

SHOP MANUAL



GUIDANCE FOR REUSABLE PARTS

LUBRICATED TRACKS



GUIDANCE FOR REUSABLE PARTS
KOMATSU

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Application of this Guide

This guide is applicable to the sealed & lubricated tracks of the following machine models and serial nos.

Models D31 thru D75...all machines equipped with sealed & lubricated tracks

Models D80A & E	Machine serial nos.	25460 and up	
Models D85A & E	" "	" "	26514 and up
Model D80P	" "	" "	2063 and up
" D85P	" "	" "	2093 and up
" D95S	" "	" "	2057 and up
" D150A	" "	" "	8454 and up
" D155A	" "	" "	19065 and up
" D155S	" "	" "	1087 and up
" D355A	" "	" "	4234 and up
" D455A	" "	" "	1334 and up

INTRODUCTION

This GUIDANCE FOR REUSABLE PARTS describes through photos the methods of checking track links, bushings, seals, spacers, pins, etc. for failures and the criteria for their reuse. It also gives fundamental information about various parts of sealed & lubricated tracks and the causes of their failures.

We hope that this guide will help you become familiar with the ways of correctly identifying the causes of failures and their repair. This will contribute to overall customer satisfaction through the [reduction of customer's operating and repair costs](#) and extension of the track life.



Note: This publication is intended for guidance only and KOMATSU LTD. hereby expressly denies and excludes any representation, warranty or implied warranty for the reuse of sealed and lubricated track components.

FAILURE SIGNS AND DIAGNOSIS FOR REUSE

Inspection Points for Parts Reuse Diagnosis

In order to correctly determine whether or not faulty parts can be reused, it is necessary to clean the track thoroughly before disassembling the track links. When disassembling the track links, check them for lube oil. When checking the following track parts, pay special attention to the inspection points indicated.

Part	Inspection point
Seal	Sealing surface for wear, damage, deterioration and roughness. Seal for deformation. Loading ring for damage
Bushing	End surfaces for wear. R (at corners) for wear, cracks, breakage, corrosion, etc.
Link	Loading ring for wear in its contacting surface with the line. Link for wear in its contacting surface with the bushing.
Pin	Pin surface for uneven wear, scraping, etc. Ends of pins for wear
Spacer	Spacer for corrosion, wear, cracks, breakage, etc.

Precautions in Checking Track Parts for Reuse

- i) If there is no lube oil when the track is disassembled, the seals and bushings cannot be reused in a "wet turn".
- ii) When inspecting seals and links, leave seals installed in links.
- iii) Always clean pins, bushings and spacers before inspecting them.
- iv) Take care in handling and storing seals and bushings so that their surfaces will not be impaired.
- v) Ordinarily, not all loading rings need to be checked for wear of the external surface. Check only the rings whose seals were taken out of place just after the seals are re-installed on the links.

Standards for Turning a Sealed & Lubricated Track

Standards for Reuse as a Sealed & Lubricated Track (Wet Turn)

Rank	Failure degree
Use again	The present track can be reused without functional problems by turning and using as a sealed & lubricated track. The present track failure will not cause secondary trouble.
Use after reconditioning	The present track can be reused for a while without functional problems by turning and using as a sealed & lubricated track. However, continued use of the track will make it unfit to perform as a sealed & lubricated track. Consequently, the track can be re-used if reconditioned.
Do not use again	The present track cannot be reused because it is likely to cause troubles if used as a sealed & lubricated track.

* To determine the degree of normal wear, refer to the maintenance standards in the applicable Shop Manual.

Standards for Reuse as a Dry Type Track (Dry Turn)

Rank	Failure degree
Use again	The present track can be reused without functional problems by turning and using as a dry type track.
Do not use again	If reused as a dry type track, it is likely to cause troubles.

* It is reusable without reconditioning for Dry Type Tracks, which ranks are classified into Use Again or Use After Reconditioning for Sealed and Lubricated Track.

Precaution for Determining the Reusability of Parts

When either bushings or seals must be replaced with new ones, replace their mating parts with new ones at the same time. However, if the bushings are only very slightly worn on the end faces, the seals may be replaced without using new bushings.

Part	Rank of individual part	Corrective action
Bushing	Use again	Use the bushing and seal again as the same set.
Seal	Use again	
Bushing	Use again	Use the bushing again and replace the seal only.
Seal	Do not use again	
Bushing	Do not use again	Replace both the bushing and seal with new ones.
Seal	Use again	

Standard for Reuse of Track Parts

To determine the reuse of track parts, refer to the standards below. When two or more failures occur at the same time, the reusability of the faulty parts should be determined with reference to the highest degree of seriousness of failure. [For example, when the reusability of two failures is judged to be "Use Again" and "Do not use again", give higher priority to "Do not use again" and its corrective action].

Part name	Type of failure	Failure degree for wet turn			Reusability as dry turn	
		Use again	Use after reconditioning	Do not use again		
Link	1	Wear of contacting surface with the loading ring or on the bottom of the counterbore	With seal in place link cannot be turned by hand	—	With seal in place link can be turned by hand 31 & 32	Use again
	2	Bore is stretched (stepped surface)	Bore is extended due to wear 29	—	—	Use again
	3	Burrs at bore bottom	—	Burrs at bottom of a bore where a pin is forced in place 30	—	Use again
Pin	1	Flaking in the external surface	—	—	Pin has flaked surface	Do not use again
	2	Wear of external surface	Chafing but not uneven wear 33 & 34	—	Uneven or stepped wear on pin is 2 mm max. (difference in uneven surface)	Use again
	3	Corrosion of the external surface or adherence of carbide	—	Corroded external surface or adherence of carbide 35 & 36	—	Use again
	4	Flaw or damage on end surface	Fine scratches 15	—	Slight damage, scores, etc. 16 & 17	Use again
	5	Cracks on end surface	Hair crack, barely identified by visual inspection	—	Distinct cracks 18 & 19	Use again
Spacer	1	Cracks, damage (breakage)	Slight damage 20	—	Marked damage, cracks 21 & 22	Use again 20 Use after reconditioning 21 & 22
	2	Wear on end surface	Oil groove remains on worn surface 23	—	Oil groove is gone because of wear 24	Use again
	3	Corrosion	Slight corrosion 25	Marked corrosion 26	—	Use again
	4	Scores, dents, etc. on end surface	Scores or dents on end surface 27	—	—	Use again
	5	Burrs on end surface	—	Burrs on end surface 28	—	Use again

Note: Bold numbers refer to photos in the text.

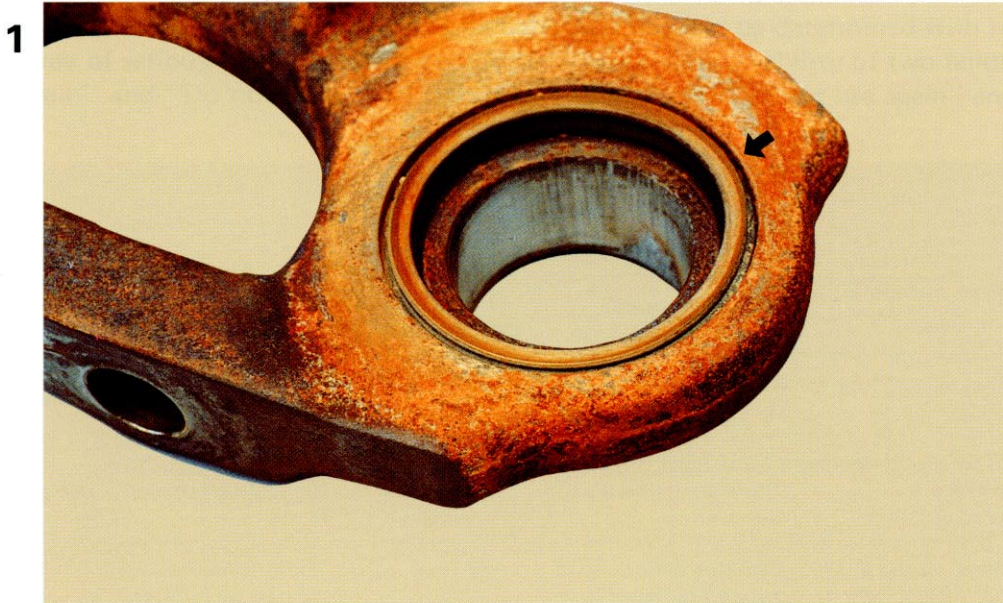
Part	Type of failure	Failure degree for wet turn			Reusability as dry turn	
		Use again	Use after reconditioning	Do not use again		
Seal	1	Presence of lube oil	Lube oil remains 3	—	No oil remains 1	Use again
	2	Flaw on the sealing surface	Slight flaws outside the sealing position 2	—	Slight flaws inside the sealing position 5	Use again
	3	Wear on the external surface or distortion of the loading ring.	The ring cannot be rotated by hand in the link bore.	—	The ring can be rotated by hand in the link bore.	Use again
Bushing	1	Presence of lube oil when disassembled.	Lube oil remains	—	No oil remains 11	Use again
	2	Abnormality of seal groove on end surface	Wide and deep seal groove 12	—	—	Use again
	3	Corrosion of end surface	Corrosion outside the seal position 13	—	Slight corrosion inside the seal position 14	Use again
	4	Clogged hole	—	Hole clogged with foreign substance 37	—	Use again
	5	Sharp edges at the end	—	Sharp edges formed on the ends 38	—	Use again
	6	Sharp edges at the vertical hole	—	Sharp edges formed on the vertical hole 39	—	Use again
	7	Protrusion around the hole into which the pin is forced.	—	Protrusion, burrs, etc. are around the hole for pin 40	—	Use again

Note: Bold numbers refer to photos in the text.

Failure Signs and Diagnosis for Reuse

Seals

No Lube oil remains when a seal ass'y is disassembled



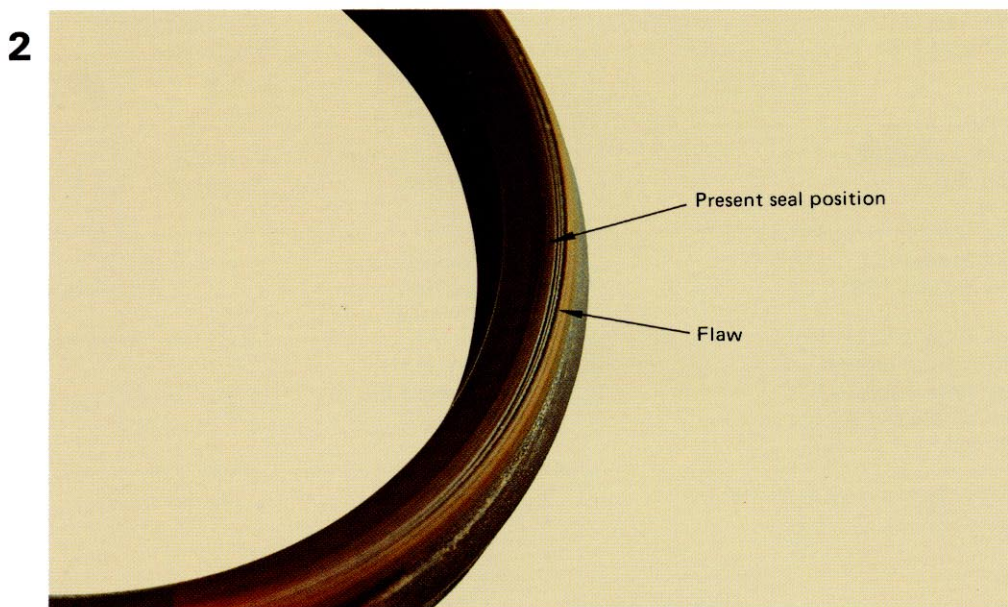
DO NOT USE AGAIN
(Wet turn)

USE AGAIN
(Dry turn)

Failure Sign

Dirt or dust has already entered this seal ass'y, resulting in the damaged seal surface. If no oil is retained between the bushing and seal when the seal ass'y is disassembled, it cannot be reused for a "wet turn", even through it seems to have no failure.

Flaw in the seal surface (slight flaw located outside the present seal position)

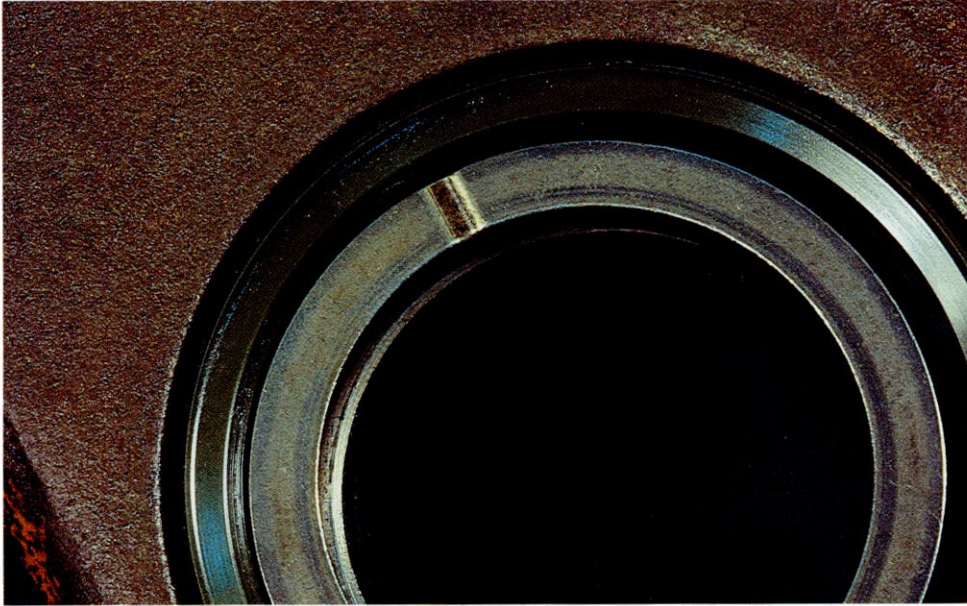


USE AGAIN

Failure Sign

Chafing is on the seal lip but located inside the present seal position. Therefore, the seal should not be removed from the link.

3

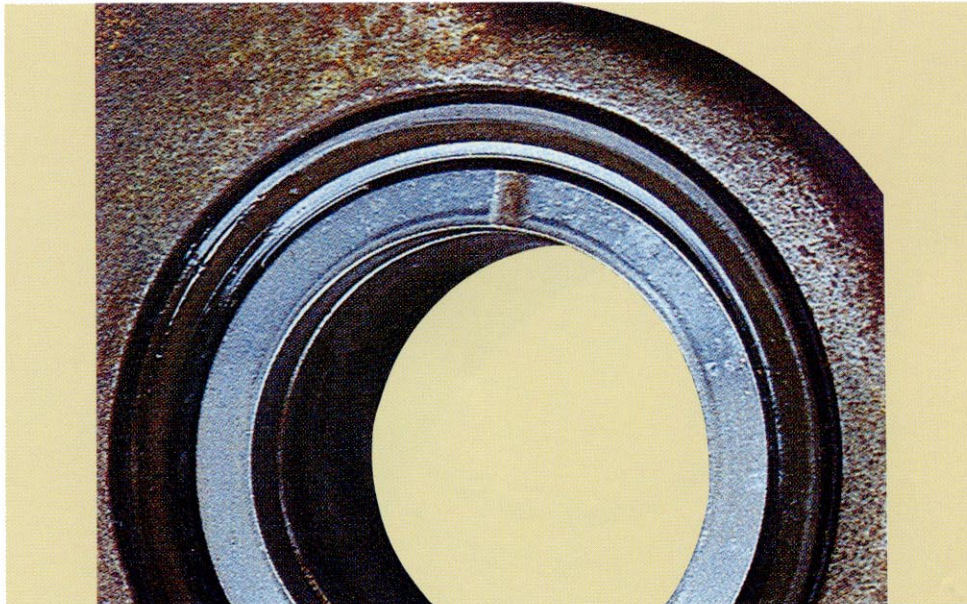


USE AGAIN

Failure Sign

Neither change in shape nor wear is observed.

4



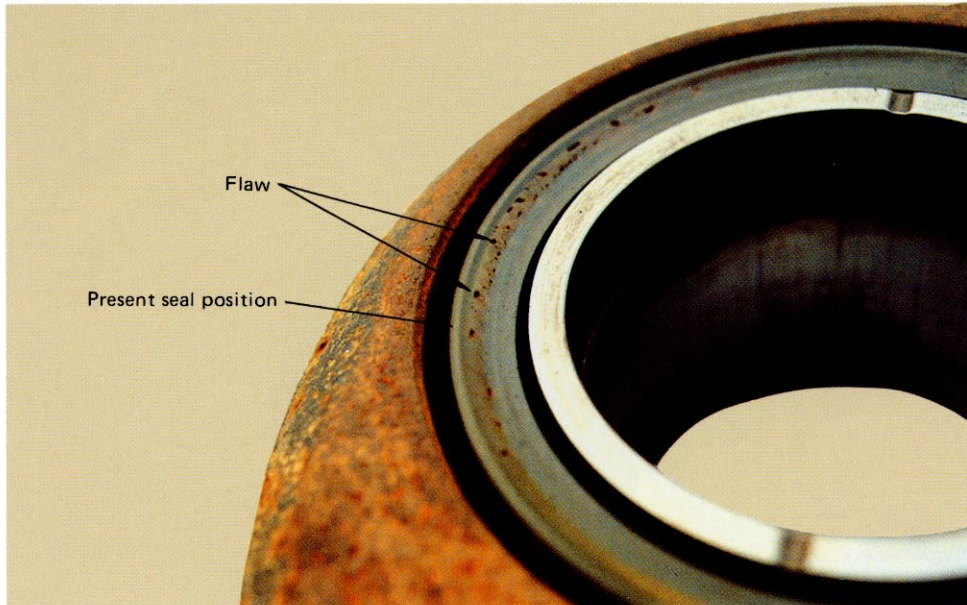
USE AGAIN

Failure Sign

Slight wear is observed on the seal, although neither deterioration of quality nor change in shape is seen.

**Slight flaw in the seal surface
(flaw located inside from the present seal position)**

5



**DO NOT USE AGAIN
(Wet turn)**

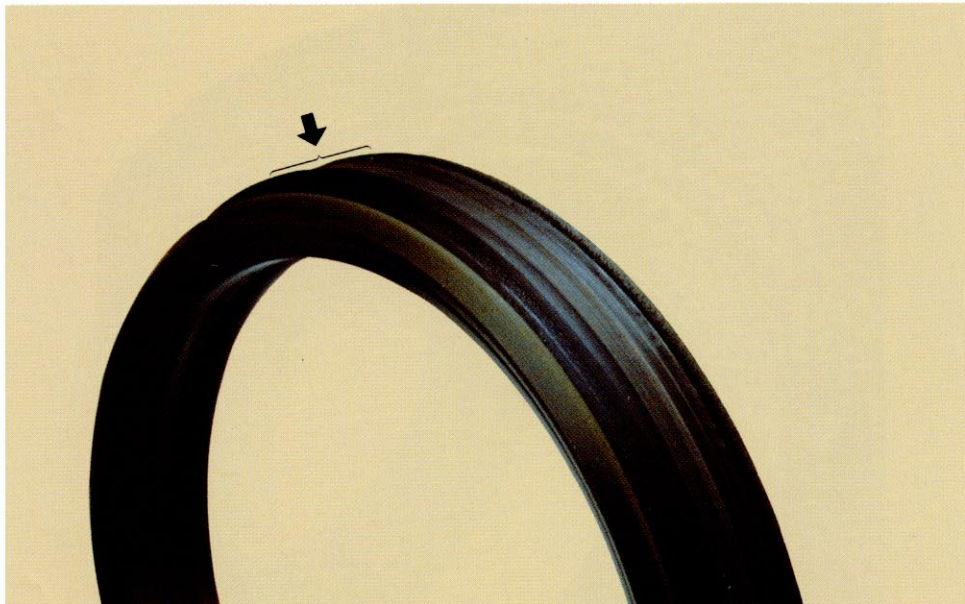
**USE AGAIN
(Dry turn)**

Failure Sign

Tearing flaw or pickup is on the sloping surface but located inside the present seal position.

**Marked wear on the external surface of a loading ring
(The ring can be turned in the link by hand.)**

6



**DO NOT USE AGAIN
(Wet turn)**

**USE AGAIN
(Dry turn)**

Failure Sign

Considerable wear of the external surface of the seal. The ring can be turned in the link by hand.

(The seal need not be removed from the link to be checked.)

Note: In this check item, not all seals need to be checked. Only check those seals which have been removed. Check them when restoring them to their original positions.

7

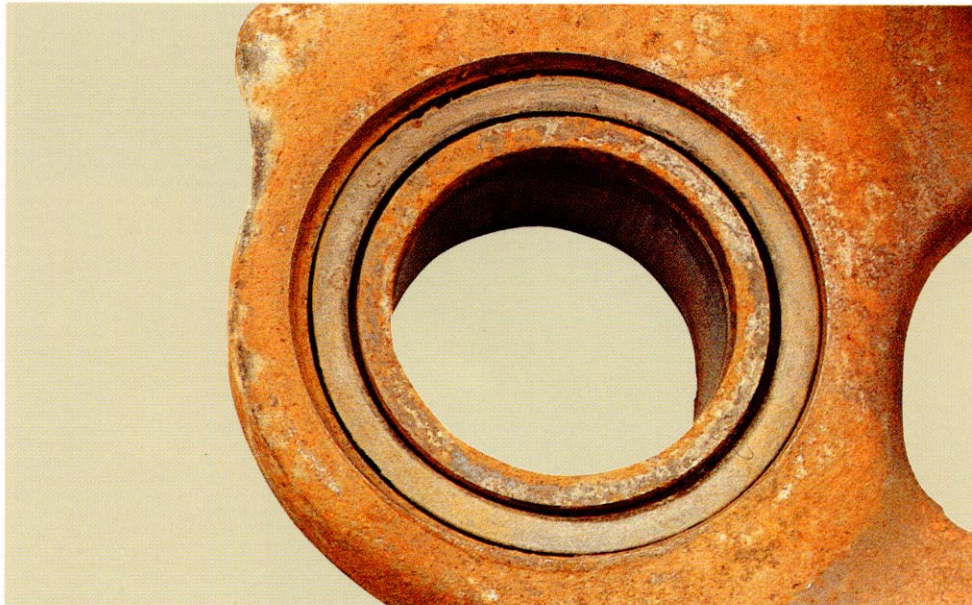


DO NOT USE AGAIN
(Wet turn & Dry turn)

Failure Sign

Damage seal tip and badly damage loading ring.

8

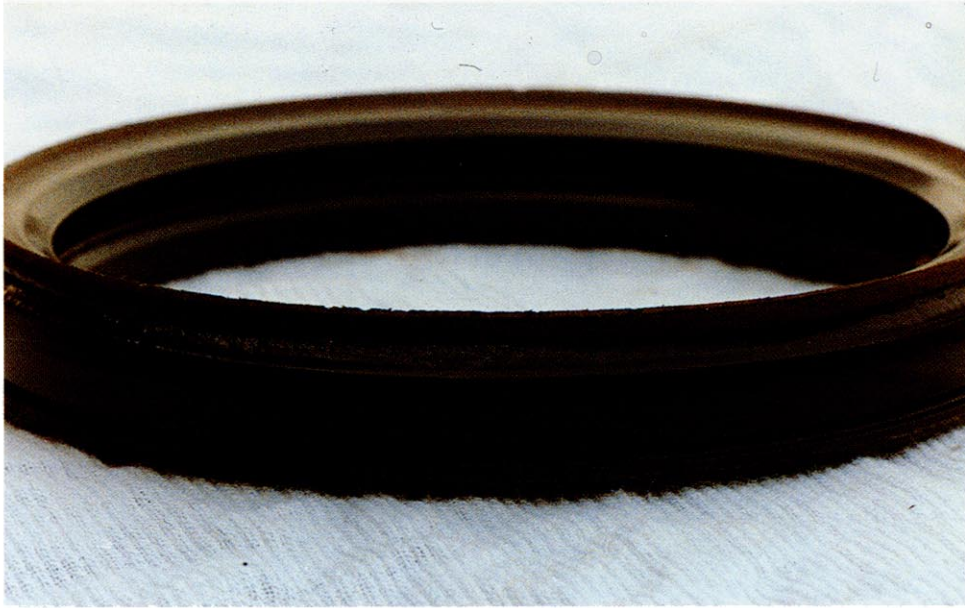


DO NOT USE AGAIN
(Wet turn & Dry turn)

Failure Sign

Marked wear, damage and deterioration.

9



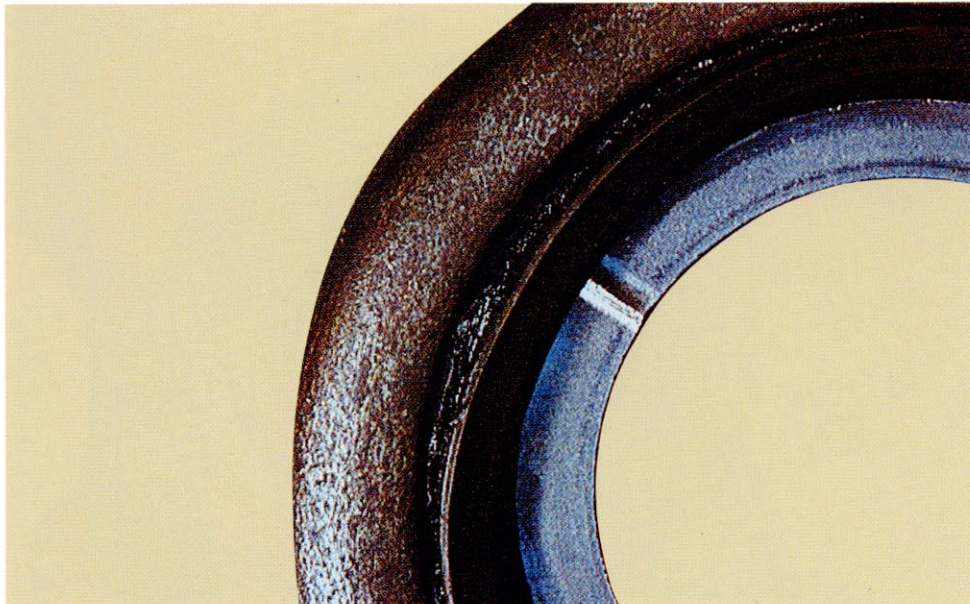
DO NOT USE AGAIN
(Wet turn)

USE AGAIN
(Dry turn)

Failure Sign

Damaged seal tip and loading ring.

10



DO NOT USE AGAIN
(Wet turn)

USE AGAIN
(Dry turn)

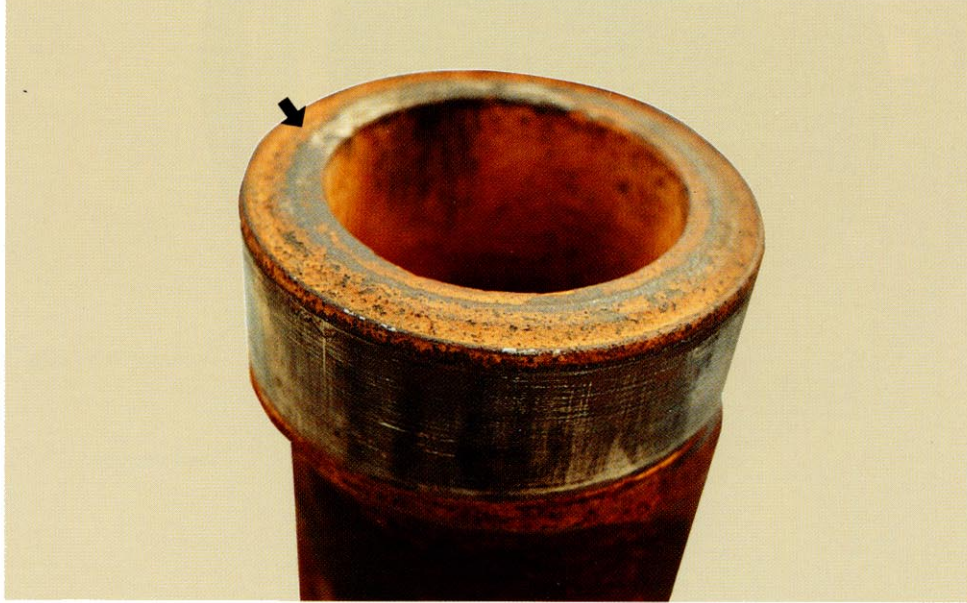
Failure Sign

Marked change in shape of seal, loading ring is damaged or protrudes out of place.

Bushings

No oil remains on the bushing when disassembled

11



DO NOT USE AGAIN
(Wet turn)

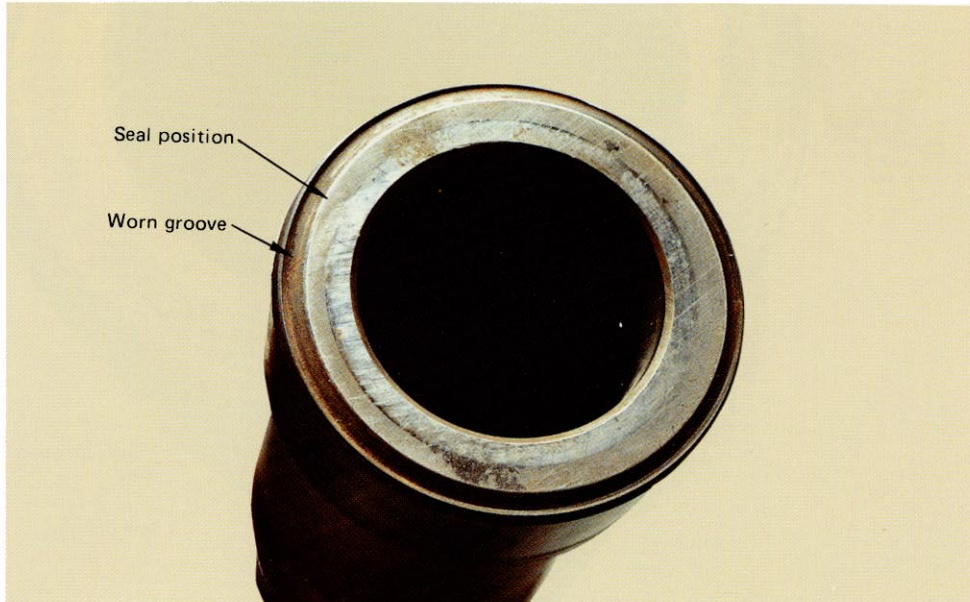
USE AGAIN
(Dry turn)

Failure Sign

Dirt and dust have already entered the bushing and caused flaws to its end surfaces. If the bushing has no oil left between the bushing and seal when disassembled, it cannot be reused in a "wet turn", even though it seems to be sound.

Wide and deep worn groove

12



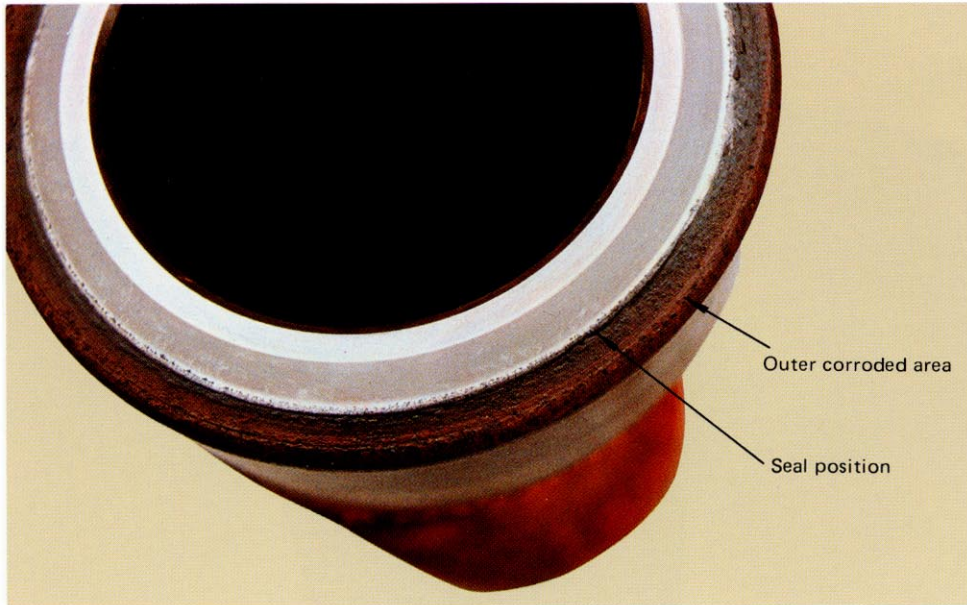
USE AGAIN

Failure Sign

Wide and deep worn grooves are on the bushing. The bushing can be reused in a "wet turn". Large worn grooves may occur depending on the type of soil. They are a form of ordinary wear.

**Corroded end surfaces
(corroded areas are outside the present seal position)**

13



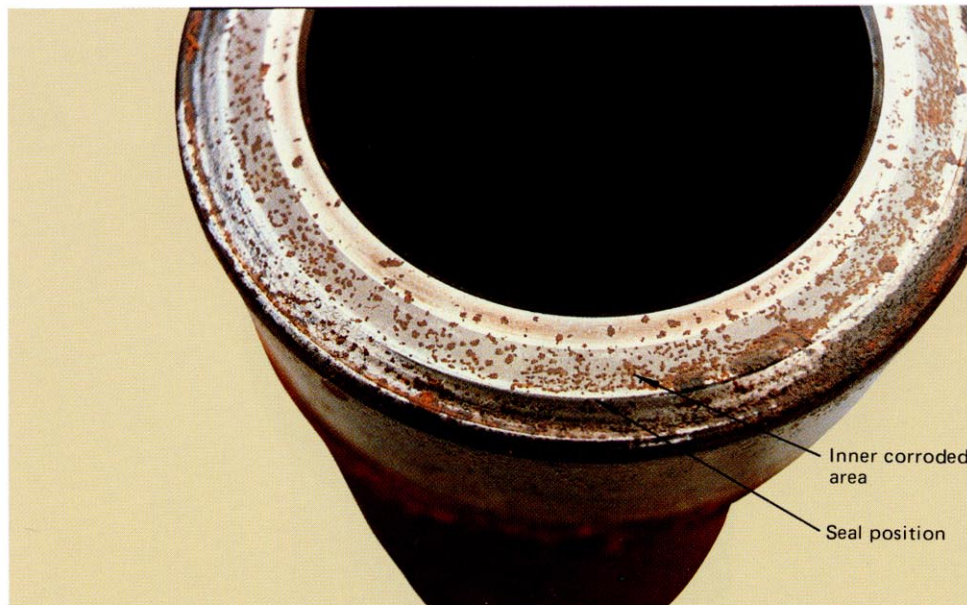
USE AGAIN

Failure Sign

Corrosion have occurred on the end surfaces but the present seal position is inside the corroded areas. This is a form of ordinary corrosion.

**Corroded end surfaces
(corroded areas are inside the present seal position)**

14



**DO NOT USE AGAIN
(Wet turn)**

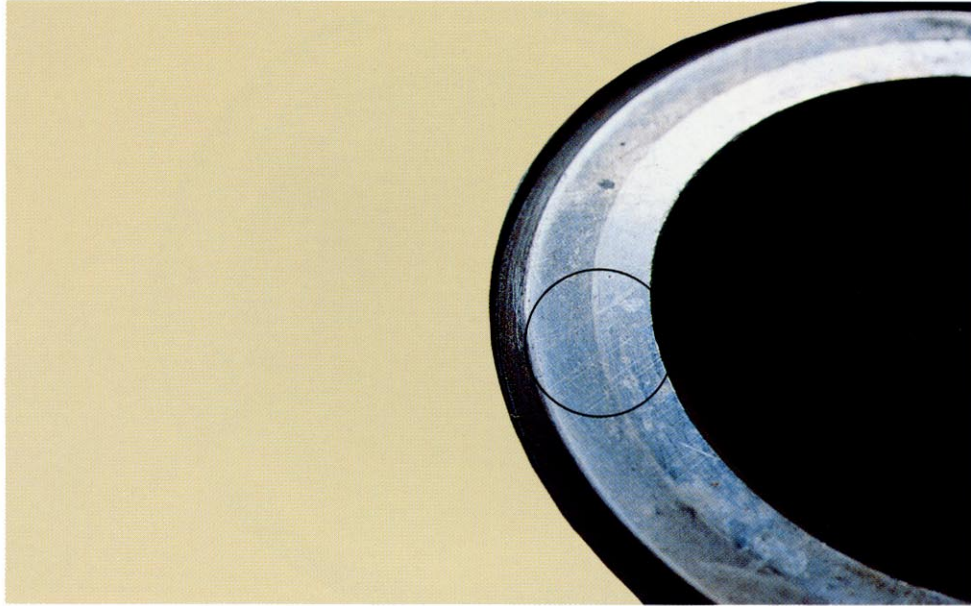
**USE AGAIN
(Dry turn)**

Failure Sign

Corrosion are on the whole end surfaces. Corrosion located inside the seal position adversely affect the bushing. Thus, this bushing cannot be reused in a "wet turn".

Scratches on the end surfaces (fine scuffing)

15



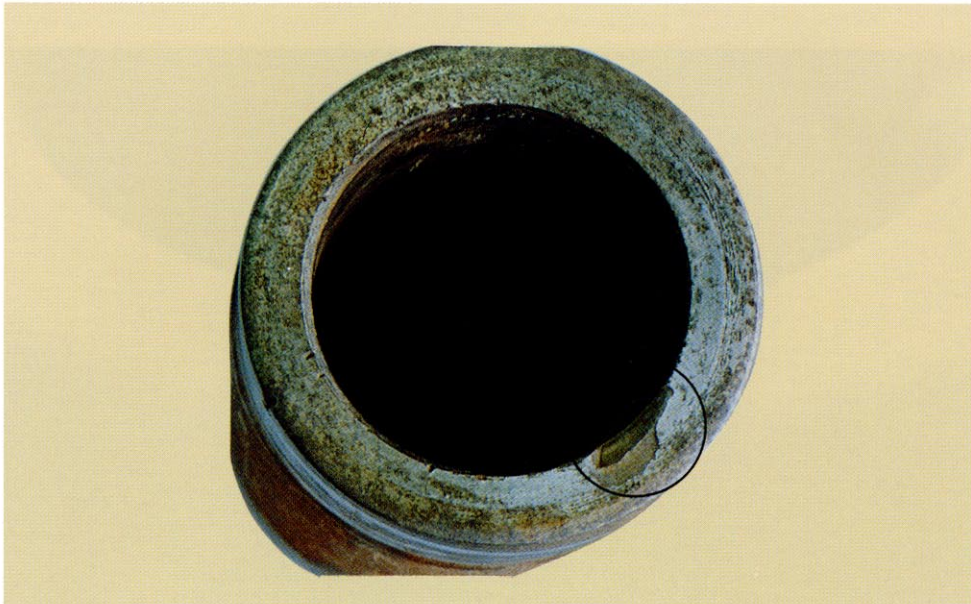
USE AGAIN

Failure Sign

Fine scuffing marks remain on the end surfaces. This flaw does not pose a special problem.

Peeled end surfaces

16



DO NOT USE AGAIN
(Wet turn)

USE AGAIN
(Dry turn)

Failure Sign

An end surface is partly peeled off.

17



DO NOT USE AGAIN
(Wet turn)

USE AGAIN
(Dry turn)

Failure Sign

Internal break of a bushing and partial break of the contacting surface with the seal.

18



DO NOT USE AGAIN
(Wet turn)

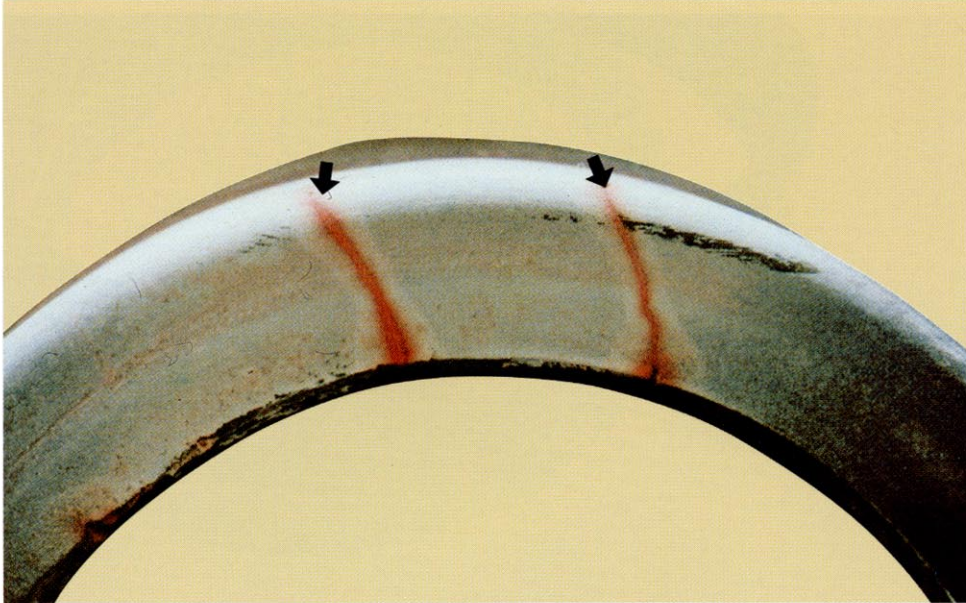
USE AGAIN
(Dry turn)

Failure Sign

Hair cracks in the end surface.

Cracks in the end surfaces (distinct cracks)

19



DO NOT USE AGAIN
(Wet turn)

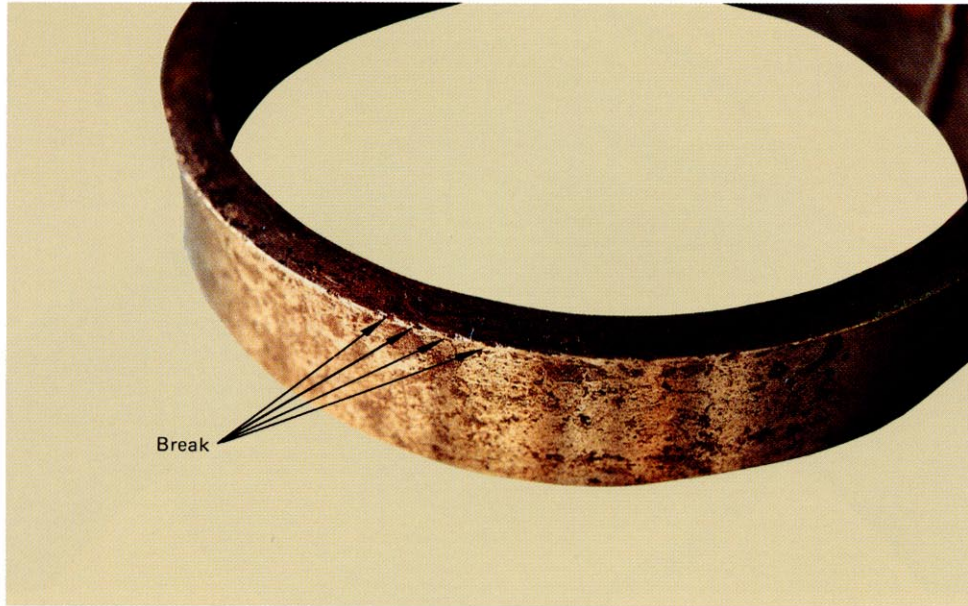
USE AGAIN
(Dry turn)

Failure Sign

Distinct cracks are in the end surface.

Spacers
Breaks (slight)

20



USE AGAIN

Failure Sign

Slight degree of breaks have occurred at end surface corners.

Break (large)

21



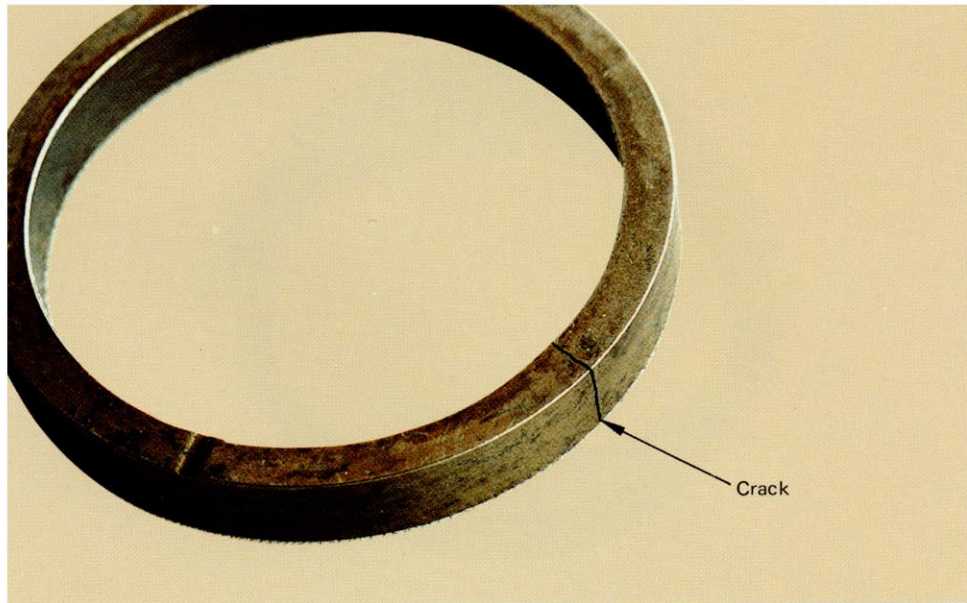
DO NOT USE AGAIN
(Wet turn & Dry turn)

Failure Sign

Severe break has occurred at the end surface corner.

Crack

22



DO NOT USE AGAIN
(Wet turn & Dry turn)

Failure Sign

Distinct crack has occurred, making this spacer unusable.

Wear of the end surface (but oil grooves still remain)

23



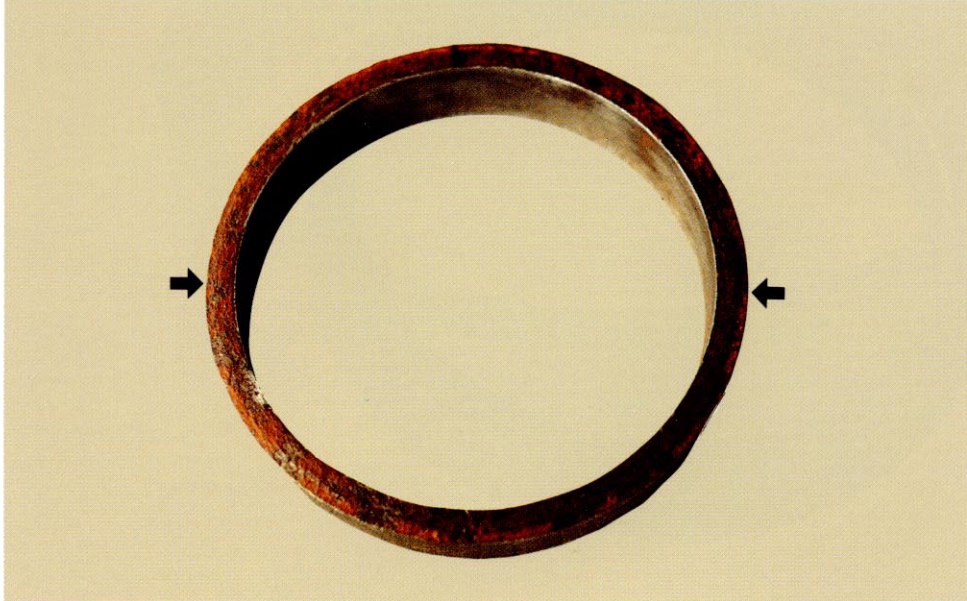
USE AGAIN

Failure Sign

Wear of the end surface is so slight that oil grooves still remain. This spacer can be reused in a "wet turn".

Wear of the end surface (oil grooves have been worn out)

24



DO NOT USE AGAIN
(Wet turn & Dry turn)

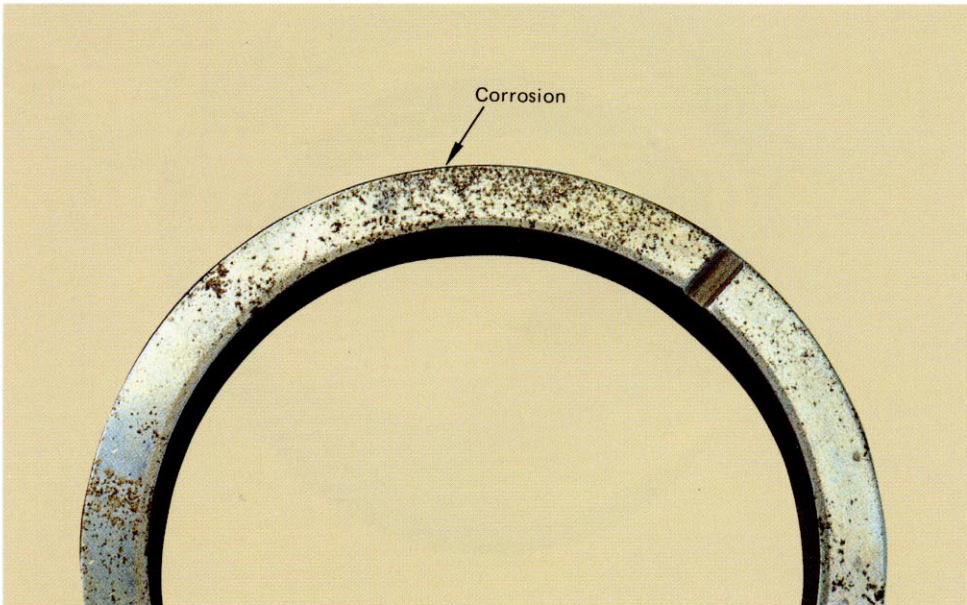
USE AGAIN
(Dry turn)

Failure Sign

Wear of the end surface has progressed so much that oil grooves have disappeared. This spacer cannot be reused in a "wet turn".

Corrosion (slight)

25



USE AGAIN

Failure Sign

Slight corrosion have occurred on the end surface.

Corrosion (large degree)

26



USE AFTER RECONDITIONING

Failure Sign

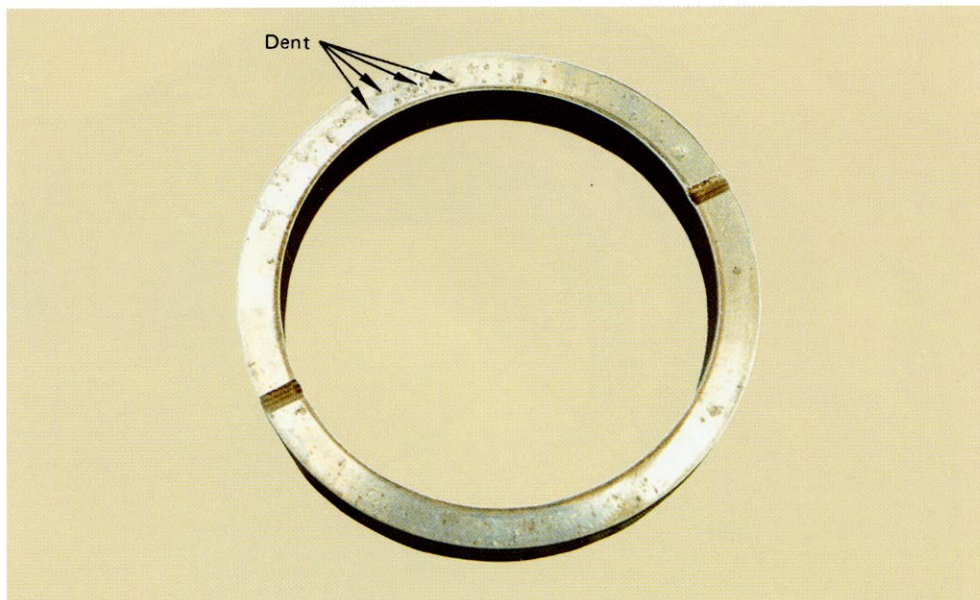
Corrosion have occurred on the whole end surface. This spacer cannot be reused in a "wet turn". To make this spacer reusable, take the following action.

Reconditioning Method

Remove the corrosion thoroughly from the surface with sandpaper and wash it to eliminate the chips.

Dents on the end surface

27



USE AGAIN

Failure Sign

Dents are observed on the end surface. This spacer can be reused without reconditioning.

Burrs on the end surface

28



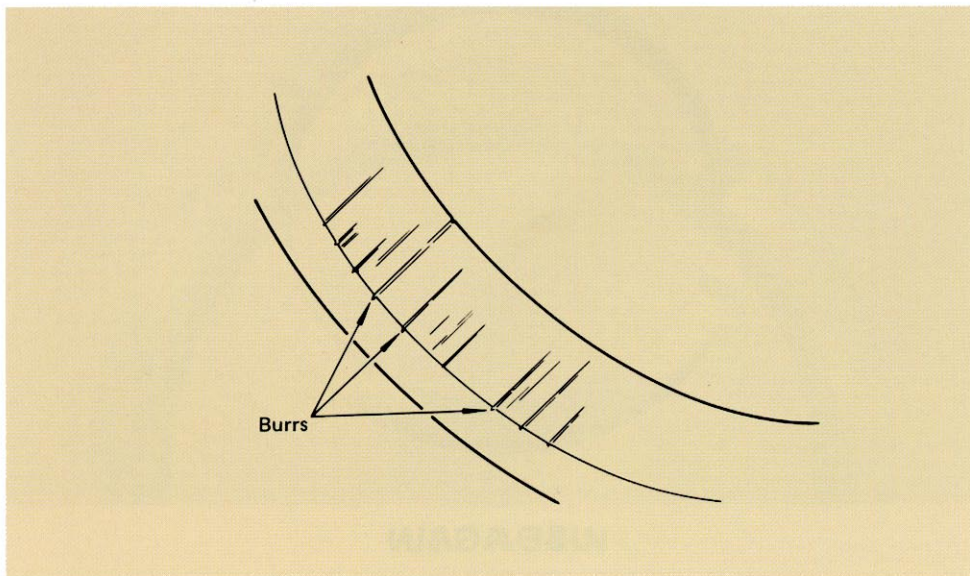
USE AFTER RECONDITIONING

Failure Sign

This spacer has burrs (due to scratches) on the I.D. side of the end surface. These scratches are caused by spacer scuffing due the unsatisfactory centering of the link press jig at the link disassembly or by interference of the extrusion jig with the spacer due to excessive extension of the ram. A spacer left in this condition cannot be reused in a wet turn. To make this spacer reusable, take the following action.

Reconditioning Method

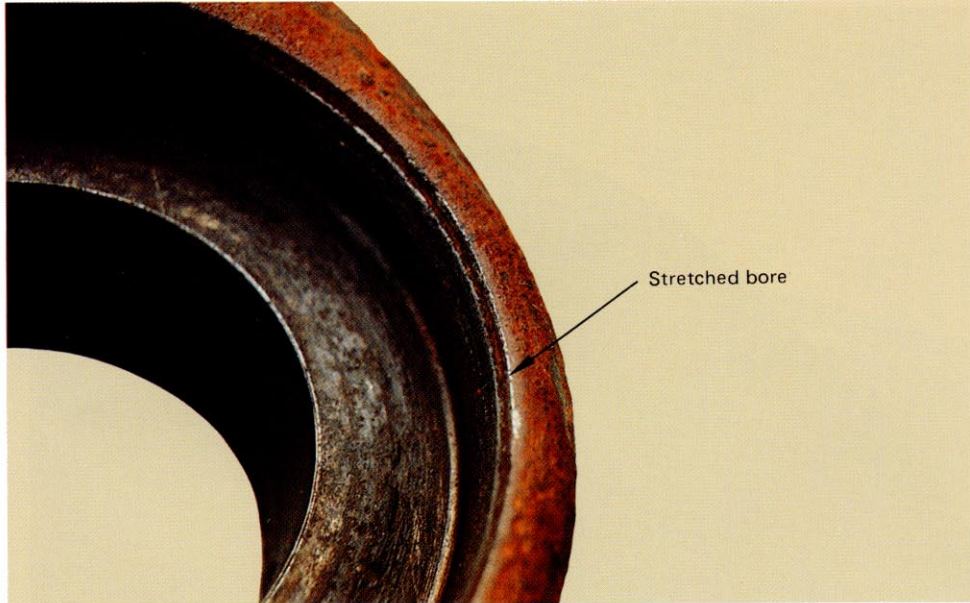
Remove the burrs on the end surfaces with an oil stone and wash it to eliminate the chips.



Links

Stretched (stepped) link bore

29



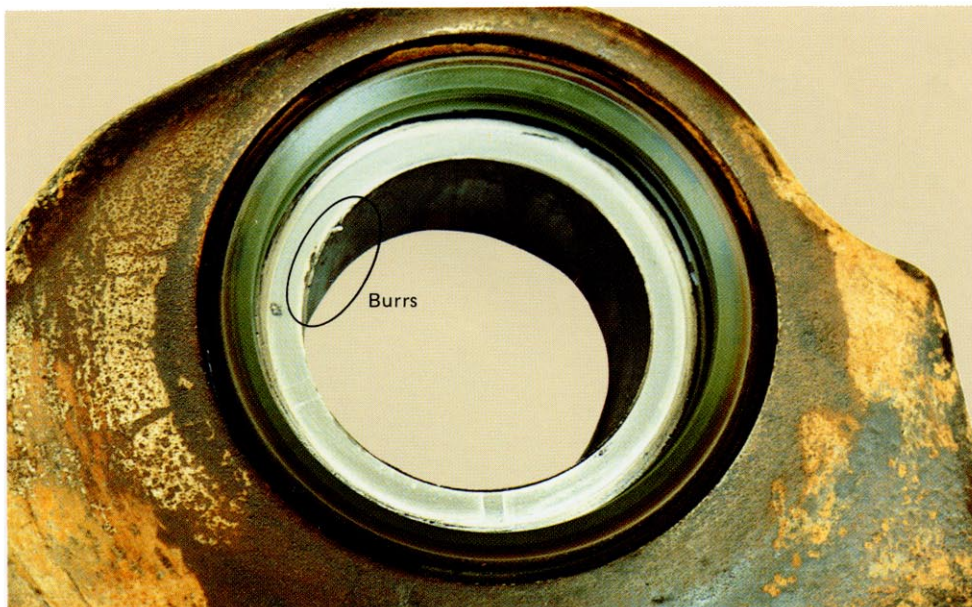
USE AGAIN

Failure Sign

The link bore has been stretched (into a stepped condition) due to wear. This link can be reused without reconditioning.

Burrs on the bore bottom

30



USE AFTER RECONDITIONING

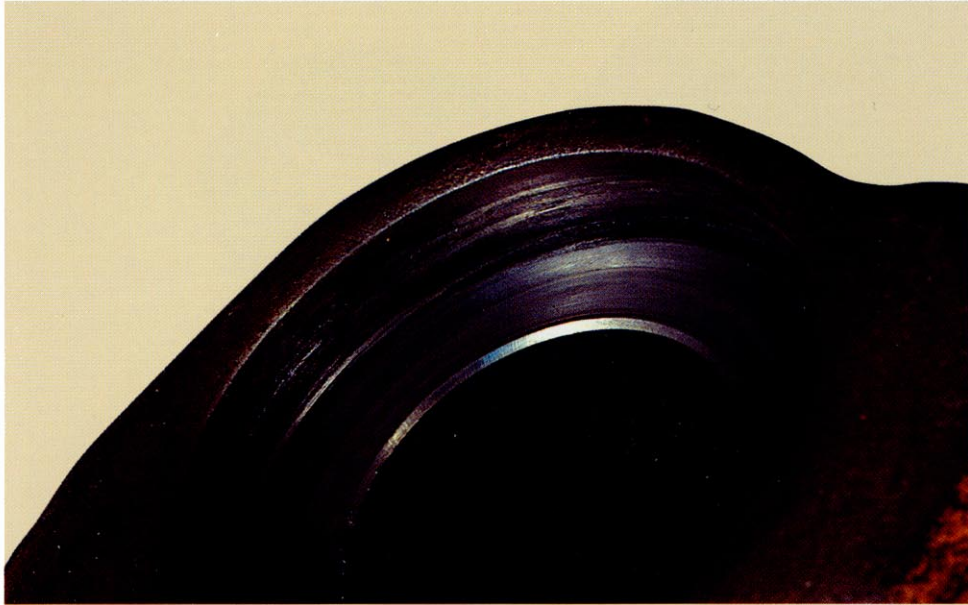
Failure Sign

Burrs are observed on the bore bottom due to scratches. These burrs were formed during disassembly of the link.

Reconditioning Method

Chamfer the area having burrs with a portable grinder. Remove all chips from the link.

31



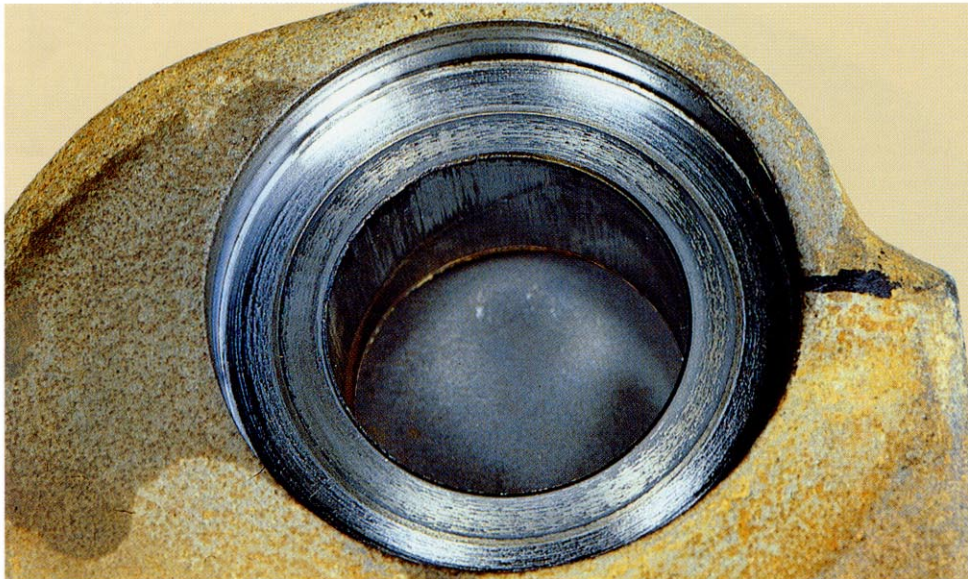
DO NOT USE AGAIN
(Wet turn)

USE AGAIN
(Dry turn)

Failure Sign

Wear is observed on the surface contacting a loading ring.

32



DO NOT USE AGAIN
(Wet turn)

USE AGAIN
(Dry turn)

Failure Sign

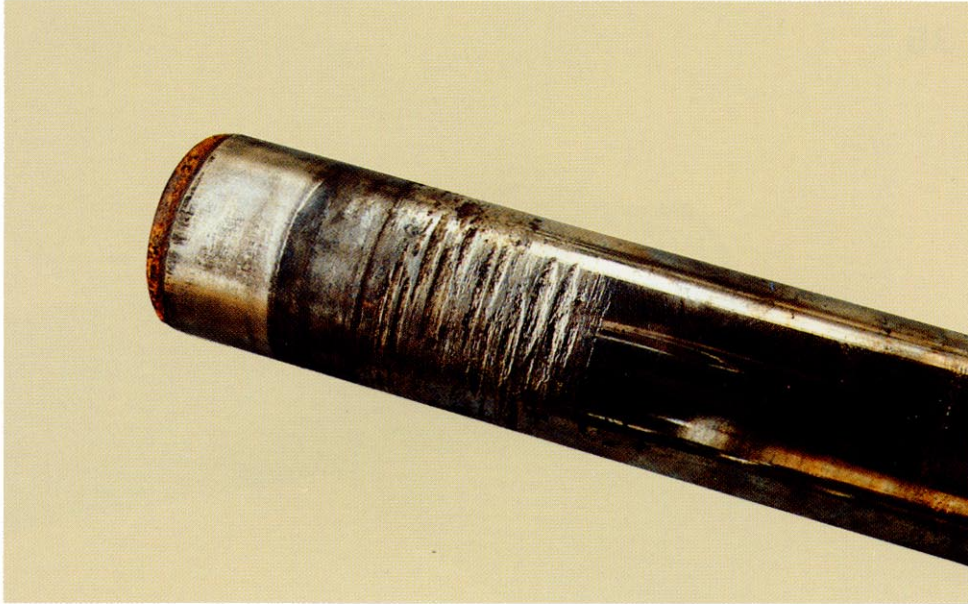
Wear is observed on the surface contacting a loading ring, and uneven wear is on the counterbore bottom.

Pins

Wear of the external surface

(Chafing marks are observed but uneven wear is not observed)

33



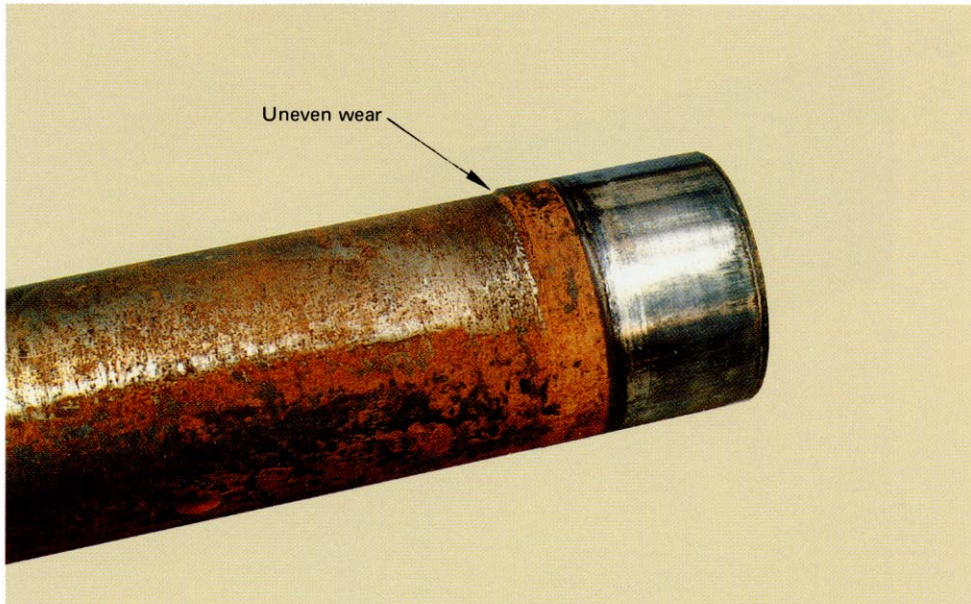
USE AGAIN

Failure Sign

Chafing has occurred partially on the pin surface due to the partial shortage of oil on the surface. However, this pin can be reused without reconditioning.

Wear of the external surface (uneven wear)

34



DO NOT USE AGAIN
(Wet turn)

USE AGAIN
(Dry turn)

Failure Sign

Shortage of oil on this pin has caused uneven wear to the external surface. This pin cannot be reused in a "wet turn". When differences in depth between the uneven surfaces are less than 2 mm, the pin can be reused in a dry track.

Corrosion of the external surface

35



USE AFTER RECONDITIONING

Failure Sign

Shortage of oil has caused corrosion on the external surface of the pin. However, no uneven wear is observed.

Reconditioning Method

Thoroughly remove corrosion from the surface with sandpaper and wash the pin to eliminate the chips.

Adherence of carbide

36



USE AFTER RECONDITIONING

Failure Sign

Shortage of oil. Residual oil has stuck on the pin as carbide.

Reconditioning Method

Wash the pin to eliminate the carbide.

Clogged side hole

37



USE AFTER RECONDITIONING

Failure Sign

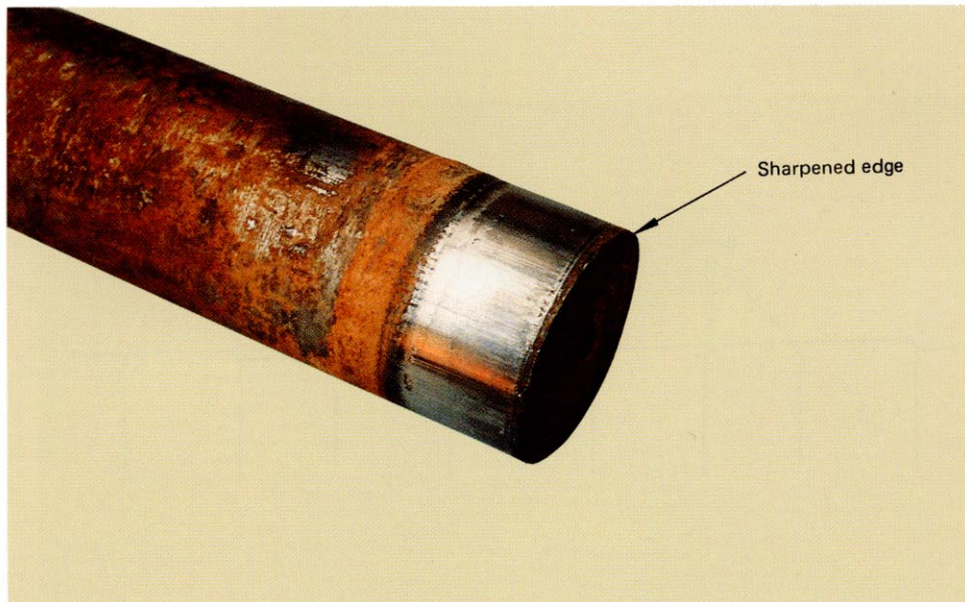
Dirt, mud, etc. have entered between the pin and bushing, resulting in a clogged side hole.

Reconditioning Method

Clean and wash the pin.

Sharpened edge of the end surface

38



USE AFTER RECONDITIONING

Failure Sign

The pin end surface was scraped while the machine was traveling. As a result, the edge has become sharper.

Reconditioning Method

Chamfer the edge of the end surface with a grinder, and wash the pin to eliminate the chips.

Sharpened edge of a vertical hole in the end surface

39



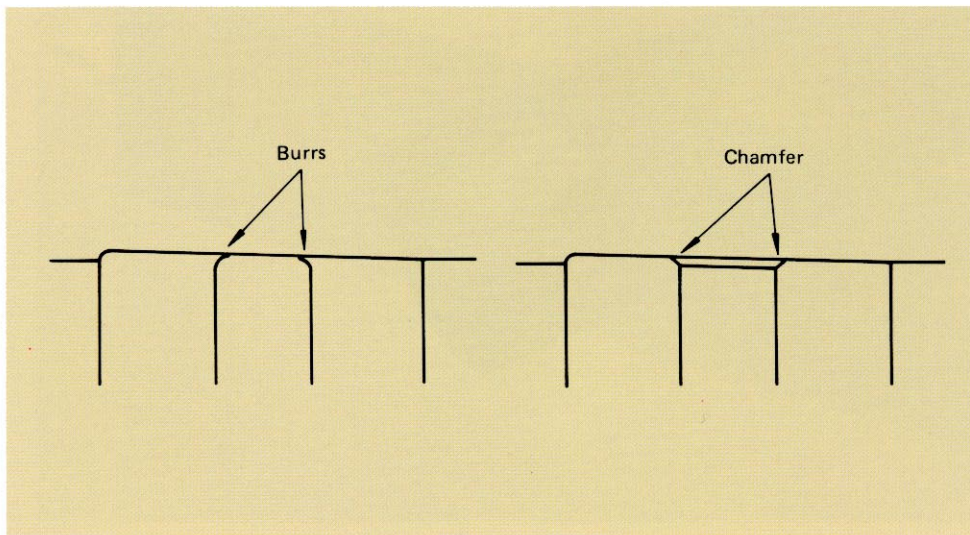
USE AFTER RECONDITIONING

Failure Sign

The pin end surface was scraped while the machine was traveling. As a result, the edge of a vertical hole in the end surface has become sharper. If the pin is used without reconditioning, the plug will be scraped by the edge when driving the plug into the hole.

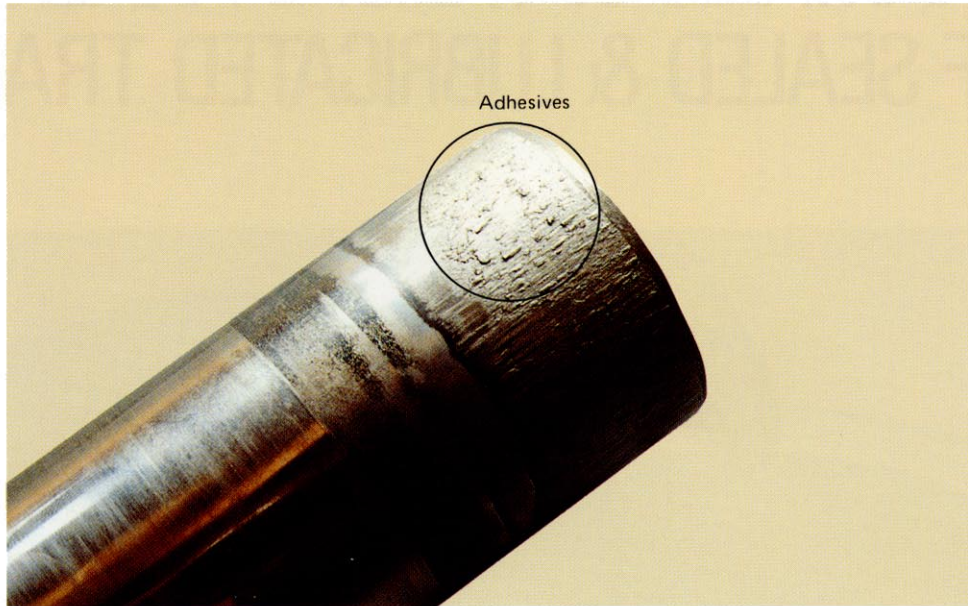
Reconditioning Method

Chamber the sharpened edge of the vertical hole with a portable grinder or hand drill. For best results, chamfering should be performed before disassembling the link. After disassembly, wash the pin to eliminate the chips.



Protruded fitting portion of a pin into a link

40



USE AFTER RECONDITIONING

Failure Sign

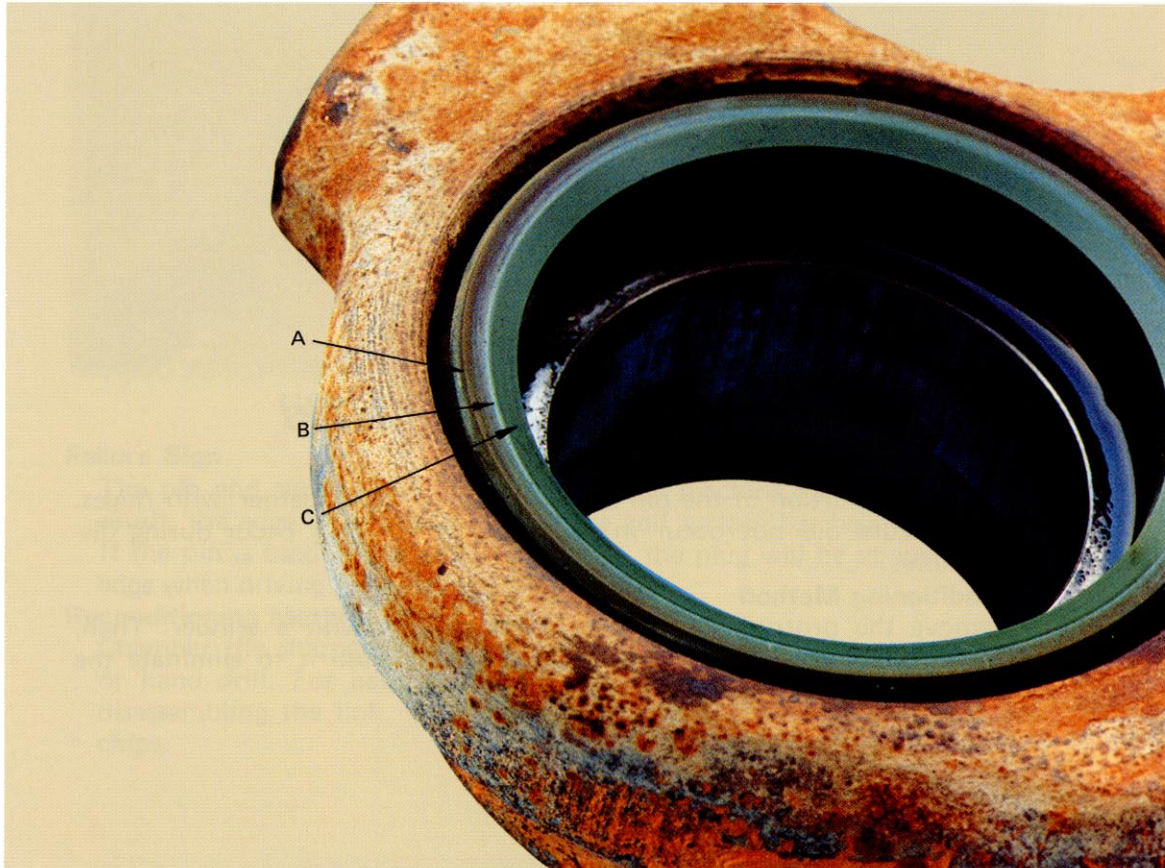
The fitting portion of the pin and a link are seized together with ridges. This seizure did not occur in operation. It can only occur during disassembly.

Reconditioning Method

Remove the protruding adhesives from the pin with a grinder. Then, finish the surface smooth with sandpaper and wash it to eliminate the chips.

EXAMPLES OF FAILURE ANALYSES OF SEALED & LUBRICATED TRACK

Seal



Description of portions A, B and C of a seal

Portion A:

A seal makes first contact with a bushing in this portion to form the sealing face. As the wear of the seal progresses little by little, the sealing position is transferred toward the I.D. or bore side. At this stage, this portion plays no important function but makes it difficult for dust particles to enter the seal. This portion has become brown.

Portion B:

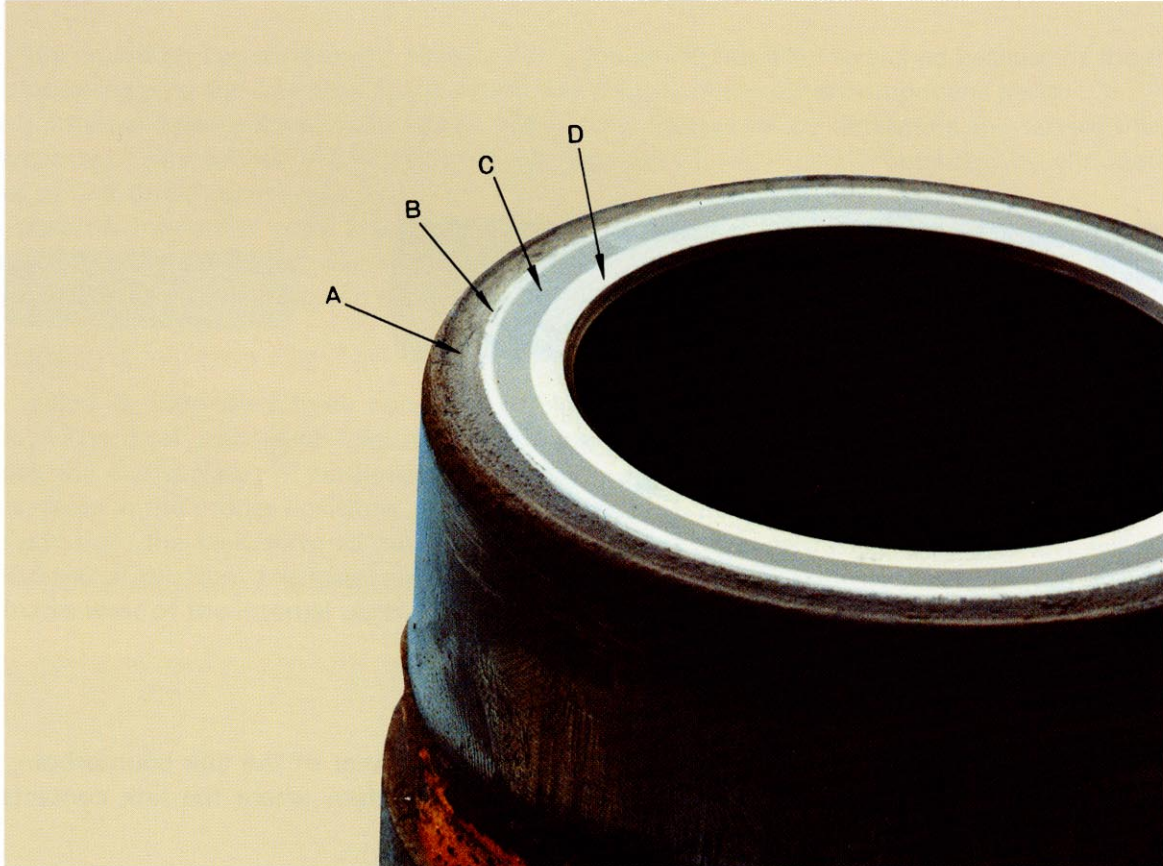
Portion B is now used as the sealing position. It is easily discriminated because of its shiny white color. A seal that has flaws in this portion as well as in the further inner surface cannot be reused in a "wet turn".

Portion C:

This is the inner slant face of the seal. Its color is similar to that of a new seal. After a "wet turn" the sealing position is gradually shifted toward this portion.

Note: Determination of reusability of seals should be made with the seals still installed in the link. When reusing a seal, it need not be washed. When installing a seal, its contacting surfaces with adjacent parts should be free from dust.

Bushing



Description of portions A, B, C and D

Portion A:

This portion is worn with sand, gravel, etc. and has been corroded. Deep worn grooves may sometimes be formed depending on the type of soil. Originally, a seal is in contact with this portion to form the sealing face. As wear continues on the sealing face, the sealing position moves toward the inside dia. (bore). At present, this portion has been worn with sand, gravel, etc. and is corroded.

Portion B:

The present seal position. This portion is easily discriminated because of its shines white color. A bushing that has flaws or corroded areas in this surface or the inner surface (portion B and C) cannot be reused in a "wet turn".

Portion C:

A portion inside the seal position. After a "wet turn", the seal position gradually moves into this portion.

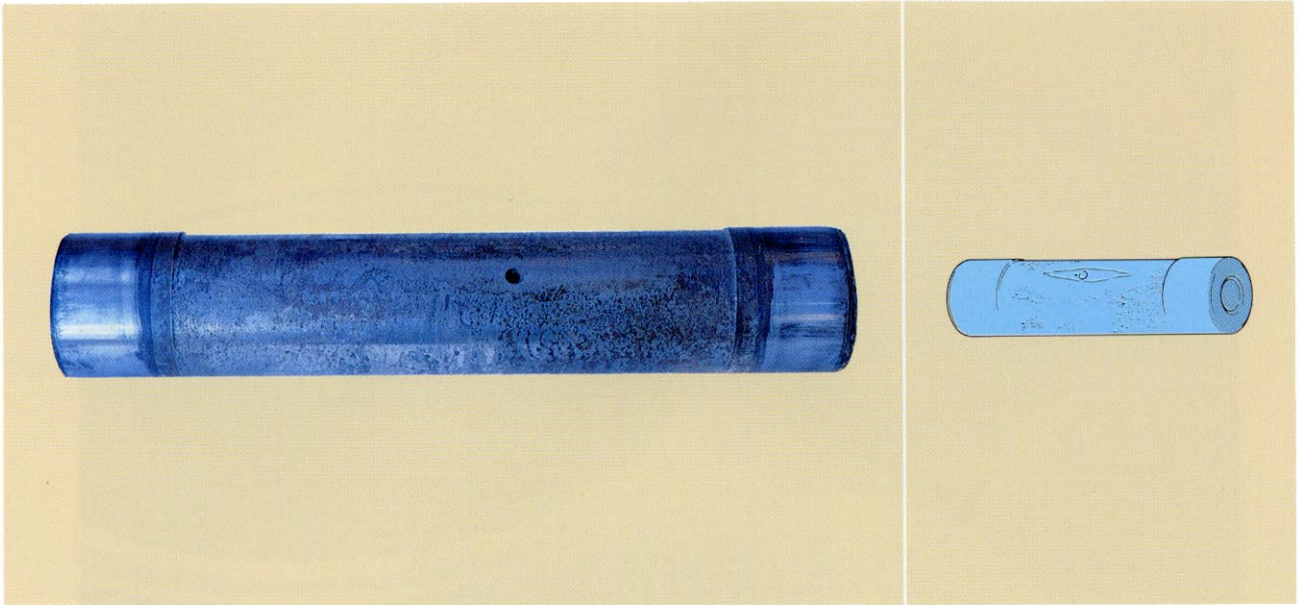
Portion D:

This portion comes into contact with a spacer and shines white.

Note: Handle bushings with extra care because their end surfaces are easily damaged.

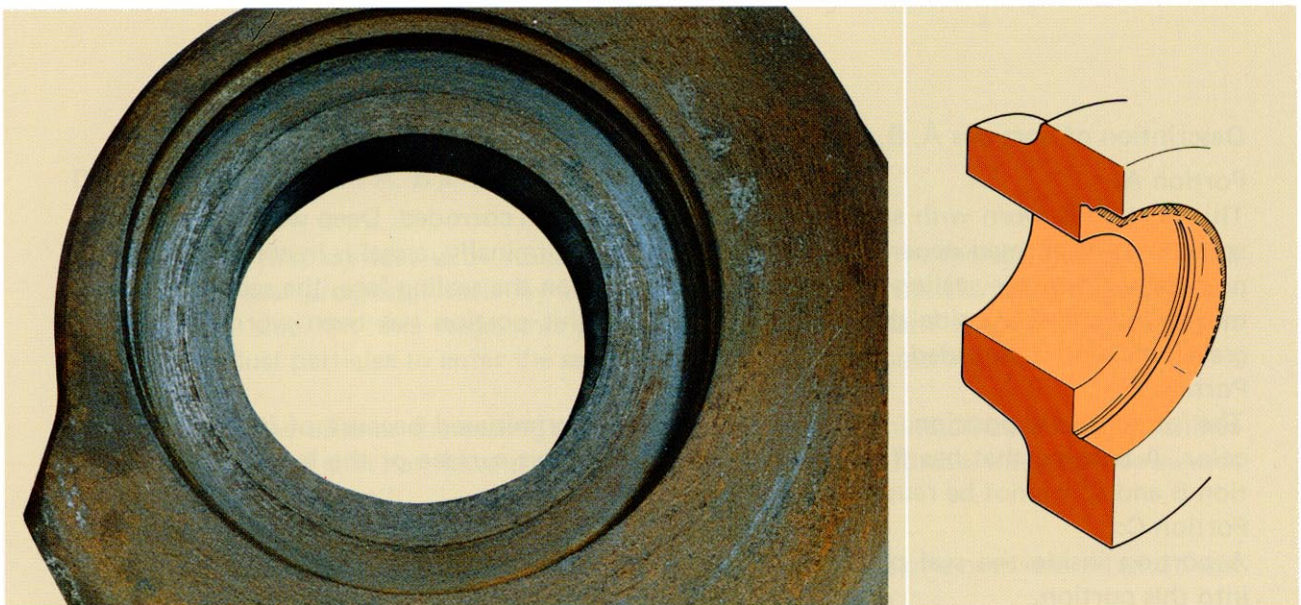
Pin

Wear of pins and bushings (internal surfaces) is accelerated if water leaks in from the seals. In this pin, uneven wear is observed on the external surface. Corrosion of the pin surface has also been accelerated.



Link

Lack of oil or intrusion of sand and gravel has accelerated the wear of the link counterbore. The resultant pitch extension has caused an excessive wear on the surface where the link contacts the bushing.



CONSTRUCTION AND FUNCTION

General

Of the undercarriage component parts, a link pitch which has been stretched because of the relatively fast wearing pins and bushings will have adverse effects on the other component parts.

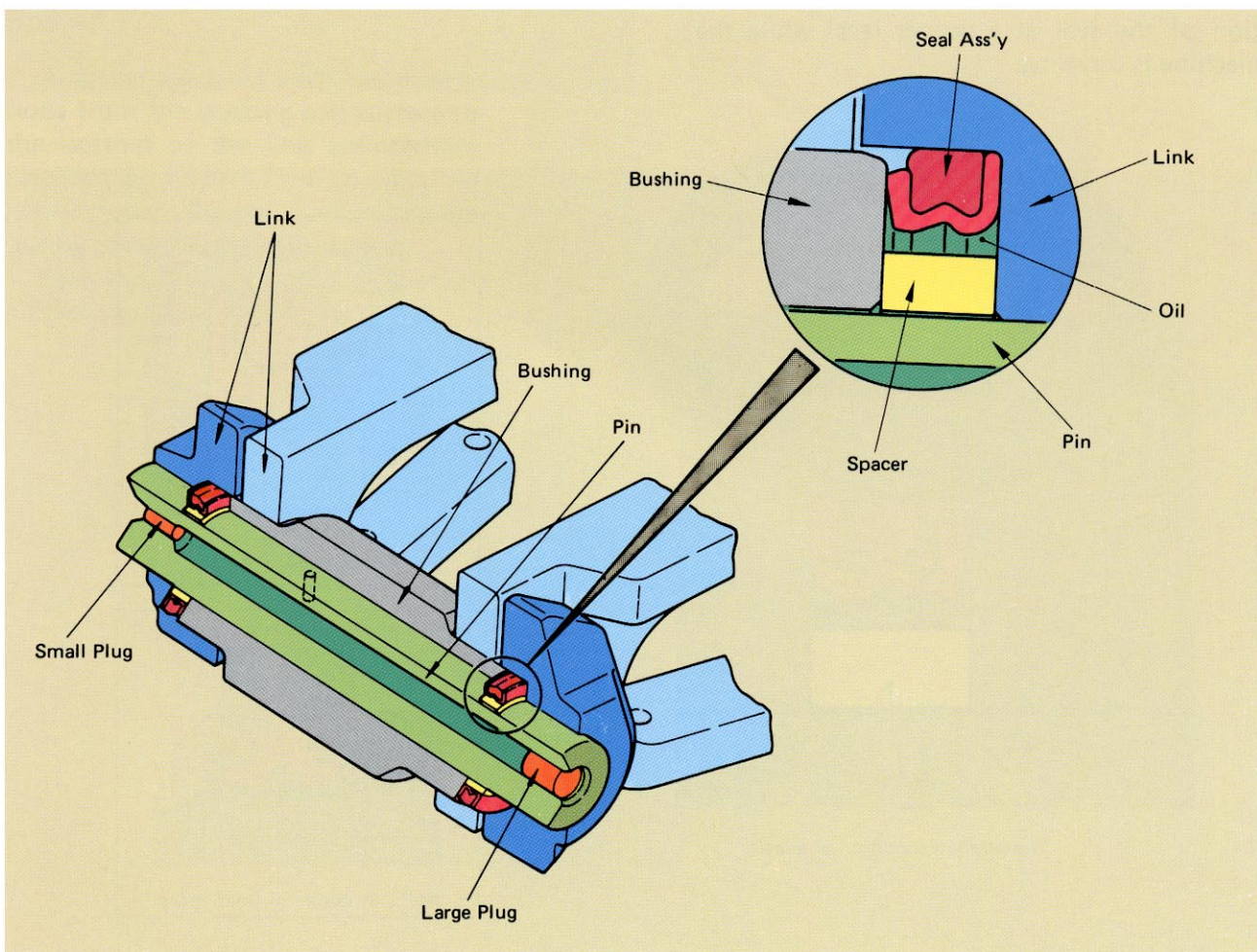
This internal wear accounts for about 70% of the factors which determine the service life of the undercarriage. The service life of the undercarriage can be significantly extended by eliminating the causes of link pitch stretching.

A sealed & lubricated track is provided with unique seals to prevent the entrance of fine sand and gravel (the main factors of wear) and to allow oil to flow between the pins and bushings. Thereby, both internal wear and stretching of link pitches are eliminated.

Structure of the Sealed & Lubricated Track

A sealed & lubricated track consists of links, bushings, pins, plugs (large and small), seals, and spacers. The most important feature of this track is its sealing capability. The forced attachment of seals to the end surfaces of bushings and counterbores in links gives elasticity to the seals, holds the sealing faces in the proper positions, and insures correct sealing.

In addition, the seals serve to positively seal link joints to prevent the entrance of dirt and dust and the leakage of oil from the reservoirs in pins. This insures the satisfactory lubrication of bushings and eliminates wear of the internal parts.



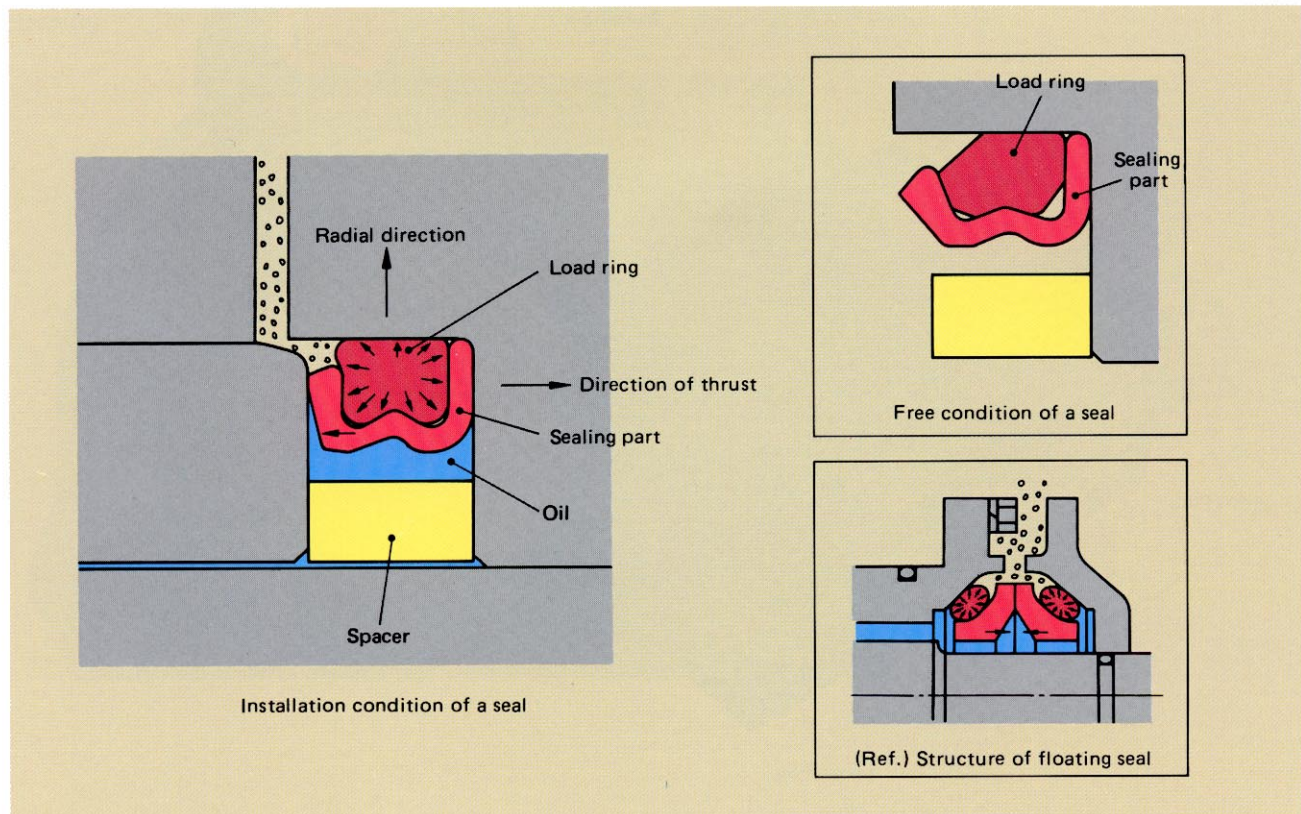
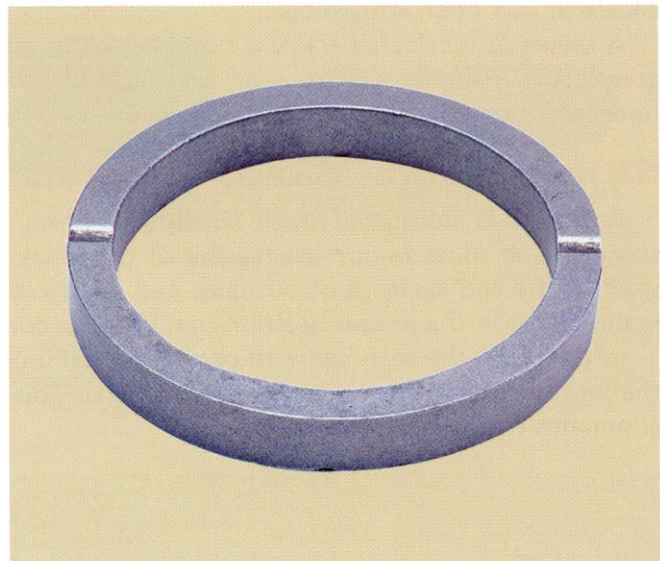
Functions of Sealed & Lubricated Track Parts

Seal

A seal is installed in close contact with the bushing end surface and link counterbore. Thereby the seal not only prevents the intrusion of dirt and dust into the track, but also the leakage of oil from the track.

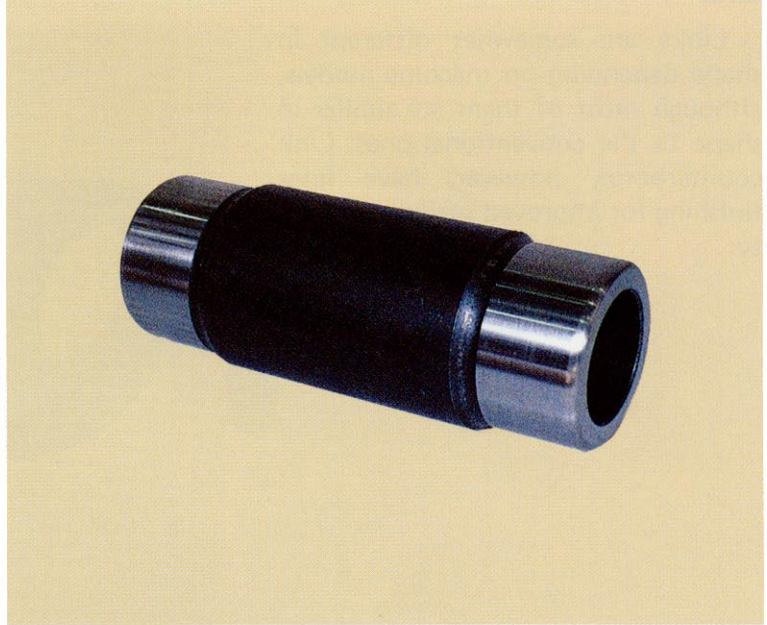
The loading ring is forced into the internal surface of the seal. The ring serves to force a seal to its contacting surface, to give elasticity to the seal, and to keep it in the proper position.

The structure of this seal is similar to that of floating seals used in idlers and rollers of the undercarriage. It consists of a part which seals oil in and keeps dirt and sand out, and a loading ring which imposes a thrust to the said part. The loading ring is set in place in a crushed condition. Its resilience pushes the sealing portion in the direction of thrust, exerting the proper surface pressure on the sliding surface with the bushing. The thrust is also given in the radial direction of the link counterbore, preventing oil from leaking from the bores. The spacer is set inside the seal to protect it from overload and keep the deflection of the seal at a proper level while the machine is traveling.



Bushing

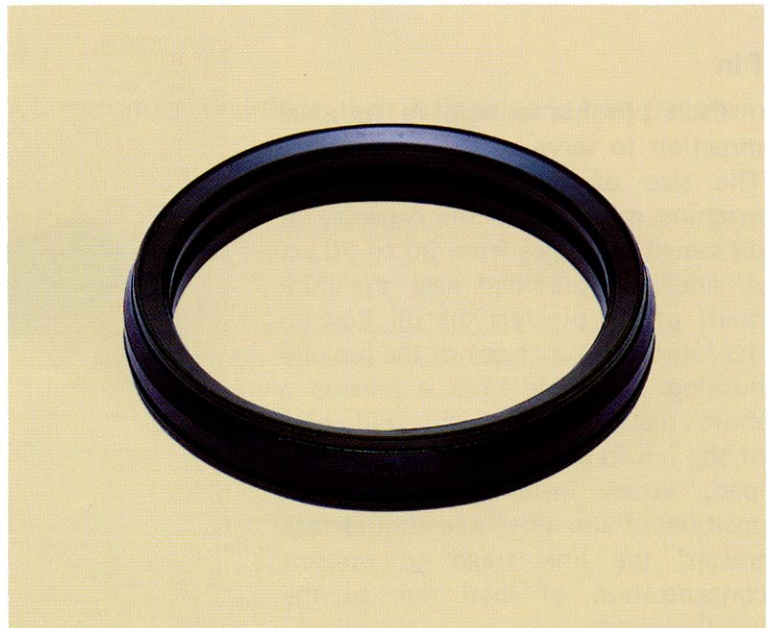
The end surfaces of each bushing are finished accurately in order to seal the oil tight in a seal ass'y.



Spacer

A spacer serves to keep the dimensions from the bushing end surface to the bottom of the link counterbore constant at all times and support the lateral force, thereby preventing the sealing portion from overloading.

Each thrust face of a spacer has two oil grooves for lubrication with oil.



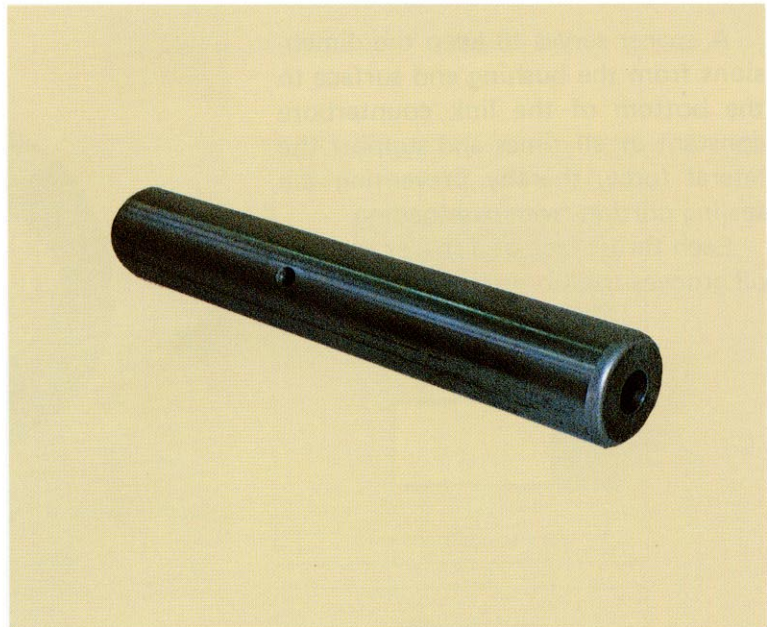
Link

Links are somewhat different in shape depending on machine models, although most of them are similar in shape to the conventional ones. Link counterbores, however, have finer finishing for improved sealing capability.



Pin

Each pin has a hole in its axial direction to serve as an oil reservoir. The size of the hole varies with machine models and the capacity of oil sealed in ranges from 30 to 70 cc. A side hole provided near the mid-point of the pin lets the oil flow to the lubricating surfaces of the pin and bushing. The side hole is located a short distance from the mid-point of the pin to prevent concentration of load. When installing a pin, the position of the side hole should face toward the link tread to prevent concentration of load due to the bending stress.



Plug

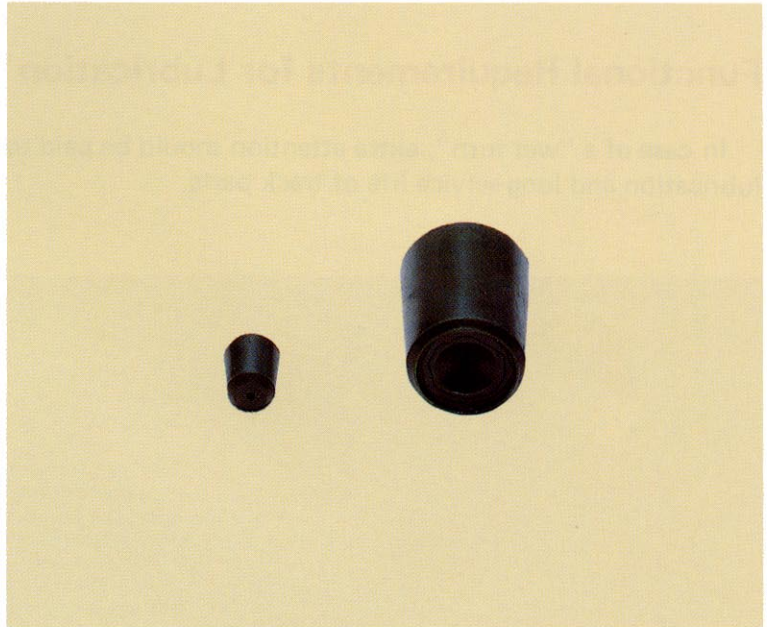
Large and small plugs are available to seal the oil reservoir holes in the pin end surfaces.

Large Plug

This plug is removed only to wash the oil reservoir when overhauling the track.

Small Plug

After adding oil to the reservoir, drive a new plug into the filler hole.



Materials and Heat Treatment

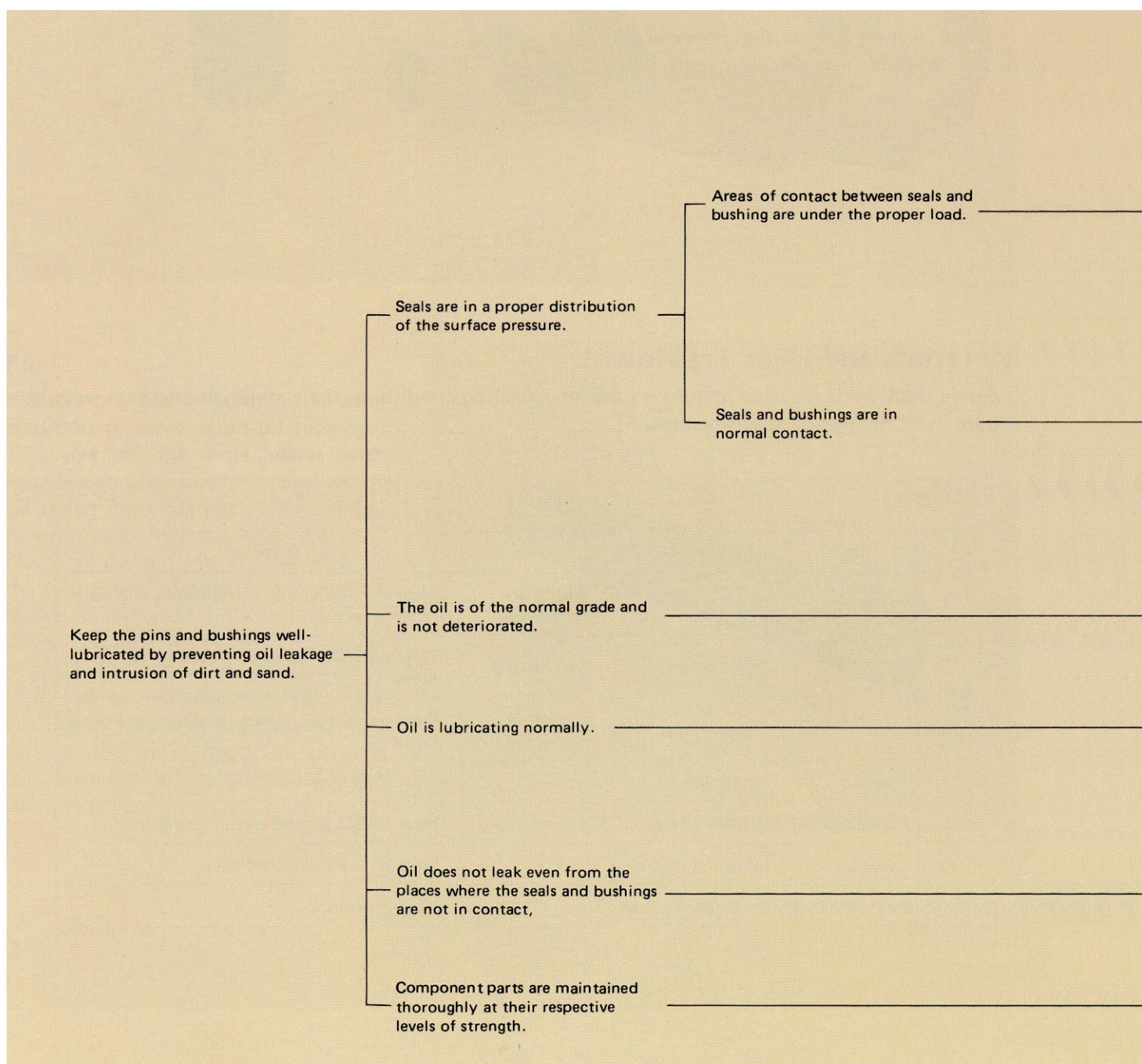
Since track parts are used under very severe operating conditions, their materials and heat treatment should meet high-grade specifications.

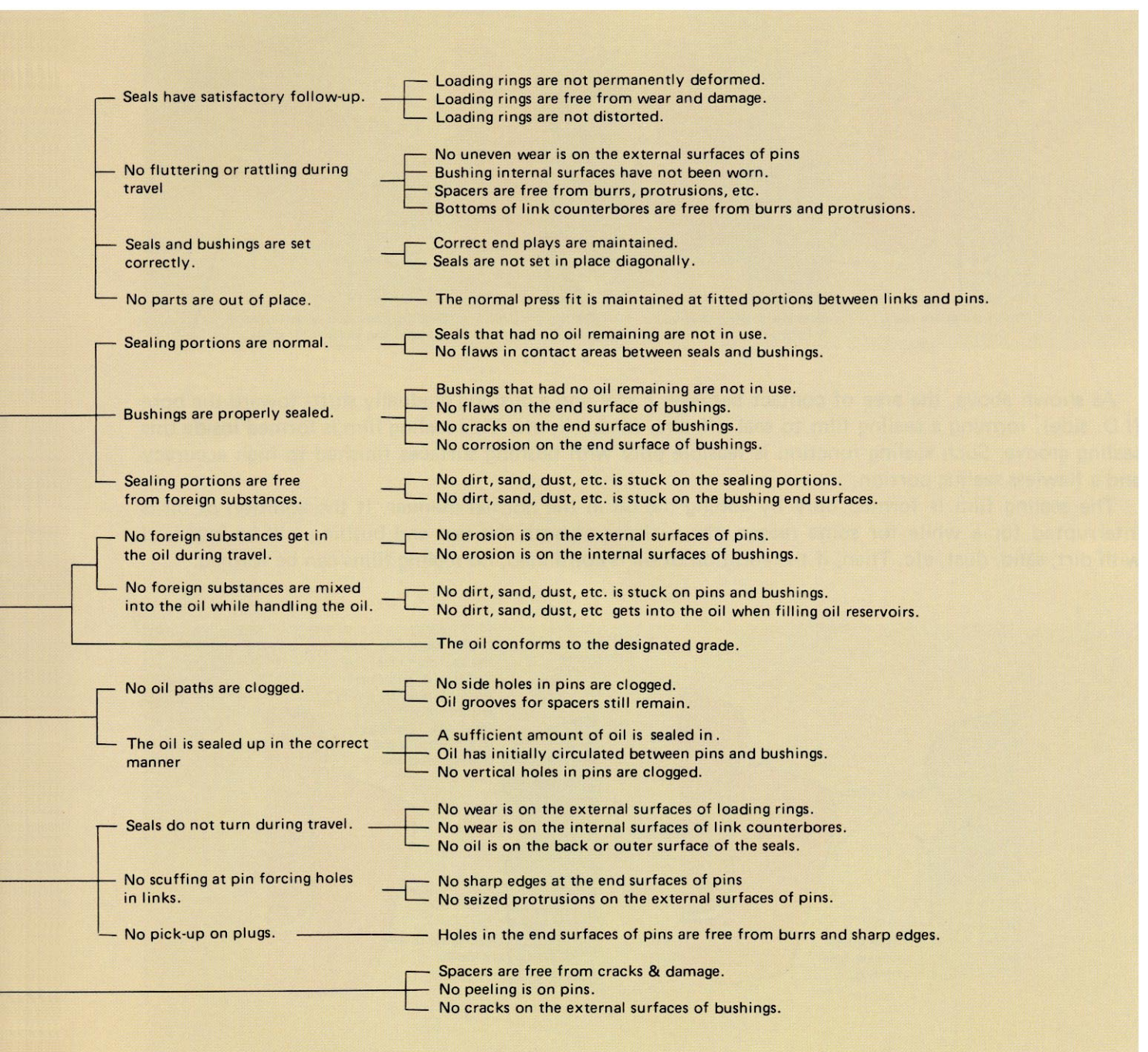
	Part	Material	Heat treatment	Purpose
1	Link	Special steel	Induction hardening	Wear resistance, impact resistance and durability
2	Bushing	Special steel	Carburizing	Wear resistance, impact resistance and durability
3	Pin	Special steel	Induction hardening	Wear resistance, impact resistance and durability
4	Seal	Urethane rubber	—	Wear resistance
5	Loading ring	Nitrile rubber	—	Wear resistance and elastic strength
6	Spacer	Sintered iron	—	Wear resistance and oiliness
7	Plug	Urethane rubber	—	Wear resistance

TECHNICAL POINTS REQUIRED FOR A "WET TURN"

Functional Requirements for Lubrication of Pins, Bushings, etc.

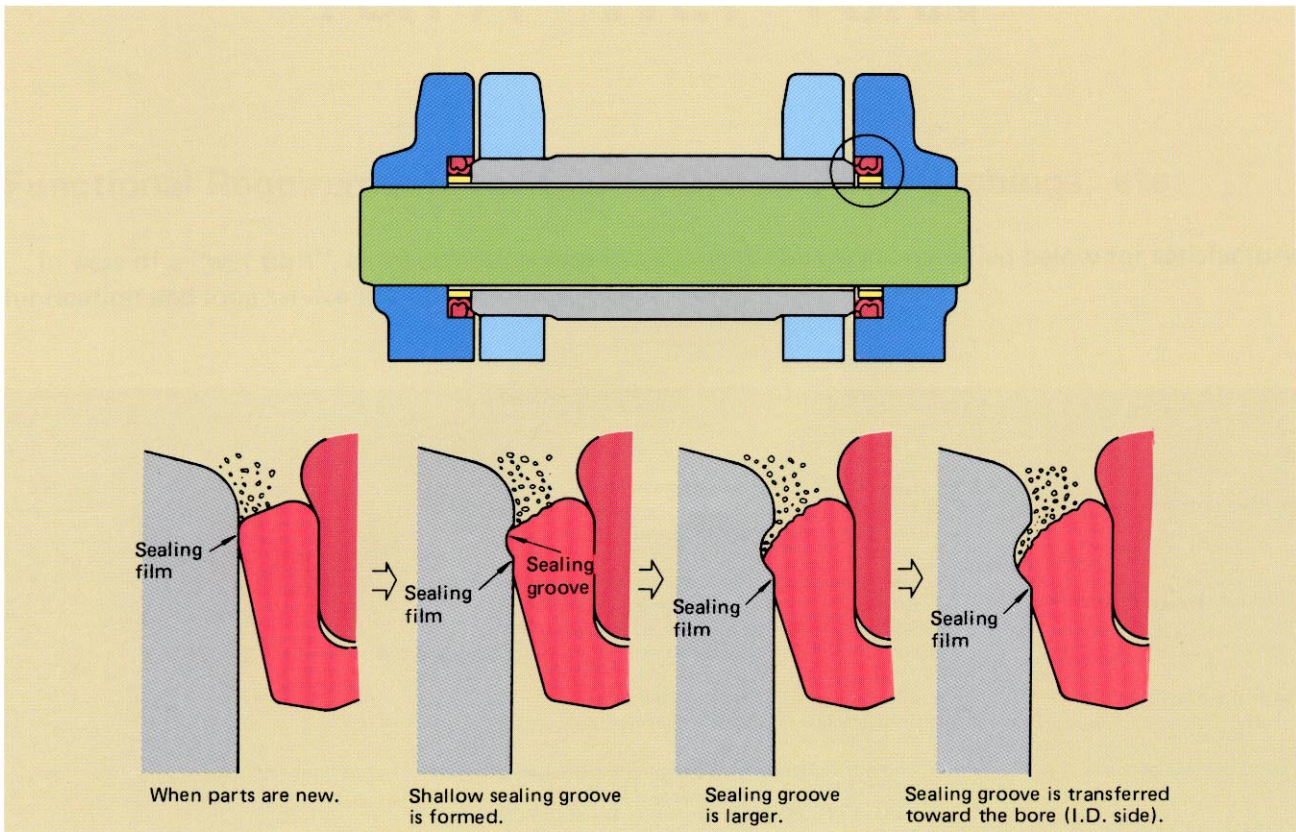
In case of a "wet turn", extra attention should be paid to the points specified below for satisfactory lubrication and long service life of track parts.





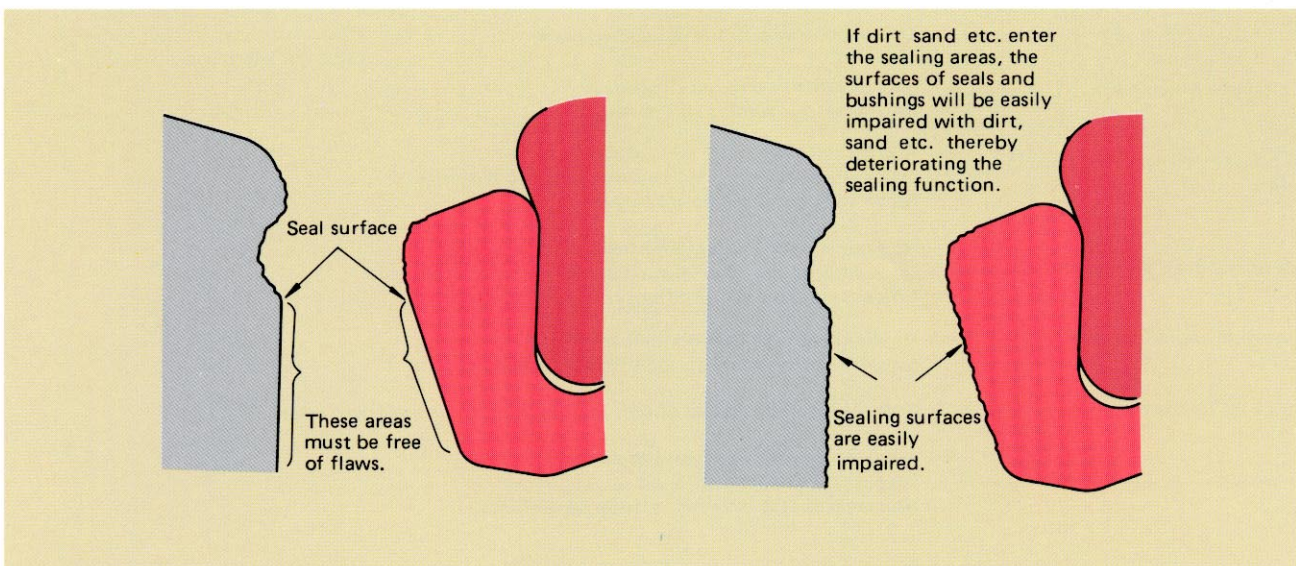
Precautions for the Sealing Mechanism

In the areas of contact between seals and bushings, wearing grooves are gradually formed by the following mechanism.



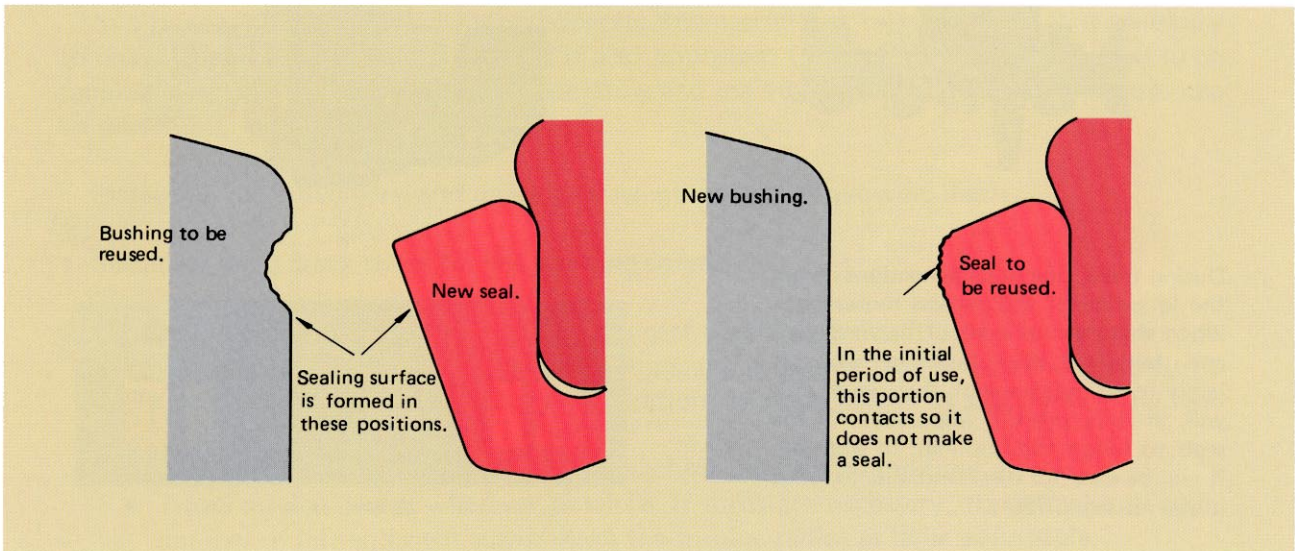
As shown above, the area of contact between a seal and a bushing gradually shifts toward the bore (I.D. side), forming a sealing film to seal off dirt, sand, oil, etc. This sealing film is formed inside this sealing groove. Such sealing function is feasible only with bushing surfaces finished to high accuracy and a flawless sealing portion.

The sealing film is formed only by adding the oil in the normal manner. If the addition of oil is interrupted for a while for some reason, the surfaces of both the seal and bushing will be impaired with dirt, sand, dust, etc. Then, if the addition of oil is continued, no sealing films can be formed.



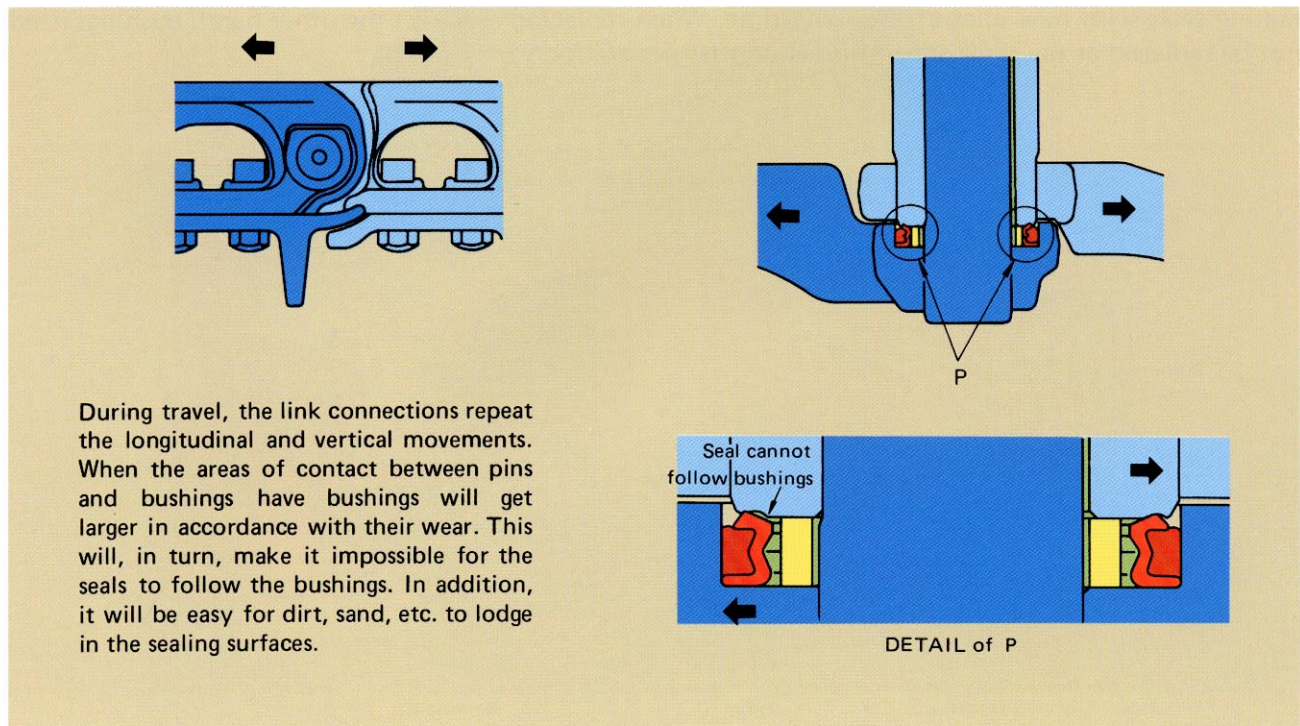
In case of a wet turn, if a link is disassembled, the sealing film formed with the seal and bushing will be broken. If the bushing is turned and the link is reassembled, the seal lip will be set in a sealing groove in the mating bushing. Thereby, the sealing film will be formed again. In one machine, all bushing sealing grooves are formed in the same manner. Consequently, the same seals and bushings need not be matched again when resetting seals and bushings.

When replacing bushings with new ones when reassembling links, it is necessary to replace the mating seals with new ones at the same time. When replacing seals, on the other hand, bushings need not be replaced at the same time, if no abnormalities are found.

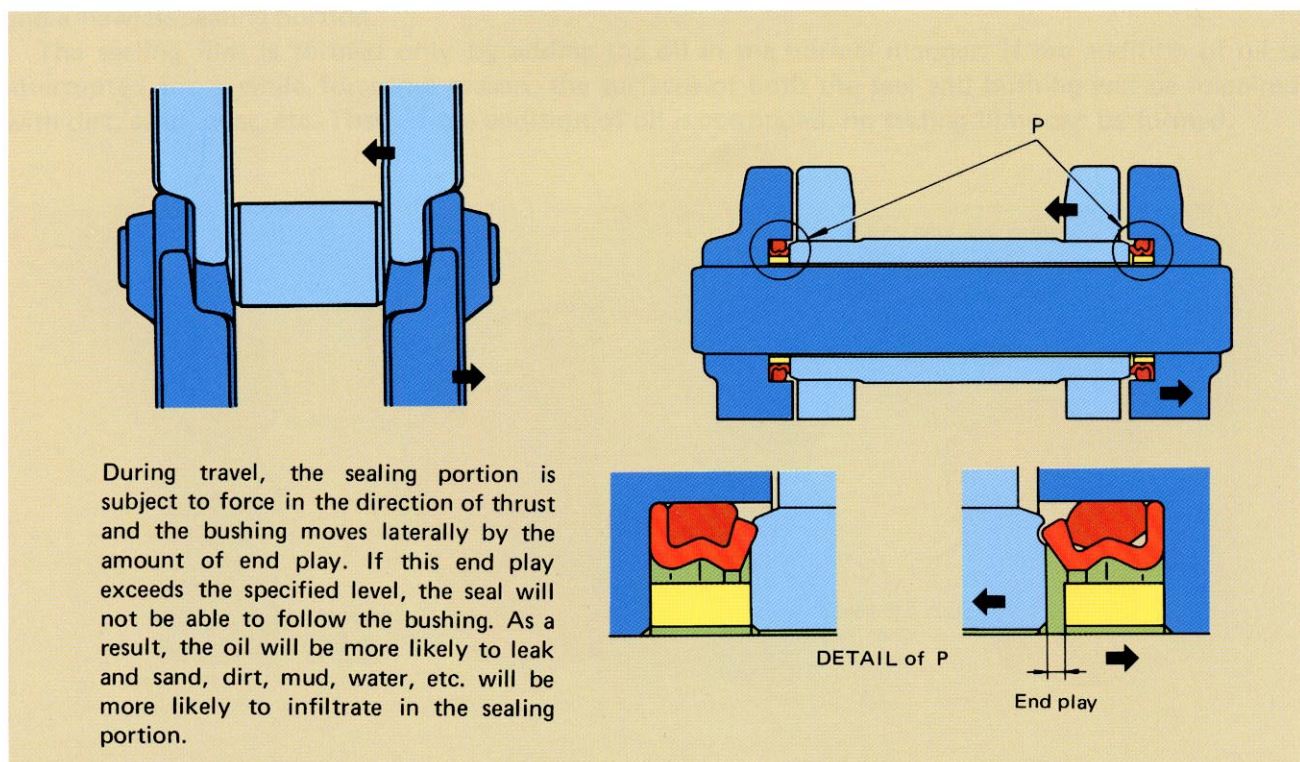


Precautions for Track Link Movement During Travel

While a machine is traveling, the link connections move in various ways. The sealing portions are subjected to various forces in these movements. Consequently, if unevenly worn pins and bushings are installed in a "wet turn", the free play in the radial direction will be larger, making the sealing portions more likely to leak oil.



If an end play larger than specified is allowed when reassembling a link, the free play in the direction of thrust will be larger, making the sealing portion more likely to leak oil.



PREVENTIVE MAINTENANCE

In order to prevent breakdowns and operate the machines at full efficiency, it is necessary to check their operating conditions. It is also important for operators and servicemen to be familiar with the correct methods of operating and maintenance. Thereby, most failures can be prevented.

Please call the customers' and operator's attention to the following items.

1. Select the right track shoes for the working conditions.
2. Use correct operating practices for the longest possible service life of the undercarriage.
 - a. Avoid sudden starts, acceleration, and stops, unnecessarily high speeds and sharp turns.
 - b. Do not allow shoes to slip during operation. If shoes begin to slip, reduce the load until slipping stops.
 - c. Do not impose load on one side of the machine only for a long time.
 - Travel straight away wherever possible. If turns are necessary, try to make an equal number of left and right turns. Make the turning radius as large as possible.
 - On a slope, operate a machine along to the inclination of the slope. Do not operate the machine across the slope.
 - When stopping the machine on a slope, keep it facing toward the top of the slope.
 - d. Avoid travelling over boulders or other big objects unless absolutely necessary.
 - e. Always park or stop on level ground.
3. Key points of daily inspections for the longest possible service life of the undercarriage.
 - a. Check the track for proper tension.
 - b. Check the front idler for proper adjustment.
 - c. Check link pitch for excessive elongation.
 - d. Check bolts and nuts for loosening.
 - e. Check front idlers and rollers for oil leakage.
 - f. Check the undercarriage unit for freedom from dirt and mud.
 - g. Check for cracked track parts.
4. Earlier than scheduled inspections and repairs will reduce repair costs.

