initial 50 Hrs. Maintenance

NO.	Task	Qty.	Interval (h)	
			10	50
1	Engine oil level	1	★	
2	Hydraulic oil level	1	★	
3	Fuel level	1		★
4	Oil-Water separator	1		★
5	Fuel pipelines	----	★	
6	Work equipment pivots	----	★	
7	Hydraulic hoses & pipelines	----	★	
8	Bucket teeth	4		★
9	Seat belt	1	★	
10	Bolts and nuts torque	----		.

Note:

★: Routine maintenance interval

●: Maintenance prior to initial us

5.2 Greasing, Replacement & Periodical Check Schedule

No.	Task	Interval (100 hr.)							
		1	2.5	5	10	15	20	25	40
1	Grease the slewing bearing		★						
2	Grease the slewing bearing gears	★							
3	Change engine oil	●	▲	★					
4	Change hydraulic oil					△	★	△	
5	Change hydraulic oil suction filter elements				★				
6	Check the fuel pipe crack		★						
7	Change the oil-water separator			★					
8	Check fuel hose leakage		★						
9	Check the fuel hose leakage		★						
10	Change the bucket	As needed							
11	Check the connection of the bucket	As needed							
12	Remove the traveling handle	As needed							
13	Check the track for defection			★					
14	Maintain the tensioner			★		★			

Note:

★: Routine maintenance interval

●: Maintenance interval of engine oil since initial use

▲: Changing interval of hydraulic oil depends on the oil type.

△: Under the dusty environment, shorten the maintenance interval.

5.2.1 Pivots & Bearings Lubrication

Parts		Qty.	Interval (100 hr.)						
			0.1	0.5	1	2.5	5	10	20
Pivots	Boom base pivot	10							
	Boom base cylinder pivot		★						
	Bucket and connecting rod pivots								
	Others	6	★						
Slewing	Slewing bearing	2					★		
	Slewing bearing external meshing gear	1						★	

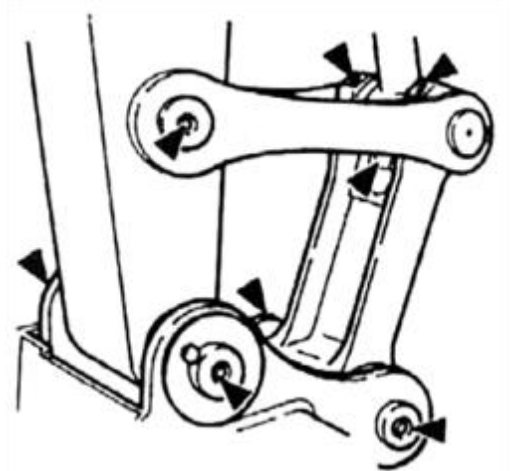
Note:

Using lithium grease is recommended.

★: Routine maintenance interval

Locations of Pivots

- Pivots between bucket and connecting rod



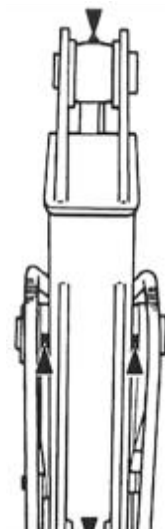
- Pivot at base of the boom



- Pivot at the base of boom cylinder



- Others include:
 pivots between the boom and arm;
 pivot of arm cylinder plunger;
 pivot at base of bucket cylinder.



5.2.2 Lubricating the Slewing Bearing

Lubricate the slewing bearing every 250 hours.

1. Position the excavator on level ground. Lower the bucket to the ground.
2. Allow the engine to idle at low speed for 5 minutes. Switch the ignition **OFF** and remove the key.
3. While the upper structure remains stationary, apply grease to the two grease nipples.
4. Initiate the engine to raise the bucket clear of the ground. Rotate the upper structure by 45 degrees (1/8 cycle).
5. Lower the bucket to the ground.
6. Lower the bucket onto the ground Turn off the engine.



Using lithium grease is recommended.

5.2.3 Lubricating the Meshing Gear of Slew Bearing

1. Lower the bucket to the ground. Allow the engine to idle at low speed for 5 minutes.
2. Switch the ignition **OFF** and remove the key.
3. If necessary, add approximately 0.5kg of grease.

Ensure the grease is stored on the top of the external meshing gear of the slewing bearing, free from any contamination. Any contaminated grease should be replaced with fresh grease.



Using lithium grease is recommended.



5.3 Engine Maintenance

Refer to the engine's manual for engine maintenance.

5.4 Hydraulic Systems Maintenance

Task	Qty.	Interval (100 hr.)									
		0.1	0.5	1	2.5	5	10	15	25	40	
Oil level check	1	★									
Drain pipe cleaning	1				★						
volume	16.5L/4.4 gal.									★	
Replacing the suction filter elements	1						★				
Hose & pipeline check					★						
Changing the hose	39			★							★

Note:

★: Routine maintenance interval

5.4.1 Checking the Hydraulic Cylinder

Caution! Hang a “**DO NOT OPERATE**” sign on the joystick to prevent accidental excavator activation during inspection.

Caution! For your safety and a longer service life of the hydraulic cylinders, it is recommended that you have them checked and serviced by a certified mechanist.

1. Park the excavator on a level and stable surface and stop the engine. Lower the bucket to the ground and turn off the engine.
2. Allow sufficient time for the hydraulic system to cool down completely to avoid exposure to hot and pressurized components.

Caution! The hydraulic system will remain hot after working. Wait for it to completely cool before handling it.

3. Bleed air completely from the hydraulic oil reservoir.
4. Visually inspect the hydraulic cylinder for any signs of leakage, such as oil spots, drips, or accumulated oil around seals and connections.
5. Examine the cylinder's exterior surface for dents, scratches, or any damage that could affect its performance. Check the rod and piston for signs of wear, corrosion, or scoring. Run your fingers along their surfaces to detect irregularities.
6. Gently inspect the rod seals and wiper seals for cracks, tears, or deterioration.

Caution! If the cylinder requires disassembly for a more thorough inspection, contact Customer Service. If any issues are detected or if the cylinder's performance is compromised, contact Customer Service.

7. If everything is in order, remove any safety measures, start the excavator, and test the hydraulic cylinder's functionality through controlled movements.

Caution! If you encounter any abnormal behavior or suspect an issue during testing, immediately turn off the engine and seek professional assistance.

8. Keep a detailed record of the inspection for future reference and maintenance tracking.

5.4.2 Daily Check of Hydraulic Oil Level

Warning ! NEVER start the engine with no hydraulic oil.

1. Ensure the excavator is parked on level ground.
2. Fully retract the arm cylinder and extend the bucket cylinder outward to position the excavator. Lower the bucket until it rests on the ground.
3. Allow the engine to idle at low speed for 5 minutes. Turn off the engine and remove the ignition key.
4. Check the hydraulic oil level in the hydraulic oil tank by removing the hydraulic oil as shown. Check if the oil is still between the marks on the dipstick. If not, proceed with the step for refilling.



5. Infuse the recommended hydraulic oil and check if the oil level has risen between the marks. Replace the cap when the level rises to as stated.



Warning! The hydraulic oil tank is pressurized. Before adding oil, carefully loosen the cap to release pressure slowly. Failure to do so may result in oil spraying out and causing potential hazards. Always exercise caution when working with pressurized systems.

5.4.3 Replacing the Hydraulic Oil Suction Filter Element



Caution! Do not proceed until the hydraulic oil cools down, as it may be very hot.

1. Park the excavator on a level surface. Fully retract the arm cylinder and extend the bucket cylinder to lower the bucket to the ground. Allow the engine to idle at low speed for 5 minutes. Turn off the engine and remove the ignition key.
2. Locate the hydraulic oil cap. Clean the top of the hydraulic oil reservoir to prevent dirt from entering the system.
3. Gradually open the hydraulic oil cap to release pressure. Loosen and remove the oil-pickup filter element cap. Loosen and remove the drain plug at the bottom of the hydraulic oil tank to drain the oil.



Warning! The hydraulic oil tank is pressurized. Before adding oil, carefully loosen the cap to release pressure slowly. Failure to do so may result in oil spraying out and causing potential hazards. Always exercise caution when working with pressurized systems.

4. Extract the oil-pickup filter and the levers. Thoroughly clean the filter and the inside of the hydraulic tank.
5. Utilize an oil-pickup pump to extract any remaining oil residue from the tank's bottom.
6. Position the filter and levers to ensure the filter is securely attached to the outlet. Clean and reinstall the drain plug at the tank's bottom.
7. Add oil until the level is between the markers on the dipstick.
8. Securely attach the oil-pickup filter element cap, ensuring the filter and levers are correctly positioned, then tighten the bolts to 49 Nm.



Starting the engine without hydraulic oil may damage the hydraulic pump.

9. Tighten the oil tank cap.
10. With the engine idling at a low speed, gradually operate the lever for 15 minutes to purge air from the hydraulic system.
11. Fully retract the arm cylinder and extend the bucket cylinder to position the bucket to the ground. Turn off the engine. Remove the ignition key. Check the hydraulic oil level in the tank and add more if necessary.

5.5 Checking Hoses & Pipelines



Warning! Any sprayed fluid can penetrate your skin, resulting in serious injury. Always use a paperboard to check for leakage. Furthermore, exercise extreme caution to keep your hands and body away from pressurized oil. In the event of an accident, seek immediate medical attention from a doctor experienced in treating trauma. Any fluid that penetrates the skin must be removed within a few hours to prevent complications like gangrene.

Warning! Leaked hydraulic oil and lubricant may pose a fire hazard or cause personal injury.

1. Park the excavator on level ground. Lower the bucket to the ground. Set all control rods to neutral and shut then engine off. Remove the ignition key.
2. Check the whole excavator for any missing parts, loose pipe clamps, twisted hoses, pipelines, or hoses rubbing against each other. If any abnormalities are detected, fix as needed.
3. Thoroughly tighten, repair, or replace any loose, damaged, or missing pipe clamps, hoses, pipes, oil coolers, and flange bolts. Do not bend or subject any pressure pipelines to impacts. Never use bent or damaged hoses or pipelines.

5.6 Checking the Battery

For a longer battery life, turn off the headlights when not needed. Avoid igniting multiple times at a time.

If you find it hard to start the engine, replace the battery with an identical one (12 V 45Ahr.).

5.7 Checking the Bucket Teeth

Check if the bucket teeth are worn or loosened daily. Replace as needed if any has become shorter than 5.2 inch (130 mm).

Warning! Exercise extreme care when changing the teeth. Wear goggles and other safety protections.

5.8 Replacing the Attachment

1. Your excavator should have arrived with the bucket uninstalled.



The bucket is fastened to the arm through two bolts and nuts. Installation and removal of the bolts requires strength and care. Always wear protection and exercise care. Use at least two people to handle the bucket.

2. Ensure the excavator is parked on level ground. Lower the bucket's flat surface onto the ground to prevent bucket movement.
3. Remove the two nuts at the upfront as shown. Remove the bolts and keep them where they won't be compromised by metal debris or sand grains.
4. Have two people carry the work attachment to be installed and align its holes with the two holes on the arm. If its working requires hydraulic oil, connect its hydraulic connector(s) to the excavator's hydraulic supply on the arm.



5. Replace the bolts and tighten the nuts.
6. Have two people carry the work equipment to be installed and align it with the two holes on the arm.
7. Replace the bolts and tighten the nuts.

5.9 Checking the Bolts and Nuts Tightening Torque

Check the torques of bolts and nuts at initial 50 hours or prior to initial use and then every 250 hours. Tighten them to the set torque if needed. Replace the damaged with identical ones. Refer to the below tables for required torques.



ONLY use a torque wrench to check the torques of bolts and nuts.

Metric Bolts and Nuts			
Thread Dimensions	Standard Torque (Nm)	Thread Dimensions	Standard Torque (Nm)
M6	12±3	M14	160±30
M8	28±7	M16	240±40
M10	55±10	M20	460±60
M12	100±20	M30	1600±200
Main Components Torques (Nm)			
Thread Dimensions		Recommended Torque	
M16 bolts fixing the traveling motor		252±39.2	
M16 bolts fixing the sprocket		252±39.2	
M20 bolts fixing the slewing bearing		570±60	

5.10 Miscellaneous Checking Schedule

Task	Qty.	Interval (100 hr.)								
		0.1	0.5	1	2.5	5	10	20	40	
Check the bucket teeth		★								
Change the bucket	1	If needed								
Adjust the bucket connecting rod	1	If needed								
Replace the traveling lever	2	If needed								
Check and replace the fuse	1	★	Every 3 years							
Check the track for defection	2					★				
Maintain the tensioner	2						★			
Check the fuel injection timing	—	If needed								
Check the engine compression pressure	—						-			
Check the starter & the A/C generator	—						-			
Check the bolt and nut torques	—		◆		★					

Note:

- ★: Maintenance interval under normal condition
- ◆: Maintenance needed at the first inspection
- : Contact Customer Service.

