

## Suspension Adjustments, Part 1

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.

A MOTORCYCLE'S SUSPENSION CONSISTS of the front forks and the rear shock(s). Before any suspension adjustments can be made, there are other adjustments that should be tended to first. Adjusting your bike's suspension to fit your body and your riding style will be covered in a series of upcoming articles. This month we will begin with some of the other components that should be checked first—the steering head bearings and the front wheel.

### Steering Head Bearings

The steering stem serves as a pivot for turning the front wheel. It is attached to the fork tubes by means of the upper and lower triple clamps. The steering head bearings position and support the steering stem in the steering head. The bearings should be packed with bearing grease to ensure that they operate correctly. Bearings that won't hold any more grease are considered sufficiently packed. In general they should be checked anywhere from once a month to twice a year depending on the type of riding you do.

You will know when to check the bearings. The steering will clunk during moderate braking and even more so during severe braking. When the bearings have come loose, you will feel the steering stem move back and forth even when applying the brakes and pushing down on the forks when the bike is upright. Even if the bearings are not loose, it is still important to check that they have sufficient grease. Bearings can differ from small OEM plastic races to aftermarket tapered roller bearings.

To check the bearings you should remove the forks and wheel, but you can check them by simply removing the upper triple clamp while leaving the forks securely fastened to the lower triple clamp. Before removing any items, put your bike on its centerstand or a rear stand and use some other support (such as a jack stand on the engine case or under the sump of the engine, Figure 1) that allows the bike to stand securely. Place a support system under the front wheel to keep the wheel and forks from falling forward as you work on the front end (small pieces of 2 x 4 work well).

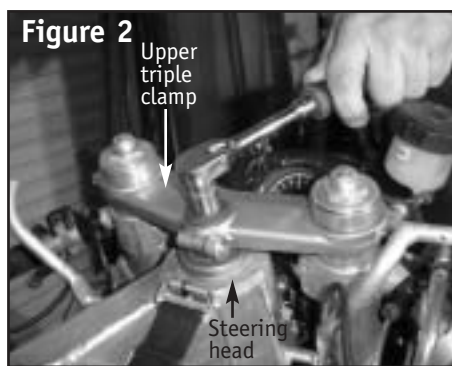
All cables, hoses, master cylinders, and brake calipers must be removed from the forks, triple clamps, and wheel before loosening the upper triple clamp nut on the steering stem (Figure 2). After removing the nut, loosen the pinch bolts that hold the forks in the upper triple clamp and remove the upper triple clamp (Figure 3). This will expose the upper and lower lock rings that hold the upper bearing in place.

Loosen and remove the upper lock ring then slowly loosen and remove the lower lock ring while supporting the lower triple clamp (which still has the fork tubes attached). The upper dust seal can now be removed and the top bearing can be extracted from the top of the steering column (Figure 4).

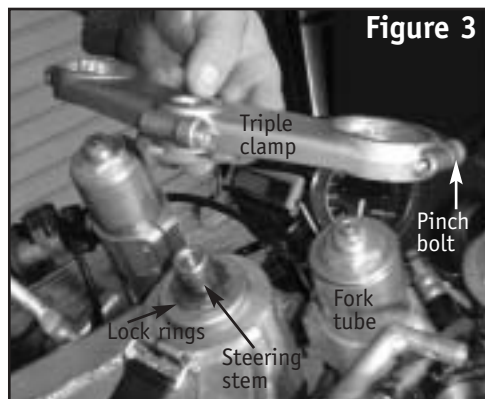
Should you be inspecting an older vintage bike that has loose ball bearings held in place by grease, have several friends and lots of magnets ready. If the bearings are dry they scatter like marbles. I have played 'catch' for my dad several times over the years. It is not quite as much fun putting



**Figure 1**  
Once the forks are loosened/removed, the bike will want to fall forward so make sure it is solidly supported before you start. Photos by Dave Moss.



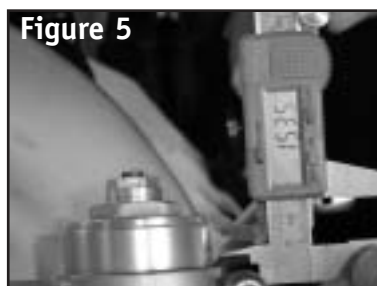
**Figure 2**  
Loosen the upper triple clamp nut on the steering stem.



**Figure 3**  
Remove the upper triple clamp to expose the upper lock ring and steering stem.



**Figure 4**  
Remove the upper and lower lock rings and dust seal, then remove the bearings.



**Figure 5**  
Digital Vernier calipers are used to measure how far the fork tube protrudes above the upper triple clamp.

them back in, but entertaining all the same.

When inspecting the bearings they may be dry, shiny, show some hint of residual grease, or have copious amounts on them. In any event, clean them with a rag and repack them. If you see rust spots or pitting on the bearing surfaces, they should be inspected more closely for corrosion (as should the bearing races in the steering head itself) to evaluate whether they need to be replaced. Check plastic races by cleaning them with a rag and inspecting them for cracks in the plastic. In most cases the lower triple clamp bearing is pressed into place and packed with grease while in position.

To reinstall, seat the lower bearing in the steering head then lift the lower triple clamp (with fork tubes still attached) back into place. Once the lower bearing is seated correctly in the steering head of the frame, the top bearing can be put into place by sliding it over and down the steering stem. The dust seal is placed on top of the bearing.

The lower lock ring (which applies pressure to the steering head bearings) is tightened onto the dust seal until it is snug. A C-wrench (or a carefully-used hammer and large flat-blade screwdriver) can be used to tighten the lower lock ring. As you do this, periodically rotate the lower triple clamp to check for smooth operation from side to side.

If the lower triple clamp feels rough or as though it is dragging, the head bearings are too tight and need to be loosened. In that case, slowly ease the tension on the head bearings until the left-to-right movement becomes smooth. Once the movement is smooth, fit the upper lock ring over the steering head and screw it down until it meets the lower lock ring. Tighten the upper lock ring using a C-wrench (or hammer and large flat-blade screwdriver). Reassembly of the upper triple clamp can now take place.

### Front Wheel Alignment

If the front wheel is out of alignment then the front forks are not exactly even. The effects can range from minimal to blatantly obvious depending on the severity of the fork misalignment. You might notice fork misalignment as tire wear and uneven braking on both rotors (since they are off center). More serious alignment problems can result in a bike that corners well in one direction but wants to tuck the front tire in the opposite direction.

One rule of thumb is that if the axle will not slide easily into place (Ducatis are the exception), then check the forks for accuracy. Alignment should never be a problem unless you remove the forks for servicing or you change the height of the forks in the triple clamps to change the steering geometry.

To check the forks, measure the distance one fork protrudes above the triple clamp and record the measurement in millimeters. (Some forks are flush with the triple clamp, so all that is needed is a straightedge.) You can also use a digital Vernier caliper for more accuracy (Figure 5). Next, measure the other fork. If the measurement is different, loosen the triple clamp pinch bolts and set both forks to the same height. When you are sure of the accuracy, tighten both triple clamp pinch bolts and remeasure.

### Next Month

Next month's article will discuss chain alignment and adjustment and the importance of proper tire pressure. **FZ**

*Dave Moss started riding in 1974. He currently works with Redwood City Yamaha helping new bike owners set up their bikes as well as providing chassis geometry/suspension classes for customers.*