Product Information

Link Assemblies

Functions
• Provide a rail for the machine to run on.
• Provide a means to attach track shoes.
• Transmits driving force from track bushing to track shoe.

Requirements
• Flexible joints between sections.
• Matched wear and structural life of components.
• Components replaceable and/or reusable.

Features
• Assembled from components designed and manufactured to fit and work together as a system.
• Pins, bushings and links resist loosening, cracking, and breaking until worn beyond wear limits.
• Designed for a second wear life if proper maintenance and rebuilding practices are followed.

Supporting Reference Material Available
• Sleeve Bearing Track Data Sheet (PEHJ0004)
• Grease Lubricated Track Data Sheet (PEHP9555)
• SystemOne™ Undercarriage Elevated Sprocket Machines (PEHJ0060)
• SystemOne Undercarriage Oval Track Machines (PEHJ0064)
• Positive Pin Retention Data Sheet (PEHP7025)
• Heavy Duty Track Data Sheet (PEHP5031)
• Rotating Bushing Track Data Sheet (PEHP5030)
• Sealed and Lubricated Track Data Sheet (PEDP0036)

Note: Sealed Track is not offered on elevated sprocket tractors.
Track Links

Functions
- Provide a continuous rail for rollers.
- Support weight of the machine.

Requirements
- Machined to close tolerances for pin, bushing and shoe retention.
- Long rail wear life.
- Resist cracking, spalling and fatigue failures.
- Rebuildable.

Features
- Forged of Deep Hardening Steel.
- High body hardness.
- Uniform rail hardness.
- High rail design.
- Massive strut design.
- Self-locking nut seats.
- Rebuildable.

Deep Hardening Steel
Deep Hardening Steel used in current links allows high body hardness, greater hardened depth and greater fatigue resistance than plain medium carbon steel.

High Body Hardness
Links on current track-type tractors, loaders, and excavators have a high body hardness. This increases toughness, durability, fatigue resistance and improves pin and bushing retention.

Uniform Rail Hardness
Link rails are pattern induction heated, spray water quenched and furnace tempered for a deep, uniform hardened depth. This gives link rails a crown hardness pattern that resists side wear and roll-over. The hardened rail matches the track roller tread and flange hardness for optimum wear life.

Duralink™ Design
The Duralink is a crowned link, designed for maximum durability. This reduces idler scallop wear to eliminate vibration and increases the depth of hardness for 20-40% longer wear life. It also has more material at the nut seat window to eliminate cracking. Link height varies by model for D8 – D11.

Rebuildability
Cat track links are rebuildable; high body hardness results in good pin and bushing retention, even after repeated disassembly and reassembly.

Massive Strut Design
Provides the best available resistance to cracking failures that result from flexing shoes, pins, and bushings.

Self-locking Nut Seats
Allow easy installation and removal of track shoes. Also, help keep hardware tight.

The nut and nut seat on “L”, “N”, “R”, and “T” series tractors are rounded to reduce stress risers in the link.
Product Information

Split Master Link

Function
• Allows convenient removal and installation of track.
• Eliminates the need for a master pin and master bushing.

Requirements
• Wear life equal to regular link.
• Same strength as regular link.
• Serviceable and Reusable.

Features
• Bolt-together design for faster and easier assembly and disassembly.
• Allows use of regular pins and bushings.
• Factory assembled with lubricant.

Bolt-Together Design
Removing and installing track has always been time consuming. To improve this, Caterpillar designed a two-piece or split master track link, joined with bolts. Only a torque wrench is needed to separate the track in place of field press tooling.

Regular Pins and Bushings
Split master links require no master pins, master bushings, nor spacers. Instead they use standard pins and bushings. Thus, pins and bushings in split master links wear at the same rate as all others and can be turned along with others.

NOTE: Split master links often require a master shoe, with different bolt hole pattern than other shoes and four special track bolts.

MASTER LINK ASSEMBLING AND TORQUING PROCEDURE
• Refer to machine O&M manual for master bolt assembly and torque specifications

SystemOne™ LINK BOX
Serviced at the Link Box level
• Contains two common links and two cartridges

Track Links
• New rail design for increase wear life
• Stronger straight link design
• Forged of deep hardened steel that provides high body hardness, hardened depth and toughness
• Rail guided design for superior guiding
• Self-locking nuts

Cartridge
• Factory sealed and welded to control end play
• Improved seal integrity through an innovative new sealing system
• Uses standard Cat Synthetic SAE 75W-140 gear oil to lubricate the joint

SystemOne TRACK CLAMP MASTER
Master Links with Center Strut
• Refer to machine O&M manual for master bolt assembly and torque specifications

Master Links without Center Strut
• Refer to machine O&M manual ot D&A manual for master bolt assembly and torque specifications
Track Pins / Track Bushings

Track Pins

Functions

• Help hold track section together.
• Act as hinge with bushing at adjoining section.
• Transfer loads between bushing and link.
• Provide reservoir for lubricant in Sealed and Lubricated Track.

Requirements

• Strength — to resist flexing and cracking, even when worn to limit.
• Wear Resistant.
• Finished to close dimensions — for accurate press fit with link and clearances with bushing I.D.

Features

• Machined from medium carbon steel.
• Heat treated.
  – Induction hardened.
  – Spray water quenched.
  – Tempered.
• Sealed and Lubricated Track pins ground to final dimensions.

Medium Carbon Steel

Caterpillar manufactures track pins from a medium carbon steel which provides a tough pin with good surface hardness. This provides good spalling and cracking resistance in high impact conditions. Sealed and Lubricated Track pins are center drilled to provide an oil reservoir and cross drilled to provide a passage for the oil to flow between the pin and bushing. After heat treatment the pin ends are ground to provide the close final dimensions required for accurate press fit and oil retention.
Product Information

Track Pins / Track Bushings (Cont'd.)

Track Bushings

Functions
• Help hold track section together.
• Act as hinge with pin of adjacent section.
• Provide sealing surface to keep abrasives out and lubricant in with Sealed and Lubri-
cated Track.

Requirements
• Strength — to resist cracking, even when worn to service limits.
• Finished to close dimensions — for accurate press fit into link bushing bore clear-
ance with pin O.D.
• Wear resistant — on I.D. equal to pin, on O.D. greater than sprocket.
• Smooth finish on end — to maximize sealing and minimize seal wear.

Features
• Formed by cold extrusion of low carbon steel. (Extruded bushings have smoother in-
ner and outer surfaces with more uniform dimensions than machined bushings.
• Carburized and heat treated for optimum hardness and toughness.

Difference between Sealed Track bushings and Sealed and Lubricated Track bushings
Sealed and Lubricated Track bushings are:
• Polished on the ends for a smooth sealing surface.
• Shorter than Sealed Track bushings to provide the space needed in the link counter bore for the thicker thrust ring and seal.

Track Seals

Sealed Track Seals

Functions
• Retard abrasive entry between pin and bushing.
• Prevent bushing from wearing against link counterbore.
• Carry side loads.

Requirements
• Wear life equal to pin and bushing turn time.
• Have spring-like resiliency without brittleness.

Features
• Made from hardened and tempered spring steel. Seals are formed like cone shaped washers. Used in pairs, they fit into each link counterbore. One washer butts against the bushing end, the other against the link counterbore base. When track sections are pressed together, the washers flatten to form a seal. The spring effect of the flattened washers maintains sealing pressure as they wear. Seals are designed to wear against each other instead of against the link counterbore and bushing end. This system extends internal pin and bushing life by 20-30% compared to unsealed track. Sealed Track Seals are not reusable at turn time.
Track Seals (Cont'd.)

GREASE LUBRICATED TRACK SEALS

Internal pin and bushing wear is usually the reason for track maintenance with Sealed Track. Caterpillar engineers have designed a track system that reduces internal pin and bushing wear on excavators. The sealing arrangement is what makes this reduction possible.

Functions

• Keep abrasives out of internal pin and bushing joint.
• Keep grease in joint.
• Absorb side or thrust loads.
• Reduction in noise compared to Sealed Track

Requirements

• Pin and Bushing internal wear life affected less by external environment.
• Not a lifetime lubricated track.

Features

• Seal Assembly – Consists of a “W” shape polyurethane seal. The seal contacts the smooth bushing end. The seal distributes an even load along the sealing surface to assure a 360° seal.
• Seals are designed to operate at a maximum temperature of 70° C (160° F). Exposure to high temperatures will reduce seal life.
• Shorter bushing compared to Sealed Track.

Benefits of Grease Lubricated Track

• Internal pin and bushing wear reduced as the primary maintenance consideration.
• The system keeps abrasives from entering the internal pin, bushing, and link counterbore area of the joint.
• Grease reduces normal friction and wear between the pin and bushing.
• Decrease of internal wear and resulting track pitch extension reduces snaky track; this reduces wear on other components, such as links, rollers, and guiding components.
• Most undercarriage components are reusable.
• Internal bushing life is extended about 20% compared to Sealed Track.
Sealed and Lubricated Track Seals

Internal pin and bushing wear is usually the reason for track maintenance with Sealed Track. Caterpillar engineers designed a track system that would eliminate internal pin and bushing wear as a maintenance consideration. The sealing arrangement is what makes this possible.

Functions

- Keep abrasives out of internal pin and bushing joint.
- Keep lubricant in joint.
- Absorb side or thrust loads.

Requirements

- Pin and Bushing internal wear life not affected by external environment.

Features

- Seal Assembly — Consists of a plastic seal and resilient rubber load ring. The seal contacts the smooth bushing end. The rubber load ring distributes an even load along the sealing surface to assure a 360° seal. Seals are designed to operate at a maximum temperature of 70°C (160°F). Exposure to higher temperatures will reduce seal life.
- Greater end play capacity from .030 to .060.
- Thrust Ring — Made from hardened steel, it protects the seal assembly from side thrust loads. The ring has notches so the oil can flow past the ring into the sealing areas.
- Rigid Seal Design now available for all Elevated Sprocket machines, Low Sprocket machines, and Track Type Loader machines.

Benefits of Sealed and Lubricated Track

- Internal pin and bushing wear eliminated as the primary maintenance consideration.
- The system keeps abrasives from entering the internal pin, bushing, and link counterbore area of the joint.
- Lubricant eliminates normal friction and wear between the pin and bushing.
- Absence of internal wear and resulting track pitch extension reduces snaky track; this reduces wear on other components, such as links, rollers and guiding components.
- Most undercarriage components are reusable.
- External bushing life is extended about 50% compared to Sealed Track.

Oil

- Caterpillar uses Synthetic SAE 75W–140 gear oil to lubricate the joint.
Sprockets

Functions
• Transfer driving loads from the final drive to the track through the bushings.

Requirements
• Wear life — equal to at least one side of the bushing.
• Strength — to resist cracking.

BOLT-ON SEGMENTS
Used on: All Track-Type Tractors and Track-Type Loaders, but not available for D4E or 941.

Features
• Formed from Deep Hardening Steel.
• Both segments and sprockets are manufactured to accurately mate with bushings.
• Tightly controlled manufacturing processes to ensure proper mounting segment hardware.

Benefits of Bolt-on Sprocket Segments
• Reduced maintenance and downtime.
• No need to remove track group to replace sprockets.
• Segments are easier to handle.
• No risk of misalignment.
• Reversible — switching segments to opposite sides of the machine can increase sprocket life.

Conversion to Bolt-on Sprocket Segments
A one-piece weld-on adapter ring is available for converting some older models to bolt-on sprocket segments. Once a customer converts a machine to the bolt-on design, he will save both labor and downtime cost when the segments need replacing.

Torquing Procedure
• Refer to machine O&M manual or D&A manual for sprocket bolt assembly and torque specifications.

CAST ASSEMBLY, WELD-ON, AND BOLT-ON RIM
Used on: Earlier Tractors, Earlier Loaders, and 200 Series Excavators. Current 300 Series Excavators have bolt-on one piece sprockets.

Features
• Cast from Deep Hardening Steel.

Deep Hardening Steel
Cat sprockets are formed from Deep Hardening Steel which allows about twice the hardened depth as plain medium carbon steel.
Product Information

Track Shoes

Functions
• Support the machine’s weight on the ground
• Provide traction.

Requirements
• Strength — to resist bending and breaking.
• Wear resistant grouser and plate.
• Retention — to resist loosening during link wear life.

Features
• Furnace or induction hardened, die quenched and tempered.
• Curved leading and trailing edge.
• Rebuildable
Curved leading and trailing edges provide stiffness to reduce shoe bending and hardware loosening. Overlapped edges keep debris from lodging between shoes as the track bends around the sprocket and idler.

Track Shoe Selection
The wide variety of working conditions makes choosing the right shoe very important. A good rule is: choose the narrowest shoe that provides adequate flotation. Shoes that are too wide will loosen, bend and crack more easily. They require more power to turn, and affect maneuverability. Shoes of the correct width give maximum performance and the lowest possible cost to the entire system.

Caterpillar offers the following track shoes:

SINGLE GROUSER MODERATE SERVICE SHOES (MS)
The Moderate Service shoe is the best shoe for low to medium impact and abrasive conditions. It gives the best penetration and traction, resists wear and bending and is available in various widths and modifications. Rolled from modified medium carbon steel.

Single Grouser Extreme Service Shoes (ES)
Extreme Service shoes should be used wherever the Moderate Service shoe bends or breaks, or where links out last shoes. Extreme Service shoes are both stronger to resist bending and breaking and have more allowable wear material than the Moderate Service shoe. Greater Strength – Extreme Service shoes are rolled from tough alloy steel. They are also more massive. They are heat treated to provide a higher tensile strength to resist bending and breaking in high impact conditions. More Wear Material – Extreme Service shoes have up to approximately 50% more allowable wear material than the respective Moderate Service shoe. More Rebuildable – Because of the thicker section on the Extreme Service shoe, it can be successfully regrousered more times than the Moderate Service shoe (when used in similar conditions and worn to comparable limits).

Single Grouser Super Extreme Service Shoes (SES)
Super Extreme Service shoes provide approximately 25% more life than the Extreme Service in high wear applications.
Track Shoes

Multi-Grouser Shoe (Triple and Double Grouser)
Multi-Grouser shoes have less penetration and traction than Single Grouser shoes, but better turning ability. These shoes are standard on track-type loaders and excavators because less turning resistance and greater maneuverability are needed. By spreading tractor weight over the larger contact area of several low profile grousers, the turning resistance is reduced and maneuverability improved.

Special Shoes
Self-Cleaning, Low Ground Pressure Shoe
This shoe is designed for use in loose, muddy conditions. As these shoes move around the sprocket and idler, they separate from one another, causing debris to fallout. These cast steel shoes come in widths that make them suitable for LGP machines only and should not be used in high abrasive or high impact conditions.

Chopper
This shoe is designed for use in demolition and landfill applications where compaction is required. Designed with a full length front grouser, two angled side grousers and a center opening for material extrusion, these shoes provide long wear life and structural life in the most demanding underfoot conditions.

Steel Mill Flat
Designed for use in hot slag and other heavy abrasive materials where low penetration and high wear and bending resistance is required. Large, countersunk bolt holes are designed to protect the bolt heads.

Track Shoe Supports for Hydraulic Excavators
Forestry applications for Hydraulic Excavators generally involve high impact and severe underfoot conditions for the undercarriage components. For this reason, full length track shoe supports mounted to the track roller frame are recommended for forestry applications. These shoe supports are intended to limit the torsional loads experienced by the link assembly when the machine encounters uneven underfoot conditions. As the machine rides over objects such as rocks or stumps, the track shoe deflects and the track chain begins to twist. With track shoe supports, the shoes contact the support and prevent further twisting of the chain. These supports limit the loads going into the link assembly and significantly reduce the occurrence of link cracking and track pin walking.
Product Information

Track Hardware
Track Bolts

Function
• Hold the shoe on the link.

Requirements
• Wear resistant head.
• Tensile and shear strength.

Features
• Induction hardened heads.
• Rolled threads.
• Tensile strength exceeds Grade 8 specifications.
• Reusable

Induction Hardened Heads
Track bolt heads are induction hardened to protect them from deforming in high impact, highly abrasive conditions to extend their wear life.

Rolled Threads
Rolled threads resist stripping better than cut threads. By rolling, the natural flow lines of the steel follow the thread contours. Cutting threads cut the flow lines, making the threads weaker.

Strength
Cat track bolts exceed Grade 8 strength requirements with a minimum tensile strength of 160,000 PSI.

Track Nuts

Function:
• Used with the track bolt to hold the shoe to the link.

Requirements
• Strength
• Retention on bolt.

Features
• Furnace hardened and tempered.
• Self-locking.

Furnace hardened
Track nuts are thru-hardened and tempered to match or exceed bolt strength. Track nut core hardness is Rc30 minimum.

Self-locking
Track nuts are designed to fit into the nut seats in the link strap area. Broached grooves hold the nut so bolts can be removed from the shoe.

Track Shoe Tightening Procedure
• Refer to machine O&M manual or D&A manual for track bolt assembly and torque specifications.
Track Rollers

Functions
• Support the machine on the track.
• Guide the machine along the track.

Requirements
• Strength — to resist structural failure before tread wear life is utilized.
• Shell tread wear life equal to links
• Shell tread and flanges rebuildable.
• Most internal components reusable.
• No maintenance during original tread wear life.

Features
• Shells forged from deep hardening steel and are designed to resist bellmouthing.
• Shafts and bearings are designed to reduce friction and wear and to provide maximum strength.
• Lifetime Lubricated for minimum maintenance.

Bronzed Sleeve Bearing
• Sleeve design provides a large surface area for better load distribution.
• Inner diameter surface is polished to a smooth finish.
• Soft bronze coating in the bearing absorbs any small foreign particles before they can damage the shaft and seals.

Duo-Cone™ Seal
• Seals oil in and abrasives out.
• The Duo-Cone Seal consists of two metal seal rings and two rubber toric rings. The toric rings provide the proper pressure to both sides of the metal seal rings.
• Resists permanent deformation and temperature changes from -40F (-40C) to 225F (107C). Extreme Temperature Seals respond over a wider temperature range from -60F (-50C) to 325F (163C) constant and 450F (233C) peak.
• Duo-Cone Seals are designed to last through several roller shell tread lives, depending on individual conditions. For reusability guidelines, refer to SEBF8511 (Guidelines for Reusable Parts).

Oil
• Cat Lifetime Lubricated Track Rollers use a 30 weight oil, which cools and lubricates better than grease. Cat track-type tractors and loaders use both single and double flange rollers. Typically excavators use all single flange rollers. Single flange rollers are used adjacent to the sprocket so they can be placed closer to the sprocket. Double flanged rollers are used to maximize the guiding effect wherever space permits.
Product Information

Track Rollers (Cont'd.)

SystemOne Track Rollers

- Serviced at Roller Group level
- Single flange roller shell
  Forged from deep hardened steel and through hardened heat treated for internal strength to resist bellmouthing and uniform hardened depth that provides wear life equal to link wear life
  Through hardened flanges to resist wear and prevent cracking or breakage
  Tall flange rollers for superior guiding
- Track Roller Shaft
  Forged and heat treated for strength
  Bearing surfaces are hardened and polished to reduce friction and wear
- End Caps
  Retain the roller shaft to the track roller frame and provides serviceability
  Not part of the roller group and serviced separately

The unique characteristics of the four roller designs are as follows:


Track Roller Shell

- Forged from Deep Hardening Steel and heat treated for internal strength to resist bellmouthing and to increase rebuildability.
- 2-piece roller shell rim
- Heat treated for a deep, uniform hardened depth that provides wear life equal to link wear life.
- Thru-hardened flanges to resist bending and improve rebuildability.
- Steel-backed bronze bearings are press fit inside the shell.

Track Roller Shaft

- Forged and heat treated for strength.
- Bearing surfaces are hardened and polished to reduce friction and wear.
- Larger diameter for greater load bearing capacity.

Retainer

- Bolts to the ends of the track roller shells.
- Transmits side loads to the roller shaft and houses the Duo-Cone Seals.

End Caps

- End caps retain the roller shaft to bogies, and provide serviceability.
- End caps are serviced separately.
Track Rollers (Cont’d.)
For D7R, D7H, D6R, D6H, D6N, D6M, D5H, D5N, D5M, D4H 973, 963, 953, 943

Track Roller Shell
- Forged from Deep Hardening Steel and heat treated for internal strength to resist bell-mouthing and to increase rebuildability.
- 2-piece roller shell rim
- Heat treated for a deep, uniform hardened depth that provides wear life equal to link wear life.
- Thru-hardened flanges to resist bending and improve rebuildability.

Track Roller Shaft
- Forged and heat treated for strength.
- Bearing surfaces are hardened and polished to reduce friction and wear.
- Center flange absorbs side thrust from roller shell.

Cast Iron Bushing
- Supports the bronze sleeve bearing.
- Cast from iron to absorb loads without permanent deformation.
- Large lubricant reservoir to reduce heat build-up.

End Collar
- Attaches the track roller to the track roller frame.
- Houses and protects the outer Duo-Cone Seal.

Snap Ring Design
- Retain cast iron bushing.
- Eliminates need to use bolts to retain cast iron bushing.
Product Information

For Excavators

Track Roller Shell
- 2-piece roller shell rim.
- Forged from deep hardening steel and heat treated for internal strength to resist bellmouthing.
- Heat treated for a deep, uniform hardened depth that provides good wear life.
- A large oil reservoir is provided for in the shell and is filled through a threaded hole located between the wear surfaces.
- Steel-backed bronze bearing is press fit inside the shell.

Track Roller Shaft
- Forged and heat treated for strength.
- Bearing surfaces are hardened and polished to reduce friction and wear.
- Large diameter for a greater load bearing capacity.
- Straight, solid shaft, with a hole in each end to provide positive attachment of the end collar.
- Reduces end play growth.

End Collar
- Completely encircles the shaft to give added strength. Connected to the shaft by pins. Mounting surface area is larger for improved bolt retention.


Track Roller Shell
- Forged from Deep Hardening Steel and heat treated for internal strength to resist bellmouthing and to increase rebuildability.
- 2-piece roller shell rim.
- Heat treated for a deep, uniform hardened depth that provides wear life equal to link wear life.
- Thru-hardened flanges to resist bending and improve rebuildability.

Track Roller Shaft
- Forged and heat treated for strength.
- Bearing surfaces are hardened and polished to reduce friction and wear.
- Center flange absorbs side thrust from roller shell.

Cast Iron Bushing
- Supports the bronze sleeve bearing.
- Cast from iron to absorb loads without permanent deformation.
- Large lubricant reservoir to reduce heat build-up.

End Collar
- Attaches the track roller to the track roller frame.
- Houses and protects the outer Duo-Cone Seal.
Track Roller Sequence

Use the following charts to determine the original position of track rollers, identified by their flange type. The letter “D” represents a Double flange roller and the letter “S” represents a Single flange roller.

**ELEVATED SPROCKET MACHINES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Rollers Per Side</th>
<th>Roller Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>D17R/N(1), D17T/R/N(1), D17L(1)</td>
<td>8</td>
<td>S S D D D D S S</td>
</tr>
<tr>
<td>D9T/R/N(1), D9L</td>
<td>8</td>
<td>S S D D D D S S</td>
</tr>
<tr>
<td>D8T/R/N(1), D8L(1)</td>
<td>8</td>
<td>S S D D D D S S</td>
</tr>
<tr>
<td>D7R/H STD &amp; LGP</td>
<td>7</td>
<td>S D S D S D S</td>
</tr>
<tr>
<td>D7R/H XR</td>
<td>8</td>
<td>S D S D D S D S</td>
</tr>
<tr>
<td>D6T/R/H STD</td>
<td>6</td>
<td>S D S D S S</td>
</tr>
<tr>
<td>D6H XL &amp; XR</td>
<td>7</td>
<td>S D S D S D S</td>
</tr>
<tr>
<td>D6T/R/H XW &amp; XL</td>
<td>7</td>
<td>S D S D S S</td>
</tr>
<tr>
<td>D6T/R/H LGP</td>
<td>8</td>
<td>S D S D D S D S</td>
</tr>
<tr>
<td>D6N/M LGP, D5H LGP</td>
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</tr>
<tr>
<td>D6M, D4H STD, D5N/M XL, D4H XL</td>
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</tr>
<tr>
<td>D5M LGP, D4H LGP &amp; TSK</td>
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<td>589</td>
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<td>S S D D D D D S</td>
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</tbody>
</table>

SystemOne Track Roller Sequence:
For elevated sprocket machines all rollers are single flange. Rollers per side are the same as in the table above.

**LOW SPROCKET TRACTORS AND LOADERS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Rollers Per Side</th>
<th>F</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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</thead>
<tbody>
<tr>
<td>D9G &amp; H</td>
<td>7</td>
<td>D</td>
<td>D</td>
<td>S</td>
<td>D</td>
<td>S</td>
<td>D</td>
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<td>D9O, E &amp; G</td>
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<td>D</td>
<td>S</td>
<td>D</td>
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<tr>
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<td>D</td>
<td>S</td>
<td>D</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D7E, F &amp; G</td>
<td>6</td>
<td>D</td>
<td>S</td>
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1 Machines with large diameter single flange rollers.
### Product Information

**Track Roller Sequence (Cont’d.)**

**LOW SPROCKET TRACTORS AND LOADERS (Cont’d.)**

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**SystemOne Track Roller Sequence:**

For low sprocket tractors and loaders all rollers are single flange. Rollers per side are the same as in the table above.

---

New design.
**Carrier Rollers**

*Functions*
- Support the track as it moves between the sprocket and idler.
- Guide the track between the sprocket and idler.

*Requirements*
- Strength — to resist failure before tread wear life is utilized.
- Tread wear life matched to track links.
- Treads and flanges rebuildable on forged shells.
- Most internal components reusable.
- No maintenance required during tread wear life.

**Carrier Roller Shell**

Carrier rollers have shells forged from Deep Hardening Steel for strength, wear life and rebuildability. Cat carrier rollers used Duo-Cone Seals for maintenance free operation.

*Features*
- Heat treated shells for body strength and long wear life.
- Shaft and bearings designed to carry and turn with heavy track weight.
- Lifetime Lubricated for minimum maintenance.

*Note*
D8T and larger track-type tractors use a single flange track roller group as the carrier roller.
Idlers

Idler Assembly

Functions
- Guide the track in and out of the track rollers.
- Intermittently support the machine’s weight.
- Provide a way to control track slack and tension.

Requirements
- Strength to resist failure before tread wear life is utilized.
- Tread wear life equal to or greater than link wear life to service limits.
- Treads and center flanges rebuildable.
- No lubricant maintenance during original tread wear life.

Features
- Tread hardness similar to links, track rollers and carrier rollers for impact strength and balanced wear life.
- Lifetime Lubricated for minimum maintenance.
- Rebuildable tread.

Fabricated Idlers

*Straight Side Plate*  
*Curved Side Plate*  
*Center Tread Idler (CTI)*  
*Typical Cast/Forged Idler*  
*Cast Idler*

Track Roller Guards

Functions
- Protect the track, rollers and sprockets from rocks and debris.
- Provide some additional tracking guiding assistance.

Cat track roller guards help prevent large rocks and other high strength debris from jamming and being crushed between the track rollers, track and sprockets. This crushing could accelerate wear and damage components. Caterpillar offers two types of roller guards — full and partial. Both bolt to the roller frame.

The full length track roller guards cover the entire roller area. With full length guards, track guiding guards cannot be used. Full length track roller guards have bolt-on wear strips. See CTS Handbook for usage information.

Partial length track roller guards are designed to be used with end guiding guards. They protect the roller area while allowing the use of end guiding guards. See CTS Handbook for usage information.
Track Roller Guards (Cont'd.)
Track Guiding Guards

Caterpillar offers three types of track guiding guards — end guiding guards, center guiding guards, and full length guiding guards.

**Function**
- Help align and guide the track in and out of the idler and the sprocket and through the rollers.

**End Guiding Guard**
- Located at the front and rear of the track roller frame.
- Helps guide the track as it enters and leaves the sprocket and idler.
- Prevents link gouging by the sprocket during turning and sidehill operations.

**Segmented (Center) Guiding Guard**
- Located in the middle of the track roller frame.
- Maintains track alignment.
- Reduces link scuffing with other undercarriage components.
- Allows packing material to fall free.

**Full Length Guiding Guard**
- Covers entire roller area.
- Maintains track alignment.

**Cast Guards (Center and Full Length)**
- Strength.
- Better pin coverage.

Cat track guiding guards have heat treated bolt-on wear strips. They can easily be replaced to restore the worn surface without changing the entire guard assembly.
Conversion Guide

Determining Competitive Undercarriage Conversions

To identify which Cat components can be used, and if modifications are required, to convert any track type machine to Cat undercarriage components, refer to the following guidelines:

- Refer to guidelines on the following pages to determine what dimensions should be collected on the competitive machine to make a complete or partial conversion to Cat undercarriage.
- Use Conversion Report Form/Work Sheet PEEP0210, to collect dimensional data.
- Refer to IRM UC96-12, titled "Cat Undercarriage Components Dimension Guide". This guide provides information to compare the dimensions of the competitive undercarriage with Cat undercarriage components for conversion purposes.

---

Conversion Report Form/Work Sheet

**Competitive Model:**

**Serial Number/Year:**

**Conversion Date:**

**Link Assembly**

- Competitive Dimensions
- Warms
- New*

### Gear Assembly

- Track Roller
- Track Roller Diameter (A)
- Plug Diameter (B)
- Plug Diameter (C)
- Plug Diameter (D)
- Plug Diameter (E)
- Plug Diameter (F)
- Plug Diameter (G)
- Plug Diameter (H)
- Plug Diameter (I)
- Plug Diameter (J)
- Plug Diameter (K)
- Plug Diameter (L)
- Plug Diameter (M)
- Plug Diameter (N)
- Plug Diameter (O)
- Plug Diameter (P)
- Plug Diameter (Q)
- Plug Diameter (R)
- Plug Diameter (S)
- Plug Diameter (T)
- Plug Diameter (U)
- Plug Diameter (V)
- Plug Diameter (W)
- Plug Diameter (X)
- Plug Diameter (Y)
- Plug Diameter (Z)

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*Certain dimensions may vary.*

---

**Carriage Roller**

- Competitive Dimensions
- Warms
- New*

**Comments/Problems:**

---

*Certain dimensions may vary.*
Primary Dimensions

The primary dimensions are the critical dimensions to determine if a Cat link assembly can be used with the OEM sprocket and/or OEM rolling components. Compare measurements to Cat link assembly dimensions, refer to IRM UC96-12. If measurements are within the ranges shown then the Cat link assembly may be used with the OEM sprocket and/or rollers. If measurements and Cat link dimensions are different, or conversion to Cat sprockets and/or rollers is desired, sprocket and/or roller measurements must also be taken.

Pitch — A
Purpose: Determines OEM sprocket compatibility with Cat track.
Range: ±.03" (.76 mm)
Method: Track pitch (A) is the distance between pin centers in adjacent track sections. Track pitch can be determined by measuring the distance from one side of the pin to the same side of the pin in the adjacent section. When measuring to determine OEM pitch on worn link assemblies, you will need to adjust for an increase in track pitch due to internal wear.
Link Assembly (Cont’d.)

Bushing Outer Diameter (O.D.) — B

Purpose: Determines OEM sprocket compatibility with Cat track.
Range: - .12” (3.04 mm) without modifications
± .12” (3.04 mm) with modifications

Method: The bushing outer diameter measurement should be taken across the unworn horizontal centerline of the bushing. In cases where the competitive track bushing is of smaller diameter than the Cat track bushing, and where the competitive sprocket must be used, the new competitive sprocket root should be ground out to properly accommodate the larger diameter bushing. This grinding should be done with the sprocket held in a fixture to achieve uniform profile and pitch. Failure to grind out the difference in radius can result in mismatch and accelerated bushing wear. Normal break-in cannot be expected to relieve the difference without some detrimental wear.

Rail Spread

Inside — C
Outside — D

Purpose: Determines OEM rolling component compatibility with Cat track.
Range: Inner — .0” to + .19” (4.83 mm)
Outer — -.19” (4.83 mm) to + .0”

Method: The inside and outside rail spreads can be measured as shown at below.
Note: As link assemblies wear, there will be a slight change of rail spread. It does not significantly affect measured dimensions.
Conversion Guide

Link Assembly (Cont'd.)

SECONDARY DIMENSIONS
The secondary dimensions are less critical. Although they rarely prevent a conversion, modifications may be necessary in order to protect a complete Cat undercarriage system.

![Link Assembly Diagram]

**Link Height — E**
Purpose: Determines if machine height will be raised or lowered and affects number of sections required.

**Pin Length — F**
Purpose: Determines if pin will clear guards or other machine parts.

**Rail to Pin Boss — G**
Purpose: Determines material available for wear.

**Rail to Bushing — H**
Purpose: Determines if link will clear idler, roller flanges, and provide maximum wear material without sacrificing guidability, number of sections required.

**Bolt Size — I**
Purpose: Bolt sizes need to be equivalent to ensure use of competitive shoe and proper fastener strength.

OTHER CONSIDERATIONS

**Number of Sections**
The number of Cat track sections required should be determined from the number used on the competitive machine at the time of conversion.

Assuming the sprockets and rolling components maintain relatively constant placement and sizes, the following procedure is usually accurate enough to determine the number of Cat sections required.

\[
\text{No. Sections of Cat} = \frac{\text{OEM Pitch (New)} \times \text{No. Sections Currently}}{\text{Cat Pitch}}
\]

Example: Calculations for converting a competitive 7.50" pitch 36-section machine to Cat 8.00" pitch track are as follows:

7.50" x 36 = 270 total inches of chain required on this machine. 270" 8.00" or 33.75 or 34 sections of Cat 8.00" pitch track required for conversion.

If link height and/or rail to pin boss clearance increases a large amount, the preceding formula may lead to a link assembly that is too short.
Conversion Guide

Track Shoe

Primary Dimensions

Bolt Hole Spacing — A
— B
— C

Bolt Size — D

Bolt Hole Spacing — A, B, C
Purpose: Determines interchangeability of track shoes.
Range: .0"
Method: There are two methods of measuring shoe bolt spacing:
1. Measure a track shoe, by measuring from one side of a bolt hole to the same point of the hole adjacent
2. Measure an assembled track group, by measuring from the center of the bolt head to the center of the adjacent bolt

Bolt Size — D
Purpose: Determines reuse of track shoes and/or track hardware.
Range: .0"

Other Considerations
The shoe leading and trailing edges must maintain proper clearance, especially if link pitch changes, to allow proper assembly and operation.

Sprocket

Primary Dimensions

Tip Diameter — A
Root Diameter — B
Inner Diameter — C

Other Considerations
Offset
Segment Hardware

Primary Dimensions
Use these dimensions to determine if a Cat sprocket can be used on the competitive machine.
Sprocket (Cont’d.)

**Tip Diameter — A**

**Purpose:** Determines if machine interference will result from using Cat sprocket.

**Range:** Not Specified

**Method:** Measure the overall diameter of the sprocket. It may be helpful to mark the center of the hub or axle. Then, using a 12" ruler extended from the tooth tip measure to the hub center with a tape measure. The most accurate sprocket measurements can be obtained after the track has been removed from the machine. Either too large or too small tip diameter can result in track or sprocket interference with other machine components.

**Root Diameter — B**

**Purpose:** Determines if sprocket will carry machine weight.

**Range:** Not Specified

**Method:** Measure the diameter of the (estimated) unworn sprocket roots. The track bushings must increase elevation such that at the six o’clock sprocket position the bushing is above the level that it left the last roller.

It may be necessary to use spacer plates on the competitive track roller frame to increase ground clearance when using a larger diameter Cat sprocket. This should lift the track roller frame at the bottom entry position. Spacers may be fabricated from 1030 or 1020 steel. Full length spacer plates are recommended and bolts should be checked for tightness at regular intervals.

**Inner Diameter — C**

**Purpose:** Determines if there is adequate space and geometry for welding.

**Range:** Not Specified

**Method:** Measure the area that will facilitate welding. Use same procedure described above.

**Other Considerations**

**Offset**

The Cat rim or adapter ring and segments may have a different offset than the OEM design. Failure to compensate for the offset will result in sprocket-link interference.

Whether you use an adapter ring or a weld-on rim, the inner diameter must allow proper mounting and orientation on the competitive sprocket “hub.”

When welding, the sprocket teeth must be in line with the track roller center line and the rim or segments must be clear of all other parts.
Segment Hardware
Any additional clearances needed for segment hardware must be considered, especially if the sprocket runs close to final drive housings, guards, etc.

Track Rollers
Primary Dimensions
- Tread Diameter — A
- Tread
  - Inside — C
  - Outside — D
- Mounting Width — E
- Roller Frame to Tread Surface — I
- Width Between Bolt Centers — F
- Bolt Hole Spacing — H

Other Considerations
- Flange Diameter — B
- Bolt Size — G
- Roller Spacing
Conversion Guide

Track Rollers (Cont’d.)

Primary Dimensions

Use these dimensions to determine if Cat link assemblies will fit on the competitive track rollers.

Tread

<table>
<thead>
<tr>
<th>Inside</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>Outside</td>
<td>D</td>
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</table>

Purpose: Determines Cat link assembly compatibility with OEM track rollers.

Range: Outside — .0” to + .19” (4.83 mm)

Inside — .19” (4.83 mm) to + .0”

Method: Measure from inside flange to inside flange and outside flange to outside flange. Measurements from worn rollers will result in slightly inaccurate dimensions. If clearances appear to be close compensation for wear may be needed. Note: Be sure to compare these measurements to the link assembly intended for use in the conversion.

Use these dimensions to determine if Cat track rollers can be used on the competitive machine.

Mounting Width — E

Purpose: Determines if Cat rollers will fit in OEM frame.

Range: -.10” (2.54 mm) to + .0” (.0 mm)

Method: Measure the OEM track roller frame and compare to Dimension E on the Cat roller.

Note: Failure to maintain a clearance between the roller frame and roller end collar vertical faces may cause roller damage.

Roller Frame to Tread Surface — I

Purpose: Determines if Cat roller lowers or raises machine.

Range: Depends on roller wear limits, idler and sprocket placement.

Method: Differences in tread diameter or end collar design can result in slightly raising or lowering overall height of machine. This can cause track interference with frame, guards or cause sprocket to carry some machine weight. Frame to tread surface (Dimension I) should be measured and any potential interference compensated for as necessary on a case by case basis. If required, roller frame spacers can be used.

Width of Bolt Centers — F

Bolt Spacing — H

Purpose: To determine use of existing bolt pattern.

Range: ± .01” (.254 mm)

Method: Measure from the center to center point of bolts in track roller frame. For comparison, use Cat track roller dimensions as reference. If patterns are not within range, plugging, drilling, and tapping of the competitive roller frame may be needed.

Other Considerations

Flange Outer Diameter
Conversion Guide

Track Rollers (Cont’d.)

Two points to check are (1) roller flange to link pin boss clearance, and (2) roller flange and track frame interference.

Bolt Size
If bolt size and tread type are similar, reuse of competitive hardware maybe possible.

Roller Spacing
If the Cat roller selected has different tread, flange diameters and/or roller frame to tread surface dimensions, be sure to compensate for these to prevent idler/sprocket interference, especially on the front and rear roller.

Shaft and End Collar Design
(flat shaft mounting vs. round shaft mounting)
For example, Cat D8 and D9 size track rollers utilize a full round shaft mounting which requires a saddle type cutout in the roller frame (Illustration B). D8 size roller conversion can use 983 rollers which do mount flat as in Illustration A. However, D9 roller conversion will require a roller frame saddle arrangement.
Conversion Guide

Carrier Rollers

Primary Dimensions

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<th>Dimension</th>
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Other Considerations

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Primary Dimensions

Use these dimensions to determine if Cat link assemblies can be used on the competitive carrier roller.

**Tread**

**Inside** — A  
**Outside** — B

**Purpose:** Determines link assembly compatibility with carrier rollers.

**Range:** Inside — .19” (4.83 mm) to +.0”  
Outside — .0” to +.19” (4.83 mm)

**Method:** Measure from inside flange to inside flange and outside flange to outside flange. Measurements from worn rollers will result in slightly inaccurate dimensions. If clearances appear to be close compensation for wear may be needed. Note: Be sure to compare these measurements to the link assembly intended for use in the conversion.

Use these dimensions to determine if Cat carrier rollers can be used on the competitive machine.

**Shaft Outer Diameter — C**

**Purpose:** Determines compatibility of Cat roller shaft with competitive carrier roller holder.

**Range:** As small as competitive roller holder will hold. As large as competitive roller shafts.

**Method:** Measure competitive shaft with calipers, compare to Cat roller; if Cat roller is smaller, a sleeve may be fabricated to compensate for small diameter.

**Reference Dimensions — D**

**Purpose:** Determines compatibility of Cat carrier roller with competitive carrier roller holder and link assembly.

**Range:** ±.10” (2.54 mm) depends on tread inside and competitive holders.

**Method:** Measure from radius to holder to determine reference dimension. The reference dimensions assure proper carrier roller alignment with the link assembly.
Conversion Guide

Other Considerations

Shaft Mounting Length — E
The Cat carrier roller shaft may have a longer or shorter shaft mounting length, providing it does not interfere with the holder or other components.

Dowel Spacing and Size
The dowel spacing and size may need to be moved or resized; many times this is accomplished by drilling new holes in the competitive holder.

Idler

Primary Dimensions

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Other Considerations

Slide Plate Profile

Primary Dimensions

Use these dimensions to determine if Cat link assemblies can be used on the competitive idlers.

Tread Diameter — A
Purpose: Determines link assembly compatibility with idler.
Range: Slightly smaller than OEM up to OEM diameter.
Method: Measure the diameter; compensate for wear as much as possible.

Tread

<table>
<thead>
<tr>
<th>Inside — B</th>
<th>Outside — C</th>
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</table>
Purpose: Determines link assembly compatibility with idler.
Range: Inside — .19" (4.83 mm) to +.0"
Outside — -.0" to +.19" (4.83 mm)
Method: Measure from inside flange to inside flange and outside flange to outside flange. Measurements from worn rollers will result in slightly inaccurate dimensions. If clearances appear to be close compensation for wear may be needed. Note: Be sure to compare these measurements to the link assembly intended for use in the conversion.
Use these dimensions to determine if Cat carrier rollers can be used on the competitive machine.

Mounting Shaft — D
Purpose: Determines use of OEM mounting block.
Range: Same shaft O.D., same mounting arrangement.
Method: Compare Cat shaft O.D., length and mounting type with competitive idler. Modification to OEM mounting block may permit use of Cat idler.
Other Considerations

Side Plate Profile

Some manufacturers use guards that run close to idler side plates; modification may be needed to avoid interference.

For additional conversion information go to this Knowledge Network site:

https://kn.cat.com/cat.cfm?ID=11053