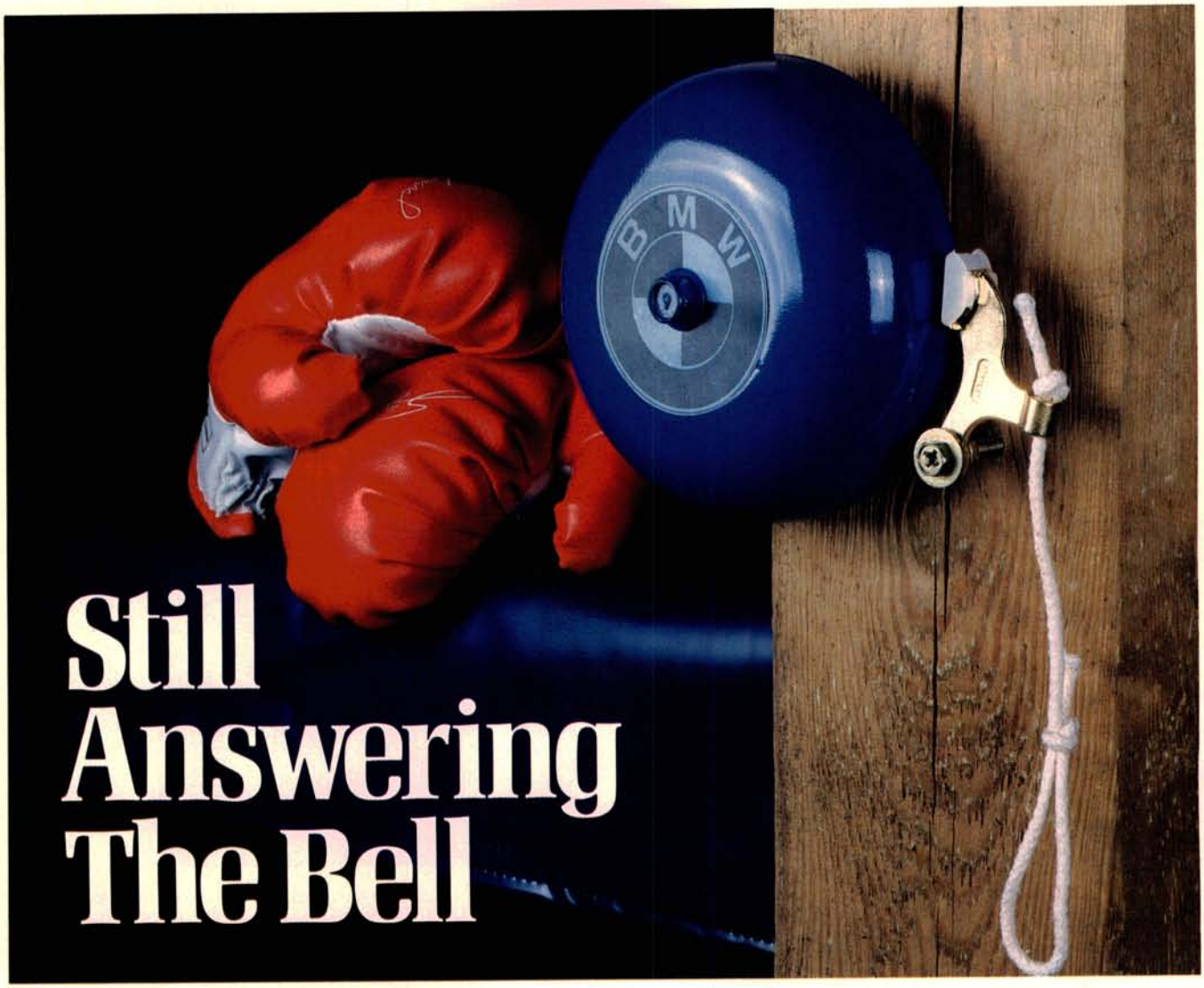


Still Answering The Bell

The Bimmer's back. My boss's BMW 535iS has returned to its corner for some sorely needed attention. Bloodied but unbowed, it takes a brutal beating now that the old man refuses to get on an airplane. I've heard of long term test vehicles before, but this is ridiculous.

This time, at 160,000 miles, the Bimmer is still answering the bell, but it's getting weak in the knees. The factory strut inserts have lost their original enthusiasm for high speed driving. The BMW bobs and weaves like a sparring partner, and the boss man has taken to keeping a bottle of Dramamine™ handy when he cruises Interstate 80. The car has also developed a suspension knock, most noticeable at slow speeds over rough pavement.

Then, during a panic stop last week, the front brakes shook the car so badly that the fuzz buster fell from the sun visor into the ashtray. Convinced that he'd been saved by the bell, our fearless leader surrendered the car before the next near miss became a TKO.

Our BMW came from the factory with gas filled strut inserts. The good folks at Bilstein sent along a new set of replacement struts. We'll show you how to install them. Aside from some remove-and-replace procedures peculiar to this model, strut replacement is not extremely difficult.

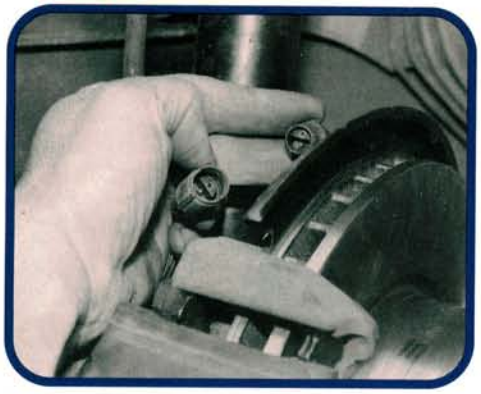
A "simple" brake job on the ABS equipped 5 series is a little more complicated than some, but it's hardly a nightmare. Make sure the ignition is OFF before disconnecting any of the ABS sensors.

All in all, new pads and rotors, strut inserts, and new stabilizer links made a night and day difference in the car. Ball joints, tie rod ends, strut tower bushings, and the rest of the suspension components all checked out okay. Ride height was still within specs and the height was even from side to side, so we did not replace the springs.

Looks like the BMW will continue to answer the bell for a few more rounds.

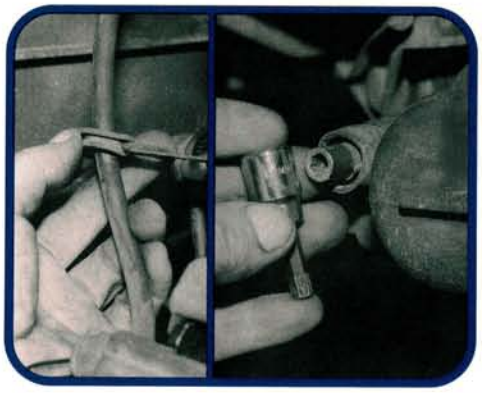
—By Ralph Birnbaum

Still Answering the Bell



1

The left front caliper has a brake pad wear sensor. The connector for the sensor snaps into two retainer clips on the backside of the rotor shield. Later, the old sensor will be transferred to the new inboard brake pad and reused. Check the connector for any signs of dirt, water, or corrosion.

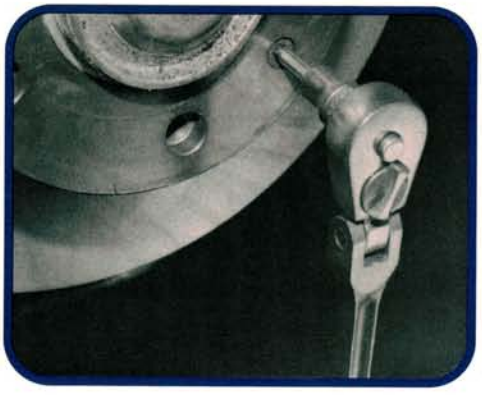


2

Caliper removal is a simple process. Pop the rubber brake line/grommet out of the metal retainer on the strut tube. Remove the protective caps over the two caliper mounting bolts. Grab a 7 mm hex and remove the bolts. Check the pins for sticking or corrosion. Ours needed only a good cleaning and fresh grease.

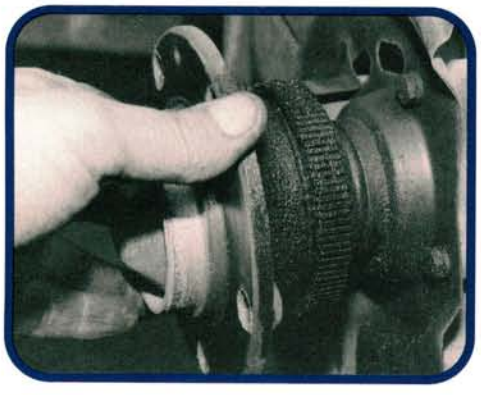
3

Pry between the anti rattle clip and rotor hub as shown and the clip will pop out. Slide the caliper off and hang it with mechanics wire so you don't damage the brake hose. Spin the rotor. Listen for any noise or "notchiness" in the wheel bearings. Unbolt and remove the caliper frame from the knuckle.



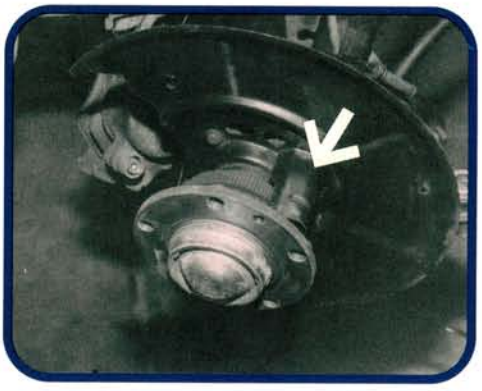
4

The rotor is held to the hub by this small hex headed bolt. The bolts in both hubs were frozen in place, and we soon gave up on this ratchet. A healthy dousing with penetrant oil, a fresh hex head socket, and an impact driver were summoned before the bolts came free.



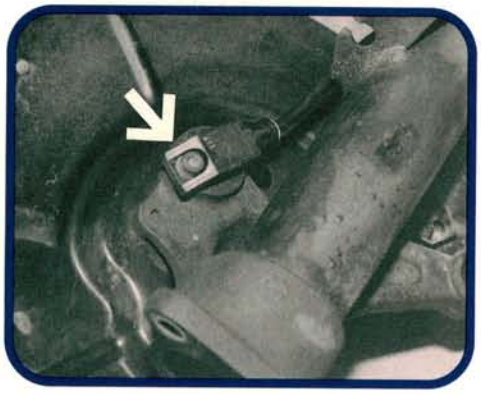
5

The teeth on the front hub pulse rings are almost closed with rust. We have heard reports of teeth which were damaged or even rusted away in extremely corrosive conditions. Once again, we soak the rust with penetrant oil. Then we carefully remove the rust and debris with a wire brush.



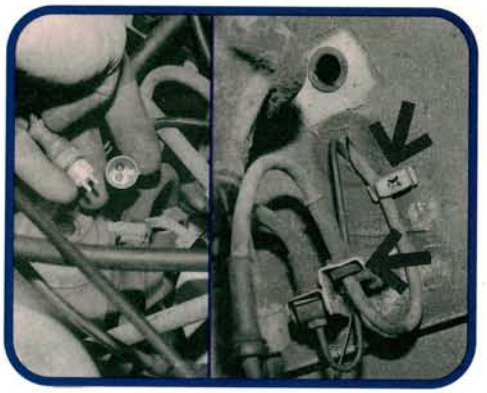
6

The ABS sensor passes through the lower strut. The tip of the sensor rides above the toothed wheel. The sensor generates an electrical signal as the teeth in the pulse ring pass by. That's how the ABS module keeps track of wheel speed. The sensor is hidden beneath a protective shield (arrow).



7

Before we remove the strut we need to remove the ABS sensor. A small hex screw holds each front sensor in place. The right side sensor comes out easily, but the left side is very stubborn. Rather than force the issue and risk damaging the sensor, we decide to unplug it and leave it in the strut.

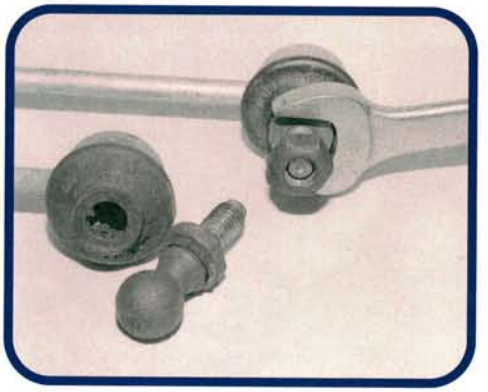


8

The carside connector for the left speed sensor is located beneath the master cylinder reservoir. We unplug it and pull the sensor cable though the rubber grommet in the wheel well. We're very careful not to kink the sensor cable as we remove it from its retainer clip and support bracket (arrows).

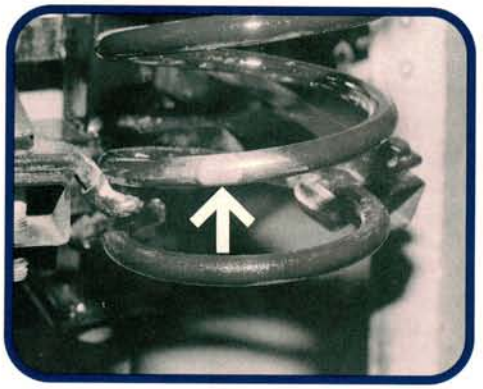
9

Now we can unbolt the strut assembly and remove it. Three bolts hold the lower ball joint assembly to the base of the strut tube. Also unbolt the stabilizer links. Then remove the strut tower nuts under the hood. Pry the strut tube away from the ball joint and slide the assembly down and out of the wheel well.



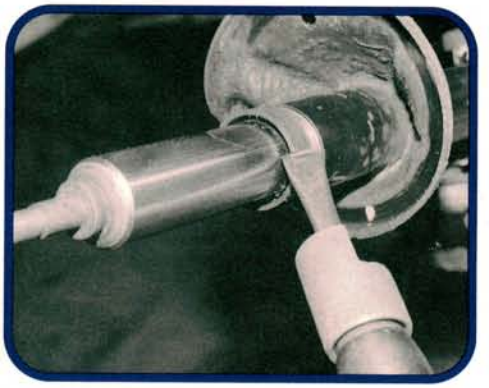
10

Speaking of stabilizer links... In an earlier article we said that they do go bad over time. Our clunk in the front end was caused by a badly worn ball and socket which pulled apart by hand. When installing new links, use a thin 17 mm wrench to keep the ball stud from turning as you tighten the locking nut.



11

Over at the spring compressor, we remove the spring from the strut as we would any other. Some springs have a red mark, some don't. This will help you identify the springs used. Red marked springs have a different part number, and use thicker rubber spring mount rings than those without any mark.

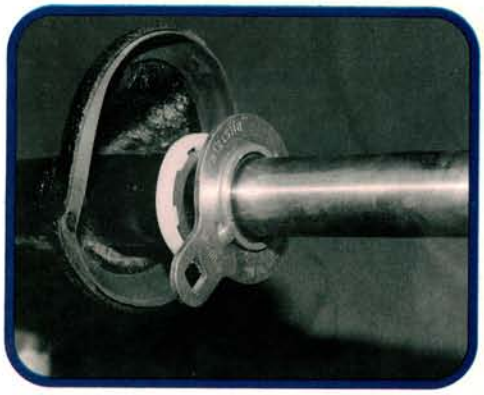


12

The retaining collars on the strut tubes are also rusted in place, and a little persuasion is called for. After protecting the old baby blues with wrap around safety goggles, we roll the collars off with an air chisel. The replacement struts come with new collars anyhow.

13

These are gas filled strut cartridges, so we don't add any oil to the strut tube before sliding the new inserts into the tube. Notice the nylon ring at the left (arrow). It slides onto the strut tube, and will hold the accordion protective tube in place. We'll show you in a minute.

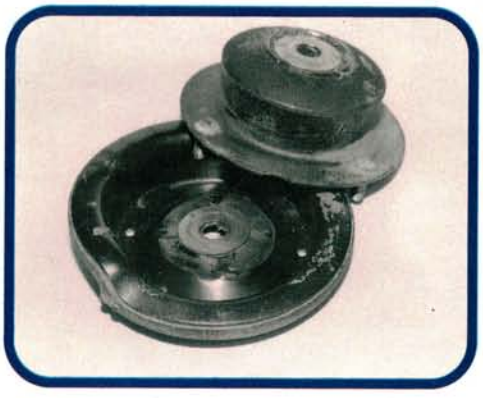


14

The Bilstein strut kits come with a swell wrench for tightening the retainer collars. Torque the retainer to 130 Nm (96 ft-lb). Once the nut is in place, the nylon ring at the left is captive, since it can't slide past the larger outside diameter of the retainer collar.

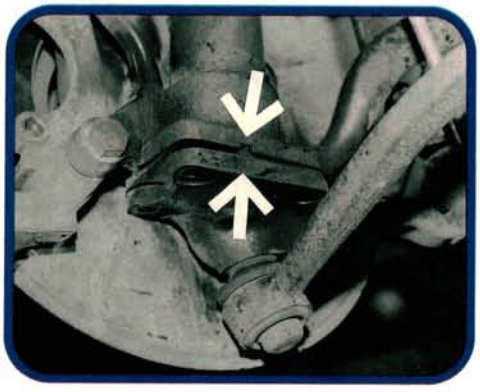
15

This is the protective boot included in the kit. At the strut tube end, the accordion snaps over the nylon ring shown in the previous photo. A small groove at the top of the strut shaft secures the other end (arrow). Make sure the rubber ring is securely installed in the spring perch.



16

Check the upper spring mount rubbers for signs of cracking. Each mount contains a bearing. While we didn't find either of the mounts to be damaged in any way, the grease in the bearings looked like peanut butter—crunchy style. We forced fresh grease through the bearings before we reassembled the strut.



17

Slide the strut assembly up and into the strut tower. Slide the strut mount studs through the holes in the tower and start the nuts. Down below, press down on the control arm and drop the strut tube onto the ball joint assembly. Align the tooth and notch (arrows) and install the ball joint bolts.

18

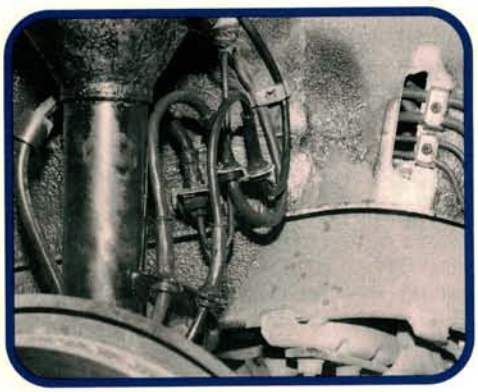
Back to the brakes. If the pads had worn far enough to wear away the sensor's outer coating and turn on the light, we would replace it. Our pads weren't that worn and the sensor could be reused. We pried the sensor out of the old inboard pad and pressed it into the slot on the new pad as shown.

19

Install the new rotors, and reinstall the caliper frames. Compress the piston in each caliper, and load the pads in each caliper before sliding them back in place. As we start the caliper bolts, notice that we've routed the pad wear sensor wire through the loop provided by the brake bleeder cap.

20

Reconnect all the wiring connectors. Final torque the caliper frame and caliper slide pin bolts. Replace the protective plastic caps to keep water out of the caliper slides. Snap the anti rattle clip on each caliper into place as shown. Oh, and don't forget to pump up the pads before your test drive.



21

This part only takes a minute, but it could save you a lot of grief. With everything back in place, turn the steering full left and then full right. If you've properly reinstalled, and properly secured all the cables, nothing should catch, bind or rub as the steering travels from lock to lock.