WEST SIDE TECH TIPS

SPOTLIGHT ON: UNDERCARRIAGE

www.westsidetractorsales.com

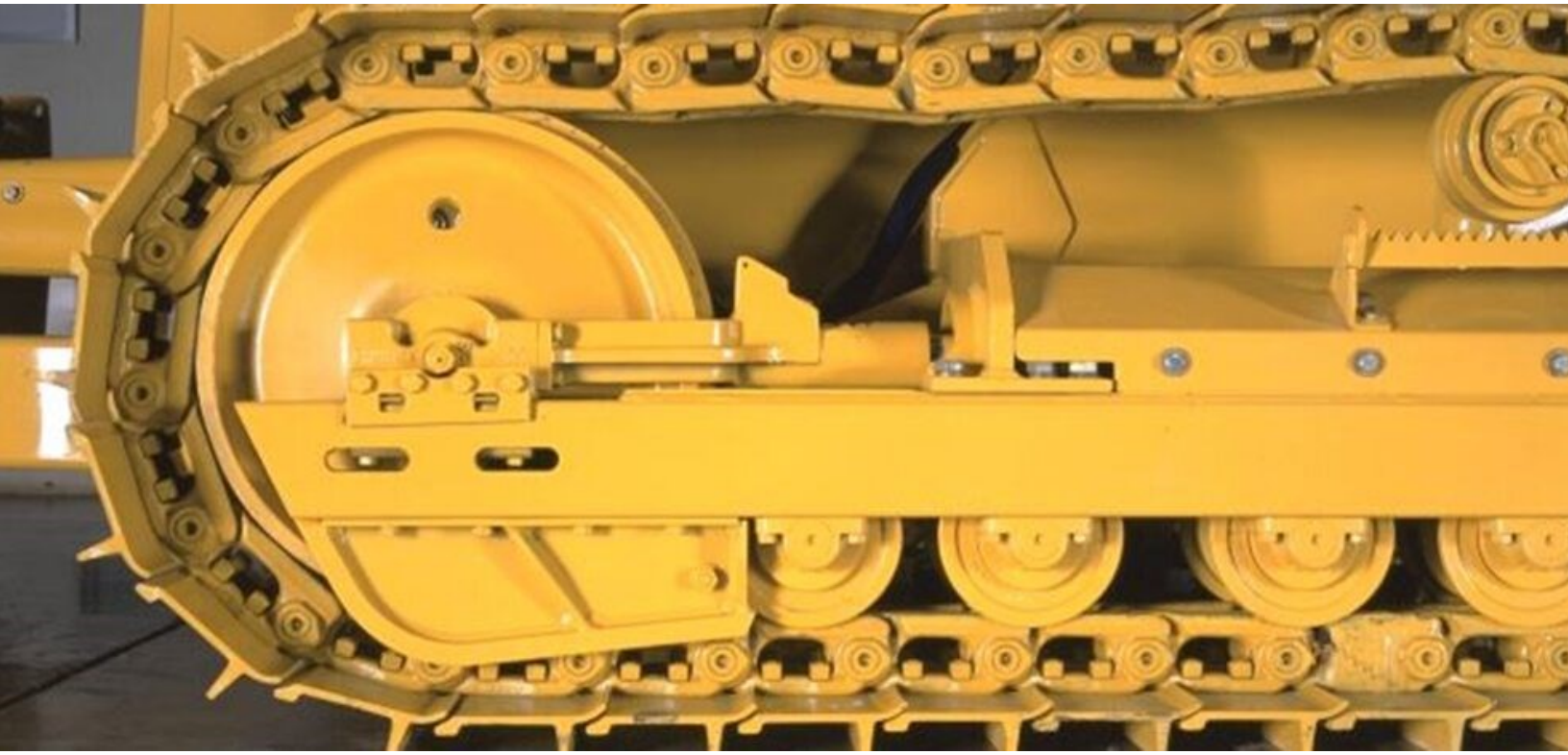
UNDERCARRIAGE: OPERATION, PREVENTATIVE MAINTENANCE & REGULAR INSPECTIONS

A significant percentage of the purchase cost of a machine equipped with tracks is the undercarriage assembly. This includes the tracks, idlers, tensioners, rollers, and frames in general. Because of the unique cost involved with owning equipment equipped with tracks, whether the initial purchase cost, or the maintenance and repair costs during the life of the machine, it is in the best interest of the owner to be aware of proper machine operation and maintenance practices to ensure you are achieving the best return on your investment.

Construction equipment undercarriage can come in all shapes and sizes. As the popularity of compact equipment has grown in the industry, rubber tracks are now common place on majority of the jobsites. So it is important to understand the differences between the traditional steel track undercarriages and rubber tracked undercarriages. And, just because a dozer and an excavator both have traditional steel undercarriages, they do require unique operation and maintenance procedures.

Three areas of focus for owners and operators of equipment with tracks are: 1) how the machine is operated, 2) preventive maintenance, 3) regular inspections. Many factors can play into the life span of an undercarriage, so frequency of maintenance and inspections may vary depending on machine application.

As with any aspect of machine operation and maintenance, it's crucial that the machine's operator manual is consulted for specific guidelines. This article is in no means intended to replace those manufacturer provided publications. Replacement manuals may be purchased from your local dealership.



UNDERCARRIAGE: MACHINE OPERATION

Machine operation will determine your undercarriage life expectancy. No matter what type of equipment you own, a machine is designed to operate under certain conditions. Operating precautions and specific supplemental maintenance may be required when operating a track machine in certain conditions. Specifically, the undercarriage (tracks, chains, idlers, rollers, sprockets, support frames) is no exception. Understanding the recommended operating procedures for a machine with an undercarriage will provide you with the best opportunity for long service life from your undercarriage, and machine in general.

It's always good practice to review the machine's operator manual. John Deere manuals are generally formatted in the same manner regardless of machine model. Each operator manual includes an 'Operation' section. This section of the manual provides specific details on how to operate the equipment for optimal performance and service life. It also provides the operator with the understanding required to prevent excessive machine undercarriage wear, and possible damage.

Common machine operation suggestions related to the undercarriage are (but not limited to):

- **Reduce the amount of time operating the machine in reverse.** On all steel track machines, track bushing, pin, and sprocket wear increases significantly in reverse travel. This is due to the fact that in reverse, there are three pivot points under contact, load, and motion. First and second points are where the track enters and exits the idler, and third being where the track bushing pivots into the sprocket. These pivot points by nature induce wear of the undercarriage components. Compared to forward motion, where there is only one pivot point. *Limiting reverse travel is an operational practice that can have a significant impact on the service life of the undercarriage. Time in reverse data is available in JDLink, John Deere telematics system. Machine must have active JDLink subscription.*
- **Reduce travel speed when possible.** Increased travel speed increases undercarriage wear. Track slippage is more likely at higher speeds, which will increase grouser tip wear. *Travel speed data is available in JDLink, John Deere telematics system. Machine must have active JDLink subscription*.
- **Equip your machine with chain guides and guards if required due to the operating environment.** Track guides and guards will aid in keeping the chain aligned with the rollers and idler, and help prevent undercarriage component damage from large foreign objects (i.e. large rocks).
- **Special attention is required for excavators.** Prevent excessive side loading of the tracks when digging. This increases the wear on pins and bushings, can damage track links, and in extreme cases will bend the shoes. Rule of thumb is that the idlers should be closest to the work area (where you are digging / lifting). Loading the machine with the final drives closest to the work area will put unnecessary load on the final drive bearings and seals.
- **Select the correct shoe width for your application.** Use the narrowest pad possible to achieve the desired floatation. Too wide of a track shoe in a rocky conditions for example, can increase loading and wear on the undercarriage. Although this is something usually only considered when purchasing a machine, track shoe width should be considered when consistent long term operating conditions exist (i.e. working in a quarry).

Rubber tracked machines require special attention when operating in rough ground conditions. Rubber tracks are designed for use on hard flat surfaces. Large rocks, broken asphalt, and concrete can cause significant damage to the rubber track, so special attention should be given to how the machine is operated in those conditions. *Other considerations when operating machines with rubber tracks are:*

- Follow the recommended break-in procedures for new rubber tracks.
- Avoid constant operation across slopes or side hills. Accelerated wear can occur. It's always safest to traverse a hill side straight up or down when possible.
- Avoid high speeds, avoid aggressive turns, and limit track spinning as much as possible.
- Operating in corrosive materials (such as fuel, oil, salt, fertilizer, etc.) will decrease the service life of the track and undercarriage components in general. Special care must be taken to keep the machine clean after operating in these conditions.
- Avoid track edge contact with hard surfaces such as walls, curbs, and other hard objects which could cause damage to the track edge.

Just as it is crucial for tires to be properly inflated to the manufactures recommended pressure setting, tracks – whether steel or rubber – require proper tension. The machines operator manual will specify how to correctly measure and adjust the track tension. Typically this is done once a day (steel tracks) and typically every 50 hours for rubber tracked machines. (More frequent adjustment may be required depending on operating conditions, always consult the machines operator manual).

Proper track tension not only prevents accelerated wear to the pins, bushings, and links, but to all components of the undercarriage. Over tightened tracks accelerate wear to the undercarriage, and in addition, consumes more engine power. Loose tracks increase side wear to links, rollers and idlers. Loose tracks also slap at high speeds, which will contribute to impact wear on sprocket teeth, bushings and carrier rollers.

Most machine maintenance schedules will include recommendations for checking the retaining hardware torque of the track shoes and sprockets. It's also recommended to verify that the roller and idler retaining hardware is tight / in place. Follow the operator manual for specific torque sequences for the track shoe hardware. For shoes with missing or loose cap screws and nuts, remove shoes and clean the mating surface of shoes and links before replacing cap screws and nuts. The cap screws must be replaced because they have been stretched to yield previously during the initial torque sequence.

The undercarriage should be kept as clean as possible. Clean out the undercarriage when working in especially muddy wet material. It's highly recommended that the undercarriage be cleaned at the end of the work shift prior to parking the machine for any length of time. This is especially important in cold temperatures to prevent material from freezing. Excessive buildup of material on the undercarriage can lead to premature failure of the undercarriage components. Excessive build up can also lead to incorrect track tension (too tight), increasing horsepower usage, and increased wear of the undercarriage components.

Special maintenance considerations for rubber track machines:

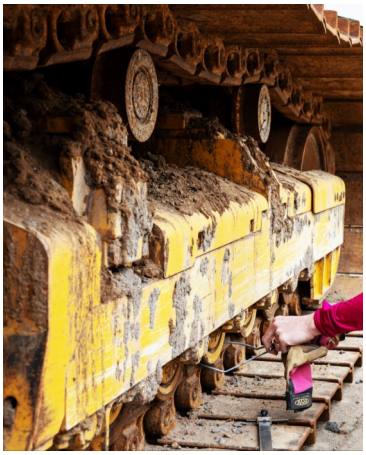
- Check track adjustment weekly (or as required). Certain ground conditions / environments may require more frequent adjustment. The easiest way to maximize track life is to check track sag regularly. Tracks that are too tight can decrease the track life up to 50 percent and accelerate the wear of the undercarriage components. A tight track can also increase fuel use.
- If storing the machine for extended periods of time, store machine out of direct sunlight and avoid wet ground conditions, to help achieve optimal life of the tracks. Wash the machine if possible.
- When new rubber tracks are installed it's important to properly break-in the new tracks to prevent excessive wear during the first 200 hours of operation. As much as possible, operate the machine in dirt so that the rubber compounds of the track can properly break-in. If high speed operation on hard ground is necessary during the break-in period, periodic lubrication with a dry lubricant (such as talc powder) should be considered. Verify and ensure proper track alignment during the break-in period as well.

Most common and crucial is to check for proper track tension. If proper track tension cannot be maintained, further inspection of the idler, tensioner and other undercarriage components will be required.

Inspect idler, tensioner, rollers, and the sprocket for any signs of wear, leaking oil / grease from seals, and damage such as chipping or flat spots on rollers. Inspect the wear pattern on the rollers to ensure there is no excessive wear on one side of roller / idler. If wear patterns are not even across contact surfaces of the rollers/ idlers, this may indicate an alignment issue within the undercarriage assembly.

Inspect the sprockets for excessive wear on the teeth. A sprocket with a worn tooth profile will cause excessive wear and prevent proper sprocket tooth engagement to the track.

Inspection of rubber tracks will include checking for proper tension, track material (rubber) missing, and for cuts / deep tears. It's important to be aware of cuts or tears in the rubber, as this may expose the internal metal cords. Once these metal cords are exposed to the environment, they can rust and break, leading to a complete track failure.

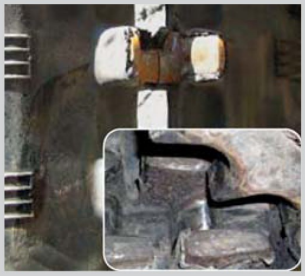


Some excessive track wear can cause abnormal machine vibration when driving on hard surfaces. This can lead to further problems with the machine (electrical component failures, hose wear, pipe breakage, etc.). If track wear is causing excessive machine vibration while driving, the tracks should be replaced.

Your machine operator manual may have specific additional inspection items, be sure to consult the operator manual for full details. Your local Customer Service Advisor (CSA) can also be of additional assistance when inspecting your machines undercarriage. There are multiple inspection points to consider when inspecting the undercarriage of a steel or rubber track machine. Your CSA has the special tools and training to provide a detailed inspection, and can provide recommendations for repair or replacement.

Damage:
Embedded steel cords are cut.

Prevention:
1. Check track tension.
2. Avoid quick turns on rocky surfaces.
3. Avoid sharp objects.



Damage:
Excessive wear of embedded metal on tracks.

Prevention:
Check for wear periodically–especially when machine is under heavy load or operating in abrasive conditions for extended periods.

Damage:
Cuts on sides of tread lug.

Prevention:
Avoid high speeds, quick turns, and overloading on concrete or surfaces with sharp debris.

Damage:
Small cracks at foot of the tread lug.

Prevention:
1. Avoid excessive exposure to direct sunlight, rain, or snowfall during storage.
2. Store tracks in well-ventilated areas– following recommended rubber-track storage remove-point procedures.
3. Drive your rubber-track equipment at least once a month.

Following the outlined operation, maintenance, and inspection procedures as discussed will increase the longevity of your machines undercarriage, increase machine uptime, and overall productivity of your operation. These recommendations work hand-in-hand to provide the best return on investment for your machines equipped with tracked undercarriages, whether traditional steel tracks or rubber tracks.

Written by Curtis Drewniak, Trainer and Technical Communicator at West Side Tractor Sales