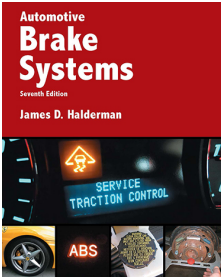


Automotive Brake Systems



CHAPTER 12

Disc Brakes

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OBJECTIVES

- Describe the parts and operation of disc brakes.
- Describe the construction of disc brake pads.
- Discuss the brake pad assembly methods and brake lining composition.
- Describe the difference between fixed caliper and floating or sliding caliper.

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DISC BRAKES

- Parts and Operation
 - Piston(s) squeeze friction material (pads) on both sides of rotating disc (rotor)
 - Used on front wheels of late-model vehicles
 - Used on rear wheels of increasing number of automobiles

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DISC BRAKES

- Adopted because supply greater stopping power than drum brakes with less likelihood of fade

DISC BRAKE PADS

- Brake Pad Assembly
 - Block of friction material attached to stamped steel backing plate
 - Some pad backing plates have tabs that bend over caliper to hold pad in place
 - Others have tabs with holes in them
 - Pin slips through holes and fastens to caliper body to hold pads

DISC BRAKE PADS

- Still others have retainer spring that locks pad to caliper piston
- Lining material can be one of a number of products
- Can be fastened to backing plate in several ways

DISC BRAKE PADS

- Brake Pad Assembly
 - Edges of lining material usually perpendicular to rotor surface
 - A few larger pads have tapered edges to help combat vibration and noise

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DISC BRAKE PADS

- Pad Assembly Methods
 - Riveted linings
 - Brake block attached to backing plate with metal rivets

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DISC BRAKE PADS

- Pad Assembly Methods
 - Bonded linings
 - Glue brake block directly to shoe pad backing plate

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DISC BRAKE PADS

- Pad Assembly Methods
 - Mold-bonded linings
 - Combines advantages of bonding with mechanical strength of riveting

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DISC BRAKE PADS

- Brake Lining Composition
 - Ingredients mixed and molded into shape of finished product
 - Fibers in material only thing holding mixture together

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DISC BRAKE PADS

- Brake Lining Composition
 - Large press forces ingredients together to form brake block, which becomes brake lining

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DISC BRAKE PADS

- Brake Lining Composition
 - Semimetallic friction material
 - Uses metal rather than asbestos in its formulation

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DISC BRAKE PADS

- Brake Lining Composition
 - Semimetallic friction material
 - Require very smooth finish on rotor

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DISC BRAKE PADS

- Brake Lining Composition
 - Nonasbestos friction material
 - Use synthetic material such as aramid fibers instead of steel

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DISC BRAKE PADS

- Brake Lining Composition
 - Carbon fiber friction material
 - Newest and most expensive of the lining materials

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DISC BRAKE PADS

- Brake Lining Composition
 - Ceramic friction material
 - Most pads today are ceramic and use little, if any steel

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CALIPER DESIGNS

- Fixed Caliper Design
 - Body manufactured in two halves
 - Uses two, four, or six pistons to apply brake pads
 - Caliper rigidly mounted to suspension
 - When brakes applied, pistons extend from caliper bores and apply brake pads with equal force from both sides of rotor

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CALIPER DESIGNS

- No part of caliper body moves when brakes applied
- Floating and Sliding Caliper Design
 - Used in front brakes of most vehicles
 - Caliper free to move within limited range on anchor plate solidly mounted to vehicle suspension

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CALIPER DESIGNS

- Floating and Sliding Caliper Design
 - When brakes applied, caliper piston applies inner brake pad
 - At same time, caliper body moves in opposite direction on anchor plate and applies outer brake pad
 - Caliper body moves every time brakes applied

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CALIPER DESIGNS

- Floating Caliper Operation
 - Body of floating caliper does not make direct contact with anchor plate
 - Body supported by bushings and/or O-rings
 - Allow it to “float” or slide on metal guide pins attached to anchor plate

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CALIPER DESIGNS

- Floating Caliper Operation
 - Depend on proper lubrication of pins, sleeves, bushings, and O-rings for smooth operation
 - Special high-temperature brake grease must be used

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CALIPER DESIGNS

- Sliding Calipers
 - Body of sliding caliper mounts in direct metal-to-metal contact with anchor plate
 - Calipers move on ways cast and machined into caliper body and anchor plate
 - Retaining clips and design of caliper prevent body from coming out of ways

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CALIPER DESIGNS

- Depend on good lubrication of ways for proper operation

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SUMMARY

- Piston(s) squeeze friction material (pads) on both sides of rotating disc (rotor)
- Fixed caliper design is body manufactured in two halves
- In floating and sliding caliper design the caliper free to move within limited range on anchor plate solidly mounted to vehicle suspension

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