

Issue and Trends

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Corrosion and Rust-Jacking on Heavy-Duty Brake Shoes. . . How to Recognize and Prevent Corrosion and Rust-Jacking on Heavy-Duty Brake Shoes

When rust creeps in between the brake lining and shoe table, it can cause the lining to fracture. Provided chunks of the linings do not break off, the real problem that fleets are facing is “out-of-service criteria” which dictates that a crack is not acceptable.

What Is Rust-Jacking?

During normal braking, a brake lining will have miniscule movement from temperature cycling, brake torque and component deflections, relative to the shoe table. If the lining wears off the paint on the shoe table (a condition called micro-abrasion), the bare metal is exposed to road spray and grime. Oxidation can begin to form as quickly as overnight.

Over the long-term, layers of rust can build up between the brake shoe and the lining. Each layer puts more upward pressure on the lining, which is firmly riveted to the shoe. Eventually, the lining can crack. Rust-jacking looks different from surface cracks, edge de-lamination, or fractures that happen when the lining is worn down to the rivet head. The characteristics of rust-jacked shoes include:

- There’s still plenty of usable lining on the shoe, at least 1/8 inch above the rivet heads.

- The lining is buckling between the rivet heads, resulting in a noticeable gap between the shoe table and lining block.
- Cracks tend to run horizontally across the lining and are visible along the edge of the lining block. The lining also may be flaking, chipping, or show other signs of deterioration.

Why Does Rust Form?

Rust happens when iron and oxygen react, usually in the presence of water. Rust-jacking, therefore, is more likely to occur when moisture can collect between the brake shoe and lining. Several factors influence this, including:

- The amount of brake heat that can reach the shoe table (higher temperatures would speed up the evaporation of moisture). Shoes with thicker linings help insulate the shoe table from whatever brake heat is generated.
- The duty cycle of the vehicle and the replacement rate of the shoes. Shoes that receive little work or are left on the vehicle for several years are more susceptible to rust-jacking.

- The quality of the brake shoe table paint process and its ability to resist micro-abrasion.
- Exposure to sea-water or winter-road deicers like salt and chemical compounds like magnesium chloride, calcium chloride, or sodium chloride which can accelerate corrosion of bare metal.

Preventive Measures

Paint is the brake shoe's most basic level of protection from oxidation. ArvinMeritor uses a unique, advanced coating on new Original Equipment (OE) brake shoes. Electronically charged particles of coating are drawn onto the brake shoe and pulled into hard-to-reach areas and crevices. After the shoe is baked and cured, the result is a uniform, continuous coating. The coating process is highly effective at protecting brake shoes.

Remanufactured shoes are typically sprayed or dipped. To produce better paint adhesion and durability, ArvinMeritor introduced, in February 2009 for May 2009 availability, the PlatinumShield[®], a multi-step coating process for remanufactured brake shoes. Shoes are shot-blasted and go through a five-stage wash and pretreatment process with iron phosphate before the PlatinumShield[®] coating is applied.

In testing to evaluate surface rust after more than 400 hours of exposure to salt and road solvents, remanufactured shoes with PlatinumShield[®] achieved the highest possible ASTM scale rating of 10 (less than .01% surface rust). Shoes from the only two competitors advertising protective coating to prevent rust-jacking had much lower surface rust ASTM ratings.

Starting in May 2009, PlatinumShield[®] will be standard on all Meritor remanufactured shoes (and later in 2009 for OE production shoes) with "MA" and "R" prefixes; Meritor MG1, MG2L, MG2, CG, and MET OEM aftermarket shoes; and Fras-Le F550, F555, F577, F560, F587, F787T, and Combo shoes. The shoes come with a three-year warranty against rust-jacking and a guarantee of full lining life to within 1/8-inch of the rivet head.

Everyday Efforts

Specifying a high-quality OE or remanufactured brake shoe is the first thing to reduce the risk of rust-jacking. However, staying ahead of corrosion demands every day diligence.

On a routine basis, spray the vehicle's undercarriage to wash away the salt and road grime. Use a gentle stream from a hose, not a pressure washer.

When servicing a truck or trailer, ask to have the linings inspected for abnormal wear and potential out-of-service conditions: cracks or voids more than 1/16th of an inch wide; cracks that exceed 1-1/2 inches in length; cracks across the lining face that extend through the lining edges; and cracks that result in missing chunks of lining. This is stipulated clearly with the CVSA guidelines. Any of these conditions may indicate rust-jacking.

Finally, specify replacements that match the quality, performance, and wear characteristics of the original. If the truck's vocation has changed, ask your supplier to help in selecting linings that will deliver the necessary performance for different speeds, braking pressures, loads, and operating conditions today.

If you'd like more information on this topic, or for copies of other Issues & Trends, contact ArvinMeritor Marketing Communications at 248/435-1933, fax to 248/435-9946, e-mail david.pennington@arvinmeritor.com, or visit our web site at: www.arvinmeritor.com

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