Lowering A Motorcycle

by Dave Moss

Lowering a motorcycle is a necessity for some riders because they have a short inseam, but that's not the only reason for lowering a bike. In SuperMotard racing 30–50 percent of the travel is removed from the forks and shock so the rider can compete. Regardless of the reason why a bike is lowered, it can be done to all types of bikes.

There are three different ways to lower a motorcycle:

1. Shave the seat foam or purchase an aftermarket seat.
2. Lengthen shock linkage arms to lower the seat height and then correspondingly drop the forks an appropriate amount.
3. Internally modify forks and re-buildable shocks to lower the bike while retaining stock geometry.

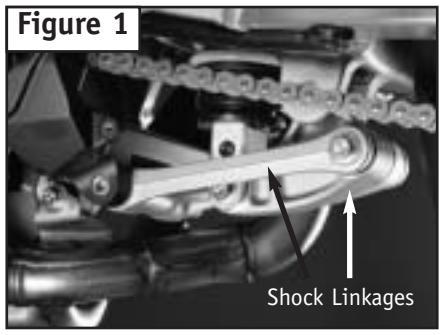

Figure 1

Stock shock linkages can be changed to longer ones to help lower the seat height. Photo courtesy of American Honda.

Change the Seat

The first scenario is by far the most common and easiest to do. There are many specialists that will reconstitute the shape of the seat foam based on the amount of material that needs to be removed and then recover the seat with the original material. The only issue with this option is the potential lack of comfort caused from seat foam removal.

A more expensive option is to purchase an aftermarket seat that has been specifically constructed to be lower than the stock seat. Some aftermarket seats include gel packs as part of the seat construction which can provide a cushion of sorts, and this is obviously a far better option.

Longer Shock Linkages

Using modified shock linkages (commonly referred to as "dog bones", Figure 1) sometimes make it possible for the stock seat to be retained. The longer linkages lower the seat height of the bike by changing the swingarm pivot point angle and shock leverage ratios. The change in seat height needs to be measured accurately because the front forks must be raised through the triple clamps to ensure that the geometry of the bike stays the same. Upside-down forks can be raised or lowered at will, but telescopic forks can only be raised a certain amount as the lower fork leg will eventually hit the lower triple clamp. The biggest net loss in this scenario is ground clearance, but for a great many cruiser and sportbike riders, maximum lean angles are not met on a daily basis.

For most cruiser manufacturers, linkages can be purchased from OEMs as "lowering kits." Cruiser lowering kits are often used to lower the bike by 1–2″. Given the way in which the shock is placed in the chassis, the overall effect is not profound. The only common difficulty in doing this with some cruiser models is that it is hard to get the forks to an appropriate position due to the positioning of the handlebars—they're in the way of the fork tubes (Figure 2). Since cruisers have limited ground clearance (which this process diminishes even further) be prepared for very early grinding of foot pegs and floor boards.

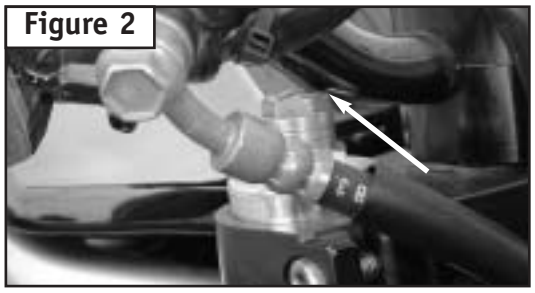

Figure 2

Notice how the top of the fork is touching the handlebar. Certain styles of motorcycles, especially cruisers, make it difficult to change the height of the forks to compensate for changes in seat height. Photo by Dave Moss.

On sportbikes and dirtbikes the dog bones alter the shock leverage ratio. Sportbikes and dirtbikes with more internal and external shock adjustability rely on the design and linkage apparatus to make the shock work at its best. If you change that, then the shock does not work within the same performance parameters and the damping characteristics change considerably.

If the bike is only being used for commuting and touring, there will not be a significant seat-of-the-pants difference (if the suspension is correctly adjusted for sag). You will lose total suspension travel with lowering, but comfort is worth the sacrifice in this case. Should the bike be used on the track or for very spirited riding, there will be a very noticeable difference in overall performance and early grinding of parts due to the reduced clearance.

The most expensive option is to have the forks and shock professionally lowered so that the OEM geometry and seat remain intact. This is done by modifying internal shock components which can only be done if the shock is fully rebuildable. For many cruisers and sportbikes, this is not possible unless you purchase an aftermarket shock or alternate OEM shock to replace the stock unit. If you are doing the latter, the shock must have the same total length from the center of the mounting bolts and must also fit in the allotted space on the bike. For example, the 1999–2002 Suzuki SV650 models can take a 1996–1999 GSX-R750 shock transplant with minor modifications.

Rebuilding Forks and Shocks

In order to lower the forks and shock internally, accurate measurements must be taken. The first assessment for the forks is how much lower the chrome sliding tube needs to be in the lower leg. For the most part you can measure that by compressing the forks and measuring how far the slider tube travels to get the rider's feet in a comfortable position on the floor.

The same applies to the shock. Compress it and measure the amount of travel that needs to be removed. Measure in millimeters for the most accuracy. Make sure that the rider is happy with the amount of contact his foot has with the ground as it is very expensive to go back and do this again.

Once the measurements have been made, the forks and shock are taken completely apart into individual components. New fork springs, which have been selected for the rider's weight, are shortened by the appropriate amount. To take up the gap created by the shorter spring, a spacer can be made from Delron. In the case of cartridge forks, the valving is also changed to compensate for the loss of travel to better manage oil flow. For damping rod forks, some rebound holes can be braised and heavier weight oil added depending on the person's weight. The Delron spacer sits between the fork spring and the top of the damping rod/cartridge and the forks are then put back together.

Shocks are a lot more difficult to work on and require very specialized equipment. Once the shock is disassembled into individual components, a Delron spacer is machined and placed onto the shock shaft. The valving is changed for better hydraulic management and the shock is reassembled. The forks and shock are reinstalled in the stock position and the lowering is complete.

While reworking the suspension is by far the most expensive option, it retains the stock geometry of the bike, retains the OEM seat, has better internal valving for oil management, and has the correct springs installed for the rider's weight. The ultimate benefit is that the bike is lowered to your specifications. You will probably recoup most of your investment when you sell the bike—many other riders are looking for this enhancement. **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.