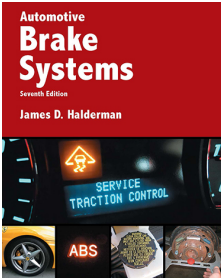


Automotive Brake Systems



CHAPTER 09

Wheel Bearings and Service

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OBJECTIVES

- Explain the different types of antifriction bearings, bearing greases, and seals.
- Explain the diagnosis of defective wheel bearings.
- Discuss rear drive axle classifications and the procedure to replace rear axle bearings and seals.
- State the reasons for bearing failure.

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ANTIFRICTION BEARINGS: BALL BEARINGS

- Ball bearings use hardened steel balls between the inner and outer race to reduce friction.
- While ball bearings cannot support the same weight as roller bearings, there is less friction in ball bearings and they generally operate at higher speeds.

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ANTIFRICTION BEARINGS: BALL BEARINGS

- Ball bearings can control thrust movement of an axle shaft because the balls ride in grooves on the inner and outer races.

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ANTIFRICTION BEARINGS: INNER AND OUTER WHEEL BEARINGS

- Many rear-wheel-drive vehicles use an inner and an outer wheel bearing on the front wheels.
- The inner wheel bearing is always the larger bearing because it is designed to carry most of the vehicle weight and transmit the weight to the suspension through to the spindle.

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ANTIFRICTION BEARINGS: INNER AND OUTER WHEEL BEARINGS

- Between the inner wheel bearing and the spindle, there is a grease seal;
 - Which prevents grease from getting onto the braking surface and prevents dirt and moisture from entering the bearing.

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ANTIFRICTION BEARINGS: STANDARD BEARING SIZES

- Bearings use standard dimensions for inside diameter, width, and outside diameter.
- The dimensions that are standardized include bearing bore size (inside diameter), bearing series (light to heavy usage), and external dimensions.
- When replacing a wheel bearing, note the original bearing brand name and number.

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ANTIFRICTION BEARINGS: STANDARD BEARING SIZES

- Replacement bearing catalogs usually have cross-over charts from one brand to another.
- The bearing number is usually the same because of the interchangeability and standardization within the wheel bearing industry.

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SEALED FRONT-WHEEL-DRIVE BEARINGS

- Most front-wheel-drive (FWD) vehicles use a sealed nonadjustable front wheel bearing.
- This type of bearing can include either two preloaded tapered roller bearings or a double-row ball bearing.

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SEALED FRONT-WHEEL-DRIVE BEARINGS

- This type of sealed bearing is also used on the rear of many front-wheel-drive vehicles.
- Double-row ball bearings are often used because of their reduced friction and greater seize resistance

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BEARING GREASES: GREASE ADDITIVES

- Commonly used additives in grease include the following:
 - Antioxidants
 - Antiwear agents
 - Rust inhibitors
 - Extreme pressure (EP) additives such as sulfurized fatty oil or chlorine

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SEALS: TYPES OF SEALS

- Two general applications of seals are static and dynamic.
 - Static seals are used between two surfaces that do not move.
 - Dynamic seals are used to seal between two surfaces that move.

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BEARING DIAGNOSIS: SYMPTOMS OF A DEFECTIVE BEARING

- Wheel bearings control the positioning and reduce the rolling resistance of vehicle wheels.
- Whenever a bearing fails, the wheel may not be kept in position and noise is usually heard.

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BEARING DIAGNOSIS: SYMPTOMS OF A DEFECTIVE BEARING

- Symptoms of defective wheel bearings include the following:
 - 1. A hum, rumbling, or growling noise that increases with vehicle speed
 - 2. Roughness felt in the steering wheel that changes with the vehicle speed or cornering

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BEARING DIAGNOSIS: SYMPTOMS OF A DEFECTIVE BEARING

- 3. Looseness or excessive play in the steering wheel especially while driving over rough road surfaces
- 4. A loud grinding noise in severe cases, indicating a defective front wheel bearing
- 5. Pulling during braking

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REAR AXLE BEARING AND SEAL REPLACEMENT

- The rear bearings used on rear-wheel-drive vehicles are constructed and serviced differently from other types of wheel bearings.
- Rear axle bearings are either sealed or lubricated by the rear-end lubricant.

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REAR AXLE BEARING AND SEAL REPLACEMENT

- The rear axle must be removed from the vehicle to replace the rear axle bearing.
- There are two basic types of axle retaining methods:
 - Retainer plate-type
 - C-lock

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REAR AXLE BEARING AND SEAL REPLACEMENT

- Retainer Plate-type Rear Axles
 - The retainer plate-type rear axle uses four fasteners that retain the axle in the axle housing.
 - To remove the axle shaft and the rear axle bearing and seal, the retainer bolts or nuts must be removed.

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REAR AXLE BEARING AND SEAL REPLACEMENT

- C-lock-type Axles
 - Vehicles that use C-locks (clips) use a straight roller bearing supporting a semi-floating axle shaft inside the axle housing.
 - The straight rollers do not have an inner race.

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REAR AXLE BEARING AND SEAL REPLACEMENT

- The rollers ride on the axle itself. If a bearing fails, both the axle and the bearing usually need to be replaced.
- The outer bearing race holding the rollers is pressed into the rear axle housing.
- The axle bearing is usually lubricated by the rear-end lubricant and a grease seal is located on the outside of the bearing.

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BEARING FAILURE ANALYSIS

- Inspect old bearing to discover cause of failure
- Metal Fatigue
 - Result of long vehicle usage
 - Cracks often appear and expand into metal
 - Metal between cracks may break into chips, slabs, and scales
 - Process called spalling

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BEARING FAILURE ANALYSIS

- Electrical Arcing
 - Damage can be caused by poor ground wires or improper welding on vehicle
- Shock Loading
 - Dents can form in bearing race and lead to bearing failure

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SUMMARY

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