Approximately 20 percent of your crawler’s purchase price is for undercarriage. More importantly, nearly 50 percent of your maintenance costs will go into maintaining it. We know that one weak link in a system can cause a problem.

That’s why all Deere undercarriages are integrally designed. All components are carefully matched in tolerance, strength, hardness, and wear limits for overall optimum wear life. Although wear cannot be eliminated, you can prolong the wear life of components — minimizing maintenance costs. Keep your undercarriage system running strong with certified Deere parts.

Your Deere dealer’s certified Customer Support Advisor can help you manage undercarriage system costs from the day you buy your machine until you sell it. Your CSA also can help you manage the undercarriage system on your non-Deere machines such as Caterpillar, Case, Komatsu, International, Liebherr, Dresser, and many other brands.

This strategy guide explains how to get the most out of your undercarriage. It is not a repair manual. It will give you a good look at what causes wear and provide you with information on how to better manage your system for maximum production. By understanding what causes wear and by periodically checking wear patterns on key components, you will have the information you need to make the best maintenance decisions possible.

Owners of Cat, Komatsu, Case, International, and Liebherr machines can count on John Deere dealers to keep them running.
UNDERCARRIAGE SYSTEM COMPONENTS

1. Sprockets are forged and induction-hardened for maximum strength and long wear life.
2. Track shoes are through-hardened for maximum life.
3. Pins and bushings are precision-machined, induction-hardened, and sealed from abrasives.
4. Track links are forged from a special boron-steel alloy and deep-induction-hardened.
5. Front idlers are induction-hardened on the tread for a long life.
6. Carrier rollers are induction-hardened.
7. Track frames provide a solid working frame.
8. Track rollers are forged from a boron-steel alloy and then through-hardened or induction-hardened for long life.

Split master links are forged from special boron steel. They allow for easier removal and installation of the track chain.
Sealed (non-lubricated) undercarriage track

Sealed track chain (non-lubricated) is constructed with counter-bored track links. Spring-steel conical-shaped washers seat in the track link counter bore and make contact with the bushing ends when the track links are pressed together. The steel conical washers act as seals to limit abrasive material entry between the pins and bushings.

As internal pin and bushing wear occurs, the distance from one track pin to the center of the next track pin increases. This is called pitch extension. As pitch extension occurs, wear increases on the bushing outside diameter and the sprocket teeth.

There is wear only on about 180 degrees of the track pin outside diameter and bushing inside diameter.

Sealed and greased undercarriage track (excavators)

Most excavator manufacturers today have gone from a sealed track chain (non-lubricated) to a sealed and greased track chain. Sealed and greased track chains have counter-bored track links. They have a special "M"-shaped polyurethane seal. The seal keeps the grease inside the pin and bushing joint, and keeps abrasives out.

Similar to sealed and lubricated track chain, sealed and greased track chain uses a lubricant between the pin and bushing. It is usually molybdenum or lithium grease. This improves wear life by reducing internal friction between the pin and bushing. Sealed and greased chain also has lower travel resistance and reduced noise during travel.

Unlike sealed and lubricated track chain, the track pin is not centered and cross-drilled to allow grease between the pin and bushing. During assembly, grease is pumped between the pin and bushing until filled. Compared to the lubricant used in sealed and lubricated track, the grease is generally shorter lived. Sealed and greased chain life is approximately 20- to 40-percent longer than sealed (non-lubricated) track chain. Sealed and greased track-chain pins and bushings can be turned if the machine has been working in a non-impact condition. During a turn, the pin and bushing joint can be coated with fresh grease.
Sealed and lubricated undercarriage track

Sealed and lubricated track chains have counter-bored track links. They also have polyurethane seals that seat in the track link counter bore and make contact with the bushing ends when the track links are pressed together. The polyurethane seals keep lubrication sealed between the pins and bushings, and keep abrasives out.

Lubrication provides a film of oil between the pin and bushing internal contact surfaces, reducing friction and virtually eliminating internal pin and bushing wear. Elimination of the pitch extension slows down sprocket tooth wear and bushing outside-diameter wear. Sealed and lubricated chain life is approximately 50-percent longer than for sealed track chain.

Sealed and lubricated track chain not only reduces bushing outside-diameter wear and sprocket tooth wear, it reduces noise and increases machine fuel efficiency.

No matter what type of track chain you have, the track pins rotate approximately 180 degrees on the inside-diameter surface of the bushings as the track chain pivots into and out of the sprocket and idlers.

On sealed track chain, wear will occur on about 180 degrees of the track pin outside diameter and bushing inside diameter. On sealed and lubricated track chain, lubrication virtually eliminates this wear.

> Extended-life undercarriage with SC-2™-coated bushings

Based on a patented metallurgical breakthrough, SC-2-coated bushings deliver twice the wear life as standard bushings. Whether you turn bushings or run to destruction, they eliminate a bushing turn. Doubling the wear life of the bushings also lets you maximize the wear life of the other parts in your track-chain assembly.

SC-2-coated bushings are available for most John Deere dozers and selected crawler loaders. They are interchangeable with standard undercarriage, require no special tools, and “will fit” other brands of non-Deere-tracked equipment.

**After punishing tests in abrasive sand, zero wear.** Track-chain assemblies were field-tested in abrasive sand. These photos show the standard bushing wore 32 percent while the bushing with SC-2 coating had no visible wear.
WEAR FACTORS

> What causes wear?
An undercarriage works as a system. When a machine is in motion, there will be normal, unavoidable wear. With good undercarriage maintenance and operating techniques, the rate of wear can be reduced.

> Undercarriage maintenance:
Maintenance practices that can reduce wear are:
1. Track tension or track sag
2. Track shoe width

Incorrect sag.

Correct sag is about two inches.

Always adjust track sag in the actual, underfoot working condition. Check track sag often.

> Track tension and track sag affect wear
The most important controllable factor in undercarriage wear is correct track-chain adjustment. Correct track sag for all conventional crawlers is two inches (± ¼ inch). Tight tracks can increase wear up to 50 percent. For example, a crawler in the 80-horsepower range with ¼-inch track-chain sag results in approximately 5,600 pounds of chain tension when measured at the track adjuster. The same machine with the suggested 2-inch track-chain sag results in approximately 800 pounds of chain tension when measured at the track adjuster. A tight track magnifies the load, which results in more wear on the track bushings to sprocket teeth contact areas and the track-link-to-idler roller contact areas. Increased wear also occurs at the track-link-to-idler contact point and track-link-to-roller contact points. More load means more wear on the entire undercarriage system.

Also, a tight track requires more horsepower and more fuel to do the job. Follow these steps to adjust track-chain tension:
1. Move the machine forward, slowly.
2. Let the machine roll to a stop.
3. Center the track pin over the carrier roller (A).
4. Put a straight edge over the track (B).
5. Measure the sag at the lowest point (C).
TRACK SHOES

> Track shoe width makes a difference
Select the narrowest track shoes possible — make sure they give you the flotation you need. Wide track shoes used on a hard surface will put an increased load on the track-chain pin and bushing joints, and can affect pin and bushing retention in the track links. Lubricated track chain seal integrity also can be affected. A wider than necessary shoe width also increases stress and load on idlers, rollers, and sprockets.

The wider the track shoe and the harder the under-track work surface, the faster track shoes, pins, bushings, rollers, and idlers will wear.

> Open-center (center-punched) track shoes allow some soil, debris, and material to work out from between mating undercarriage components through the shoe. Open-center shoes are best for landfill operations or in snowy conditions.

> Closed-center shoes should be used in almost all other applications.

> The primary cause for track shoe loosening and split-master link separation is improperly torqued hardware. See your operator’s manual for proper torque procedures and specifications.

Wide shoes can reduce chain life by 50 percent and accelerate wear to all components, especially in rough terrain.
OPERATION TIPS

> How the machine is operated can affect undercarriage component wear
By using intelligent operating procedures, you can extend the life of the undercarriage.

> Limit nonproductive, high-speed travel
High-speed operation accelerates wear on all undercarriage components. Track wear is directly proportional to speed. Speed equals stress. The distance a track machine travels determines wear. Plan your jobsite work carefully to make travel productive.

> Limit reverse operation
Reverse operation accelerates wear on the reverse-drive side of the track bushings and sprocket teeth. The only time bushings rotate against sprocket teeth under load is during reverse operation.

During reverse operation, approximately 75 percent of pins and bushings are under contact, load, and motion, from the bottom of the front idler to the first pin and bushing joint engaged by the sprocket tooth. Make reverse travel productive. Forward operation puts about 25 percent of the pin and bushing joints under contact, load, and motion.

Reverse operation greatly increases load between the pins, bushings, and sprocket teeth, and between the track links, idler tread surface, and carrier roller, greatly accelerating the wear rate between these components.
Use rock guards selectively
Full-length rock guards are not required in normal working conditions. If you are working on soil or surfaces that pack, full-length rock guards will trap the material between track rollers and track links, reducing their useful life. Use rock guards when you are working in rocky material — larger rock and material will not lodge as easily between the sprocket teeth and track bushings or between the track links and idler tread. Rock guards also aid in guiding the tracks in extreme hillside applications.

Reduce slippage and spinning
Track slippage and spinning accelerate track shoe grouser wear and limit productive work. Heavy contact between the sprocket teeth and track bushings, between the track links and rollers, and between idler tread surfaces accelerates wear.

Plan your turns
Constantly turning to one side will reduce the life of a track. The sprocket teeth, bushings, track links, idler, roller flanges, and tread surface on the side under constant load will wear faster. Plan your job to even out turns if possible.

Working on a crown puts all of the load and machine weight on the inner ends of the track shoes. The load is transferred to the inside track links, inside roller, idler tread surfaces, bushing ends, and sprocket contact areas. Continual work on a crown will accelerate wear on the inside track contact surfaces. Compare that wear to that on the outside track components.

Working in a depression puts all of the load and machine weight on the outer ends of the track shoes. The load is transferred to the outside track links, outside roller, idler tread surfaces, bushing outside ends, and sprocket contact areas. Continual work in a depression will accelerate wear on the outer track contact surfaces. Compare that wear to that on the inside track components.

A. Crowns wear tracks inside.
B. Depressions wear tracks outside.
**OPERATION TIPS CONTINUED**

1. **Buildup of material causes excess wear.** Prevent packing of soil and debris in undercarriage components by cleaning out the track as frequently as possible. Packing prevents the proper engagement between the mating components such as sprocket teeth and track-chain bushings. This can cause increased loads on undercarriage components and higher wear rates.

2. **Operate with the terrain.** Plan your jobs and the movement of your machines to fit the terrain, and you will reduce undercarriage wear.

3. **Working uphill** shifts the weight of the machine to the rear. This adds more load to the rear rollers and increases sprocket teeth and bushing forward drive-side wear. There will be a light load on the undercarriage when reversing down the hill.

4. **Working downhill** shifts the weight to the front of the machine. The additional load will be placed on the front roller, idler tread surface, and track links. When you reverse up the hill, the bushing rotates against the reverse-drive side of the sprocket tooth. Also, there is heavy load and motion between the bushing and sprocket teeth, which accelerate wear. A heavy load is placed on all pins and bushing joints from the bottom of the front idler to the first bushing contacted by the sprocket teeth. Extra load also is placed between the sprocket teeth and track links and the idler tread surface. The life of bushings, sprockets, track links, rollers, and idlers is reduced.

5. **Working on a slope or sidehill** shifts weight to the downhill side of the machine and causes additional wear on the roller flanges, sides of the track links, and grouser ends. Balance wear between each side of the undercarriage by changing the work direction on the slope.

1. Buildup of material causes excess wear.
2. Uphill operation causes wear on the rear components.
3. Downhill operation shifts weight to the front of the machine.
4. Sidehill operation shifts the load to the downhill side of the undercarriage.
CHECK THE ALIGNMENT AND WEAR POINTS

Alignment checks:
Track frame and front idler misalignment will accelerate wear on all components. You can check for alignment by observing the wear patterns on the bottom rollers, carrier rollers, and front idlers. You also can stand at the front and rear of the machine and do a visual inspection. See your machine manuals for specific adjustment procedures.

1. Check alignment.
2. Check bottom rollers.
3. Inspect the carrier roller.
4. Check front idlers.
5. Check pins and bushings.

John Deere provides complete undercarriage service — regardless of your machine make or model. See your local dealer to schedule your undercarriage inspection.
Your certified CSA will help you set up a periodic inspection program including record-keeping and maintenance suggestions that will help you minimize downtime, maximize your budget, and extend undercarriage life. A planned preventive maintenance program will help you get the most from your investment. It's never too early to start controlling undercarriage costs.

You can rely on your John Deere dealer for the best parts and support in the business for all your track machines.

www.johndeere.com