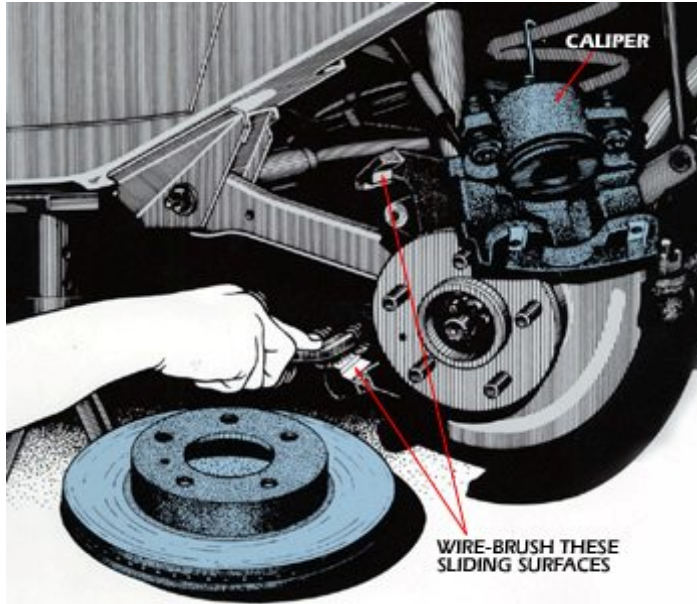


Brake Maintenance

You're taking a pleasant ride in the country, enjoying your car's performance. A stop sign. You step unhurriedly on the brake pedal—what the heck? You let off and try again. There's no mistake. You hear a high-pitched squeal that you recognize as a pad wear indicator sounding off. Those front linings are going, going, gone. That wouldn't be so troubling except that you distinctly remember doing a brake job less than a year ago. Hey, what's going on?



Low-Life Linings

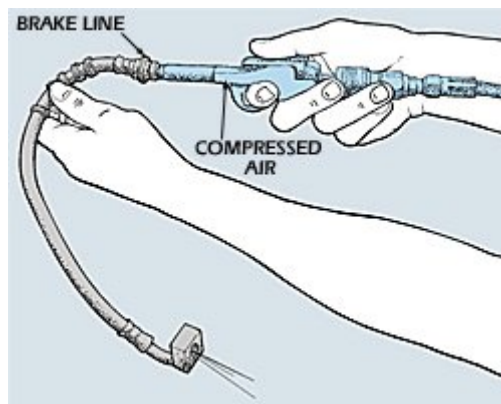
Thirty years ago when disc brakes were becoming common, we were impressed by how long linings lasted. Not anymore. Many late model cars and trucks eat their pads quickly. The tendency is to blame new friction material formulas for accelerated pad wear, but the real reason is usually something

If the caliper won't slide on its grooves or pins, brakes will wear fast. Clean, and then lube sparingly.

else altogether. Now, you've got overdrive, a low-friction V6 and an aerodynamic design that not only lets the car coast farther, but also cuts airflow to the brakes. Another factor in the short-lived pad scenario is the SUV phenomenon. A typical Blazer or Explorer might weigh 4800 pounds, but the brakes are pretty much the same as those designed for the 3000-pound pickups most of these vehicles evolved from. It doesn't take much of an intellectual leap to see that even normal driving amounts to heavy-duty service.

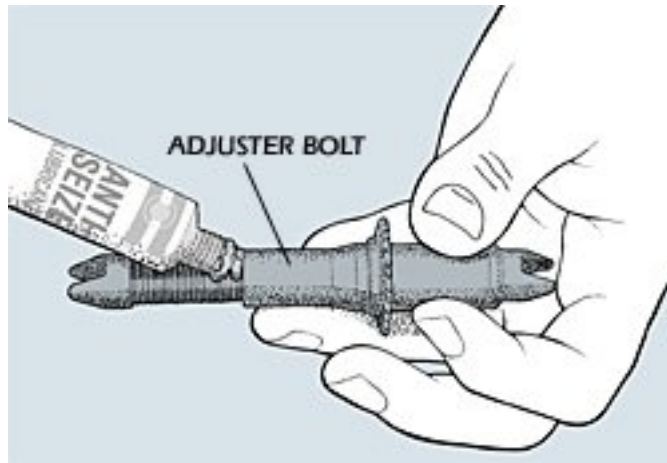
Take A Proactive Role

What can you do to extend the life of those brakes? First off, buy the highest-quality brand-name linings you can find. These may have ceramics added to the semimetallic mix, or have a sacrificial titanium coating that speeds break-in and improves initial feel. That's not, however, all there is to the job by a long shot. You've got to look at the brake system as a whole. Many motorists just don't use the parking brake. Some may think it's an emergency stopping system only. But with many common rear-disc designs and some rear drums, lining-to-



A partially clogged brake line can let pressure build up in the caliper.

rotor/drum adjustment simply doesn't occur unless the parking brake is applied (a symptom is a low pedal). So, adopt the sensible habit of engaging this device every time you park instead of just depending on Park to keep the car from rolling away.



Coat those star-wheel adjuster threads with grease or antiseize compound.

Innards And Fresh Juice

Even the most diligent person in this regard is still going to have problems if the self adjusters of the rear discs aren't operating. Typically, corrosion and contamination jam the piston and immobilize the screw mechanism.

Some professionals have

switched from overhauling rear calipers to installing quality remanufactured units, saying that it wasn't worth the labor and headache to pull them apart and put in a kit—it's hard to get the adjusting mechanism to work properly. Great, except calipers can cost over \$300 a pair in some cases. That's the price you pay for driving a modern car and neglecting maintenance. What maintenance is that? Brake fluid changes, of course. With that parking brake/self-adjustment mechanism present and immersed, internal corrosion is to be strenuously avoided. Ergo, periodic fluid changes are even more important than with disc/drum systems. This has been advised by many import manufacturers for decades, and is now starting to show up in the service recommendations found in the owner's manuals of domestics. This car-care item can save you serious money in the long run. Besides disc brake internals, consider ABS. Corrosion and debris in the control unit can result in a disastrously expensive repair—\$1500 isn't unusual! Use a turkey baster to get most of the old stuff out of the master cylinder reservoir, refill it with fresh, then use a clear bottle and hose setup at each of the bleeders and pump until you see a nice, clean liquid appear. Do this every other year.

Beaten Drums

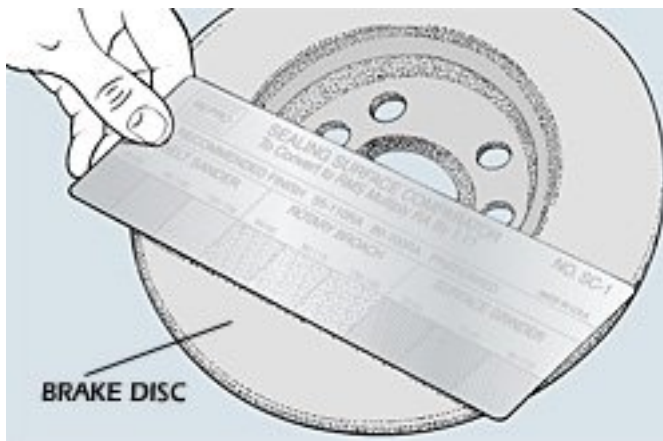
Rear drum brakes often shirk their duty, too, resulting in burned-up front pads. Seized star-wheel screws and otherwise inoperative self adjusters are practically an epidemic, so you're asking for accelerated front lining wear if you don't inspect and lubricate the hardware involved, and replace any items you're dubious about (frayed or fatigued cables, for instance). We fixed a car recently that had fried pads and a badly grooved rotor on one side. It turns out the hose was plugged—it allowed pressure to gradually build up in the caliper, so the piston couldn't retract. Another possible cause of drag is overfilling the master reservoir, which can apply the brakes as the fluid expands.

Broken In Or Just Broken?

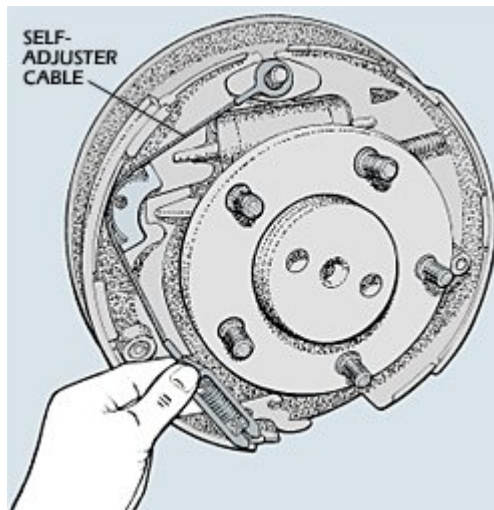
We know people who still believe that the right way to seat new linings is to really stand on the brakes a few times.

That's an anachronistic idea left over from the days when linings were supplied "green." Panic stops would indeed get that friction material hot enough to cure it. But you don't get uncooked pads and shoes from manufacturers anymore,

so this whole idea belongs to a bygone era, a time of ignition points and bias ply tires. There's no way to overemphasize the importance of proper lining break-in (some authorities say overlooking this procedure is the No. 1 cause of noise and hard pedal complaints). The ideal way to start new linings off is to make 30 slow stops (spaced 2 minutes apart) from about 30 mph using light to moderate pressure. You may not be willing to take that much time, but you'd be foolish not to make at least 10 moderate stops at 30-second intervals (you should be able to feel the action smooth out), then avoid heavy braking for the first 200 miles. What if one pad is worn-out, but the other still has lots of friction material left? Think about the way a single-piston caliper operates. The piston pushes one side directly against the disc, and this action pulls the other side into contact. If anything interferes with the sliding or floating movement that transfers and divides the force, only the pad that the piston actually bears on will wear. So, every time you put in a new lining, clean and lubricate the machined grooves of sliding calipers, using special brake grease. Ditto for the bushings and pins or bolts of the floating variety, and make sure any rubber parts are in good shape.



Discs need to be refinished to a finer finish for today's pad material.



Drum brake self-adjuster hardware is frequently faulty.

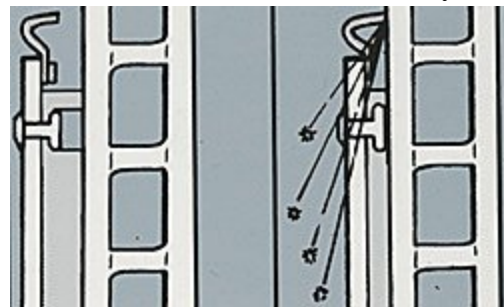
Voice Of Experience•

When lubrication is called for on an internal mechanism, use silicone grease. Anything else will attack the rubber parts. • Don't force caliper pistons back for pad replacement without opening the bleeder. The line comes in near the bottom of the cylinder where the sediment is, and this forces debris up into the ABS unit—often resulting in a glowing antilock warning light. In fact, many brake experts say just opening the bleeder isn't good enough. They want you to clamp that hose (use a special tool or pad the jaws of locking pliers with heater hose). • Don't believe you

can get away with the rough directional disc finish that worked fine with asbestos. Smoothness is the rule today. If you're familiar with roughness scales, where 80-100 RMS or 73-91 RA was once considered correct, now 40-60 RMS or 36-55 RA is recommended (you can check this with a surface comparitor gauge). In other words, finish that rotor up with 120- to 150-grit paper instead of the traditional 80-grit. | Regardless of whether the rotors have been refinished, you absolutely must take the time to clean them. Otherwise, hard particles will become embedded in the new linings and you'll get noise and scoring. But brake cleaner isn't the answer because it won't float those iron filings away. Use detergent and water, and then dry with a paper towel.

HOW IT WORKS: Pad Wear Indicators

Mechanical pad wear indicators, which have been around since the early '70s, are so simple and can head off so much damage that it's surprising they didn't show up even before then. All that's required to warn the driver that he's almost down to the rivets is the addition of a light steel tab that contacts the rotor when the linings are getting too thin for comfort. This produces a high-pitched squeal that appears suddenly and is unmistakable. The tab is too flimsy to cause any damage to the disc,



NEW

WORN

unlike the rivets, which will grind away at that nice stopping surface, leaving wide, deep grooves. With bonded linings, the steel pad plates will do the same, and have been called "full-mets" by brake guys with a twisted sense of humor. By the time you hear and feel either, considerable rotor damage has

already begun. Unfortunately, many of the cars out there still aren't so equipped, and often replacement pads for cars that had wear indicators as O.E. don't include this helpful device. A slightly higher-tech variation on this theme is the electrical pad wear warning system, which first appeared a couple of decades ago on such cars as Toyotas and Mercedes. Here, the pad is drilled for an electrical contact that stands slightly proud of the lining rivets. When wear reaches the point that this touches the rotor, the ground circuit to a Brakes warning light on the dash is completed, and the lamp winks on. Again, unfortunately, some companies that manufacture replacements for these applications don't bother to include the contact, with the result being that the wire ends up tied off in the suspension somewhere.