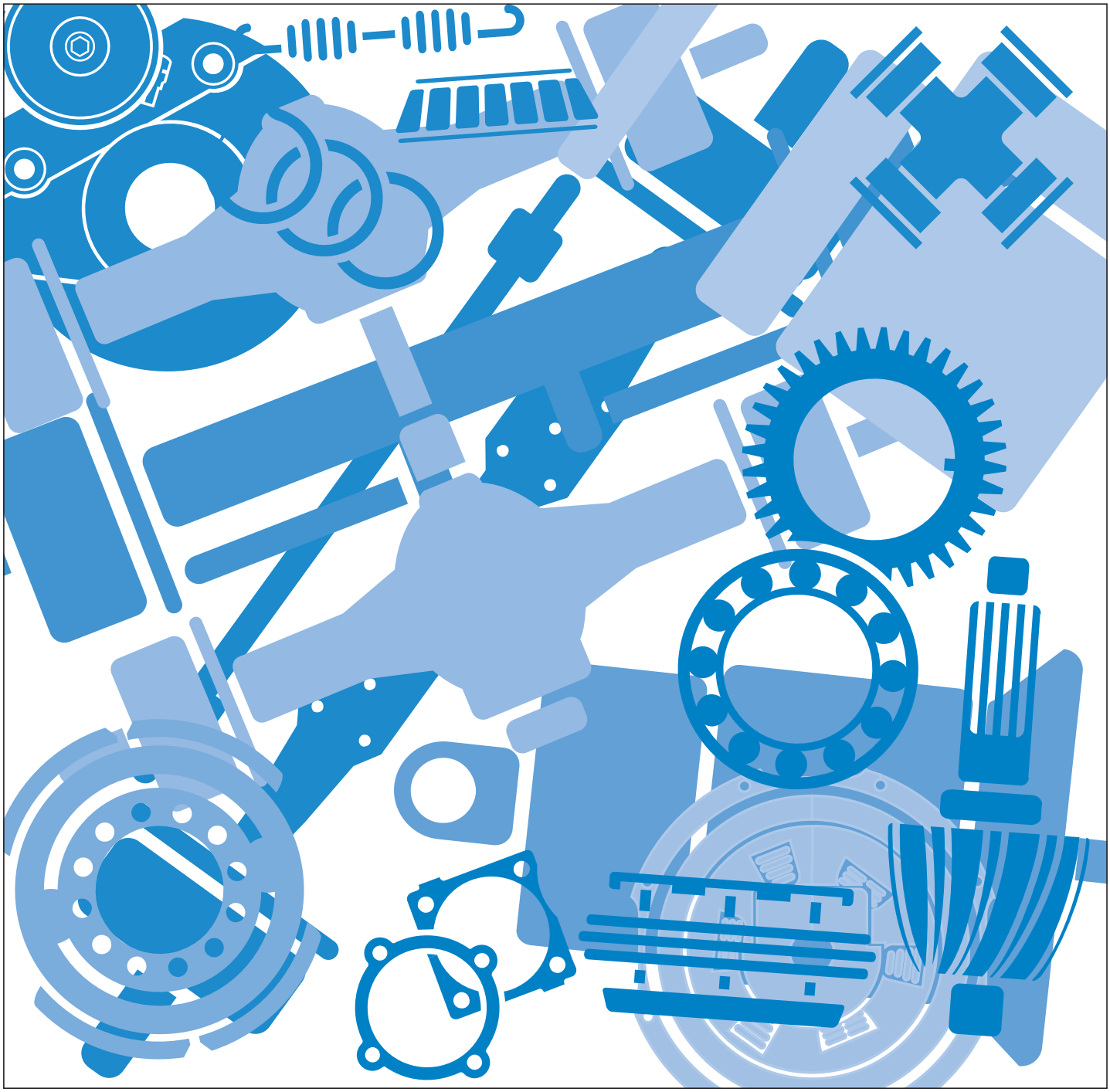
Roadranger®

Dana® Spicer® Brakes

15" Series S-Cam

One Great Drivetrain from Two Great Companies

Service Manual BRSM-8904 May 1989



For the most current information, visit the Roadranger web site at www.roadranger.com

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SPICER®

DANA

⚠ This symbol warns of possible personal injury.

SPICER SERVICE PARTS

Spicer Brake Service Parts are manufactured under the same rigid specifications as are original equipment brake components. This assures the end user who uses genuine Spicer Service Parts maximum reliability for his Spicer Brake assembly.

Should a brake assembly require component parts replacement, it is recommended that "Original Equipment" replacement parts be used. They may be obtained through your original equipment manufacturer dealer. The use of non-original replacement parts may cause unit failure and or affect vehicle safety and warranty.

Introduction

GENERAL DESCRIPTION

The Spicer 15″ diameter single anchor pin cam brake is designed for use on heavy duty highway vehicles. It is a mechanically actuated, leading/trailing shoe brake with a fixed position cam and anchor. The brake consists of two fabricated steel shoe assemblies anchored to a ductile iron spider and actuated by a single forged camshaft. Two retaining springs secure the shoe assemblies to the anchor pin. The twin ribs of each shoe assembly engages the anchor pin on one end and the cam roller on the other. A single return spring is used to maintain contact between the shoe, cam roller and cam.

OPERATION

The Spicer cam brake operates in the following manner during a braking application. The force of the push rod of the air camber is converted from a linear force to a rotary torque. This is accomplished by use of the slack adjuster. On the opposite end of the camshaft is the S-cam which when rotated lifts the cam rollers. This spreads the brake shoe ends apart and pivots the shoes about the anchor pin so the brake lining comes in contact with the rotating brake drum. When brake application is released, the return spring pulls the shoes away from the drum.

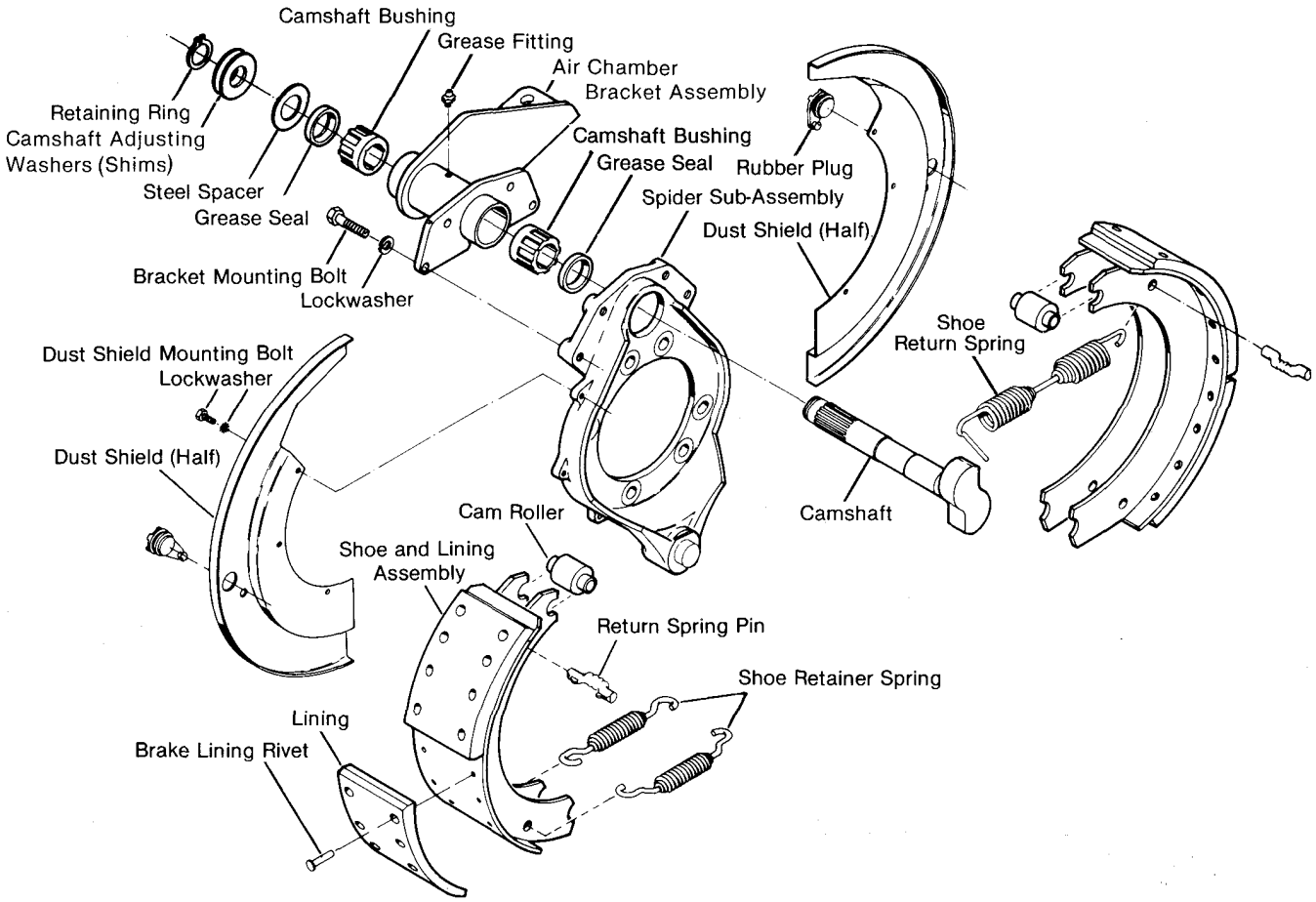
KEY DIMENSIONS

1. Minimum lining thickness
   1/4″ total or 1/16″ above rivet heads
2. Camshaft end play (axial)
   .005-.045″
3. Camshaft end play (radial)
   .020″ max.
4. Anchor pin groove depth
   .030″ max.
5. Camshaft grease seals installed
   .000-.150″ from end of tube

TORQUE SPECS

1. Air chamber bracket assembly mounting bolts
   70-80 ft.-lbs.
2. Dust shield screws
   90-110 in.-lbs.
3. Spider to housing mounting bolts
   (vehicle manufacturer specifications)

Component Identification -15 Inch



General Precautions for Assembly and Disassembly

All Spicer original equipment or service parts for steering and drive axle brakes are manufactured using non asbestos brake lining. It is recommended that orginal Spicer service parts be used when brake maintenance is necessary.

WARNING

The long term effects of exposure to non asbestos fibres has not been determined. Avoid creating dust when performing service on brake assemblies. Excessive exposure to brake dust may cause respiratory damage or other bodily harm.

SAFETY PRECAUTIONS

Proper service and repair of vehicle components is important to the safe and reliable operation of all motor vehicles. This applies particularly to brakes such as the ones described in this manual. The procedures recommended and described in this service manual are tested, effective methods for performing service operation. Follow each procedure closely, making use of both the text and pictures. Some of these service procedures show the use of certain tools designed especially for the operation being performed. It is not mandatory that these tools be used; they are shown only as preferred means of performing the operation. It is not practical to anticipate and advise the service trade of all possible alternate service methods, and of all possible hazardous consequences that could result from any particular method. Accordingly, anyone who uses a service procedure or tool different than shown must first thoroughly satisfy himself that neither his safety nor vehicle safety will be jeopardized by the service method he selects.

IMPORTANT

READ THIS SECTION BEFORE STARTING THE DETAILED ASSEMBLY OR DISASSEMBLY *PROCEDURES.*

When working on or around air brake systems and components, the following precautions should be observed:

1. Always block vehicle wheels. Stop engine when working under a vehicle. Depleting vehicle air system pressure may cause vehicle to roll. Keep hands away from chamber push rods and slack adjusters; they may automatically apply as system pressure drops.
2. Never connect or disconnect a hose or line containing air pressure. It may whip as air escapes. Never remove a component or pipe plug unless you are certain all system pressure has been depleted.
3. Never exceed recommended air pressure and always wear safety glasses when working with air pressure. Never look into air jets or direct them at anyone.
4. Never attempt to disassemble a component until you have read and understand recommended procedures. Some components contain powerful springs and injury can result if not properly disassembled. Use only proper tools and observe all precautions pertaining to use of those tools.
5. Use only genuine Spicer replacement parts and components.
   A. Only components, devices, mounting and attaching hardware specifically designed **for use in air brake systems** should be used.
   B. Replacement hardware, tubing, hose, fittings, etc. should be of equivalent size, type, length and strength as the original equipment.
   C. Make certain that when replacing tubing or hose, all supports, clamps or suspending devices that were originally installed by the vehicle manufacturer are reinstalled.
6. Devices with stripped threads or damaged parts should be replaced. Repairs requiring machining should not be attempted.

PREPARATION

1. Park vehicle on a level surface and prevent movement by means other than the brakes.
2. If equipped with spring brakes, cage the spring on all axles to be worked on.
3. Raise the axle, to be worked on until the tires clear the ground. Support raised axle with heavy duty jack stands.

WARNING: Never work under a vehicle supported only by a jack. Always use a jack stand.

4. Remove wheels and drums using the procedures specified in the vehicle maintenance manual.

Safety Glasses should be worn at all times when assembling or disassembling brakes

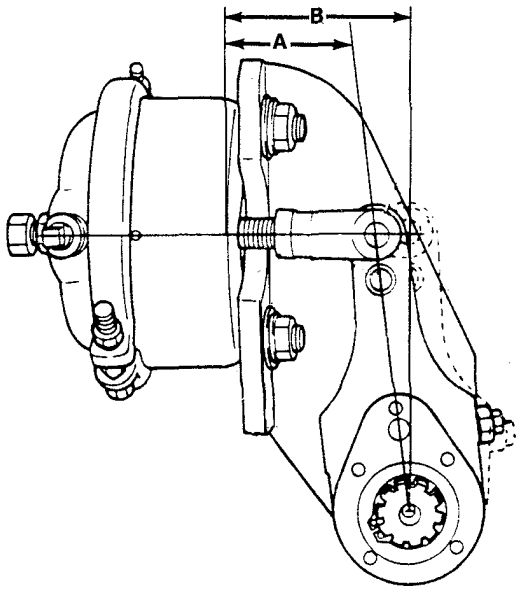
Preventative Maintenance

BRAKE ADJUSTMENT

Weekly, or whenever the air chamber push rod stroke exceeds the maximum distance listed on the following chart. To determine if brake adjustment is required measure the push rod stroke with the brakes applied as follows:

1. Measure the distance between the air chamber mounting face and the center of the clevis pin, with brakes released.
2. Make an 85 PSI application and hold it. Measure the distance between the air chamber mounting face and the center of the clevis pin.
3. Subtract measurement A from measurement B. If this measurement equals or exceeds the maximum applied stroke shown below, the brakes need to be adjusted.
4. If adjustment is required, spin the wheel slowly and adjust the slack adjuster until wheel will no longer turn. Back off slack adjuster just enough for wheel to spin freely. Be sure to adjust brakes equally on each axle.
5. Apply and release brakes and observe slack adjusters. Both slacks on each axle should respond rapidly and in unison during application and release.
6. Drive vehicle at a low speed in a safe area and check for brake effectiveness prior to putting back in service.

Chamber Size/Type	Adjust when applied stroke at 85 PSI equals or exceeds
12	1⅜"
16	1¾"
20	1¾"
24	1¾"

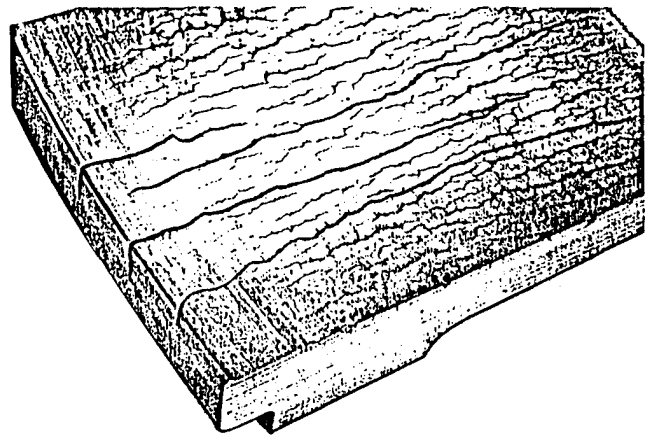


Ⓐ SLACK ADJUSTER MORE THAN 90° IN RELEASED POSITION

Ⓑ APPLIED POSITION

BRAKE DRUMS

Inspect for heat checks, grooves, hot spots, glazing, cracks, and out of round. Drums which are glazed, grooved, or have moderate heat checking may be resurfaced and returned to service. The drum however should not be used if it exceeds the vehicle manufacturers recommended maximum diameter or runout specification. The maximum diameter is generally stamped on the drum.



CAUTION: Drums displaying heat checks with a continuous length of four inches or more or that extend around the open edge of the drum should be discarded.

BRAKE LUBRICATION

Lubricate the camshaft thru the grease fitting on the camshaft bracket with the chassis lube specified by the vehicle manufacturer. Lube once every six months or at each chassis lubrication.

BRAKE RELINE

The life of the brake lining is dependent on many factors such as the material of the lining, type of operation the vehicle is used for, geographic terrain, maintenance practice of the shop, and the driver of the vehicle. If driving conditions require frequent braking, lining replacement will be required more often.

BRAKE OVERHAUL

As often as necessary to maintain satisfactory brake performance. When overhauling the brakes provide equal service to both the left and right side of an axle.

Inspection of Parts

AIR CHAMBER BRACKET ASSEMBLY

1. Check assembly for bent chamber bracket and broken or cracked cam tube welds.
2. Inspect camshaft bushings for signs of wear. Bearing surfaces should be smooth and free of any pitting or fractures. Insert camshaft and measure looseness at both ends with a dial indicator. If more than .020" movement is note, replace bushings and/or camshaft. NOTE: If it is determined that a bushing requires replacement, both camshaft bushings and seals should be replaced.

CAMSHAFT

1. Inspect camshaft spline for cracks and excessive deformation. Replace as necessary.
2. Inspect the camshaft bearing journals for wear or corrosion. If the shaft shows wear or roughness that is visible or roughness that can be detected by feel, it must be replaced.
3. Inspect cam head for cracks, and its roller surfaces for flat spots, brinneling, or ridges. Note unusual wear patterns which may indicate an out-of-square condition. Replace if any of these conditions exist.

SPIDER

1. Inspect for cracked or broken surfaces on the spider at the cam, anchor pin, and mounting bolt holes. Replace any spider with visible damage. Do not attempt to weld or repair. The anchor pin, which is not serviced separately, is staked into the spider. If pin is loose or grooved more than .030 inches,the spider assembly must be replaced.

ROLLERS

1. Inspect rollers for flat spots, galling, broken or cracked surfaces. Replace as necessary.

SHOES AND LINING

1. Check shoes for bent shoe ribs, cracks in shoe table welds or ribs, and elongated rivet holes. Replace shoes if any of these conditions exist.
2. Measure the shoe span by loosely installing the anchor pin and cam roller in the appropriate ends of the shoe rib. If the distance from center of anchor pin to center of cam roller exceeds 11.76 replace shoe.
3. Check linings. Replace when any of the following conditions exist: See reline procedure page.
   A. Total Lining thickness at thinnest point is 1/4" or less or 1/16" above the rivets.
   B. Linings are cracked or worn in an unusual or odd pattern, i.e., lining wear tapered from side to side across shoe table. Unusual wear patterns can indicate damage to foundation brake parts.
   C. Rivet holes are elongated in lining or shoes.
   D. Lining is oil soaked.
   E. Linings can be moved by hand, i.e.; loose rivets.

BRAKE DRUMS

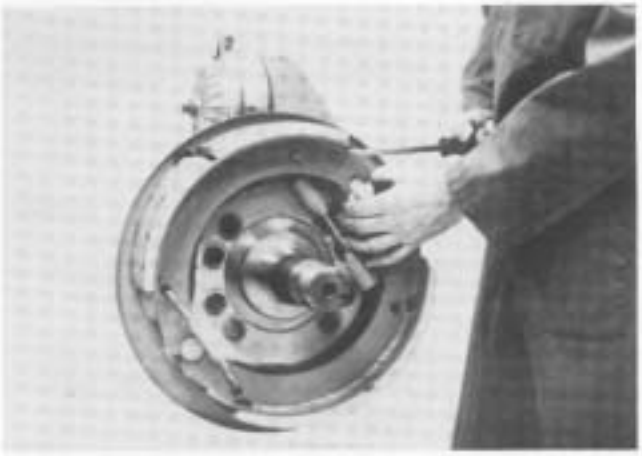
1. Inspect drums for cracks, heat checking, glazing, grooving, severe out-of-round condition or bell mouthing (must not exceed .025 T.I.R.). Replace any cracked drums. It is recommended that drums be turned at reline to prevent hot spotting and achieve quicker, more complete burnishing of the new lining.

CAUTION: Drums displaying heat checks with a continuous length of four inches or more or that extend around the open edge of the drum should be discarded.

2. Measure the drum I.D. to be sure the maximum limit allowed (stamped on drum) has not been exceeded due to wear or machining.

Disassembly

SHOE REMOVAL



1. Insert a sturdy lever between the end of the shoe and the return spring pin. Pry shoe away from cam until roller can be removed. Repeat procedure for opposite shoe.

2. Push the ends of both shoes together until they contact the S-cam head. Unhook the shoe return spring and discard.

3. Remove shoes. Rotate both shoes off the anchor pin and lower shoes to the floor.

4. Remove the two shoe retainer springs and discard.

NOTE: If only replacing the brake shoes, no further disassembly is required.

Reassemble in reverse order. Always install new springs.

MANUAL SLACK ADJUSTER REMOVAL

1. Remove the cotter pin from the clevis pin and remove clevis pin.
2. Depress slack adjuster locking sleeve. Turn adjuster nut until slack is clear of air chamber pushrod clevis.
3. Remove snap ring and shims from splined end of camshaft. Remove slack adjuster from camshaft (a puller may be required).

⚠ CAUTION: Do not hammer on slack adjuster to remove. Serious damage to the slack adjuster and/or the camshaft splines may result.

CAMSHAFT REMOVAL

1. Grasp camshaft at the camshaft head and pull in the outboard direction to remove.
2. Clean and inspect.

AIR CHAMBER BRACKET ASSEMBLY REMOVAL

1. Remove the two nuts and washers that secure the brake chamber. Remove brake chamber and temporarily place it out of the way.

CAUTION: Do not let chamber hang freely supported only by the air line.

2. Remove the air chamber bracket assembly from the spider by removing the four cap screws and lockwashers using a 3/4" socket.

CHAMBER BRACKET SEAL AND BUSHINGS REMOVAL

1. Remove and discard the two camshaft grease seals. The seals are removed by driving out with a punch.
2. Remove and discard the two camshaft bushings located in approximately the same area as the seals. Use a tool of proper diameter and length to drive the bushings out from the backside.

SPIDER REMOVAL

1. Note or mark the relationship of the spider to the axle (R.H. or L.H.) and the orientation on the axle flange.
2. Remove the spider to axle mounting bolts.
3. Remove spider.

DUST SHIELD REMOVAL

1. Mark dust shields (upper left, lower right, etc— prior to removal.
2. Detach dust shields by removing the six cap screws using a 7/16" socket. Do not remove dust shield unless there is apparent damage.

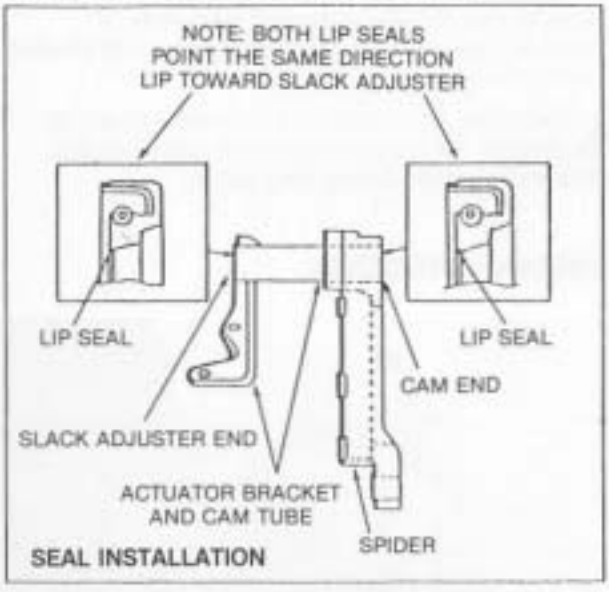
CLEANING

After disassembly wash the metallic components in suitable solvent and wipe dry. Be careful not to get any foreign material, especially grease on the brake shoes or on the interior of the brake drum. Use a wire brush to remove heavy contamination from the knuckle, the spider, brake drum exterior, and chamber mounting bracket. If shoes are to be relined, thoroughly wire brush shoe table and paint with a rust inhibitive coating.

Wipe the interior of the drums with a greaseless solvent to remove lining dust. A vacuum cleaner can be used to pick up heavy concentrations of brake dust.

Assembly

CHAMBER BRACKET ASSEMBLY

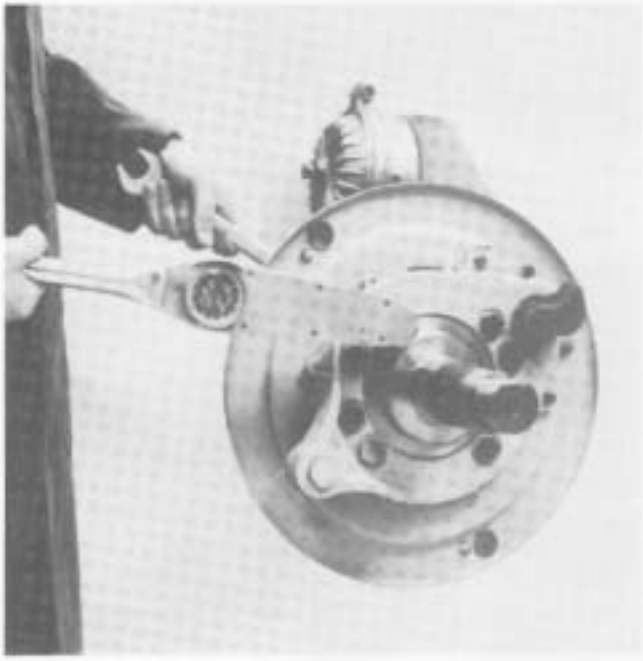


CAUTION: The lip of the grease seals must be installed correctly to prevent possible damage. The lip of the seal that is installed in the spider must enter the opening first. The lip of the seal that is installed in the opposite end of the cam tube must enter last. (See illustration). Install the chamber bracket and cam tube assembly onto the spider using four cap screws and lockwashers. Torque to 70 ft. lbs.

If removed, reinstall the dust shields. Tighten the six cap screws and lockwashers to 90-110 in. lbs. torque.

SPIDER

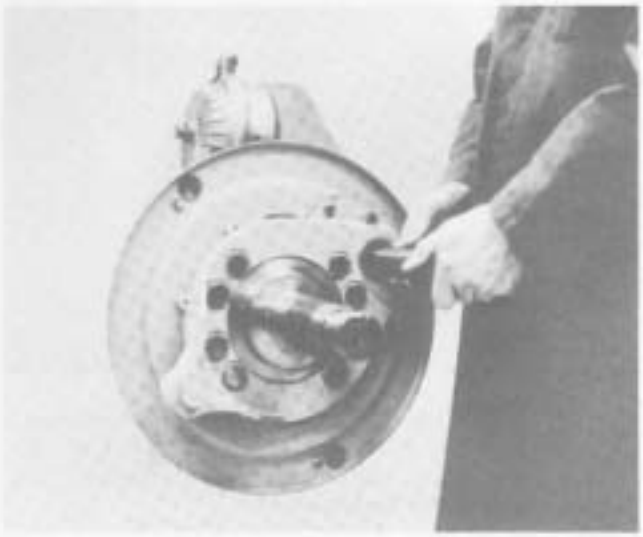
1. Use a wire brush to remove heavy contamination from the knuckle, the spider, brake drum exterior, and chamber mounting bracket.



2. Install the spider and chamber bracket assembly onto the axle flange. Be sure spider is properly oriented, as noted during disassembly. Tighten mounting bolts to vehicle manufacturer's specifications.

CAMSHAFT

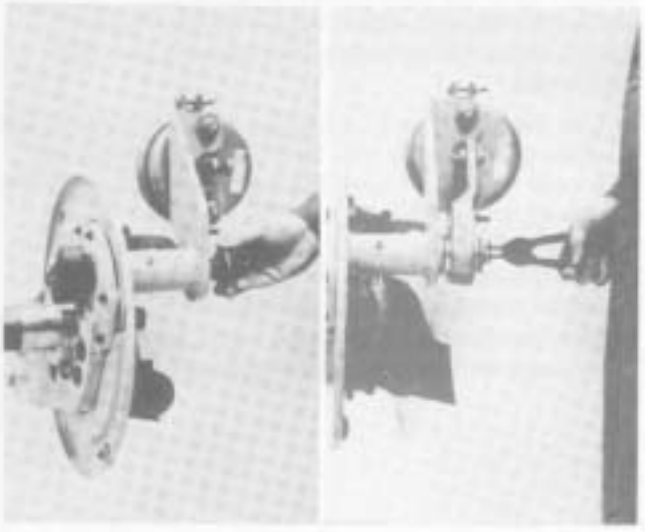
1. Prior to installation verify the camshaft part number is correct for the individual brake. There are RH and LH camshafts and they **cannot** be interchanged.
   (See CAUTION and NOTE below)
2. Coat bushings, seals, journals, and camshaft spline with light film of chassis lube. **Do not coat "S" cam head.**



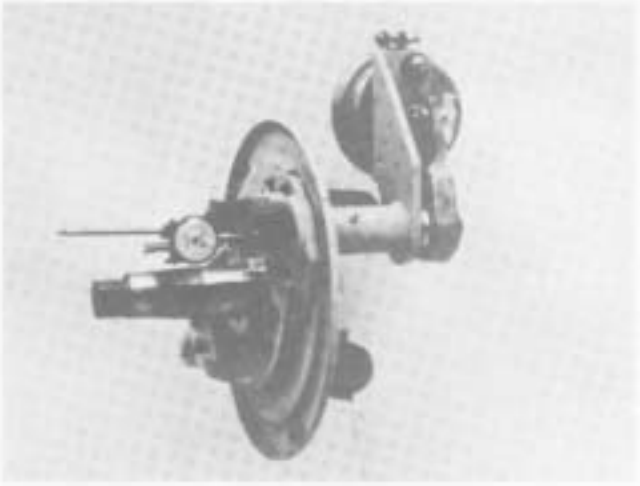
3. Carefully install camshaft through the large hole in the spider and continue on through the chamber bracket tube. Be careful not to damage the grease seals.

CAUTION: To assure the camshaft is correct for the individual brake, perform the following check. After the brake is assembled rotate the camshaft in the same direction the slack would move during a brake application. If the cam rollers begin to ride up on the convex side of the cam head the camshaft installation is correct. NOTE: With the wrong hand camshaft it is *impossible* to apply the brakes.

SLACK ADJUSTER

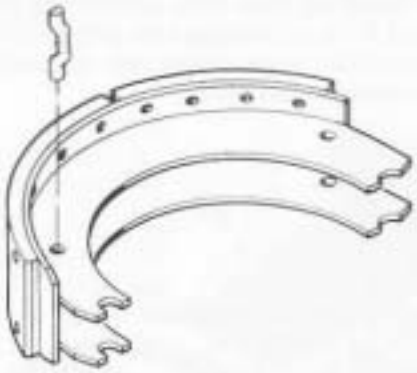


1. Install the thick camshaft flat washer, the slack adjuster, shims, and a new snap ring in that sequence onto the splined end of the camshaft.

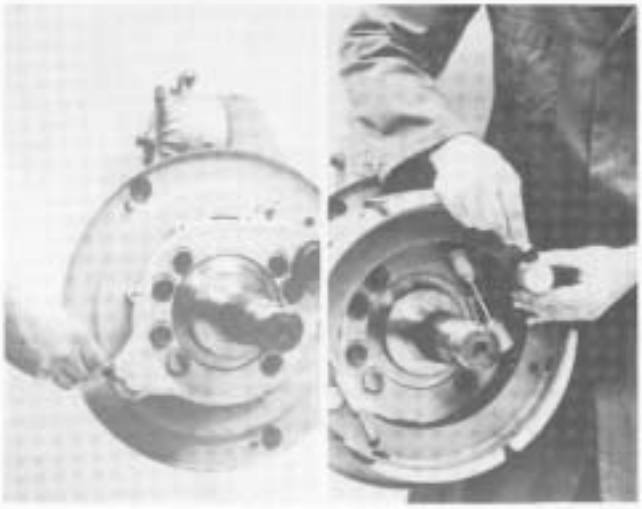


2. Adjust end play of the camshaft to between .005" and .045" by using the appropriate number of shims. Make sure the snap ring is seated into the groove at the end of the splined camshaft.

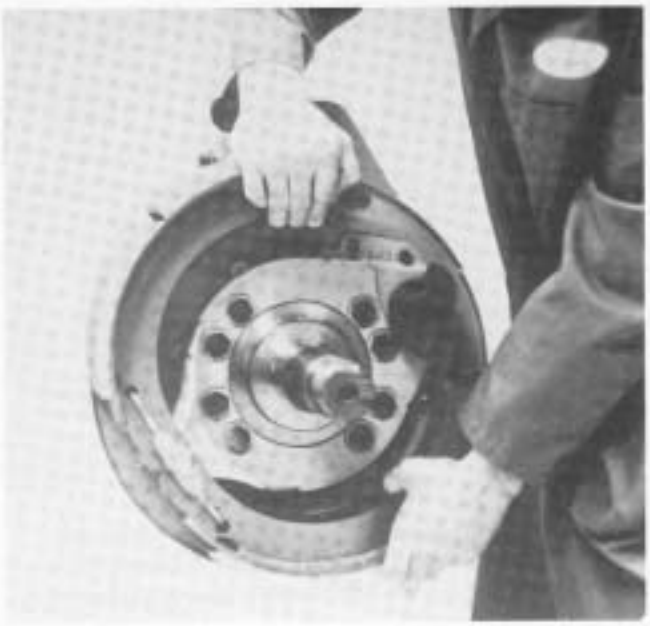
BRAKE SHOES



1. Install new return spring pins.

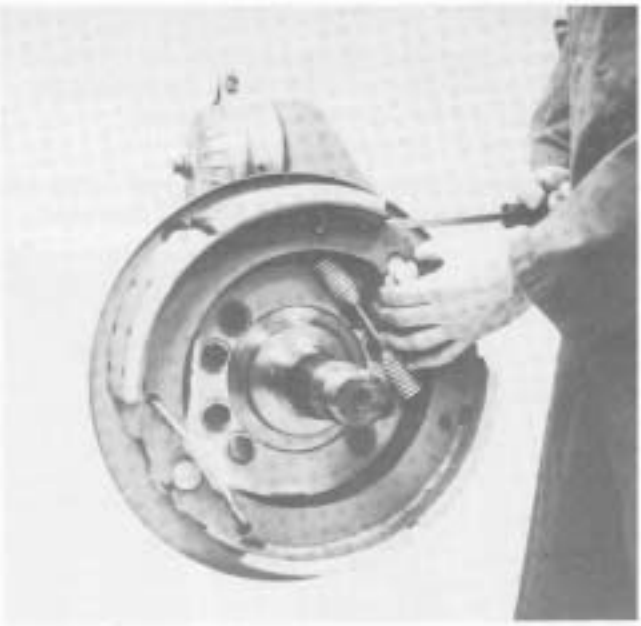


2. Apply a thin film of Lubriplate ™ 630-A grease or its equivalent to the cam roller journals and the anchor pin.
3. Install new brake shoe retaining springs in anchor end of shoes.



4. Place the top shoe onto the spider by engaging the open slots on the end with the retaining springs onto the anchor pin. Place opposite end of the shoe against the S-cam. Swing the lower shoe, with springs attached, back until slots in the shoe engage the anchor pin. Rotate the shoe toward the S-cam. Lower shoe may require support while completing assembly.

5. Place the short hook of the brake shoe return spring onto the return spring pin. Hold shoes against the S-cam and push the long hook of the brake shoe return spring over the opposite return spring pin until it snaps in place.



6. Insert a sturdy lever between the end of the shoe and the return spring pin. Pry away from the cam until the cam roller can be installed between the S-cam and the slots in the end of the brake shoe.

   Make sure the cam rollers are in the lowest position on the cam.

   Repeat the same procedure on the other shoe.

BRAKE ASSEMBLY

1. Lubricate the camshaft bushings by filling the camshaft tube with chassis lube through the zerk fitting provided. Fill until grease is forced out in the area of the slack adjuster. Grease should not appear at the cam head end. If it does, the seal has not been properly installed, or the old seals should be replaced.
2. Reinstall brake drums and wheels. Torque and adjust wheel bearings to manufacturer's specifications.

NOTE: Due to the many combinations of slack adjusters and brake chambers, follow vehicle manufacturer's specifications and procedures for assembly and final adjustment.

3. Spin the wheel slowly and adjust the slack adjuster until wheel will no longer turn. Back off slack adjuster just enough for wheel to spin freely. Be sure to adjust brakes equally on each axle.
4. Apply and release brakes and observe slack adjusters. Both slacks on each axle should respond rapidly and in unison during application and release.
5. Drive vehicle at a low speed in a safe area and check for brake effectiveness prior to putting back in service.

Reline Procedure

When removing rivets from the brake shoes, be careful to avoid doing any damage to the holes in the shoe. Do not use a chisel to shear them off as the force will elongate the rivet holes. Neglecting any elongated holes may result in a loose lining installation. If holes are burred, they should be filed down flush with the shoe table.

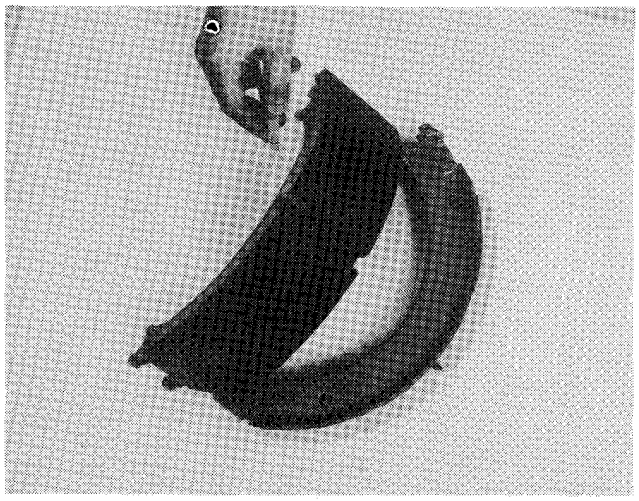
Rust often develops on the surface of the shoe table under the brake lining or blocks. In addition, scale may form from salt on the highways, or tar and oil may find their way into the brake assembly. During every reline job, shoe tables should be thoroughly cleaned. The best procedure is to steam clean the entire shoe or put it in a degreaser.

After cleaning the shoe, the shoe table should be scraped clean of rust and scale. Any burrs or nicks should be filed smooth. At the same time, the entire shoe should be examined to see whether it is worn or bent.

The shoe should be either reconditioned or discarded. It is also necessary to check for flat spots on the shoe that can be caused by cleaning away the rust from the area that was under the block previously. This can cause a mismatch of shoe lining arcs. After the shoe is cleaned and inspected, it should be given a coating of rust preventative paint. Such treatment of a new, unpainted shoe is also suggested to prevent the initial rusting problem.

Never shim the brake linings. Brake noise may result because of cracked and/or loose lining since a tight installation is not possible with shims. The inside surface of the lining is the correct arc to match the shoe table, and the rivet holes in the linings will only line up with holes in the shoes when thay are in direct contact.

Prior to riveting be sure the holes in the lining blocks and the shoes are exactly matched. The sequence of riveting should be such that the center of the block is attached first and then the ends.



The installation should be checked by attempting to insert a .006" feeler gage between the lining and shoe table. It should not be possible to insert the feeler gage anywhere along the edge. The only exception is at each end and beyond the last row of rivets. A slightly larger clearance may exist in these areas.

Some brake failures result from the use of rivets which are too short, too long, or the wrong diameter. Incorrect setting of the riveting machine may induce other types of failures. The correct length rivet must be selected for each application. A variation in shoe table thickeness may require a different length rivet.

The solid portion of the rivet should end just at the inner surface of the shoe. The hollow portion of the rivet should portrude past the inner surface of the shoe.

The proper size rivet must be used to completely fill the rivet hole.

USE ONLY 10-9 RIVETS

Brass plated steel rivets are recommended.

The riveting machine must be adjusted so that the roll of the rivet is complete, but the rivet should not split. Always use a roll set, never a star set, when riveting brake linings. A star set does not compress the rivet and expand it to fill the hole. Consequently, the lining may work loose in service.

FOUNDATION BRAKE TROUBLESHOOTING CHART

SYMPTOM	CAUSE	REMEDY
1. Degraded brake performance.	A. Too much push rod free travel. B. Severely glazed or worn out linings. C. Grease or oil on linings. D. Worn, seared, heat checked, cracked drums. E. Push rod length too long. F. Air chamber in wrong position. G. Broken or bent parts. H. Flat spots on cam or rollers.	A. Adjust brakes. B. Deglaze linings or replace. C. Replace linings. D. Replace part. E. Adjust clevice, shorten push rod length. F. Reposition. G. Replace part. H. Replace flat-spotted parts.
2. Slow brake application.	A. Cam shaft bushings binding.	A. Clean and lubricate. Check for seal leakage.
3. Slow brake release.	A. Binding cam shaft and bushings. B. Weak or broken shoe return spring. C. Flat spotted cam or rollers.	A. Clean and lubricate. B. Replace part. C. Replace flat-spotted parts.
4. Grabbing or pulling.	A. Grease, oil or dirt on lining. B. Glazed linings. C. Brake linings not a balanced set, different friction codes, or lining brand. D. Loose or broken linings. E. Brake drum out-of-round. F. Defective brake drum. G. Clevis pin or camshaft binding at one or more wheels. H. Defective slack adjuster. I. Uneven brake adjustment (side to side) J. Broken or bent parts. K. Loose spider or drum mounting bolts. L. Different air chamber size or slack adjuster length (side to side).	A. Replace lining. B. Deglaze lining or replace. C. Replace linings. D. Replace linings. E. Turn, per manufacturer's specifications. F. Replace part. G. Clean and lubricate. H. Replace part. I. Adjust brakes. J. Replace part. K. Inspect and repair, per manufacturer's specifications. L. Use same size and materials on all brakes.

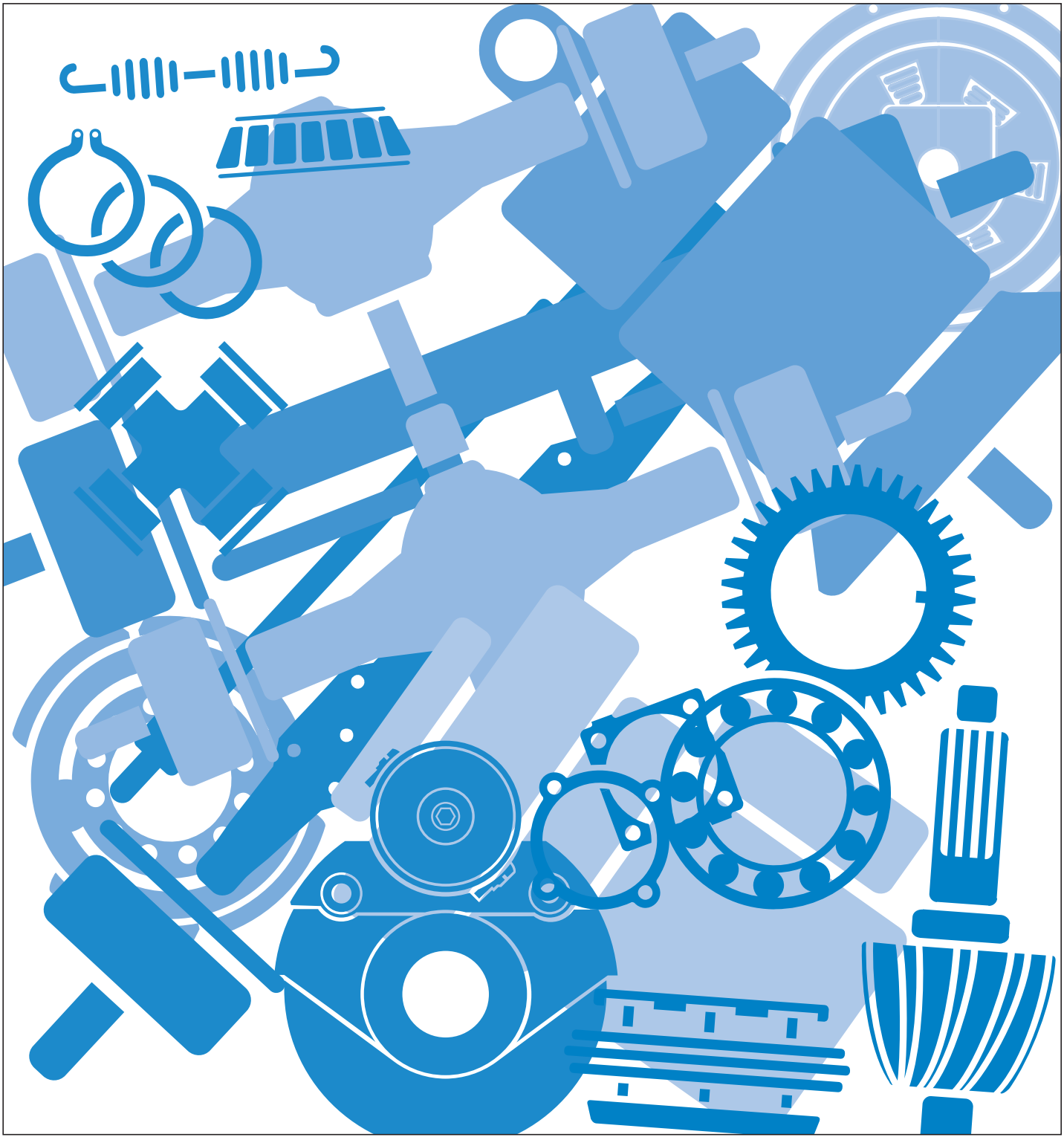
BRAKE SHOE AND LINING TROUBLESHOOTING CHART

SYMPTOM	CAUSE	REMEDY
1. Poor lining to drum contact.	A. Bell-mouth drum. B. Bent brake spider. C. Bent or stretched brake shoe. D. Undersize linings. E. Loose wheel bearing. F. Improper lining grind.	A. Replace part. B. Replace part. C. Replace part. D. Replace linings. E. Correct as required. F. Regrind linings to drum radius minus .015".
2. Linings tapered across width.	A. Bell-mouth drum. B. Bent brake shoe. C. Bent brake spider. D. Loose wheel bearings.	A. Replace parts. B. Replace parts. C. Replace part. D. Correct as required.
3. Unequal wear on in same brake.	A. Mismatched lining friction codes. B. Stretched shoe. C. Flat spots on cam or roller. D. Worn anchor pin. E. Worn camshaft or bushings.	A. Replace linings. B. Replace part. C. Replace flat-spotted parts. D. Replace spider assembly. E. Replace part.
4. Unequal wear side to side brakes, same axle.	A. Mismatched lining friction codes. B. Seized or binding camshaft. C. Brake drum surface in poor condition. D. Loose wheel bearing. E. Relining one brake.	A. Replace linings. B. Clean and lubricate. C. Replace or turn I.D. D. Correct as required. E. Reline both brakes together.
5. Wear on edge of lining.	A. Wrong width lining. B. Holes improperly drilled in lining. C. Wrong drum, or improperly machined. D. Loose bearing adjustment; bearing spacer missing or too thin. E. Improper wheel bearing or cone. F. Bent brake shoe. G. Bent brake spider. H. Worn axle spindle.	A. Replace linings. B. Replace linings. C. Replace or turn I.D. D. Correct as required. E. Correct as required. F. Replace part. G. Replace part. H. Correct as required.
6. Glazed linings (hard and shiny).	A. Overheating, due to unbalanced braking system. B. Wrong type linings for service involved.	A. Correct as required. B. Replace linings.
7. Scored or grooved linings and drum.	A. Scored or worn drum, not machined at reline. B. Abrasive material between lining and drum.	A. Replace or remachine. B. Clean, remove dirt and debris.
8. Loose lining.	A. Improper size rivets (too long, too short, improper diameter). B. Improper crimping of rivet. C. Enlarged rivet holes in shoe. D. Incorrect lining hole size or counter bore depth. E. Rust build up on shoe table.	A. Re-rivet. B. Re-rivet. C. Replace part. D. Replace linings. E. Clean, remove rust and paint shoe.
9. Craked lining at rivet holes.	A. Wrong type rivets. B. Rivets not properly crimped. C. Dirt or rust on shoe table. D. Wrong size lining counter bore.	A. Replace part. B. Replace lining. C. Clean, remove dirt and debris. D. Replace linings.
10. Elongated rivet holes.	A. Loose rivets.	A. Replace shoe and lining.

BRAKE DRUM TROUBLESHOOTING CHART

SYMPTOM	CAUSE	REMEDY
1. Brake drum heat checked.	A. Out of round brake drum. B. Eccentric mounting of drum. C. Loose wheel bearing. D. Glazed linings. E. Improper friction materials for duty cycle of vehicle. F. Overworked brake. G. Driver abuse. H. Wrong drum, too light.	A. Turn, per manufacturer's specifications. B. Inspect wheel and drum and replace defective part. C. Correct as required. D. Replace linings. E. Consult vehicle manufacturer. F. Check for proper brake balance. G. Correct as required. H. Replace part.
2. Excessive scoring of drum.	A. Defective brake lining. B. Abrasive material between lining and drum. C. Soft drum. D. Excessive lining wear, rivets contacting drum. E. Drum not turned at last reline. F. Build up of abrasives in rivet holes.	A. Replace linings. B. Clean, remove dirt and debris. C. Check hardness on flange. Should be 187 Brinnel minimum. D. Replace lining. E. Turn per manufacturer's specifications. F. Blow out debris.

NOTES



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