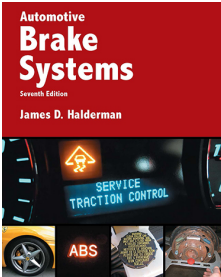


Automotive Brake Systems



CHAPTER 13

Disc Brake Diagnosis and Service

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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.

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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

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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

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DISC BRAKE DIAGNOSTIC PROCEDURES

- 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.

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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)

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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

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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

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SERVICING DISC BRAKE CALIPERS

- Some manufacturers do not recommend honing the caliper bore because actual sealing surface in caliper is between piston seal and piston itself

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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

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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])

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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

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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)

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DISC BRAKE SYMPTOM GUIDE

- 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

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DISC BRAKE SYMPTOM GUIDE

- 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

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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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DISC BRAKE SYMPTOM GUIDE

- Excessive pedal effort
- Excessive parking brake travel (four-wheel disc brakes, except Corvette)
- Dragging Brakes
 - 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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DISC BRAKE SYMPTOM GUIDE

- 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

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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"

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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

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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

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