Cat® Undercarriage

System Management

Management Guide

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Wheeler CAT

Contents

Caterpillar is the only OEM that designs and builds our own undercarriage for a machine-specific product match. Cat® undercarriage is designed to work and wear as a system to make it last. Maintenance can consume a large portion of your budget, and understanding how your undercarriage works can help you reduce wear and minimize costs. The information in the guide will help you set up an undercarriage management system to help you get the most value from your undercarriage.

This management guide offers information, tips, and ideas but is not intended as a technical manual or a substitute for the advice and recommendations of our parts and service experts. By referencing this manual and following the recommendations in your Operations and Maintenance Manual, you can maximize the productivity, service life, and value of your Cat machines.

Manage it well. Make it last.

This guide gives you the tools to get maximum value from your Cat hydraulic system. Understanding the elements of hydraulic system management can help you maintain system efficiency, extend component life, and correct problems to avoid unnecessary repairs and unscheduled downtime.

Detecting wear through daily inspections and preventive maintenance puts you in control of the life and performance of your investment. Wheeler Machinery Co. is always available to answer questions and provide whatever help you need, such as S•O•S℠ fluid analysis and periodic inspections.

Operating and Maintenance Tips

Factors Affecting Wear

Application

The type of job and materials the machine is working in can affect the rate of wear on different components. The following situations all assume level terrain:

Dozing and push loading usually shift the machine weight toward the front, causing faster wear rates on the front rollers and idlers.

Ripping and drawbar shift the weight toward the back, increasing wear on the rear rollers, idlers, and sprockets.

Loading, as with a carry dozer, shifts the weight from the rear to the front of the machine as it changes from digging to carrying. Wear will occur more on the front and rear rollers than the center ones.

Excavating shifts the weight to the side where the digging is being done. Spreading dumped material tends to create more wear on the undercarriage side where the operator hits the pile, due to the material entering the undercarriage from the side.

Terrain

Most of the time you can't control the terrain you are working in. However, it is important to understand how contours and slopes affect undercarriage wear.

Working uphill shifts the weight and load balance to the rear, causing higher wear on rear rollers and increasing forward drive side sprocket and bushing wear.

Working downhill shifts weight and load balance forward causing a relatively higher wear rate on front track rollers and idlers.

Working on a side hill shifts the weight and load balance to the downhill side of the machine. This increases the wear rate on the components and parts on the sides that are on the upper side of the hill.

Working on a crown shifts the load to the inboard components, increasing wear on inner links, inner roller, idler treads, and grouser ends.

Working in a depression shifts the load to the outboard components, increasing wear on outer links, outer roller, idler treads, and grouser ends.

Wear Reducing Techniques

Packing

During operation, materials can stick to and pack between mating components such as rollers, links, sprocket teeth, and bushings. Packing prevents parts from engaging correctly. This can cause higher loads and increased wear rates. Packing is inevitable in many applications; however, there are things you can do to reduce the effects of packing.

- Use center punched shoes in certain situations to help relieve extrudable materials such as wet sand, clay, or snow.
- Clean out your undercarriage as often as possible. Garbage, twigs, stones, and demolition debris cannot be extruded through the center punched shoes.
- Use roller guards only when necessary because they may trap debris and increase the effects of packing. They are designed primarily for use in high-impact underfoot conditions.

Always use the narrowest shoe possible

Use narrow shoes which still provide adequate flotation for your application. Proper floatation helps reduce wear by keeping track from being submerged in material, but using wider shoes than required by your application can lead to:

- *Increased bushing and sprocket wear:* Turning resistance, loads, and weight increase with wider shoes, especially in rough underfoot conditions. This added stress causes faster wear rates for bushings and sprockets.
- *Increased link, track roller, idler tread, and flange wear:* Using shoes that are too wide increases the interference between these surfaces, causing them to wear faster.
- *Loosening of pins, bushings, and shoe hardware:* Leverage forces increase with wider shoes. In high impact or especially rough terrain, greater leverage forces may lead to premature loosening of bolted and pressed-fit components.
- *Reduction of track joint life:* Bending forces are exaggerated when using wide shoes in high impact applications, causing pressed track joints to "open up." This may lead to loss of lubricant, internal wear, and replacement or reconditioning of track joints sooner than expected.
- *Shoe breakage:* Severe turning resistance in extreme conditions and bending forces may cause wide shoes to break.

Control the operation of your machine

One of the best ways to protect your machine against unnecessary wear is to make sure it is used properly. All of the following cause additional wear on the components of your undercarriage:

- Slipping the track reduces production and increases wear on all undercarriage components, especially on grouser bars.
- Avoid unnecessary reverse operations Non-productive reverse operation compounds bushing and sprocket wear. If the machine must be taxied from one location to another, reverse operation will cause more bushing wear regardless of speed.
- Operating the machine at a non-productive high speed may cause link, tractor roller, and idler tread wear. Wear increases proportionally to speed.
- Always turning the machine in one direction may cause link side rail/track roller flange and idler flange wear. Wear increases on one side of the machine because of the greater horsepower and distance traveled.

Be sure your track is always properly adjusted

Every application affects undercarriage wear differently and requires proper track adjustment. Adjust your track in the underfoot conditions in which your machine is working. For example, if track that is correctly adjusted for a non-packing application is put into a packing situation, packing materials will increase track tension, making the track adjustment too tight.

Added track tension increases both the load and the wear on all mating components of your undercarriage. Improperly adjusted track can result in problems and wear on other components:

- *Bushing and sprocket accelerated wear*
  Tight track increases loads which advances wear. Wear occurs as the bushing rotates and/or slides in the sprocket.
- *Link, track roller, and idler accelerated wear.* To a lesser extent, tight track increases loads between the links, rollers, and idlers. This particularly accelerates wear on the idlers.

For information on how to adjust your track, see Track Adjustment Procedures, page 7.

Undercarriage repair options

Maximize the life of your undercarriage and reduce your cost per hour by taking advantage of these undercarriage repair options:

- Wet bushing turn
- Roller reshelling
- Roller swapping
- Idler resurfacing
- Track shoe regrousering

Track Adjustment Procedures

Specifications

Chart 1.

Proper Track Sag

Machines without carrier rollers

	Inches			Millimeters		
Model	**Min**	**Target**	**Max**	**Min**	**Target**	**Max**
D11T, D11R, D11N, D10	6.1	6.5	6.9	155	165	175
D10T, D10R, D10N, D9L, 589	5.7	6.1	6.5	145	155	165
D9T, D9R, D9N	4.7	5.1	5.5	120	130	140
583T/R, 587T/R	3.5	3.9	4.3	90	100	110
D8T, D8R, D8N, 572R, 578	4.1	4.5	4.9	105	115	125
D8L	5.1	5.5	5.9	130	140	150
D7R, D7H	4.6	5.0	5.4	117	127	137
D6T, D6R, D6H	4.1	4.5	4.9	105	115	125
527	2.6	3.0	3.4	65	75	85
D5H, D4H, 517, 561H, 561M	3.5	3.9	4.3	90	100	110

Chart 2.

Proper Track Sag

Machines with carrier rollers

	Inches			Millimeters		
Model	**Min**	**Target**	**Max**	**Min**	**Target**	**Max**
D11T, D11R, D11N, D10	2.6	3.0	3.4	65	75	85
D10T, D10R, D10N, D9L, 589	2.4	2.8	3.2	60	70	80
D9T, D9R, D9N	2.2	2.6	3.0	55	65	75
D8T, D8R, D8N, D8L, 578	2.2	2.6	3.0	55	65	75
583T/R, 587T/R	2.0	2.4	2.8	50	60	70
D7R, D7H, 572R	2.2	2.6	3.0	55	65	75
D6T, D6R, D6H	1.8	2.2	2.6	45	55	65
D6N, D6M, D5H	1.8	2.2	2.6	45	55	65
D5N, D5M, D4H, 561H, 561M	1.0	1.4	1.8	25	35	45

Chart 3.

Proper Track Sag SystemOne™

Machines with carrier rollers*

	Inches			Millimeters		
Model	**Min**	**Target**	**Max**	**Min**	**Target**	**Max**
D8T, D8R	2.2	2.6	3.4	45	65	75
D6T/R/H, D6N/M, D5H	1.6	1.8	2.0	40	45	50
D5N/M, D4H	1.0	1.4	1.8	25	35	45
Machines without carrier rollers*						
D8T/R	3.1	4.5	4.9	80	115	125
D6T/R/H	4.1	4.5	4.9	105	115	125

* If excessive track jumping occurs, run the track adjustment to the minimum side of the track sag range.

Chart 4.

Track Roller Frame Extension Specifications

Machines with and without carrier rollers

Model (Serial Number Range)	Inches	Millimeters
D11T, D11R	7.8	198
D11N	7.0	178
D10T (RJG), D10R (AKT) (3KR01331-UP), D10	7.6	194
D10L (2YD1-515)	5.8	148
D10N (2YD516-UP)	6.8	173
D9T (RJS), D9R (ACL) (ABK) (8BL1422-UP) (7TL1212-UP)	7.4	189
D9R (8BL1-1421) (7TL1-1211), D9N	5.9	150
D9L, 589	6.3	160
D8L	6.5	165
D8T, D8R, 583T/R (7XM5094-UP) (6YZ) (KPZ)	6.0	152
D8R (7XM1-5093), D8N (9TC) (5TJ)	5.6	142
D8 T/R SystemOne	6.0	152
D8N, 578 (9TC) (5TC), 572RII	5.6	142
D7R - STD, XR	5.4	136
D7R - LGP, 572R	5.4	136.5
D7H - STD, XR, LGP, 572R	5.0	127
D6R - STD (2YN1-544) (3ZN1-762)	6.2	156.8
D6T, D6R - STD (2YN545 & UP) (3ZN763 & UP) (AFM) (AEM)	5.8	147.5
D6R - XR (6JN1-415) (7KN1-450)	6.2	156.8
D6R - XR (6JN416 & UP) (7KN451 & UP)	5.8	147.5
D6R - LGP (8LN1-528) (9PN1-1578)	6.0	151.8
D6T, D6R - LGP (8LN529 & UP) (9PN1579 & UP) (ACJ) (ADE)	5.6	142.5
D6R - XL (4MN1-503) (5LN1-2765)	6.0	153.5
D6T- XL, XW, LG, D6R - XL (4MN504 & UP) (5LN2766 & UP)	5.7	144.2
D6R - XW	5.7	144.2
D6H - STD, XR	6.4	161.8
D6H - LGP, 527	6.2	156.8
D6H - XL	6.0	153.5
D6N/M - XL	4.0	102.4
D6N/M - LGP	4.3	108.2
D5N/M - XL	3.6	91.7
D5N/M - LGP	3.5	88.5
D5H, 517	4.4	112
D4H, 561H/M	3.9	100

Adjustment procedures take only a few minutes and require only one person.

1. Always adjust the track in the working area.
2. Do not try to squeeze any packing material from in between the track.
3. Never loosen the relief valve more than one turn. Grease and oil are under extreme pressure and can penetrate the body, causing serious injury.

Elevated Sprocket Tractors

Refer to page 7 for specification charts.

1. Move the tractor forward and let it coast to a stop without applying the brakes. Make sure slack is between the sprocket and front idler. Then park the machine and turn off the engine. Place a tight line over the grouser tips from the sprocket to the front idler.

2. For machines without carrier rollers, measure the distance "A" from the line to the grouser tip at the lowest point of sag. Refer to Chart 1 to determine the correct sag for each model.

For machines with carrier rollers, measure the distance from the line to the grouser tips in two places at the lowest point of sag between the front idler and carrier roller "A" and between the carrier roller and sprocket "B." Then average the two measurements. Refer to Chart 2 to determine the correct sag for your model.

For SystemOne machines with or without carrier rollers, refer to Chart 3.

3. If your track requires adjustment, locate the hydraulic fill and relief valve in the rear roller frame, and remove the inspection cover.

Using a manual grease gun, add grease at the adjustment mechanism to tighten the track. To loosen the track, open the relief valve and allow grease to escape. Then close the relief valve.

4. Operate the machine in forward and reverse, then re-measure track tension.

To avoid damage to internal roller frame components, do not allow the length of the exposed tube "B" to exceed the dimensions listed in Chart 4.

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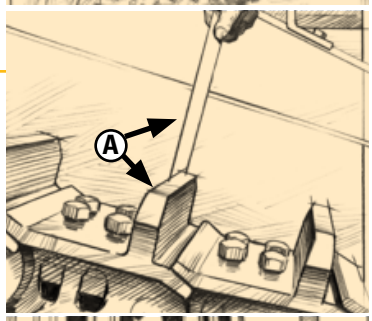

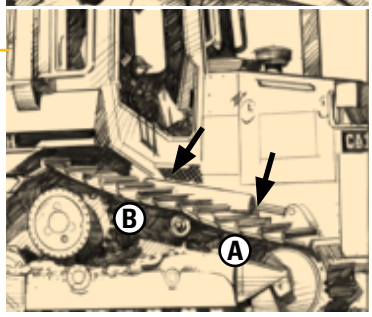

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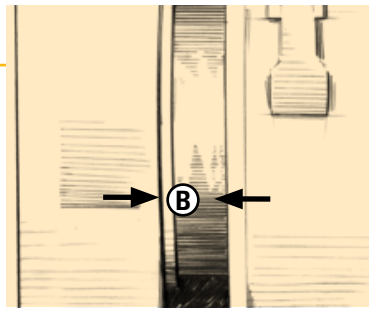

Low Sprocket Tractors and Loaders

1. Move the machine forward and let it coast to a stop without applying the brakes. Then park the machine and turn off the engine.

Place a tight line over the grouser tips from the sprocket to the front idler. Track sag should be about 2 inches or 50 millimeters. If your track requires adjustment, complete the following steps.

2. Connect the grease gun to the fitting at the track adjustment mechanism “A” located under the inspection plate. “B” is the front idler bearing assembly.

3. Add grease to extend the hydraulic track adjuster until the idler is at maximum forward position. The relief valve should remain closed.

After adding grease, the track should be almost straight between the front carrier roller and idler.

4. On machines with one carrier roller per side, place a mark on the track roller frame .4 inch or 10 millimeters behind the rear edge of the front idler bearing assembly “B.”
On machines with more than one carrier roller per side, mark the track roller frame .5 inch or 13 millimeters behind the rear edge of the assembly.

5. Open the hydraulic relief valve.

6. Place a track pin or drawbar pin between the sprocket teeth near the link assembly.

7. Travel in reverse until the idler backs up at least .5 inch or 13 millimeters. Move the machine forward until the pin is free of the track, then remove the pin.

8. Close the hydraulic relief valve. Using the grease gun, extend the hydraulic track adjuster until the rear edge of the idler bearing assembly aligns with the mark on the roller frame.

The resulting sag should be about 2 inches or 50 millimeters. Operate the machine in forward and reverse, then reinspect track adjustment.

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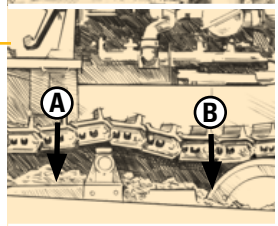

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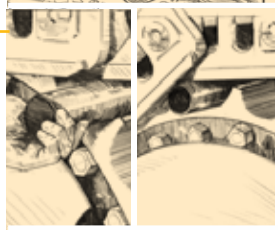

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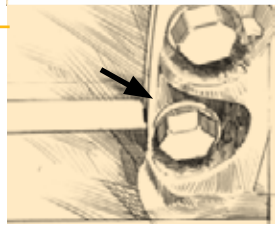


Hydrostatic Loaders

1. Move the machine forward and let it slowly come to a stop. Then park the machine and turn off the engine.
Place a tight line over the grouser tips from the sprocket to the front idler Measure the distance from the line to the grouser tips at the lowest point of sag. Proper track tension is about 2 inches or 50 millimeters.

2. If the track requires adjustment, remove the cover for the adjusting mechanism.

Connect the grease gun to the fitting. Add grease to move the idler forward until the track is tight.

3. Using a straight edge, make a mark on the rod even with the recoil housing "A."

4. Place a second mark on the rod .4 inch or 10 millimeter from the first mark, in the direction of the idler. On the 973, place the mark on the rod .5 inch or 13 millimeters in the direction of the idler.

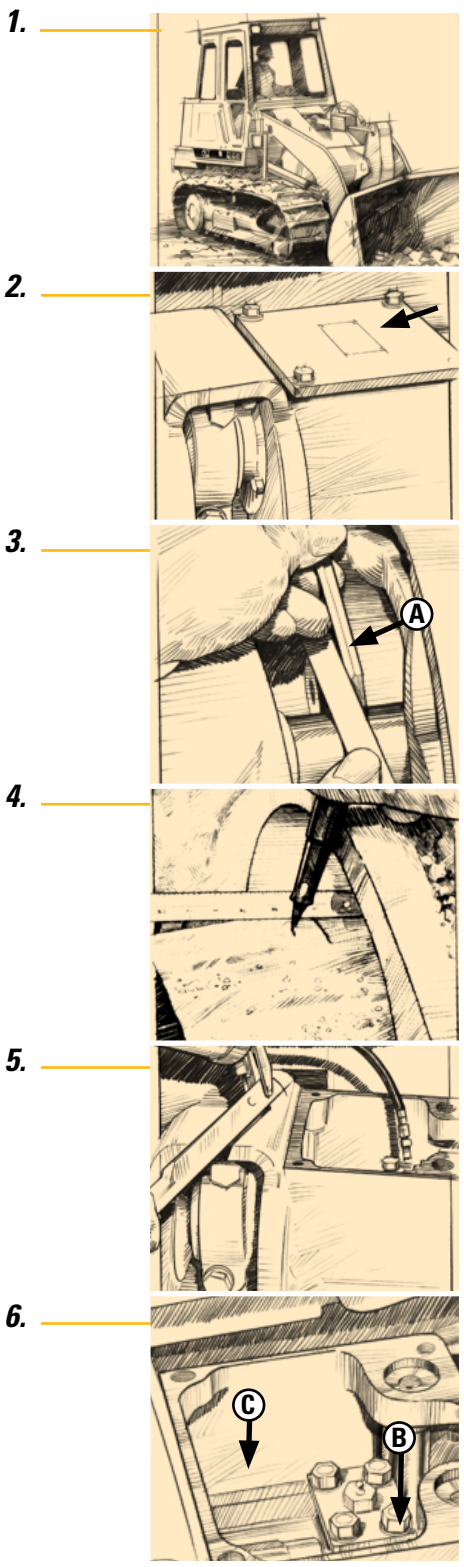
5. Open the relief valve and let the idler drift back until the second mark is behind the recoil housing. Then close the relief valve.

Using a grease gun, move the idler forward until the second mark is even with the recoil housing. The resulting sag should be about 2 inches or 50 millimeters.

Operate the machine in forward and reverse, then reinspect the track.

6. As wear increases on the track link and rolling components, the distance between the piston "B" and recoil housing "C" will increase. Consult a Caterpillar Service Manual or contact us when the distance exceeds:

- 2 inches or 50 millimeters on 943 and 953 Track Loaders
- 2.36 inches or 60 millimeters on 963 and 973 Track Loaders



Hydraulic Excavators

1. Operate the machine in the direction of the idlers.

2. Stop with one track pin directly over the front carrier roller. Park the machine and turn off the engine.

3. Place a tight line or straight edge on top of the grousers between the front carrier roller and idler.

Measure the distance from the straight edge to the grouser tip at the lowest point of sag, midway between the front carrier roller and idler.

Refer to the chart below to determine the correct sag for each model.

4. If the track is too tight, loosen it by opening the relief valve and allowing grease to escape.

5. Tighten track by adding grease at the hydraulic fill and relief valve. Travel in forward and reverse to equalize tension throughout the track. Then reinspect adjustment.

Proper Track Sag

	Inches			Millimeters		
Model	**Min**	**Target**	**Max**	**Min**	**Target**	**Max**
All 200-Family series excavators	1.0	1.3	1.5	25.0	32.5	40.0
All E-Family series excavators	1.6	1.85	2.1	40.0	47.5	55.0
All 300-Family series excavators	1.6	1.85	2.1	40.0	47.5	55.0
All 500 and TK-Family series excavators	1.6	1.85	2.1	40.0	47.5	55.0
5080, 5090B, 5130, 5130B, 5110B	1.6	1.85	2.1	40.0	47.5	55.0

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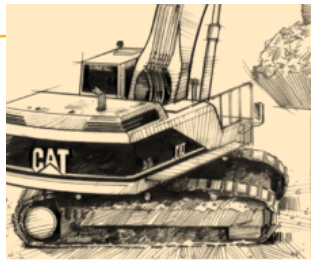

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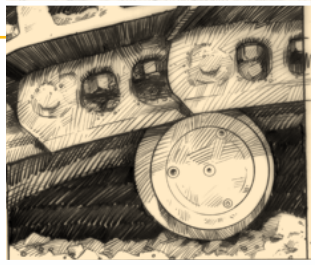

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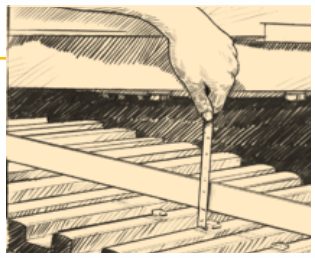

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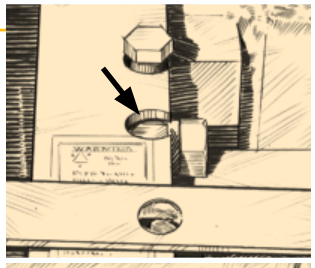

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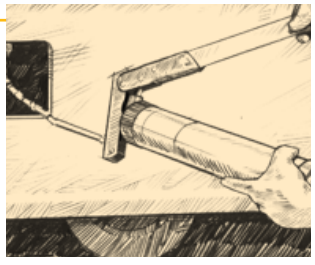

Expect more from the experts

Maximize the life of your undercarriage

To get the most out of your investment, it pays to know your undercarriage. Following the operating techniques and maintenance practices outlined in this guide can greatly extend service life. Wheeler Machinery Co. is ready to help—with parts and service solutions, or just some advice along the way. We're built to put you in control.

Call Wheeler 801-974-0511 with questions about machine operation, maintenance, or service.

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