

Easy Fork Fixes You Can Do At Home

1.The key in the small graphs reads:

SCALE:

Vertical: 10lb./div.

Horizontal: 25in./div.

Frequency: 2 Hz

Displacement: 1.5in./double amplitude

Maximum velocity: 9.4in./sec.

The horizontal bars of the graph are marked "Inch/division", the vertical bars are marked "Compression" above the zero point and "Rebound" below the zero point.

2.The prices are circa 1976 and most of the companies listed don't exist any more.

3.I have no idea what HP-315 fork oil is, the article doesn't specify viscosity.

4.If you read the GT750 conclusion carefully it sounds like they softened up the ride too much! I think the damper mods along with a progressively wound fork spring (from Progressive no less) and the right weight oil might make the whole thing right. What that weight of oil would be, I don't know, start at 5w and work up.

CYCLE WORLD has been dyno testing suspension for about a year now. Our original goal was to analyze the contribution of suspension to overall handling characteristics and then pass that information along to you in our road tests. As we developed our test procedure with Number One Products, curiosity got the best of us. Instead of simply analyzing stock components, we started modifying them in an attempt to correct shortcomings that were being revealed by the routine tests.

We modified street bikes, dirt bikes, anything we could get our hands on. In most cases, we were able to soften up the ride. Occasionally, handling improved with changes in fork and/or shock length and spring rates.

Then it dawned on us. Virtually no one was passing this information on to the consumer, especially as it relates to road machines. Our article on the subject, entitled "Easy Fork Fixes You Can Do At Home." began last month. In it we explained our methodology and modified some popular Yamahas and Kawasakis. This is a continuation of that article and will concern itself with Suzuki and Honda models.

Our intention is to correct the damping rates where necessary and to improve the ride. At anything approaching sane speeds, the softer suspension we are recommending will not affect handling, assuming you have compensated for the increased fork length by sliding the stanchion tubes upward in the triple clamps. For racing, the damper rod modifications we suggest still apply, but higher viscosity oil to raise the damper curve, and an increase in spring rate to handle the increased loading in turns and during braking, will be necessary.

CYCLE WORLD'S TESTING PROCEDURE

Before any modifications were begun, all of the machines chosen were ridden and evaluated for both handling and comfort. Next, each machine was taken to Number One Products and disassembled. HD-315 oil was substituted for stock in the forks. Both the shocks and forks were then dyno tested to determine compression and rebound damping. Springs were evaluated on a separate spring tester. After a brief discussion, forks were modified, spring rates were altered, the bikes were reassembled, and reevaluation began.

INTERPRETING THE CHARTS AND DRAWINGS

Dyno charts presented are identical to the ones in CYCLE WORLD road tests. The important considerations are compression and rebound damping. The rate of compression damping is graphically represented by the area above the zero line. Rebound damping is represented by the area below the zero line. This information, as well as spring rate and travel, also appears in the explanation below each graph.

The drawings represent damper rods and/or other fork components that control the rates of compression and rebound damping. The modified rod is represented in the center and on the right. The actual alterations are described on this drawing to eliminate any confusion when you modify your own bike.

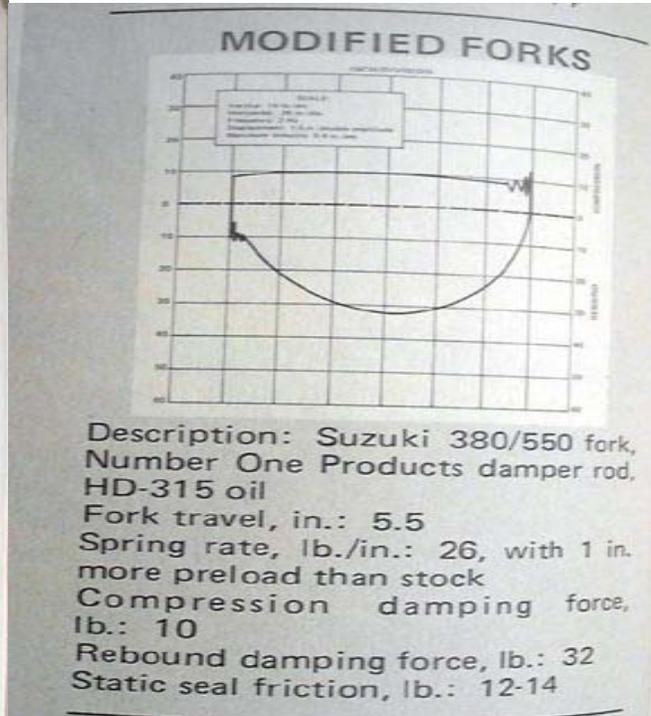
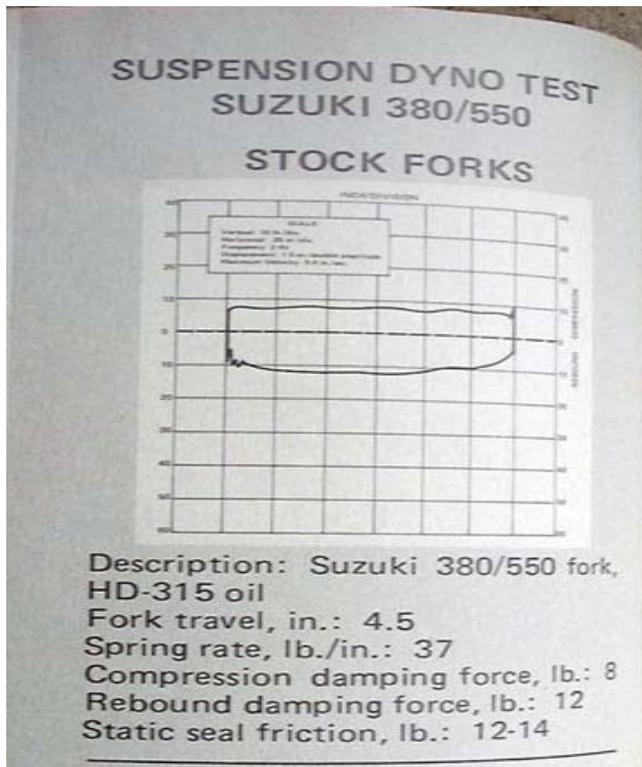
DAMPER ROD REMOVAL AND REINSTALLATION

Before the damper rods can be modified and/or the forks extended, the rods must be removed from both fork legs. The best way to accomplish this is as follows: Place the machine on the center stand and weight the rear until the front wheel comes off the ground. Remove the axle, front wheel, fender, and any brake linkage. With the forks still bolted in the triple clamps, remove the Allen bolts in the bottom of the fork slider. This is located directly above the axle on most machines. With the bolt removed, let the oil drain, then pull down on the slider to remove it from the stanchion tube. Next, loosen the triple-clamp pinch bolts and slide the stanchion tubes downward to remove the upper fork assembly from the motorcycle. Remove the fork cap. Slide out the spring and any spacers. Turn the stanchion tube over and the damper rod should slide out. If it doesn't, you'll have to remove a circlip (present on some models) from the bottom of the damper rod.

Reassembly after the modification is just the opposite. The only tricky part is getting the Allen bolt tight on the bottom of the slider. To accomplish this, it will be necessary to install the fork spring and cap. This keeps the damper rod from turning while the Allen bolt is tightened. Once tight, remove the cap and spring. Add oil until the rod is just covered. With the rod covered in oil, move the slider up and down. If the oil level drops, repeat the procedure until the oil level remains constant and just covers the top of the rod. Reinstall the spring, cap, wheel, etc..., and you're on your way.

SUZUKI 380 AND 550 TRIPLES

Initial Impressions: Except for some cornering clearance problems on early models (the exhaust system was mounted too low); both the Suzuki 380 and 550 are pleasant machines to ride. They have good stability and steer well, so you don't want to alter the geometry; but the ride is harsh in typical Japanese fashion. Rough roads seem to jar the rider and concrete seams on freeways are annoying because the suspension does not react properly to small surface irregularities.



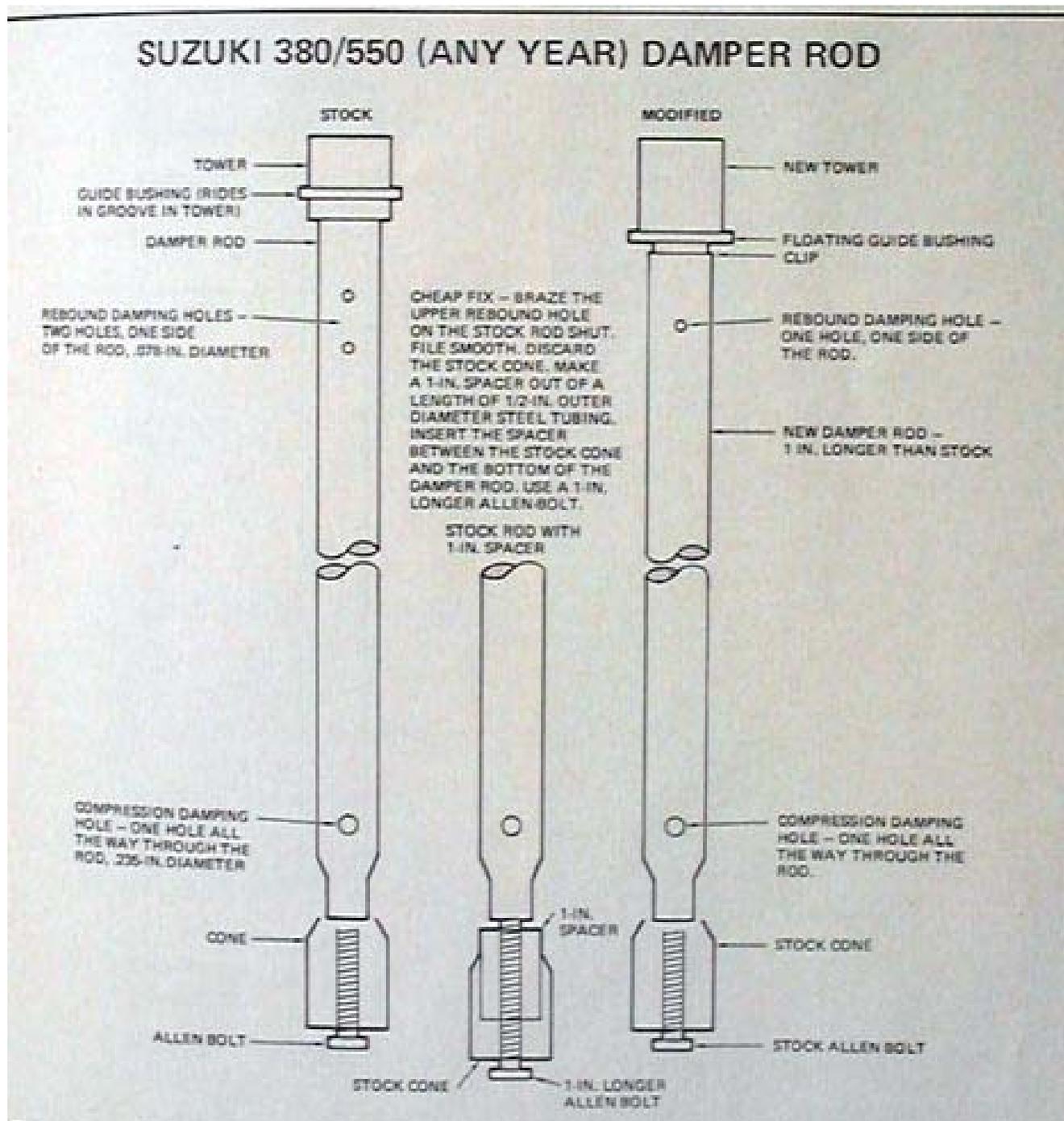
Damper Rod Modifications: Compression damping on the mid-sized Suzukis is fine, but rebound is way too light. Heavier oil is not the way to go because it would increase compression damping as well as rebound. Therefore, the best inexpensive fix is as follows: Clean the stock damper rods in soap and water. Braze the upper rebound hole shut on each rod and file smooth. This will increase rebound damping by roughly 50 percent which is pretty close to what is needed. Travel is marginal as well. To remedy this, make a 1 inch spacer out of a length of ½ inch outer diameter by 5/16 inch inner diameter steel tubing. Insert the spacer in the stock cone and slide the cone back onto the damper rod. Everything is held in place by a 1 inch longer Allen bolt once the slider is reinstalled. It's a good idea to Loc-Tite the Allen bolt to prevent it from working loose. If price is not a major consideration, a 1 inch longer damper rod is available from Number One Products with the damper modifications already performed. The Number One Rod also has a tower and guide bushing design that is superior to the originals. With this rod, the stock Allen bolt and cone is used.

Fork Springs: The stock 37 lb. spring rate is way too high. On the Suzuki, this is the primary reason the forks do not react properly to small bumps in the road. For solo riding or packing double without too much luggage, we found a 26 lb. spring more to our liking for the 380. With this spring, we used a 1 inch spacer under the fork cap to increase preload. On the heavier 550, we recommend a 28 to 30 lb spring.

Suggested Rear Suspension Modification: The damping curve on the stock shocks is not too bad, but the rebound is too heavy. Travel is minimal, which pretty much prohibits use of a more appropriate softer spring. Because of the limitations of the stock shocks, we opted for a set of Konis, part number 76F1307. For both machines we chose 90 lb springs. The weight difference in the bikes can be compensated for by the spring preload adjustment on the shock. Springs can be purchased from Ken Ross, S&W, Koni, or Girling. Boge Mulholland makes a good shock for the 380/550 that is adjustable in terms of compression and rebound damping. The part number is SS1175. Boge recommends 81/100 lb progressive springs for the 380. For the 550, use 90 lb straight wind units.

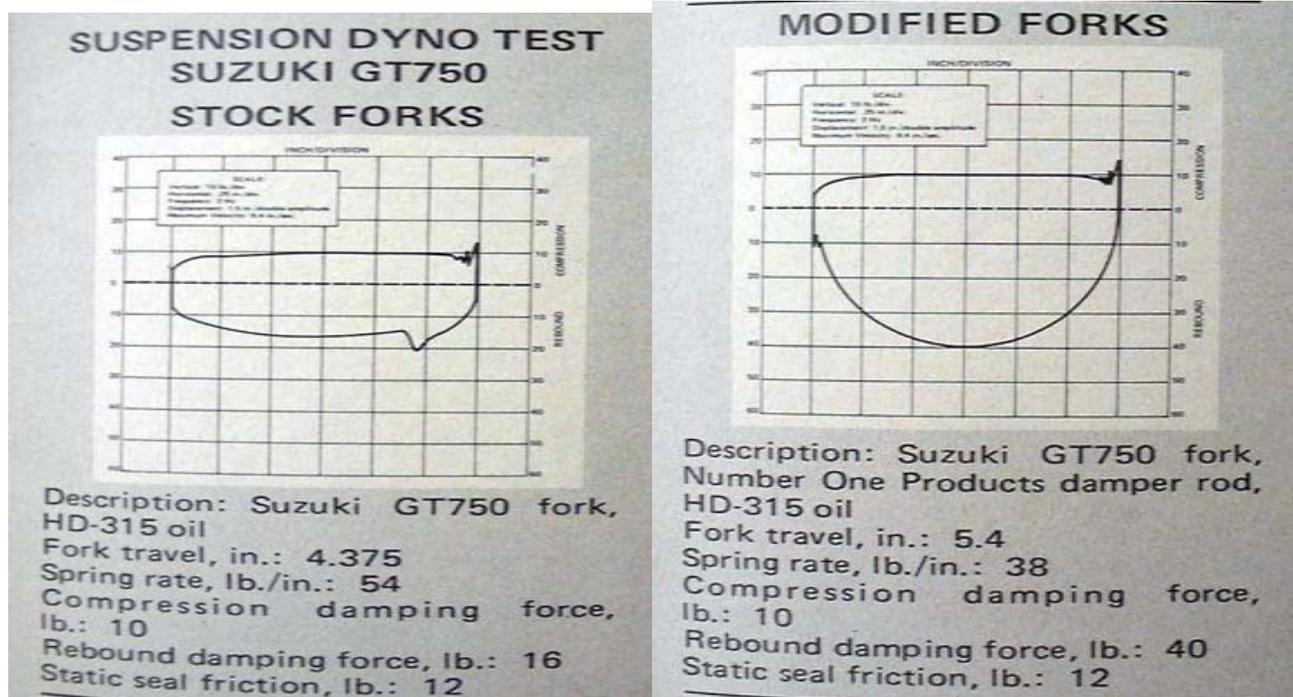
Results and Cost: Altering the damping rates adds marginally to stability, especially in turns on rough roads. Extending the forks for a 1 inch increase in travel also helps the ride, but it is necessary

to slide the forks upward 1 inch in the triple clamps because you don't want to alter the geometry on either the 380 or 550. Modifying the stock damper rods should cost you under \$10; even if you have to have someone else braze the rebound holes shut. If you don't want to do the actual modifications yourself, cost of the Number One Products kit is \$44.95. The kit includes springs. Part number is S380/14 or S550/14 depending on which bike you have. Koni shocks for either bike will cost 434 each. Springs should cost around \$8.40. Either the Konis or the Boges are worthwhile for their greater oil capacity and travel. Boges cost \$59.95 a pair. Springs are another \$16.95.



SUZUKI GT750 TRIPLE

Initial Impressions: The GT750 is a very smooth, very quiet, very heavy motorcycle. Like other Suzuki Triples, the “waterpumper” as it is called steers pretty well, has good stability, and reasonable cornering clearance. It could be a Cadillac as far as touring bikes go if it weren’t hampered by harsh suspension with very limited travel.

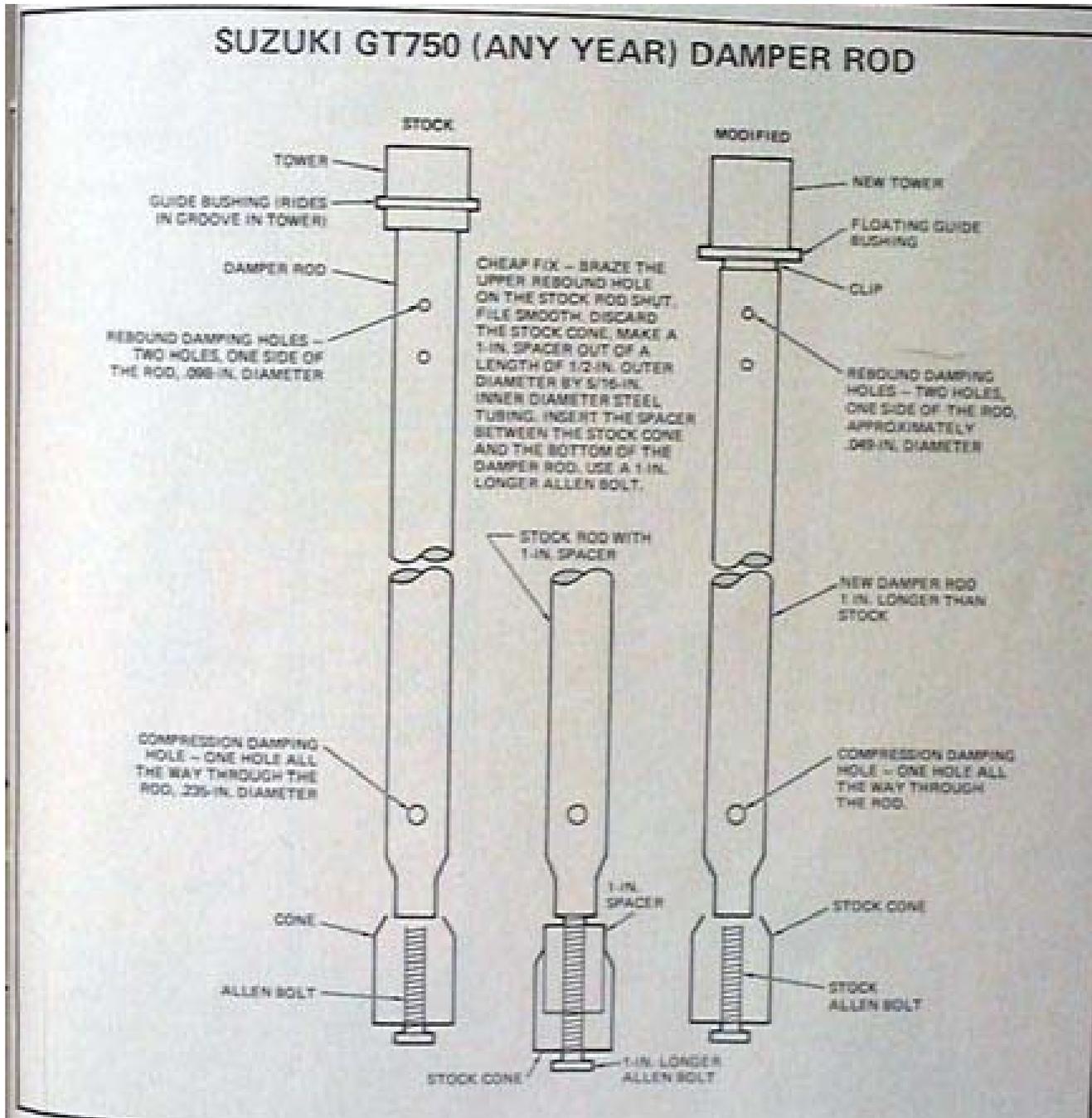


Damper Rod Modifications: First of all 4.3 inches of fork travel is not adequate for good control on rough country roads and it prevents the use of a softer spring which is necessary to improve the ride. Without adequate travel, a softer spring would let the front end bottom easily. The easiest solution is substitution of a 1 inch longer damper rod from Number One Products. As with the smaller Suzukis, this rod corrects damping and offers a superior tower/guide bushing arrangement. If cost is a consideration, fixing the stock damper rods is not difficult. Clean both rods in soap and water. Go to a welding shop and have the top rebound hole brazed shut. File the brazed area down until it blends smoothly with the rest of the rod. Travel can be extended in the same manner as on the other Suzuki triples. Make a 1 inch spacer out of ½ inch O.D. by 5/16 inch I.D. steel tubing. Insert the spacer in the stock cone and slide the cone back on the damper rod. A 1 inch longer Allen bolt holds everything together once the slider is reinstalled. Loc-Tite the Allen bolt.

Fork Springs: We achieved a soft yet controllable ride with a 38 lb. spring. Preload will vary according to rider weight and whether or not your machine is equipped with a fairing, touring bags, etc... If the bike settles more than an inch when you sit on it, you need more preload. The easiest way to achieve it is to insert a spacer under the fork cap. Begin with a ½ inch spacer, then increase it to 1 inch, and so if necessary.

Suggested Rear Suspension Modification: Damping rates aren’t bad on the stock shocks, but travel is again too limited. We recommend replacement with a set of Koni shocks and 120 lb springs. Part number on the appropriate Koni is 76F1307. Springs are available from Ken Ross, S&W, Koni, or Girling. If you prefer shocks that can be altered with respect to both compression and rebound damping, try a pair of Boge Supersports, part number SS1175 and a pair of 110 lb springs.

Results and Cost: Extending the forks and altering the spring rate improved ride a great deal, especially on concrete roads or rough surface streets. We didn't want to alter the geometry so we slid the forks up an inch in the triple clamps to compensate for the additional length required for the 1 inch gain in travel. With Konis in place, handling improved on rougher streets. There is a little wallow in high-speed turns, but not enough to cause alarm. Nose dive increased during braking, but this did not affect braking distance. Except under hard braking, cornering clearance remained the same. Modifying the stock damper rods should cost less than \$10. The complete Number One Products kit with springs goes for \$59.95. Part number for the kit is S750-15. Koni shocks are \$34 each. Plan on an additional \$8.40 for springs. Boge Supersport shocks are \$59 per pair. Springs are another \$16.95. (Number One Products 4931 Encinita Ave. Temple City, CA 91780)



From Cycle World GT500A Road Test

April 1976 Issue

(These suspension dyno tests were performed by Number One Products at the request of the Cycle World staff for each bike tested, ed.)

Suspension Dyno Tests

Front Forks

(In this space there is an oscillograph chart of the rebound/damping characteristics of the front forks...then the following copy:, ed.)

Description: Suzuki GT500 fork with HD315 oil (whatever the heck oil that is, ed.)

Fork travel, in.: 4.25

Spring Rate, lb/in: 50/65 progressive

Compression Damping Force, lb: 9

Rebound Damping Force, lb: 9

Static Seal Friction, lb: 18 (!!!, ed.)

Remarks: Forks are stiff and don't react to rough street surfaces enough to offer much rider comfort. This is due primarily to an inordinately high spring rate. The only saving factor here is that very little preload is used. Still, a 30 lb spring with an inch of preload would drastically improve the ride. Materials used in the fork are good but design is totally ineffective.

Construction is similar to that of an XR75 Honda fork (the damper rod has a slotted top in lieu of holes to control fluid movement). **There is no hydraulic damping until the fork is within one inch of full compression or extension. The only damping present in the middle of the stroke (where the fork works most of the time) is the result of seal friction.** Because of the lack of rebound damping, the fork returns too quickly and top(s out, ed.). Any sudden lifting of the front end following a bump effects steering and causes the bike to wander, especially in turns. Bottoming does not occur because of the high spring rate. There is no easy cure. There are no accessory kits available.

If you are dissatisfied with the front suspension, replacement is the answer. If you consider this approach, stanchion tube diameter is 35 mm.

Rear Shocks

(In this space there is an oscillograph chart of the rebound/damping characteristics of the rear shocks...then the following copy:, ed.)

Description: Suzuki GT500 shock

Shock travel, in.: 2.75

Wheel Travel, in: 3.0

Spring Rate, lb/in: 146

Compression Damping Force, lb: 8

Rebound Damping Force, lb: 92

Remarks: Spring rate is too high for solo riding. The result is a jarring ride. A 110-120 lb. spring with a normal amount of preload would cure this. The standard spring, however, set on the softest preload position, is well suited to riding double (two up, ed.) The ratio between compression and rebound damping is fine, but there is insufficient rebound control for weight of spring fitted. Construction of the shock is marginal, both in materials and in oil capacity. If you enjoy riding fast, we suggest shock replacement. That is the only cure for the high heat buildup and inconsistent damping of the(se, ed.) original equipment (shocks, ed.).

Tests performed at Number One Products

(end of copy, ed. -I don't think Number One is in business any longer but their reports on the suspensions of various bikes are quite enlightening).

Additional selected info from the main test data for the GT500:

Claimed BHP @ RPM: 44.0 @ 6000 Claimed Torque @ RPM, lb-ft: 39.0 @ 5000

Recommended Fuel: Premium (!!!ed.) Curb Weight (w/half tank fuel), lb: 412

Test Conditions:

Barometric Pressure, in. hg: 30.42 (so the old girl was getting enough air, ed.)

Altitude Above Mean Sea Level, ft: 328

Wind Velocity, MPH: 0 (and no adverse winds either, ed.)

Performance:

Top Speed (actual @ 6243 RPM), MPH: 99

Computed Top Speed in fifth gear @ 7000 RPM, MPH: 111

Acceleration, 0 to 60 MPH, sec: 6.0

Standing start quarter mile, sec: 14.31

Terminal Speed, MPH: 89.60

Fuel Consumption, MPG: 40-43

Speedo Error, 60MPH indicated, actually, MPH: 56

(you can get the collected road tests of the various Suzuki models in: Cycle World On Suzuki Street Bikes, 1971-1976 ISBN#: 1 869826 914)