Transportation Information

i07200040

Shipping the Machine

SMCS Code: 7000; 7500

⚠ WARNING

Automatic Engine Speed Control (AEC) will increase engine speed automatically when you operate the control levers and/or travel pedals with AEC switch on.

When loading and unloading the machine from the truck or working in close quarters always turn AEC switch off to prevent any possibility of sudden movement of machine, which could result in serious injury or death.

Set the travel speed control switch to LOW before loading the machine. Never operate this switch when loading the machine on a trailer.

Investigate the travel route for overpass clearances. Make sure that there will be adequate clearance for the machine.

Remove ice, snow, or other slippery material from the loading dock and from the truck bed before you load the machine onto the transport machine. Removing ice, snow, or other slippery material will help to prevent the machine from slipping in transit.

Note: Obey all laws that govern the characteristics of a load (height, weight, width, and length). Observe all regulations that govern wide loads.

Choose the flattest ground when you load the machine or when you unload the machine.

1. Before you load the machine, chock the trailer wheels or the rail car wheels.
2. When you use loading ramps, make sure that the loading ramps have adequate length, adequate width, adequate strength, and an adequate slope.
3. Maintain the slope of the loading ramps within 15 degrees of the ground.
4. Position the machine so that the machine can drive straight up the loading ramps. The final drives should be toward the rear of the machine. Do not operate the control levers while the machine is on the loading ramps.
5. When you drive over the loading ramp joint areas, maintain the balance point of the machine.
6. Lower the work tool to the bed or to the floor of the transport machine.
7. To prevent rolling of the machine or sudden movement of the machine, perform the following items:
   - Chock both tracks.
   - Install sufficient tie-downs at several locations.
   - Fasten wire cables.

NOTICE
Do not allow the chrome surface of the bucket cylinder rod to touch any part of the trailer. Damage to the rod can occur from impact with the trailer during transport.

Note: Refer to Operation and Maintenance Manual, “Specifications”.

Shipping a Machine that is not Completely Assembled

If the machine must be shipped when the boom, stick, or counterweight is not assembled on the machine, follow the instructions in Operation and Maintenance Manual, “Operation”.

⚠ WARNING

The ROPS structural certification depends on the support of the boom, stick, and counterweight in the event of a machine tip over or a machine rollover incident.

When the machine needs to be moved without the boom, stick, or counterweight being installed, avoid any machine operations which could affect machine stability as a machine tip over or a machine rollover incident could result in serious injury or death.

The machine should be operated slowly on flat, stable ground or pavement by qualified operators.

i06630014

Securing the Machine

SMCS Code: 7000

Comply with any laws that govern the characteristics of a load (length, width, height, and weight).

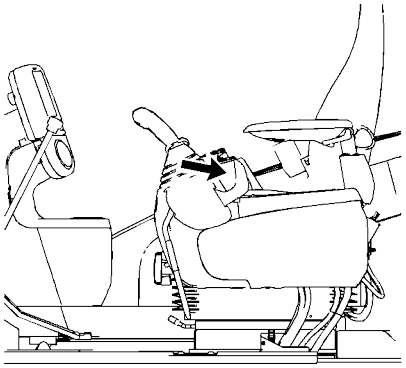

Illustration 319 g01075262

1. Move the hydraulic lockout control to the LOCKED position.

2. Turn the engine start switch to the OFF position in order to stop the engine. Remove the engine start switch key.

3. Turn the battery disconnect switch to OFF and remove the disconnect switch key.

4. Remove the ether starting aid cylinder. See Operation and Maintenance Manual, “Ether Starting Aid Cylinder - Replace” for the removal procedure.

5. Lock the door and the access covers. Attach any vandalism protection.

6. The Product Link antenna (if equipped) may be repositioned in order to meet the regulations regarding height of some locations. The Product Link antenna is located on top of the cab. Perform the following procedure in order to move the Product Link antenna to the transport position.

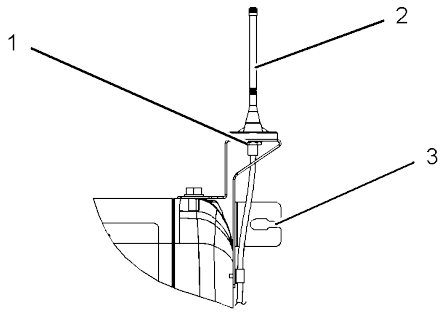

Illustration 320 g01438598

a. Loosen nut (1).

b. Remove antenna (2) and place the antenna in hole (3).

c. Tighten nut (1).

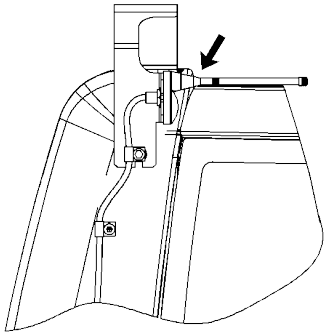

Illustration 321 g01438821

Antenna for Product Link in transport position

d. Return the antenna to the operational position before operating the machine.

7. The AccuGrade antenna (if equipped) must be repositioned for transport. The AccuGrade antenna is located on top of the cab. Perform the following procedure in order to move the AccuGrade antenna to the transport position.

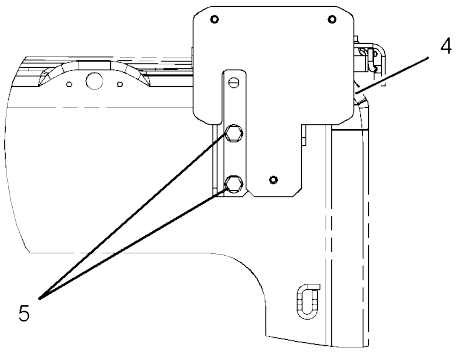

Illustration 322 g02177286

Bracket in position for operation

a. Remove bolts (5) from bracket (4).

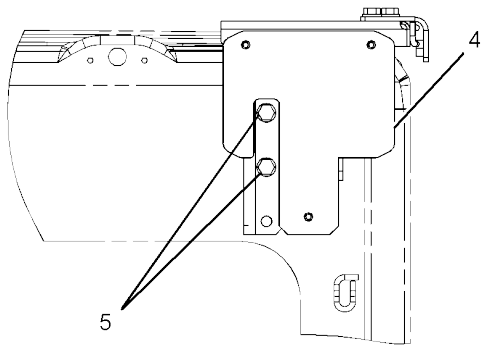

Illustration 323 g02177305

Bracket in position for transport

b. Reinstall bracket (4) with bolts (5) located in the top two holes of the bracket. Refer to Illustration 323 .

Note: The bracket for the AccuGrade antenna must be place back into the normal operating position before the machine can be placed back into service.

8. The side view camera is located on top of the fuel tank and it must be repositioned for transport. Perform the following procedure in order to move the camera to the transport position.

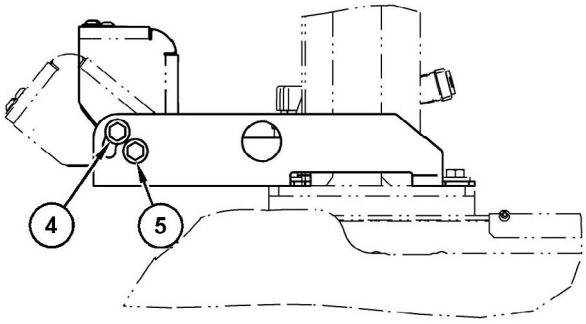

Illustration 324 g06051521

Side view camera in position for transport

a. Loosen bolts (4) and (5) and slide the camera upward to the transport position.

b. Tighten bolts (4) and (5).

Note: The side view camera must be placed back into the normal operating position before the machine can be placed back into service.

9. Cover the exhaust opening.

NOTICE
Do not allow the turbocharger to rotate while the engine is not operating. Damage to the turbocharger can result.

Note: Before you remove the excavator from the transport machine, remove the protective covering from the exhaust opening.

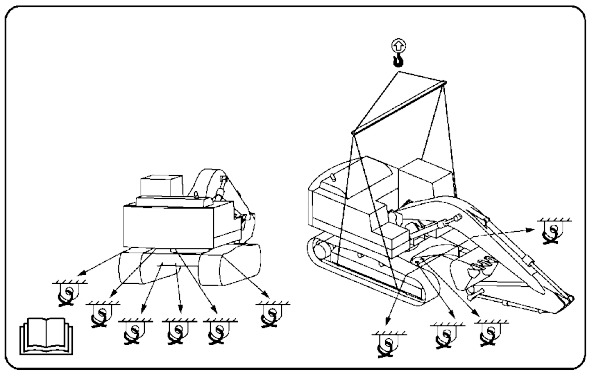

Illustration 325 g02444887

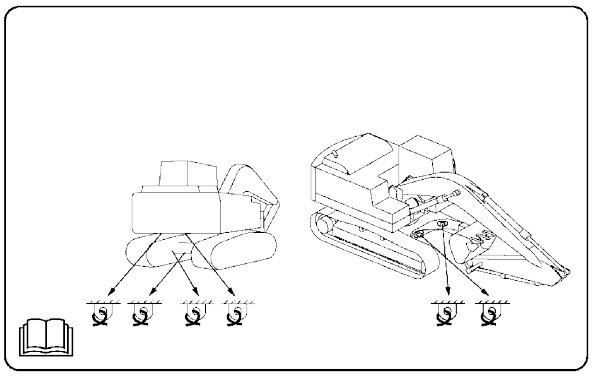

Illustration 326 g02104975

10. Chock the tracks and secure the machine with tie-downs. Make sure that you use the proper rated wire cable.

Use the front towing eyes and the rear towing eyes on the lower frame, and the rear towing eye on the upper frame.

Securely fasten all loose parts and all removed parts to the trailer or to the rail car.

When the engine is stopped, the swing parking brake is automatically applied. This action prevents the upper structure from swinging.

NOTICE
In freezing weather, protect the cooling system with antifreeze, to the lowest outside expected temperature on the travel route. Or, drain the cooling system completely.

i07819227

Lifting and Tying Down the Machine

SMCS Code: 7000; 7500

⚠ WARNING

Improper lifting and tie-down techniques can allow the load to shift or fail resulting in personal injury or property damage. Use only properly rated cables and slings with lift and tie down points provided on the machine. Keep the deck of the transport vehicle clean and use anti-slip mats on steel decks.

Follow the instructions in Operation and Maintenance Manual, "Lifting and Tying Down the Machine" for the proper technique for securing the machine. Refer to Operation and Maintenance Manual, "Specifications" for specific weight information.

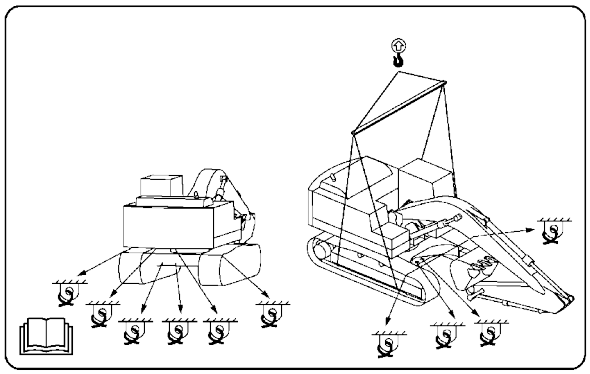

Illustration 327 g02444887

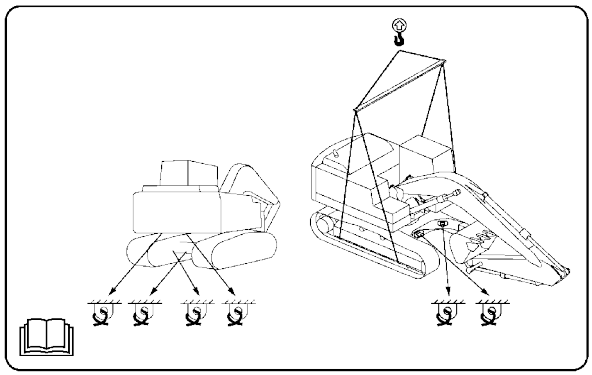

Illustration 328 g02097575

The lift and tie-down film is located near the base of the boom.

Lifting the machine

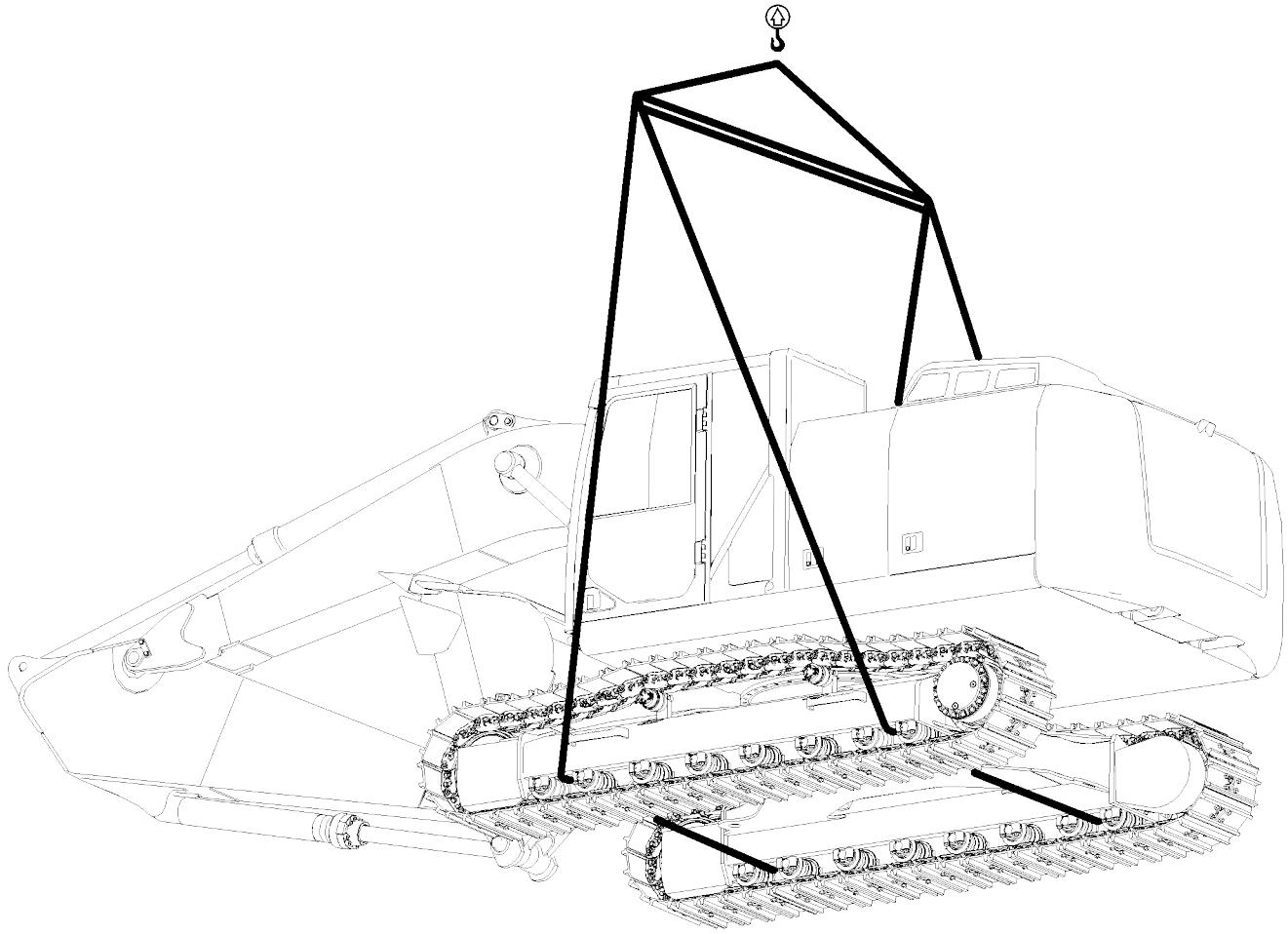

Illustration 329 g02793463

The machine center of gravity is at the center of the swing gear.

Lifting Point – To lift the machine, attach the lifting devices to the lifting points.

The weight and the instructions that are given herein describe the machine as the machine is manufactured by Caterpillar.

Refer to the Operation and Maintenance, “Specifications” for specific weight information.

Note: Only lift objects from approved lifting points and with approved lifting devices

1. Use proper rated cables and slings for lifting. The crane should be positioned so that the machine is lifted parallel to the ground.
2. To prevent contact with the machine, lifting cables should have sufficient length.
3. Move the hydraulic lockout control to the LOCKED position.
4. Thread the cable between the first and second rollers at each end of the track.
5. Do not use the foot step as a lifting point.
6. If the full length roller guard is equipped, remove the guard.
7. Apply the proper protector to prevent machine/wire damage and slippage. Make sure that the rollers are not affected by the load.

Tying Down the Machine

There are two methods that can be used to tie down a machine. Local and/or regional regulations will determine which method to use.

Note: Obey all local and regional governmental regulations.

Frictional and Direct Lashing

When allowed, a combination of frictional lashing and direct lashing is the preferred method to tie down a machine.

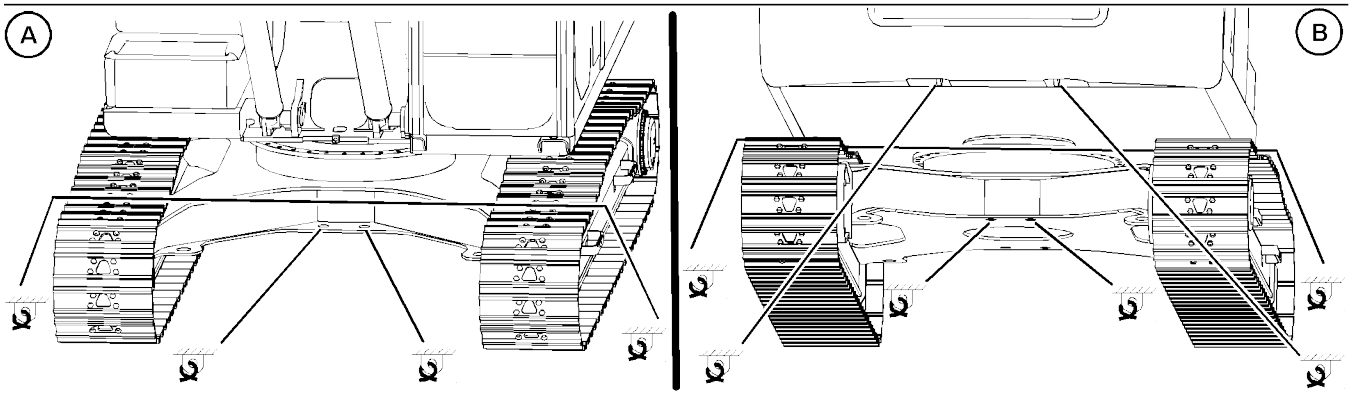

Illustration 330 g02793465

(A) Front of the machine (B) Rear of the machine

Diagonal Lashing

In areas where frictional lashing is not allowed, diagonal lashing can be used as shown below.

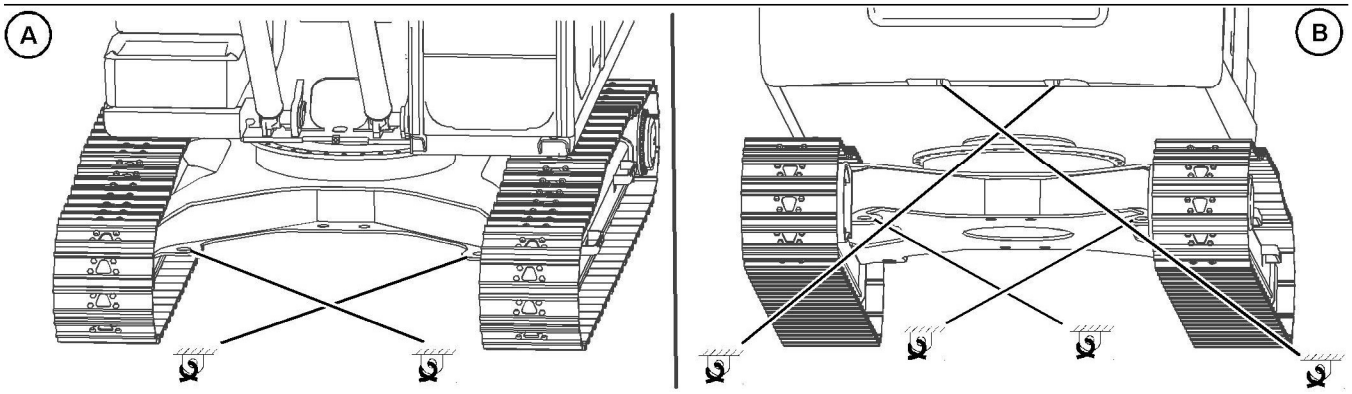

Illustration 331 g06434381

(A) Front of the machine (B) Rear of the machine

Tying Down the Machine

Tie Down Point – To tie down the machine, attach the tie-downs to the tie-down points.

The weight and the instructions that are given herein describe the machine as the machine is manufactured by Caterpillar.

Refer to the Operation and Maintenance, “Specifications” for specific weight information.

1. Use proper rated cables and shackles for tying down the machine.
2. Use the rear eyes and the front eyes that are provided on the lower frame to fasten tie-downs. Use corner protectors for sharp corners.
3. Move the hydraulic lockout control to the LOCKED position.

4. If there is a requirement of diagonal lashing for tying down, use the proper tie-down point on the lower frame. Set the lashing angle which is on the longitudinal axis of the machine and the cable, at 30 to 50 degrees.
5. Keep the transport vehicle surface clean (for example, trailer deck).
6. For steel deck transport vehicles use skid-inhibiting or anti-slip mats (for example, rubber mats) with a friction coefficient of at least 0.3.

Machines Equipped with Blade

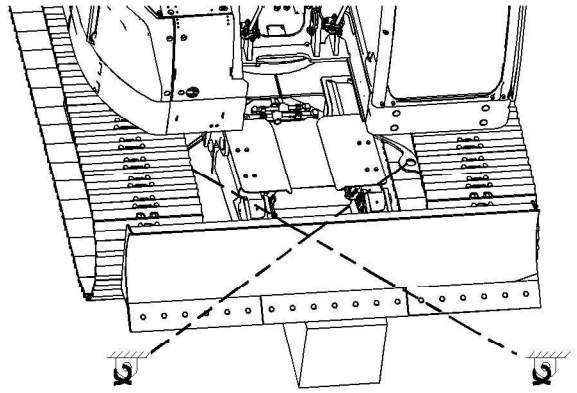

Illustration 332 g06445452

Note: The counterweight must not be positioned over the blade to properly tie down the upper structure under the counterweight.

1. Raise the blade and support the blade with proper blocking equipment.

Note: Support the blade high enough to avoid contacting the tie-downs.

The height of blocking equipment requirement is approximately 450 mm.

2. Use the proper tie-down point on the lower frame. Set the lashing angle which is on the longitudinal axis of the machine and the cable, at 30 to 50 degrees.

Lifting the Machine Segments

Bucket

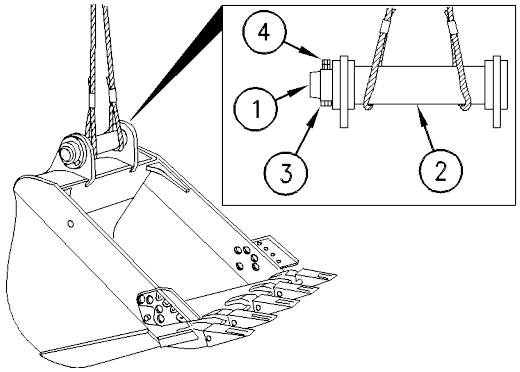

Illustration 333 g00115251

(1) Pin. (2) Sleeve. (3) Bolts. (4) Nuts.

Install pin (1) and install sleeve (2) in the brackets of the bucket. The previous illustration indicates the method to secure pin (1) with bolts (3) and nuts (4). Fasten two proper rated wire cables to pin (1).

Towing Information

i05662590

Towing the Machine

SMCS Code: 7000

⚠ WARNING

Personal injury or death could result when towing a disabled machine incorrectly.

Block the machine to prevent movement before final drives are disengaged. The machine can roll free if it is not blocked. With final drives disengaged, the machine cannot be stopped or steered.

Follow the recommendations below, to properly perform the towing procedure.

Relieve the hydraulic tank and line pressure before any disassembly.

Even after the machine has been turned off, the hydraulic oil can still be hot enough to burn. Allow the hydraulic oil to cool before draining.

NOTICE
To tow the machine, both final drives must be disengaged.

Do not operate the travel motors with the final drives disengaged. Damage could result.

These towing instructions are for moving a disabled machine for a short distance at low speed. Move the machine at a speed of 2 km/h (1.2 mph) or less to a convenient location for repair. Always haul the machine if long distance moving is required.

Shields must be provided on both machines. This will protect the operator if the tow line or the tow bar breaks.

Do not allow an operator to be on the machine that is being towed.

Before you tow the machine, make sure that the tow line or the tow bar is in good condition. Do not use a wire rope that is kinked, twisted, or damaged. Make sure that the tow line or the tow bar has enough strength for the towing procedure that is involved. The strength of the tow line or of the tow bar should be at least 150 percent of the gross weight of the towed machine. This requirement is for a disabled machine that is stuck in the mud and for being towed on a grade.

Do not use a chain for pulling a disabled machine. A chain link can break. This may cause personal injury. Use a wire rope with ends that have loops or rings. Put an observer in a safe position in order to watch the pulling procedure. The observer can stop the procedure if the wire rope starts to break. Stop pulling whenever the towing machine moves without moving the towed machine.

During towing, do not allow anyone to step between the towing and the towed machines.

Do not allow the wire rope to be straddled while the machine is being towed.

Keep the tow line angle to a minimum. Do not exceed a 30 degree angle from the straight ahead position.

Avoid towing the machine on a slope.

Quick machine movement could overload the tow line or the tow bar. This could cause the tow line or the tow bar to break. Gradual, steady machine movement will be more effective.

Prior to releasing the brake of the final drive, firmly lock both tracks in order to prevent the machine from moving suddenly. When the machine is ready to be towed, release the brake of the final drive. Refer to Operation and Maintenance Manual, “Final Drive Ring Gear Removal”.

Normally, the towing machine should be as large as the disabled machine. Make sure that the towing machine has enough brake capacity, enough weight, and enough power. The towing machine must be able to control both machines for the grade that is involved and for the distance that is involved.

You must provide sufficient control and sufficient braking when you are moving a disabled machine downhill. This may require a larger towing machine or additional machines that are connected to the rear of the disabled machine. This will prevent the machine from rolling away out of control.

All situation requirements cannot be listed. Minimal towing machine capacity is required on smooth, level surfaces. Maximum towing machine capacity is required on an incline or on a surface that is in poor condition.

Do not tow a loaded machine.

Consult your Cat dealer for the equipment that is necessary for towing a disabled machine.

Retrieval and Towing of Machine

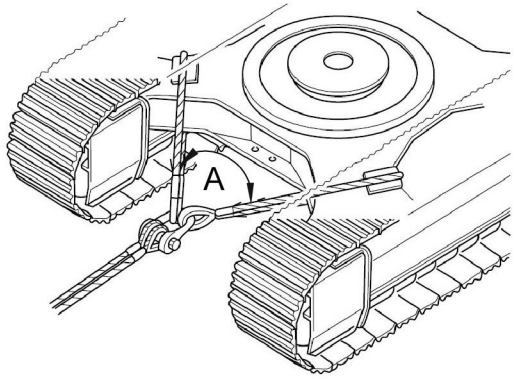

Illustration 334 g02533437

Note: Shackles must be used for towing the machine. The wire rope should be horizontal and straight to the track frame.

Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. The permissible force for the lower frame is 100 percent of the gross weight of the towed machine.

Note: In order to prevent damage to the wire rope or the lower frame of the machines, use protective sleeves on the corners of the lower frame.

Retrieve the disabled machine carefully. The applied load for each wire rope should be equal. The angle (A) between each wire rope should be 60 degree maximum. Operate the machine at a low speed.

Lightweight Towing

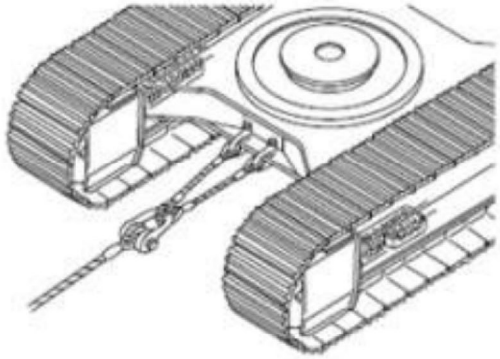

Illustration 335 g03589894

The maximum load for lightweight towing is 57000 N·m (42041 lb ft).

Shackles must be used for towing the machine. The wire rope should be horizontal and straight to the track frame.

Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. Operate the machine at a low speed.

i06139738

Final Drive Ring Gear Removal

SMCS Code: 4050

⚠ WARNING

Without the ring gear in place, the brakes are ineffective. Personal injury or death could result. Provide other means to hold or stop the machine.

Table 37

Suggested Tools			
Item	Part Number	Description	Qty
A	128-5049	Guide Stud	2
B	1P-0074	Slide Hammer Puller Gp	1
	4C-5655	Adapter	1

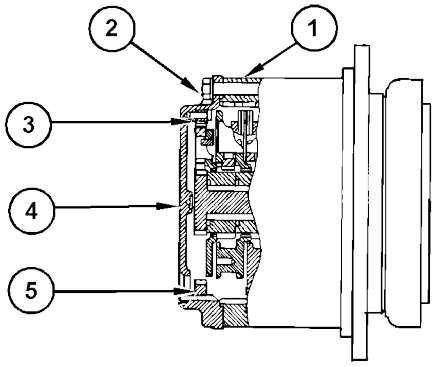

Illustration 336 g03822829

(1) Ring gear
(2) Cover bolts
(3) Bolts
(4) Final drive cover
(5) Ring gear

1. Thoroughly clean the area around the final drive. Make sure that you also clean the track shoes that are positioned above the final drive.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information that pertains to Containing Fluid Spillage.

2. Drain the final drive oil into a suitable container. See Operation and Maintenance Manual, “Final Drive Oil - Change” for the procedure.

3. Remove one track shoe in order to allow access to the face between final drive cover (4) and ring gear (1).

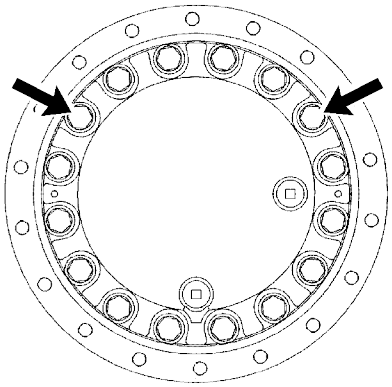

Illustration 337 g01846274

4. Remove two bolts (2). Attach Items (A). This is necessary in order to support ring gear (1) while you remove the final drive cover.

Note: If Item (A) is unavailable, you may use alignment dowels. Make sure that the alignment dowels are able to support the ring gear (1) while you remove the final drive cover.

5. Remove the remaining bolts (2) from the final drive cover.

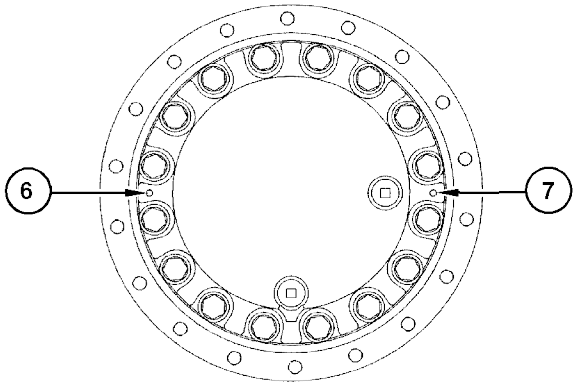

Illustration 338 g03822834

6. Install Item (B) into the final drive cover (1) at location (6) or (7). Use Item (B) in order to separate final drive cover (4) and ring gear (1). Make sure that ring gear (1) stays in place.

Note: If Item (B) is unavailable, you may use a hammer and a wedge in order to separate the final drive cover and the ring gear.

7. Remove twelve bolts (3) and ring gear (5) from final drive cover (4).

8. Apply Gasket Sealant to the mating surface of cover (4) and the housing.

9. Install final drive cover (4) and all cover bolts (2).

10. Fill the final drive with new oil. See Operation and Maintenance Manual, “Final Drive Oil - Change” for the procedure.

11. Repeat this procedure for the other final drive.

12. Refer to the Service Manual for information on the installation of the final drive ring gear.