



# Tech Tip

BRAKES 130

## THE CHALLENGE OF THE DIAGNOSIS Unique Brake and Suspension Solutions

**N**othing is more frustrating than performing a service on a vehicle and having the customer return with a complaint. The symptoms may involve a brake noise condition, a pulsation, premature wear, a suspension related condition, or any one of several symptoms. Diagnosing noise-related symptoms can be a frustrating endeavor. The technician can perform a by-the-book procedure and still be faced with a noise-related symptom. In that situation, don't rule out the possibility that the condition may be a normal characteristic for that vehicle platform, and the solution may require more than conventional repair techniques.

### **NORMAL CHARACTERISTIC**

Some brake noise is inevitable under certain conditions, and your best efforts may not succeed in eliminating the condition. "Normal characteristic" is not my favorite phrase; however, some vehicles share common problems that are inherent by design, therefore the condition is considered normal for that platform. The noise condition can be affected by differences in the loading of the vehicle, the owner's driving style, or the vehicle's use. Weather conditions, ambient temperature or driving patterns may make the noise more or less pronounced. GM says it is not uncommon for metallic pads to emit a squeal or squeak at medium speeds when light to medium pedal pressure is applied. Ford, Chrysler and Nissan make similar statements. Occasional noises may be emitted from the rear brakes during the first few stops with cold brakes, and especially during the presence of high humidity. In fact, brake grabbing may occur under those same conditions. Grinding noises may occur after the vehicle has been parked overnight. This condition results from rotor surface corrosion and usually disappears following two to three stops. Groaning noises while braking and moving slowly from a complete stop are a normal occurrence. Some symptoms are just a normal characteristic for the system under certain conditions.

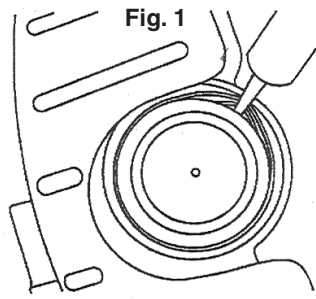
Always search for factory solutions, as many conditions are addressed by the vehicle manufacturers. Some of the solutions may seem strange, but they are worth pursuing to resolve the customer's complaint. In fact, it may be the only way to solve the problem. Read on for some examples of extreme fixes.

### **SLOW SPEED CREAKING NOISE**

While visiting a Chevrolet dealership, I observed a technician lubricating a caliper piston seal and dust boot on a 2003 Malibu. He advised that the procedure being performed was a factory solution to eliminate a creaking noise on slow speed braking. GM introduced a TSB on the following models: 1999–2003 Chevrolet Malibu, 2004 Malibu Classic, 1999–2004 Olds Alero and 1999–2004 Pontiac Grand AM vehicles. Creaking brake noises may be evident during slow speed braking. If the condition exists, you should be able to recreate the noise condition when the vehicle is not moving by depressing the brake and listening for the noise from the wheel well and caliper. GM states that the condition is caused by a caliper piston-to-seal interface issue during brake application. Replacing the disc pads or caliper is not the solution.

#### *Corrective Procedure:*

- 1) Remove the wheel and reinstall two lug nuts to secure the rotor to the hub.
- 2) Remove the bottom bolt from the caliper and swing the caliper assembly upward. Do not disturb the hydraulic system.
- 3) Clean the piston boot with brake clean, especially in the area where the boot meets the piston.
- 4) Dry with compressed air.
- 5) GM specifies applying Kluber Fluid (89022161) between the boot and piston, as illustrated (see Fig.1). One bottle per side.
- 6) Inject the lubricant as illustrated on the top side of the piston, while the caliper is tilted upward. In this position, the lubricant will flow around the entire circumference of the seal. Leave the caliper in this position for a minimum of 2 minutes to allow ample time for the fluid to work its way around the seal.
- 7) Depress the piston to ensure the lubricant is on both the piston and seal surface.
- 8) Wipe off any excess fluid, which could falsely indicate a leaking caliper seal.
- 9) Reassemble the caliper and perform the same procedure on the opposite side.



Lubricating piston and seal surface

This is a good example of a condition that was inherent in the brake system by design. Without access to the technical information from the vehicle manufacturer, it would be impossible for a technician to resolve the customer's complaint.

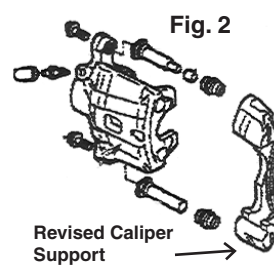
## FRONT BRAKE SQUEAL

Numerous factors must be considered when troubleshooting a brake squeal condition. The natural tendency is to replace the friction, machine the rotors and establish a non-directional finish. Noise silencers or molybde are applied to the disc pad plate/shim, and all metal-to-metal contact points are lubricated with molybde. Rubber-to-steel components are lubed with silicone grease. When these procedures fail to eliminate the noise, the friction is usually blamed. Often another manufacturer's brand or a different type of friction is installed, and the condition usually repeats itself.

Brake noise is a vibration or harmonic resonance, and replacing the friction is not always the solution. The noise generator may involve other components in the braking system.

Consider a front brake squeal condition on a 2001–2003 Dodge Stratus Coupe or a Chrysler Sebring. This applies to all 2001/2002 and 2003 models built to July 23, 2002, equipped with a 3.0L engine and a 15 inch single piston brake assembly. The brake noise condition involves a squeaking sound from the front brakes occurring at slow speeds during light brake application, such as parking maneuvers. It is extremely important that you perform a road test with the customer so that you can document the conditions present when the noise is evident. This could include braking speed, during a turn, light or heavy braking, etc. You will need this information to verify that the repairs have been made once you complete the service.

**Harmonic Resonance:** Once the normal procedures for isolating a brake squeal condition have been exhausted, the addition of a redesigned brake hardware component may be necessary. Chrysler advises that the squeaking sound from the front brakes on the mentioned applications may be due to the caliper support, and the rotor reaching a natural frequency that can be interpreted as a squeal or squeak. To correct the condition, both front caliper supports must be replaced (see Fig. 2) with revised components (MN102821) from Chrysler.



Diagnosing harmonic resonance can be a difficult process, and it is usually accomplished through the process of eliminating other system components. Replacing a caliper support to eliminate brake noise is not a common solution.

## DRIVELINE BOOM NOISES

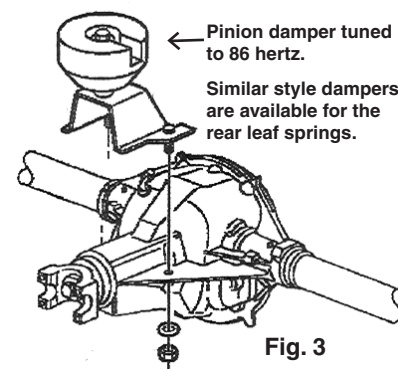
How do you troubleshoot a customer complaint involving a driveline "boom" noise at 60-65 mph? Owners of 1995–2004 Chevrolet Astro and GMC Safari vans may complain about a "boom" noise inside the vehicle, especially from those seated behind the driver's seat while cruising in the 60 mph range. GM acknowledges that this condition may result from an engine harmonic condition occurring during transmission converter lock-up.

GM has a procedure that will minimize the noise condition. The repair involves the installation of a rear leaf damper kit on each spring, in conjunction with a pinion noise damper tuned to 86 hertz (see Fig. 3). The affected vehicles may require the installation of only the pinion damper, the spring dampers, or a combination of both. This should be left to the discretion of the technician performing the repairs. Prior to performing this modification, rule out the possibility of metal-to-metal contact, such as an exhaust pipe coming in contact with the underbody. Make certain the customer understands that the "boom" noise may only be reduced to an acceptable level and not totally eliminated.

**Rear axle vibration damper (86 hertz) P/N 15006567.**

**Rear spring vibration dampers P/N 15042486.**

The frequencies or sound waves cannot be eliminated, but they can be moved into another frequency range. Racing engine builders face similar challenges. The sound waves can fatigue the engine parts, resulting in total engine destruction. The engine builder's objective is to move the frequencies out of the engine's key operating range.



Often, those same techniques must be applied to the braking and suspension system to quiet an unwanted noise.

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