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Exhaust System Maintenance

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The sign says "DIP." And it's not advertising a samba school--there's a dip in the pavement large enough to lose a first-grader in.

You touch the brakes lightly to keep from spilling your java as you traverse it. But there's a sudden graunching noise from under your car, followed by the scream as about a gallon of fast-food coffee flenses the skin from your thigh. You pull over to inspect your leg and the underside of your car, in that order. There are big, hot chunks of metal hanging loose under your chassis, and the exhaust system is nearly dragging.

Today's exhaust systems consist of a lot of expensive parts. There are one or more catalysts, an oxygen sensor, maybe even a 2-stage muffler. There's piping that's not only shaped to clear underbody lines, but also may be made of premium metals, in some cases dual-wall tubing. There are sheetmetal underbody heat shields to prevent the exhaust from igniting dry grass.

What's holding everything together? A few clamp joints and some welds. What's holding everything up? A few pieces of rubber with some brackets. What's keeping everything aligned? Those same few pieces of rubber and brackets. Failures are common and they range from cracked rubber to failed welds.

Before you suffer the same expensive fate we described earlier, take time to perform a regular underbody inspection--it's easy. To get started, jack up the car and support it on safety stands front and rear. Now you're ready for an in-depth look.

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Springs on the bolts at the joint at the base of the headpipe allow the exhaust system to flex slightly as the engine moves on its mounts. Replace broken or sacked-out springs to prevent a leak.

Hangers

If any hanger is broken, it has to be replaced, without delay--even if the exhaust system seems to be hanging level. One broken hanger means that when the system moves up and down as you drive, a whiplash effect goes through the clamped and welded joints. Eventually clamps loosen and welds crack.

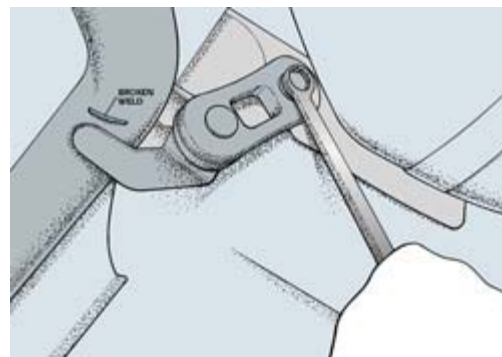
Replacing a broken hanger used to be simple, because most companies used some type that bolted to the body and clamped to some part of the exhaust system. Today, the most popular design uses rods welded to the pipes and, often, to the vehicle underbody. These hangers also have a thick rubber section that resembles a flattened football or beach ball, with holes for a rod at each apex of the rubber. Welding positively locates all the parts, and although you may have to tug and pry, replacing the rubber piece when it becomes cracked is very straightforward.

You can install a brand-new pipe if the rod comes off the pipe, but if the pipe itself is good, that's an unnecessarily tough and expensive replacement. The alternative is to install a universal hanger, though this may require a bit of jury-rigging. First, remove the broken hanger. Then look for a nearby hole, perhaps even from the old hanger.

Take a universal hanger that can twist and tilt and has an adjustable length setup, and attach it to the underbody with a bolt (and if it isn't threaded, also with a nut) through that hole. Next, make the connection around the pipe--a simple clamp and U-bolt usually works. Don't be surprised if a part of the welded-on bracket (from the broken hanger) has to be cut or ground off to provide space for the clamp that will attach to the universal hanger. You should try to make attachments very close to the locations of the original equipment setup. This will maintain system alignment and the balanced hang of the entire system.

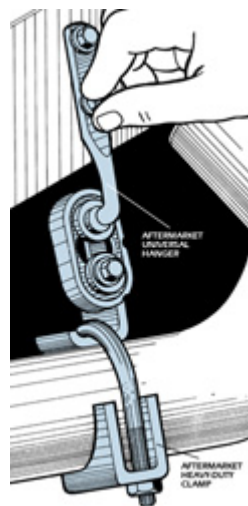
If there is noise from exhaust system contact with the underbody or an underbody part, you should check for damage underneath. Exhaust system clearances are limited, and if you see the need to increase one, it may be possible to bend or shim an original-equipment hanger. If a rod-type hanger is welded in place, see if you can bend it with a piece of pipe over the rod's open end. If you need more than 1/4 in. or so, look for an alternative. If the hanger is a bolt-on to the body, for example, you may be able to install washers as shims.

Some older imports have rubber hangers that resemble thick rubber bands. If the old band has broken off, you can get a replacement, but installing it is not a matter of simply stretching it over the retaining tabs. The band is so thick and stiff you probably will have to pry pretty hard to get it on.



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Tightening a loose clamp won't help if the bracket has broken loose at the weld line.



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Sometimes a universal aftermarket clamp will fill the bill and let you reattach the OEM hanger.

Many exhaust systems have a bracket to provide firm support close to the transmission. If the bracket cracks--or if it was removed for service and never reinstalled--that can account for a lot of exhaust system flex and eventual cracking. If you can't get a replacement bracket, you may be able to get the old cracked one rewelded. But replacement is the best choice, and if the dealer doesn't have it, the wrecking yard may.

Shields

Exhaust system heat shields are prone to damage from driving on rough roads. To avoid the possibility of a grass fire, replace any that are missing or barely hanging on. If a shield is dented, unbolt it, and check the exhaust system for damage.

Exhaust Joints

If there has been a lot of exhaust system up-down travel because of a broken hanger, the clamps and joint may be damaged. If a welded joint is cracked at a muffler or resonator joint, you can replace the parts. Or to save money, cut away the piping and part of the neck joint, then install a short connector pipe and secure it with clamps.

If a clamped joint isn't cracked, but is leaking exhaust gas, remove the old clamp. If the pipe ends are badly distorted, you'll have to rent a pipe expander to reshape them. Otherwise, separate the pipes, sand them to remove any rust, then apply a coat of exhaust pipe sealer.

Reassemble and install a heavy-duty clamp, which can tolerate much more torque, to provide a leak-free joint.

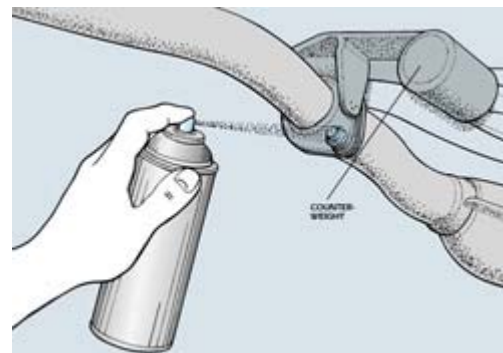
Many systems have a flange joint at the exhaust manifold or at the manifold's Y-pipe. That joint is held together with spring-loaded bolts. The heat may weaken the springs, and the joint will loosen.

Try simply tightening the bolts, but if the springs have cracked or are weak, replace the bolts. They're sold, with new springs, in auto parts stores.

If a flange joint is badly rusted, it's worth trying to free it up with penetrating solvent. Then, take it apart and see if it can be salvaged by sanding it clean, installing a new gasket with sealer and reassembling with new bolts and nuts (drill out rusted studs if necessary). Check at an auto parts store to see if a clamp-over repair fitting is available.

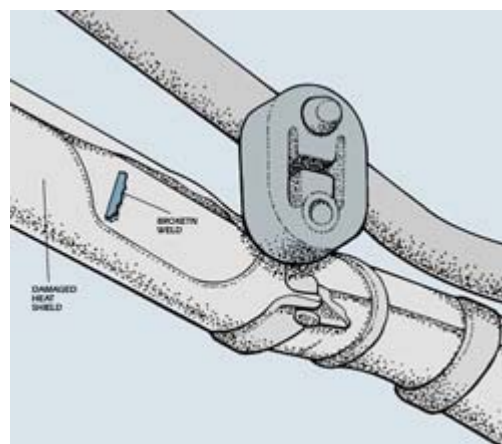
Damper Weights

Some exhaust systems have vibration dampers, which are weights that are attached to a pipe or are part of a flange connection. If a



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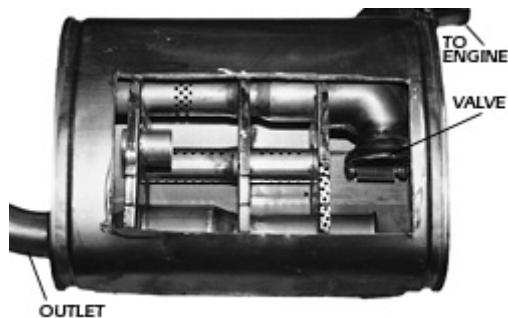
When using replacement parts, be sure to reinstall any original vibration-damping counterweights.



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Heat shields are necessary to prevent grass fires or cooked interior carpets. Check and repair them.

damper weight breaks off or is bent, the exhaust system will vibrate noticeably. This not only makes for an uncomfortable ride, but it can affect the life of welded and clamped joints.



HOW IT WORKS: Muffler

A muffler is a canister with internal tubular passages, shaped in part by baffles, designed to gradually reduce the pulsations of flowing exhaust gas. The slowdown creates back pressure in the exhaust system, all the way back to the engine itself. This slows down the exit of exhaust gas from the engine, reducing its performance. To get around this problem, many high-performance engines increase the exhaust flow with larger mufflers and accept some increase in exhaust system noise as a result. With careful design, however, including the use of silencing materials, the systems can be made to meet legal restrictions. Some back pressure is beneficial at low speed, because slowing down the flow pattern of intake and exhaust gases improves performance somewhat. Many engines have 2-stage mufflers with an internal spring-loaded valve. These mufflers maintain a specified amount of back pressure for good low-speed performance. But when the engine is at higher speed and there's more exhaust gas to flow through the muffler, back pressure builds up. Before it can become excessive, it pushes open the spring-loaded valve, and the gases take a far less restrictive flow through the muffler. This "second stage" permits the engine to develop considerably greater horsepower at higher rpm.

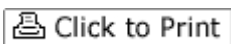
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