

## Suspension Adjustments Part 4—Forks

by Dave Moss

Editor's note—This month's article is aimed at riders who frequently work on their own motorcycles. If you have any doubts about your ability to perform the procedures described here, please take your motorcycle to a qualified mechanic.

**T**HERE ARE THREE SETTINGS that can be adjusted on forks—spring preload, rebound damping, and compression damping. Spring preload is the amount of applied load on the fork spring via the adjuster; rebound damping determines the speed at which the fork returns on its upstroke; and compression damping determines the amount of fork travel during the downstroke. Not all forks share the same adjustable features, so consult your owner's manual to see what settings your bike's forks have.

### Spring Preload

As mentioned in last month's article, preload is the amount of load placed on the spring that resides inside the fork tube. In short, more preload reduces the spring's springiness (by compressing it) whereas less preload increases its springiness.

Preload adjustments are always found on the top of the forks and are adjusted using a socket or wrench (Figure 1). In general, turning the adjuster clockwise increases preload while turning it counterclockwise decreases it. The adjusters are usually integrated into the fork cap and are sometimes differentiated by anodized color. The preload adjuster may have adjustment lines machined into it for convenience in comparing the two forks for evenness.

As discussed in last month's article, preload is initially used when setting sag. Sag is the difference between the suspension being fully extended (no rider) and naturally compressed (with rider). If the sag cannot be set correctly using preload, you must install different springs to correct the problem. Trying to compensate for an inadequate spring by adding preload to it will make the front suspension very harsh. When you install new springs, be aware that the OEM preload spacer needs to be cut to the appropriate size, otherwise the spring will have far too much initial preload on it. The goal is to ensure that the preload adjustment is somewhere in the middle of the range to allow you to make adjustments for different riding conditions.

Preload can be manipulated for various riding conditions such as the track, rough roads, or the freeway. For track riding, preload should be added if the front suspension dives excessively during hard braking. A more accurate way of assessing dive is to attach a thin zip tie around the center of the fork slider tube. Make sure that it slides easily but is not sloppy. The zip tie will allow you to see how much of the fork travel you are using. If after a session of riding you see that the zip tie is firmly against the dust scraper or axle casting, then the fork is bottoming out. In that case you need to add more preload, and then check the zip tie again. If the zip tie rests within 5mm of the dust scraper or axle casting, this indicates that you are using almost all of the available fork travel.

On various OEM forks, sometimes what appears to be a preload adjuster is a fork ride height adjuster, so again check your owner's manual. A ride height adjuster can only be used to alter the geometry of the bike by raising or lowering the front ride height. To make the bike turn quicker, remove ride height by turning the adjuster counterclockwise. To make the bike turn slower, add ride height with clockwise rotation.

### Rebound Damping

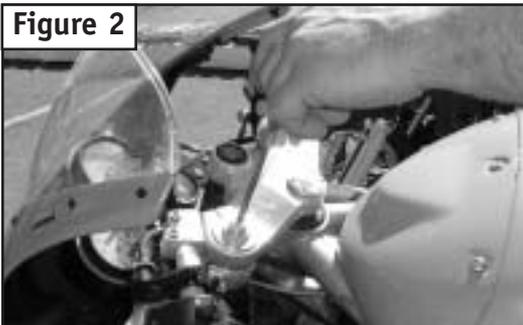
Rebound refers to the fork returning (its upstroke) after being compressed. The rebound damping adjustment controls the speed of this upward motion.

Figure 1



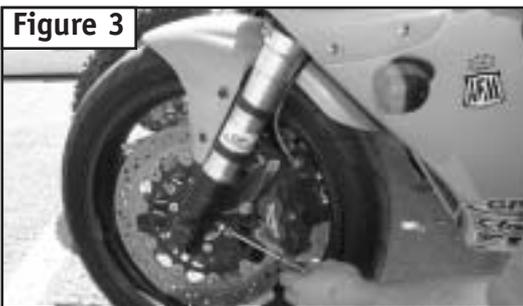
Use an open-end or socket wrench to adjust spring preload. As with all settings, both fork legs need to be set the same. Photos by Dave Moss.

Figure 2



A flat-blade screwdriver is all that's necessary to make rebound damping adjustments on most bikes.

Figure 3



The compression damping adjusters are located near the axle and can be made with a flat-blade screwdriver on most bikes.

The rebound damping adjuster is usually located in the center of the preload adjuster (Figure 2), and usually requires a flat-blade screwdriver to make adjustments. Sometimes the adjustments are measured in clicks, other times in degrees of turn. OEM stock settings are usually in the middle of adjustment.

Turn the rebound damping adjusters clockwise on both forks until they stop. Write down how many turns/clicks this took so that you know where you started. Then take the rebound adjustment counterclockwise all the way out on both forks so that you know how much total adjustment there is. With the adjustment all the way out, fully engage the front brake to lock the wheel then push down vigorously on the forks. *Do not release the front brake while doing this.* As the forks begin their upstroke, let them move naturally and observe the action of the fork. The stroke may come up then go back down, and may even start to come up again (the pogo effect).

Adjust the rebound all the way in on both forks just shy of the end of adjustment, then repeat the pumping action with the front brake fully engaged. The upstroke of the forks will occur much more slowly now. The rebound action should be between these two extremes—the fork should rise to the top of the first rebound stroke and stay there. Work the adjusters on both fork legs until this is achieved, keeping in mind that both fork legs should be set the same.

### Compression Damping

Compression damping manages fork travel during its downward (compression) motion. The compression damping adjusters are usually found on the underside of the fork or above the axle (there should be a hole in the axle to allow you to access the adjuster), or close to the brake calipers at the bottom of the fork (facing the rider, Figure 3). Usually a flat-blade screwdriver is used to make adjustments. Sometimes the adjustments are measured in clicks, other times in degrees of turn. OEM stock settings are usually in the middle of adjustment.

Turn the compression damping adjusters all the way in (clockwise) on both forks and write down how many turns/clicks it took so you know where you started. Turn the compression adjusters all the way out on both forks so that you know how much total adjustment there is. With the adjustment all the way out, fully engage the front brake to lock the wheel then push down vigorously on the forks. *Do not release the front brake while doing this.* With the adjustment all the way out (the least amount of compression), the forks should compress fairly easily.

Adjust the compression all the way in on both forks, then repeat the pumping action with the front brake fully engaged. The forks will not travel as far on the compression stroke and will feel rigid. As opposed to setting the rebound damping, setting the compression damping is subjective—you have to go by feel.

Compression damping should be between these two extremes. The correct compression damping will provide you with the plushness or degree of firmness you need. Once you grasp this concept, you will be able to manipulate the compression damping on the side of the road in just a few seconds to provide you with the suspension travel you need for the environment you are riding in. However, riding on the track requires setting both preload and compression damping in tandem to ensure that the front wheel tracks correctly to the point that it inspires confidence.

### Next Month

Next month's article will discuss suspension adjustments for the rear shock. **FZ**

*Dave Moss started riding in 1974. He currently works with Bay Area Yamaha (formerly Redwood City Yamaha) helping new bike owners set up their bikes as well as providing chassis geometry/suspension classes for customers at the dealership and at track day events with local groups.*