

NEW SECTION: TOP 10 TOOLS
California-based CV Automotive shares its
list of the top tools used in the shop **page 8**

TOOL Q&A
How to handle hybrid
repairs **page 16**

PRODUCT SPOTLIGHT
Specialty Tools **page 24**

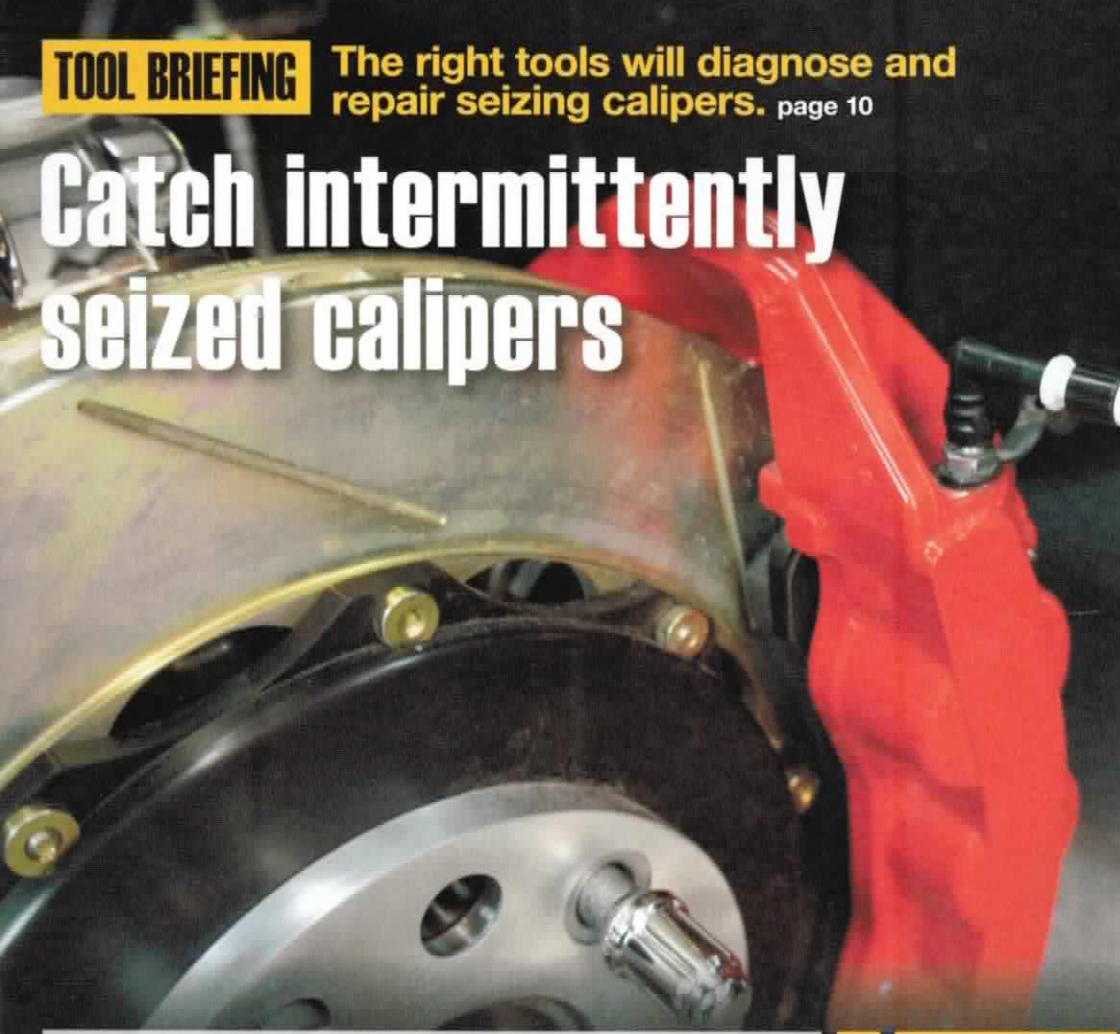
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Professional **TOOL & EQUIPMENT** News

TOOL BRIEFING The right tools will diagnose and
repair seizing calipers. **page 10**

Catch intermittently seized calipers



Check live wiring



Mobile tool storage

TOOLS of the MONTH

page 22



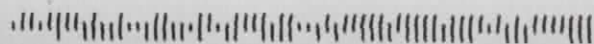
Strip wire
insulation



Speed up
air flow



Run multiple
applications
simultaneously



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PHOENIX SYSTEMS

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Tech Routing List

CYGNUS
BUSINESS MEDIA

Tool Briefing offers real-world tips and advice for using specific tools to accomplish specific tasks. The Customer Concern is shown below, along with a brief list of factory bulletins addressing the same problem. Remember, the tool information might apply to many other vehicles too.

Hot spots: Intermittently seizing Honda calipers

The right tools help diagnose and repair any intermittently seizing brake system.

VEHICLE APPLICATION:

• Honda 2003 Element 2.4L

AVG. REPORTED MILEAGE:

• 51,000 miles

CUSTOMER CONCERN:

The rear brake calipers are not releasing.

TOOLS USED:

- Brake pressure gauges
- Power bleeder (brake system bleeder)
- Scan tool
- ABS controller and/or electronic parking brake controller (for newer vehicles)

A 2003 Honda Element 2.4L rolls in because the customers complain of a "burning smell" coming from the back and a brake pulsation. When you get the car, the brakes work fine, but you feel a pulsation in the seat when you apply the brakes at over 40 MPH. You do a visual inspection and you see hot spots on the rear rotors, particularly on the rear left one, much worse than that of a typical Honda.

STEPS

TESTS/PROCEDURES:

- 1** First, verify there is no brake pressure to the rear calipers. If there is, loosen the master cylinder and open the lines at the master cylinder.
- 2** If there is no pressure holding pressure to the rear calipers, then verify the park brake is not dragging.
- 3** If there is no pressure in the brake system and the park brake is not holding, then check the caliper slides, and rotor and the pads.

STEPS PROVIDED BY:

IDENTIFIX
DIRECT-HIT
SHORT-CUT DIAGNOSTICS



Phoenix Systems' MaxPro Brake Bleeder, with the help of different adapters, can pressure, vacuum and reverse bleed a vehicle. For information on this product, go to www.VehicleServicePros.com/10721444.

Your diagnosis? Something is making the brakes lock up.

Possible causes? A failing master cylinder, the slides are hanging up, the parking brake is too tight, or the caliper piston is failing to return.

The latter, the caliper piston that fails to return, is the most obvious cause. This can be checked easily by removing the caliper from the vehicle and trying to push in the piston.

Let's assume the piston pushes in fine and the slides themselves are lubricated and not rusty (the obvious stuff). Then there are only three possible causes: a problem with the master cylinder, a hanging up parking

brake and a brake caliper equalization issue. Cracking open a line at the master cylinder and testing the parking brake for proper operation is simple enough.

You find nothing, so just change the rear calipers, right? You may be right, but you won't be sure. So, let's focus on what to do when we have a hard-to-spot intermittent brake caliper problem that we want to diagnose the right way.

STEP 1: TEST FOR CALIPER EQUALIZATION

The first step is to test the brake calipers and hoses using a brake pres-

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sure gauge. The gauge will indicate how much pressure is on the caliper. When no pressure is applied to the pedal, the gauge indicates zero. As pressure is applied, the needles on the gauge indicate the pressure in psi.

Hickok/Waekon's pressure gauge has a red needle and a black needle that together indicate the amount of residual pressure in the brake lines.

The red needle indicates when maximum pressure has been applied to the pedal; the black needle indicates the pressure when the pedal is released. This way, the tech can tell if there is residual pressure in the lines.

Other testers simply fit where the brake pads go, making testing as time-consuming as doing a brake job. The Hickok/Waekon kit has a bleeder screw adapter that the gauge connects to, allowing the tech to read the hydraulic pressures without taking everything apart. However, if the bleeder screw is seized, a traditional tester (such as IPA's Disc Brake Analyzer System, No. 7884) is the only type that will work.

Using any brake pressure gauge, simply check the pressure for each caliper and compare opposite sides. If there is uneven brake pressure, this confirms that a brake equalization issue is being caused by a faulty caliper and/or brake hose. At this point, it's fair to start replacing calipers.

After replacing the calipers, bleed the vehicle and do the test again just to verify that it was just a caliper. If you still show equalization issues, then the brake hose on the suspect side needs to be replaced. There is nothing else that can be causing this problem. A bad brake hose often compromises the caliper, so don't feel bad if you changed them. To be more exact with your diagnosis, consult the chart on page 14.

STEP 2: PROPERLY BLEED THE BRAKE SYSTEM

Now that you have "condemned" the brake calipers or maybe the brake hoses too, it's time to bleed the vehicle. The old school "pumping the brakes" method of bleeding vehicles is good after a pad slap, but often does not get all the air out when changing vital brake components that introduce air in the system (i.e. brake calipers or brake hoses.)

When changing these parts, in order to avoid a spongy pedal, it is preferable to use a tool that assists in bleeding the brakes. There are a few differ-

A tester such as IPA's Disc Brake Analyzer System, No. 7884, will read hydraulic pressures. For information on this product, go to www.VehicleServicePros.com/10098157.



The Hickok/Waekon gauge from the Hydraulic Pressure Test Kit connects to the rear calipers of a 2006 Honda Civic. For information about this product, go to www.VehicleServicePros.com/10772314.



RTI's BFX-2 Brake Fluid Exchange System pushes fluid through the master cylinder, while simultaneously applying vacuum to the appropriate bleeder. For information on this product, go to www.VehicleServicePros.com/10099737.

ent types out there that use different methods of bleeding.

Reverse bleeding is injecting fluid at the caliper to force all air up the brake lines and out through the master cylinder. This allows air not to be injected accidentally into the caliper. The level of fluid in the master cylinder must be monitored so it doesn't overflow.

Vacuum bleeding involves pulling air bubbles through the system and out the calipers. We do this by stepping on and off the brakes or by using a machine that applies pressure and fluid via an adapter at the master cylinder.

Finally, there is bench bleeding, which involves a bleeding component not installed on the car, like a new master cylinder. Different tools can bleed vehicles in different ways.

You can do any of these with a vacuum/pressure pump (such as a Matco Tools No. MVP 5000) as long as you have the right adapters. However, some companies make more specialized tools for this task.

Some tools "reverse bleed" the vehicle. One such example of this is Phoenix Systems' MaxPro Brake Bleeder. Instead of pumping the air out through the lines out of the brake bleeder, this tool pushes the air up and out the master cylinder.

The tool is a pump that directly handles the brake fluid, not a vacuum pump that forces the air out the top of

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Disc Brake System Troubleshooting Guide

(Provided by Innovative Products of America)

INDICATION	POSSIBLE CAUSE	ACTION
Uneven pressure reading on gauges	<ol style="list-style-type: none"> 1. Rear brake adjustment 2. Stuck proportioning valve 3. Frozen caliper piston or slide 	<ol style="list-style-type: none"> 1. Adjust rear drum brakes 2. Replace proportioning valve 3. Replace brake caliper
Needle drops slowly	<ol style="list-style-type: none"> 1. Imploded brake hose 2. Frozen brake caliper 	If the gauge needle drops, slowly open the bleeder valve; if the needle then drops quickly, the brake hose is imploded and should be replaced. If the needle still hangs when the bleeder is open, replace the caliper.
Pressure readings are low but even	<ol style="list-style-type: none"> 1. Both rear drum brakes are badly out of adjustment 2. Bad master cylinder 3. Bad power booster 4. ABS system in need of repair 	<ol style="list-style-type: none"> 1. Rear brake adjustment 2. Stuck proportioning valve 3. Frozen caliper piston or slide



The BrakeMate Jr. from Flo-Dynamics eliminates suction lines and includes a catch bottle giving the tech the freedom to follow the bleeding sequence himself. For information on this product, go to www.VehicleServicePros.com/10106064.

the master cylinder reservoir. In just a few minutes, the pedal is firm. This will work on any hydraulic system. It allows pressure, vacuum and reverse bleeding.

With the MaxPro, in order to bleed a master cylinder, a universal port adapter screws onto the front of the bleeder in place of the outlet hose. Push the port adapter into the ports of the master cylinder inlet, and squeeze the handle to bleed air bubbles out.

You can reverse bleed the piece by going in the master cylinder outlets. Pressure bleeding is similar but done on the vehicle. It forces fluid in at the master cylinder and out through the caliper bleed screws.

When the pedal refuses to lose its sponginess, the best technique is to use a combination of bleeding techniques, such as pressure and reverse bleeding or reverse and vacuum bleeding.

An example of a brake fluid exchange tool that vacuum bleeds is RTI's BFX-2 Brake Fluid Exchange System. This tool works by pushing fluid through the master cylinder, while simultaneously applying vacuum to the appropriate brake bleed screw. Fluid is moved from the master cylinder through the lines and out of the calipers, taking any air out with it. In order to pressurize fluid through the master cylinder without creating a mess, the tool comes with a variety of adapters designed to fit the master cylinders of many makes and models.

Other pressure bleeding tools such as the BrakeMate Brake Flush Machine from Flo-Dynamics address the issue of bleeding sequence. The BrakeMate has a "select sequence" feature that allows the tech to select the desired sequence for flushing as specified by the manufacturer.

The BrakeMate Jr. eliminates suction lines and includes a catch bottle giving the tech the freedom to follow the bleeding sequence. It also has an adjustable regulator to increase supply pressure which is required to bleed hybrids and some high end sport cars.

Brakes may be a profitable part of this business and not too difficult to diagnose. However, intermittent problems and spongy pedals can turn customers off, as brakes are one of the most important items on a vehicle. To maintain a good reputation and have no comebacks, the right tools are necessary. ■



The vacuum/pressure pump kit, No. MVP 5000, from Matco Tools can be used to bleed vehicles by sucking fluid out. For information on this product, go to www.VehicleServicePros.com/10877963.