OBJECTIVES

• Discuss how to diagnose problems with disc brakes.
• Describe how to inspect, disassemble, and service disc brake calipers.
• Explain disc brake squeal correction.
• State the symptoms of a faulty disc brake.

DISC BRAKE DIAGNOSTIC PROCEDURES

• STEP 1: Verify customer complaint.
  ▪ Test drive vehicle to see if complaint can be duplicated
  ▪ STEP 2: Check brake pedal height and verify proper operation.
  ▪ If brake pedal low, count number of “clicks” needed to apply parking brake
  ▪ Should be 3–7 clicks; over 10 clicks, check the rear brakes
DISC BRAKE DIAGNOSTIC PROCEDURES

STEP 3: Safely hoist vehicle and remove wheels. Visually check:
- Flexible brake hoses for wear or damage
- Disc brake rotors for excessive rust or scoring
- Disc brake calipers for leakage or damage

STEP 4: Remove disc brake calipers and check disc brake pads for proper lining thickness.
- Check for cracks or other damage

STEP 5: Replace all components that do not meet factory specifications.

STEP 6: Test drive vehicle to verify repairs corrected customer concern.

VISUAL INSPECTION

Thorough visual inspection can only be accomplished by removing friction pads
- Some pads may show uneven wear
- Caused by force between pad and abutment (slide area)
VISUAL INSPECTION

• To help reduce tapered pad wear, pad design may offset friction material off center
  • Be certain to position pads correctly
• Many calipers equipped with brake inspection opening allowing technician to view thickness of brake pads

SERVICING DISC BRAKE CALIPERS

• Inspection
  • After removing caliper piston, remove square-cut O-ring
  • Thoroughly clean caliper in denatured alcohol and examine closely
  • If caliper bore rusted or pitted, some manufacturers recommend special hone be used

• Some manufacturers do not recommend honing the caliper bore because actual sealing surface in caliper is between piston seal and piston itself
DISC BRAKE SQUEAL CORRECTION

- Causes of Brake Squeal
  - Greatest customer complaint about brake work involves brake noise
  - Noise caused by moving air; result of moving brake components
- Correcting Disc Brake Squeal
  - Brake squeal can best be prevented by careful attention to details
  - Keep disc brake pads clean

DISC BRAKE SQUEAL CORRECTION

- Use factory-type clips and anti-squeal shims
- Lubricate all caliper slide points as per manufacturer’s recommendation
  - Lithium-based brake grease
  - Silicone grease
  - Molybdenum disulfide (MOS2) grease
  - Synthetic grease (usually polyalphaolefin [PAO])

DISC BRAKE SQUEAL CORRECTION

- Antiseize compound
- Lubricant should be applied on both sides of shims used between pad and piston
- Machine brake rotor as little as possible and with correct surface finish
- Manufacturers also change pad (lining) composition and shape of pads to help eliminate brake noise
  - Can change frequency of vibration to above or below range that can be heard
### DISC BRAKE SYMPTOM GUIDE

- Pulls to One Side During Braking
  - Incorrect or unequal tire pressures
  - Front end out of alignment
  - Unmatched tires on the same axle
  - Restricted brake lines or hoses
  - Stuck or seized caliper or caliper piston
  - Defective or damaged shoe and lining (grease or brake fluid on the lining, or a bent shoe)

- Malfunctioning rear brakes
- Loose suspension parts
- Loose calipers
- Brake Roughness or Chatter (Pedal Pulsates)
  - Excessive lateral runout of rotor
  - Parallelism of the rotor not within specifications

- Wheel bearings not adjusted correctly
- Rear drums out-of-round
- Brake pads worn to metal backing plate
- Excessive Pedal Effort
  - Binding brake pedal mechanism
  - Improper rotor surface finish
  - Malfunctioning power brake
  - Partial system failure
DISC BRAKE SYMPTOM GUIDE

- Excessive Pedal Effort
  - Excessively worn shoe and lining
  - Piston in the caliper stuck or sluggish
  - Fading brakes due to incorrect lining
- Excessive Pedal Travel
  - Partial brake system failure
  - Insufficient fluid in the master cylinder
  - Air trapped in the system
  - Bent shoe and lining

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  - Pressure trapped in the brake lines (to diagnose, momentarily open caliper bleeder valve to relieve pressure)
  - Restricted brake tubes or hoses

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- Improperly lubricated caliper mounting system
- Improper clearance between the caliper and torque abutment surfaces
- Check valve installed in outlet of master cylinder to disc brakes
- Stuck caliper caused from rusted sliding points or rusty mounting bolts/bushings
- Stuck caliper piston
DISC BRAKE SYMPTOM GUIDE

• Front Disc Brakes Very Sensitive to Light Brake Applications
  • Metering valve not holding off the front brake application
  • Incorrect lining material
  • Improper rotor surface finish
  • Check other causes listed under “PULLS”

DISC BRAKE SYMPTOM GUIDE

• Contaminated brake pad lining material from wheel bearing grease
• Rear Drum Brakes Skidding Under Hard Brake Applications
  • Proportioning valve
  • Contaminated rear brake lining
  • Caliper or caliper piston stuck or corroded

SUMMARY

• Thorough visual inspection can only be accomplished by removing friction pads
• Greatest customer complaint about brake work involves brake noise
• Brake squeal can best be prevented by careful attention to details