

out oil damping, each of your front forks becomes exactly like a child's pogo stick. Try to imagine controlling a bike with two pogo sticks as a front suspension!

### Why They Fail

Once upon a time, one of my job responsibilities was overseeing the maintenance of literally thousands of pieces of "auxiliary equipment" in an eight-story electrical power generating plant. The machinery involved contained no less than 5000 seal-and-bushing arrangements virtually identical to those found in your bike's front forks. Yet despite constant, 24-hour a day use, the failure rate of these seals was less than one in a three-month period. The reason for this was very simple: They were operated in a controlled environment, where there was never any exposure to wind, rain, salt, dirt, dust or sand.

Obviously, the exact opposite is true of your front forks. Not only are they exposed to the elements, they are stuck right out in front of the bike, where we literally drive them at high speeds through every conceivable weather condition possible. Not to mention hammering them with road debris and bugs.

To ensure a proper seal, the shaft, or fork tube in this case, must maintain a perfectly smooth, clean, machined surface on those sections that pass through or come in contact with the seal and bushing. Even the smallest nick or scratch will, after rubbing against the seal's rubber edge several hundred times, abrade the sealing surface and create an opening for oil to leak through. Sand and rocks striking the fork tubes will inevitably create this condition, after which even replacing the seals becomes nothing more than a temporary fix.

Other culprits in damaging the tube surfaces are rust and/or corrosion caused by water and road salt. Along the coastlines of our country, many bikers' favorite thing is to ride alongside the ocean, but the salt spray that feels so good on their faces is tantamount to spraying battery acid on their fork tubes.

Sometimes, you don't even need to damage the fork surfaces to cause damage to the seals. Some of the most common causes of fork seal failure are bugs. More specifically, incredibly thin pieces of insect shells sticking to the fork tube and being carried down into the seal during the compression stroke. Most of these are small enough to get by the dust seal, and some are even thin enough to actually slide under the oil seal and get into the oil bath itself.

The worst of these are the amazingly hard and thin shells of certain beetles and grasshoppers, which are thinner than a human hair and sharper on the edges than a



**The corrosion on this fork tube makes it a sure bet no oil seal will last for long. The simple act of regular cleaning could have saved this owner hundreds of dollars in needed repairs.**

razor blade. These can stick to your fork tubes and, during the up-and-down motion of the tubes, actually slice tiny pieces out of your seals as they go by. The same thing can happen with very fine particles of sand, often carried by even light winds you can encounter when riding through desert areas.

Finally, a significant contributor to fork seal failure that is often overlooked is air pressure. Front forks on many large bikes are air-adjustable, allowing the owner to add or subtract air pressure to vary the stiffness and ride height of his suspension. This air pressure creates an increased load on the seals, trying to force a separation between them and the walls of the tubes and housings. The force exerted against the seals increases dramatically when you hit a bump, compressing the area within the shock tube and thereby compressing the air even more. Very simply put, the higher the

air pressure you run in your forks, the greater the risk of seal failure.

### How To Make Them Last

While you can never totally avoid all the situations that can contribute to fork seal failure, there are a number of things you can do to reduce their effects and prolong the life of your seals.

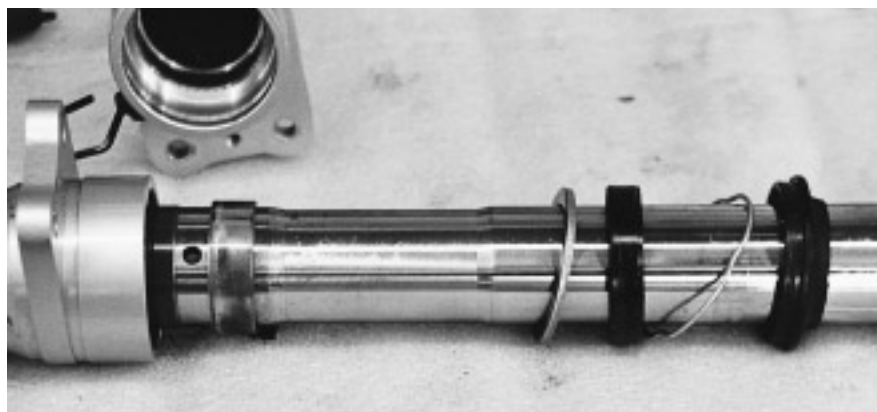
First, and by far the easiest of these, is to run the lowest air pressure possible that still gives you the support you need on bikes equipped with air-adjustable front forks. On most bikes with air-adjustable forks, replacing the OEM springs with stronger, progressive-type springs will eliminate the need to use any air pressure at all. This will give you the best of both worlds: A stronger front suspension, and less likelihood of fork seal failure.

The second, and perhaps most important, thing you can do for your fork seals can be expressed in three little words: Keep them clean! At the end of every ride, or even during rest stops along the road, take a rag and wipe down your fork tubes. The grit, grime and insect parts you remove may be so small you can't even see them, but you will undoubtedly be extending the life of your fork seals.

Another part of keeping your fork seals clean, and one which can also greatly reduce the risk of damaging the tubes themselves, is to thoroughly wash, or at least rinse off, the entire bike—especially the forks—after exposing it to sea air or salt water, or even road salt used for de-icing.

Be sure to regularly check your dust seals to see that they are not damaged in any way or loose in their seats. These are your first line of defense against foreign matter contacting and damaging your seals. Since most dust seal caps sell for around \$5-\$10, while a fork seal overhaul can run you up to \$400, it's pretty cheap insurance.

But by far the most effective method of preventing both fork tube damage and the



**From right to left: The dust cap, the stopper ring, the oil seal, the backup ring and, just before the housing, the brass slider bushing.**