

## CURNUTT SHOCKS facts and rebuild information

1. Install shocks with rods "up".

2. When the rider sits on the machine the shocks should compress from full extension between 3/4" and 1". Three different length springs of the same tension are used, a short, medium and long. The short measures about 10-3/4", the medium about 11-1/4" and the long about 11-3/4". Approximate spring setting for varying rider weights is as follows for 3.7" travel shocks:

Up to 130 lb. Short

130 to 150 lb. Short & 1 ring

150 to 180 lb. Medium

180 to 195 lb. Medium & 1 ring

195 to 215 lb. Long

215 to 230 lb. Long & 1 ring

The adjustments are only approximate for lightweight motorcycles and may vary between machines. Heavyweight machines will vary according to their weight. The only important item to keep in mind is that no matter what type of machine, the 3.7" travel shocks should compress between 3/4" and 1". The 4.7" travel shocks should compress from full extension between 1-3/4" to 2". The variation in spring adjustment for the 4.7" travel shocks is changed so much from one machine to another that an approximate breakdown is not practical. Again the important item regardless of machine type is that they compress from full extension 1-3/4" to 2". On both models "Bottoming" will occur if pre-load is too light and "Topping" will occur if pre-load is too heavy. To obtain proper spring adjustment spacers under the bottom of the spring may be necessary. Spacers are available from us, but another convenient source is a 1-1/2" harness ring which may be purchased at most hardware stores. It may sometimes be referred to as a 1-1/2" Japanned ring. Both will work effectively. One 1/4" ring adjusts for about 25 lbs. The 3/4" - 1" or 1-3/4" to 2" adjustments can be met by the use of these spacers. Any adjustments should be made after a few hours of riding. When shocks are new they may possibly feel tight and tend to stick slightly. This is completely normal and is caused by tight seals and "O" rings. This condition should only last a few hours and diminish as the shocks are broken in.

3. Riding the bike with the shocks installed is the only way, to test the shocks. "Push down" and "Sit down" tests will be confusing. The Curnutt shock tested in this manner will exhibit the characteristics of a conventional shock that is worn out. If the bike is pushed down abruptly, it will rebound seemingly as if there was no damping. This is normal. Ride them to try them.

4. The "down damping" of the Curnutt Shock varies according to the make, and model of the machine they were intended to be used on. They cannot be used on other machines unless the damping is correct. The damping is controlled by orifices in the piston of the shock. By placing the correct piston (or damping orifices) the shock can be used on any machine. On heavier or lighter machines the pre-load of the spring will have to be re-adjusted (#2). The length of the unit can be changed by replacing the top extensions on the top of the rod, with extensions of desired length. These extensions are threaded onto the rod. Piston, extension etc. can be purchased separately from us.

### CURNUTT SHOCK ABSORBER

The Curnutt Shock Absorber is a new idea in suspension control. Using a damping system, which is a radical departure from that of conventional units, the units provide superior control through rough terrain. Traction is improved in that the wheel spends more time on the ground. "Pump Down" and "Spring Sack" is virtually eliminated.

The rods are 1/2 inch diameter Stainless Steel, and the body and eye attachments are Chrome moly (4130) alloy steel. High strength Aluminum Alloy is used for the spring keepers, the seal retainers, and the pistons. Every attempt has been made in the design and construction of the Curnutt Shock Absorber to produce a unit that is high in quality and high in strength.

The units are available in lengths from 11.9" to 15.4" in 1/2" increments. From 11.9" to 13.4" the unit has a travel of 3.7". From 13.9" to 15.4" the unit has a travel of 4.7".

In a sense, the Curnutt Shock is "Custom Made". Units can be used only on the machine that they were set up for. When a set of shocks are ordered, the make and model of the machine, and the weight of the rider are factors in determining what shock will be furnished. The make and model of the machine

determine the internal damping, and the weight of the rider determines the length (pre-load) of the spring. (The make and model of the machine also determine the length of the shock).

The units are all basically the same, and can be changed to fit any machine by changing the pistons (orifices) and extensions on the rod (length). Springs are furnished in three lengths short, medium and, long. The length that is used is determined by the rider's weight, and the weight characteristics of the machine.

The Curnutt Shock is completely rebuildable, using stock American manufactured "O" rings and seals. The hydraulic fluid is Automatic Transmission Fluid, type A.

The springs that are used have a progressive rate of about 45-65 lb/inch. The springs are stressed so lightly that spring sacking does not occur. The life of the spring is indefinite, limited only by the wear against the body of the shock.

The price of the 3.7" travel shock is \$39. 50/pair complete with springs. The price of the 4.7" travel shock is \$44. 50/pair complete with springs.

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#### PERFORMANCE TIPS

1. Shocks should compress 3/4" to 1" from full extension when rider is sitting on machine in normal riding position. Settling should be checked after shocks have had time to loosen up, say two hours riding time. Should shock compress more than one inch, bottoming may occur. If they settle less than 3/4", topping out might occur. One inch is preferable for desert where 3/4" is better for moto-cross.

2. Shocks should not bottom or top excessively.

3. To test shock, smear grease or oil, anything that will collect dust, on shock rod. This is to leave a record of how far the shock is traveling. Now ride across rough terrain as hard and fast as you would under racing conditions. Avoid any large dips or anything that may cause "G" load bottoming. Shocks should then be examined. Dust mark on the rod should indicate that shocks have been using their full travel, wiping clean to within 1/8" from top of rod. No bottoming should have been noticed by the rider. If they meet these requirements, shocks are adjusted perfectly for the particular machine and rider combination. If shocks had been obviously bottoming, and settling was within the advisable range, this would indicate heavier down damping is necessary. Should they show that they have not used all of their travel by possibly 1/2" to 1", they are too heavily down damped and should be lightened up for maximum performance. This can be done by the individual or by us. There are orifices inside that must be changed a certain amount. If this is attempted by the individual, special instructions should be obtained from us. After test, grease or oil should be cleaned from around seal.

#### PREVENTATIVE MAINTENANCE

1. Keep clean around seal.

2. If riding under muddy conditions is done, care would be advisable to keep the shock relatively clean. Should it be a hot day and time between races is sufficient for mud to harden, extreme care should be exercised to clean mud from around top of rod. Mud may collect and possibly harden in this area causing possible damage to seal the next time the shock uses its travel.

3. If springs are taken off, avoid scratching the rod. Any scratches on the rod will cause leakage.

4. If leakage occurs for any reason, shocks should be rebuilt immediately. Shocks leaking within two months from date of purchase are considered defective and will be repaired at no charge. This excludes damage from crashes or tampering with unit. If they are not rebuilt immediately, unnecessary wear to the internals of the shock will occur making what could have been an inexpensive repair considerably more costly.

5. If shocks are used constantly for racing, re-building every 4 to 6 months would be advisable even though leakage may not occur. Shock fluid breaks down and the "O" rings may wear making a periodic rebuild to your advantage. If this

is done, it is very possible that one set of shocks could last indefinitely for only a few dollars per year.

6. Grommets in shock should be checked regularly. If they are in bad shape, type tubing used is 5/8 x. 7/8 vinyl tubing which can be inexpensively purchased at most hardwares.

7. To prevent squeaking of shock and improve shock and spring life, WD-40, silicon sprays, coloidal graphite, or any good lubricant can be put on the body of the shock. Care should be taken not to get lubricant on top of seal causing attraction of dust and dirt to seal area.

8. Exhaust pipes should. not be mounted as to direct exhaust gases onto the shock.

9. Items that may cause leakage include: defective or worn seals, small "O" ring defective or worn, worn or scratched rod, excessively worn top seal assembly (bearing on rod.).

10. Seals in the unit are Chicago Rawhide No. CR 4985, small "O" ring is a standard commercial type 3/32 x 1/2 x 11/16, large "O" ring is standard commercial type 1/8 x 1-1/8 x 1-3/8.

### REBUILDING CURNUTT SHOCK

1. Remove spring from shock. Care should be taken in removing springs to not scratch the rod. If a screwdriver or any sharp object is used, keep it away from rod.

2. Remove grommets from shock. The metal insert will press out of the plastic grommet material.

3. Place' the eye of the shock body in a vise making sure that it is held firmly in the jaws with the lower flange of the body resting on the top of the vise jaws. (This is to avoid leverage on the eye.)

4. With pin spanner or strap wrench remove aluminum seal unit. (Right hand threads used throughout the shock.) Withdraw rod, piston and seal retainer/bearing, as a unit, from shock body. Care must be taken not to mar top surface of shock body, as this is a critical sealing surface.

5. Place upper eye in vise and remove piston with a strap wrench or other suitable tool, taking care not to damage piston. The upper eye may unscrew from the rod instead of the piston, but this does not matter as far as rebuilding goes.

6. When rod is free from eye or piston remove seal unit from shaft.

7. Seal description:

There are two types of seals used in the sealing unit. Type one is a Chicago Rawhide 4985 seal which is a black seal 1" in diameter. It is distinguished by the rubber of the seal extending to within 1/16" of the seal edge. Type two is an Anchor Packing seal which is distinguished by there being a out 1/16" of rubber visible next to the shaft. This seal is 'encased in an aluminum retainer which is then pressed into the seal unit.

8. To remove type one place body of shock in vise as before. Screw seal unit into body 3 or 4 turns. (This is a convenient way to hold seal unit while seal is removed.) Press flat of a sturdy screwdriver under lip of seal. Press in as far as possible. Pry~ against top of the seal unit and seal will pop out. Next remove "O" ring by using a straight pin (scriber, etc.). Push point into "O" ring taking care not to damage sides of "O" ring grooves. Clean "O" ring groove carefully.

9. Place new "O" ring into seal unit. Install new seal.

10. To remove type two it will not be necessary to remove entire seal unit as in type one. With a pair of needle nose pliers carefully pull rubber portions of seal from seal retainer, being careful not to scratch or destroy aluminum seal holder. The rubber portion is not bonded in so removal should not be too difficult. With seals and "O" ring removed from seal retainer/bearing, the unit should then be checked for wear. If units have not leaked at all prior to rebuild the chances are no wear will have occurred. But if shocks have been used while leaking wear is almost certain.

11. To check for wear, place rod in seal retainer/bearing to where threaded shoulder (where threads end and shaft begins) is flush with the bottom of the retainer bearing. At this time when moved back and forth

the maximum measureable deflection of the rod at top should be 1/16. If deflection is below this figure seal retainer/bearing is useable. Any deflection exceeding this shows that unit has worn to the point that replacement will be necessary. Replacing seals in a worn unit will lead to further leakage and wasting of seals. A new seal unit checked in this manner will show about 1/32" deflection.

12. When seals are removed clean thoroughly and replace seals in the position they came out. Seals should be put in as an "O" ring would be inserted.

13. When replacing Chicago Rawhide seal (type one) with Anchor Packing (type two) a small amount of Permatex or satisfactory sealant should be placed on surface that seal is being pressed into. Seal is then pressed in with beveled edge toward the top. Small amount of ATE should be placed into seal to prevent seal from sticking initially.

14. Checking rods for wear:

If shocks have been leaking for any period of time rod should be checked for wear. Rod lower tolerance is .498. Any rods measuring under this figure will in most cases cause trouble. Rod finish is very important to the life of the seal. If scratches~7 holes or irregularities occur seal life will be impaired. Rod polishing is an effective means of returning a good rod finish. This can be done by carefully placing rod threads in the jaw of a drill press. With drill press running polish up and down rod with 400 to 600 grit sand paper until rod is once again smooth and shiny. When polish is complete, rod size should then be checked. Any rod bent or scratched noticeably should be replaced.

15. When reassembling damper unit assembly should consist of top extension-eye, seal retainer/bearing, flat washer, valve (groove facing flat washer) and piston, with groove upward. "O" ring on piston should be replaced. Hold eye in vise and using strap wrench as before tighten to at least 45 ft. lbs. Before rod is put through seal retainer/bearing ATF should be wiped or poured into seal to provide lubrication and prevent seal from sticking initially.

16. Body of shock should be cleaned thoroughly with soap and water before assembly. Small amount of Permatex should be put on sealing surface of body.. Now put body in a vise as before by holding lower eye. Fill to within 1" of top with Automatic Transmission Fluid type A. Replace damper unit. As seal retainer/bearing is tightened down push rod to the down position to displace excess fluid. Tighten down lightly. Remove shock from vise and place in boiling water and allow to heat for at least 10 minutes. This will cause oil to expand. Replace shock in vise holding as before and loosen seal retainer/bearing 1/4 turn, again press rod to fully compressed position. This will cause excess oil, which was expanded by heating, to bleed out. Replace grommets, inserts and spring. The shock is now ready for use.

#### "TYPE 2 SEAL"

The Curnutt Shock is now guaranteed for a period of six months from date of purchase against seal leakage. Any unit leaking within this period that has not been worked on by purchaser will be replaced at no charge.

To remove type 2 seal the use of a drill press or suitable press will be necessary. When shock is completely dis-assembled the seal retainer/ bearing with "O" ring removed should be threaded into body of shock to within 1/8 of turn of being bottomed. Removing "O" ring is of extreme importance, as seal removal will be impossible by this method with it in place.. At this time fill shock with water through hole in seal until full. Take rod and insert through seal into shock unit until 4" of rod is remaining out of unit. Water will bleed out as rod is pressed in. Seal retainer/bearing should now be tightened onto body. Now with unit full of water and rod in place, put lower flange of shock bottom onto drill press table so as eye and flange will not slip easily. By placing a small block of wood on either side of eye to support flange this can be accomplished. Now place shock rod under drill press chuck so as pressure may be applied using drill press to simulate an arbor press in order to force rod into unit. Applying gradual pressure will cause pressure to build in shock until aluminum seal retainer and seals, as a unit, will pop out. After being cleaned and checked for wear the seal retainer! bearing is now ready to accept new seal and "O" ring.