

DIALING IN YOUR FORKS

Do it like the pros

By Rick Sieman, with special thanks to Ed Scheidler, who really has his act together

Ahh, forks! Simple little tubes sliding inside of each other, with a wheel at one end and a set of bars at the other end. Perhaps a spring or two in the hollow part and some oil to ease the sliding. Lock it all in place with fork caps and maybe spritz some air in each leg to keep the whole works from bottoming.

And, that's it. Right?

Wrong, Butch.

Chances are, if you're the average rider, your forks are working at less than their best. With some fine tuning, basic understanding of what's going on in there, and the willingness to mess around with oils of various persuasions, you can end up with a primo set of suspenders.

We spend a great deal of time dialing in the forks on new bikes. Even a bike with a very good suspension can often be improved by a simple change in the fork's oil level. What we're going to do is let you in on the tips, tricks and secrets that we've picked up over the years. And, if you want to take the time to experiment on your forks after you read this stuff, chances are you'll end up with a superior set of front suspenders.

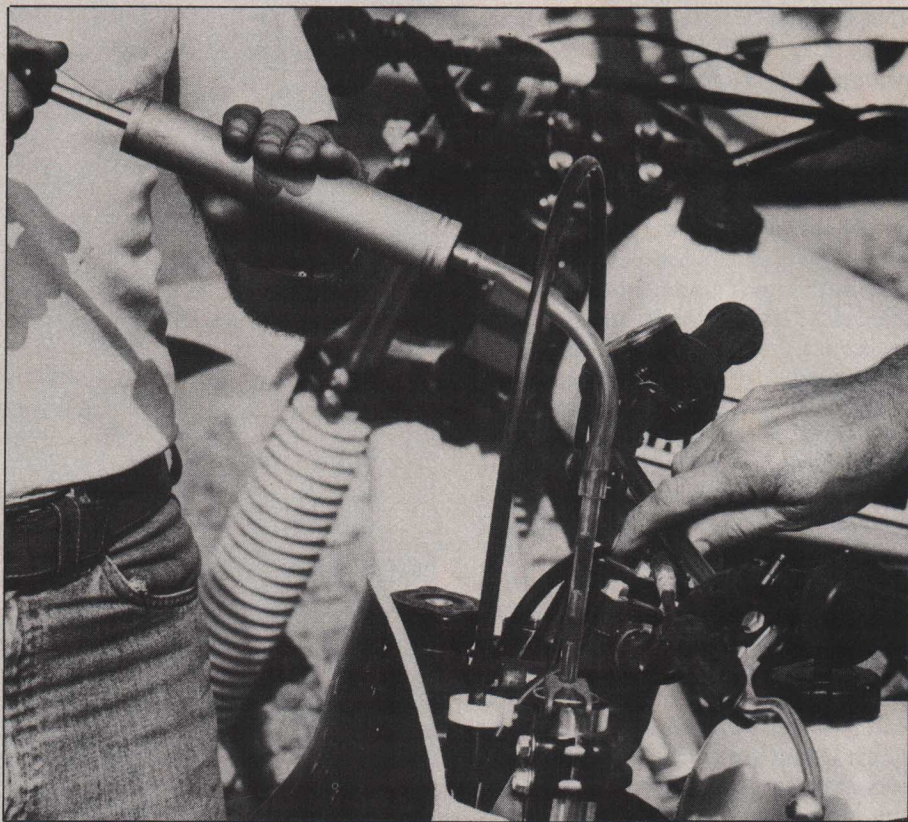
Basics: What goes on in those tubes, anyhow?

Surprisingly little, to tell the truth. Engineers would have you believe that extremely complex mechanisms control the ebb and flow of the oil. Hmmmph. Wrong-o. The best forks, in our opinion, are the ones with very simple valving.

But, we're getting ahead of ourselves.

First, when a fork hits a bump and gets shorter, that's called the compression stroke. So whenever you read the term "compression damping," all that means is the way in which the oil "damps," or helps slow down the compression stroke. By the way, the correct word is "damping," not "dampening."

When the fork starts to extend out, or return, that's called the rebound



An oil level gauge will make tuning much easier. Two spiffy tools: the Yamaha and the Simons oil level gauges.

stroke. That means any effect the oil in the fork legs might have on this stroke will be called rebound damping.

Without any oil in your forks the action would be so jouncy and uncontrolled that the forks would bounce down the trail like a basketball. You want to see how this feels? Easy. Bounce your forks up and down in the garage a few times. Just squeeze the front brake on firmly and pump on the bars. Now, drain the fork oil out of the legs and once again pump the bars up and down. You can easily get the front tire to bounce off the ground.

That should tell you that the oil in those legs slows things down and turns an otherwise uncontrolled bounce into a smooth, controlled stroke. Naturally, you can change the characteristics of your forks by changing the oil, but we'll get into that later.

Springs and things

All modern forks have springs in them. Heavy springs offer more resistance on that compression stroke we talked about earlier. Lighter springs, obviously, give less resistance and a softer stroke. Most manufacturers of-

fer both lighter and heavier springs than what comes stock in your bike. If you're a lighter, less aggressive rider, you might be happier with softer springs. If you're fast, aggressive and a two-hundred-pounder, you might be able to go faster with stouter springs. But for now, leave those stock springs alone. There are plenty of no-cost and low-cost adjustments you can make before you pop for accessory springs.

Air: The other spring

Chances are your bike has air caps on the forks. This means that you can pump in yet another spring. Air, trapped in a fork leg, is a very effective spring. But, you must know how and when to use it intelligently. With various oils, springs, levels and air pressures as options, you have an almost dizzying range of adjustments on a modern fork.

Before you start . . .

Don't even try to tune the forks if everything isn't in good shape. If the fork seals are leaking, replace them before you read another word.

If the springs are sacked (sagging badly), you must start with a healthy

Available in blue or red. One size fits all.



Available in blue or red. One size fits all.



Available in red, blue and tan.



A perfect combination from top to bottom.

Flash 'em your true colors—join the Action Team

CAPS—The perfect fit for all seasons. One size fits all.

WALLETS—Strong, durable, brilliant colors, holds all kinds of money. Special see-through plastic card holder included. Don't delay. Order now!

I CAN'T WAIT—SEND ME:

MOTOCROSS ACTION Wallet: RED TAN BLUE
DIRT BIKE Wallet: RED TAN BLUE
 \$7.95 each plus \$1.50 postage and handling.

MOTOCROSS ACTION Cap: RED BLUE
DIRT BIKE Cap: RED BLUE
 \$6.95 each plus \$1.50 postage and handling.

NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

Make checks (U.S. funds) payable to **Plus Products**, Box 14945, Las Vegas, Nevada 89114

Canadian add \$1, other foreign add \$2 (U.S. funds).

DB6-1

set of springs. It's easy to tell if those springs are in poor shape. Hold the bike upright and pump the forks a few times. Note where the forks settle. Then, pull up on the bars. If you can make the forks extend more than an inch or two, chances are your springs have gone down the yellow brick road for good.

Most European machines will have fork springs that sack out quicker than the average Japanese bike. If you have more than a year of hard riding on your bike, no matter what the make, chances are that your springs are history.

Be prepared

Before you decide to work on your forks, get everything you'll need and set aside a good half of a day for the experimenting. Get a good selection of quality fork oils. Buy some 5-, 10- and 20-weight oils. Make sure you have a bike stand or a crate that lets you get the front end off the ground. Take along a small funnel, a measuring device of some sort (a baby bottle will work fine and is cheap), a tape measure, an air pump, an accurate air gauge and the tools you'll need to do the job. It also wouldn't hurt to have two or three drain pans. Empty bleach or milk bottles will do fine. No sense wasting oil if it doesn't work out on the first few experiments.

If you can get a good oil level gauge, then by all means, get one. Yamaha makes an excellent device. So does Simons and S&W. These goodies can make your job much easier, and once you use them, they'll probably find a permanent home in your toolbox.

Load 'em up and head on out

Smoke on out to your favorite riding area and allow enough time for a genuine tuning session. Don't try to go out and put in hot laps. You're there to improve your bike. Get serious.

Find a really rough section for the tuning. You won't learn anything on a smooth track. If possible, use something with whoops, stutter-bumps and square-edge ruts. Also, a high jump or two would help things out.

When you get to the track, warm up and then put in some hard riding. Fifteen minutes should be enough for you to get the feel of the forks and to get everything warmed up. Make mental notes on where the forks work best and where they work worst.

Evaluate before you shoot

Don't just whip off your fork caps

DIALING IN YOUR FORKS

and start swapping oils. Figure out what you want from your forks.

Let's say they're too harsh over sharp bumps. This tells you there is too much compression damping. Okay. To use a starting point, let's take an ordinary bike and assume you're using the recommended 10-weight oil that the owner's manual recommends. The logical change would be to go to a 5-weight oil. So, let's...

Jump right in and start to work

Drain out the old fork oil. It's well used, so you can discard it. Let the forks drain completely. To make sure of this, remove the fork caps and springs, and stroke the legs up and down gently. More than likely, a few extra spurts will blow out through the drain holes.



A modern set of forks, like these KYB Yamaha units, allows almost infinite adjustable action.

Screw the drain plugs back in and put in the recommended amount of oil. Now go out and take a few laps over the same sections, and see how things work. Chances are that your forks will be softer and much of the harshness will go away. If the forks are too harsh, you can once again switch to a lighter oil. You can get oil as light as 2½-weight, but we feel that if you have to go below a 5-weight oil, your forks have an inherent flaw in them and you might have to resort to a fork kit.

But let's assume that your forks are now soft and plush. Too plush, to be exact. The action is great, but the front end is diving and you're bottoming easily over jumps.

Don't despair. Pop the bike back up on the crate and remove the fork caps and the fork springs. Now compress

the forks slowly until they're fully bottomed out. If you don't have a friend to help you do this, use a rope or a tie-down to do the job.

Using the tape measure, find out how far the oil level is from the top of the tubes. We've found that six inches from the top of the tubes will be a good starting point for the majority of the bikes we've seen.

Add 10mm of oil to each leg, taking care to get the measurement accurate in each leg. Now go out and ride around again. If the forks are still bottoming, go in, add another 10mm and try it again. We didn't say this was going to be easy, did we?

Keep adding oil until the forks will travel fully. One easy way to check this is to wrap a zip-tie around one fork leg and measure maximum travel. Mark the line and push the zip-tie down before each practice run.

If the forks are still too soft and are not getting full travel, it's time to try adding some air. Go back to the original oil level and add two psi of air. Go out and ride some more. Still bottoming? Add two more psi, and try it again. Then, add 10mm of oil before going much higher on the air.

It'll take some experimenting, but you can normally find the right combination of air pressure and oil level to make you very happy over the bumps.

We try not to use a lot of air whenever possible. Air tends to build up pressure as the forks get hotter. The higher the pressure to begin with, the more radical the pressure rise will be as the forks get worked.

All right. Let's say that your forks are now taking bumps just great. They are not bottoming, you're not using any air at all, and you have the right oil level for your needs; but the forks are "topping out." This merely means that the forks are extending a bit too quickly and there's a metal-to-metal clicking sound as they stretch all the way out.

Here's where you use the old *Dirt Bike* secret of "negative pressure." Sound heavy, eh? Actually, it's simple. Compress the forks as far as you can with the valve cores out of the fork caps; screw the cores back in and let the forks back down. You'll now have a set of forks that will extend easily until they get near full extension, but will virtually run into a partial vacuum. The clicking should go away. If this doesn't solve the problem, then

TONY'S TIRE TIPS



Tony Mills,
Motorcycle Tire
Development Engineer
Dunlop Tire Company

Tip
no.

9

Q.

MOTO-X TIRES FOR ENDURO?

I love off-road riding, especially Enduro. However can I use Motocross tires for Enduro runs?

A.

Sure. In fact, the tire requirements for the two are so similar, you'll have trouble finding a tire designed just for Enduro.

Like Motocross, you should find a set of tires specifically designed for the conditions you'll be riding on. Enduro riding usually offers a little bit of everything — from loose rocks and mud to dry flats. So a good, all-purpose set of tires like Dunlop's K190 IT rear and K290 front are ideal.

If you do most of your riding in the West, where conditions run consistently dry and hard, try the Dunlop K88 HT rear and K290 front combination. The K88 HT has the low profile and wide footprint you need. Plus, the soft compound tread gives you a sticky bite in the tightest leans.

In the East, conditions can get downright messy. Wet, oily conditions require tires with more surface area. Dunlop's K88 ST rear and K190 front are perfect solutions. Both feature a hard compound tread with tall knobs in an open pattern, allowing you to cut through the soft stuff without clogging your tread.

DUNLOP

P.O. Box 1109
Buffalo, NY 14240
(716) 879-8200

More cycles ride on Dunlop than any other tire in the world.

DIALING IN YOUR FORKS

you'll be forced to make some "recipes."

Custom blends

You know that 10-weight oil is too thick and 5-weight is too thin. No one makes a 7½-weight oil, but you can. If you take half 5-weight and half 10-weight, you end up, effectively, with a 7½-weight oil. By using simple math, you can just about custom blend any weight fork oil you want. Of course, if you feel that you simply must have a 6.25-weight oil, don't call us. Get out your calculator and do your own math.

Naturally, if you change to another weight oil at this point, you'll have to start from scratch all over again, using the basic oil level as the starting point. Then, patiently, add 10mm to the level and ride after each and every change.

If this all seems like a lot of work to you, then consider the fact that we've seen Dick Burselson change his fork oil a dozen times the day before an enduro, just to get his bike dialed in to the terrain. His record of seven national enduro championships can be partly attributed to his patience in things like this. Can you accept anything less?



Get a good selection of fork oils, at least one weight up and down from what your owner's manual recommends.

Why does the oil level affect things so much?

How can 10 lousy millimeters, more or less, of oil change the action of your forks so much? Simple. Consider that the action inside a fork is much like a piston in an engine. The piston rises up, and as it does, tries to squash a quanti-

ty of air into nothingness.

If you have a piston with a 7½ to 1 compression ratio, it'll compress the charge in the combustion chamber fairly easily. Slip in a 12 to 1 piston, and you have another matter entirely. As the piston nears top dead center, it has to compress a charge in a much smaller space than it did at 7½ to 1.

This means that by changing the volume of air in relation to the total stroke, you can make the forks firm up exactly where you want them to.

You *can* have a set of forks that are mushy and super soft on the first part of the travel and very firm on the last few inches. Or, if you're going to be riding in a slow, choppy enduro, you can make the forks soft the whole way through. It's simply a matter of what you want.

Patience, puh-leeze

As you can see, dialing in your forks not only takes patience, but it also takes the ability to get familiar with what each and every minor change will do. Savvy riders keep a record of oil levels, weights and pressures in their

(continued on page 66)

CASTRE ... MAXIMUM PROTECTION FOR THE MX WARS!

Protect your hands and eyes. Wear the best gloves and goggles, CASTRE! Best protection. Best selection. Best quality. Best prices. CASTRE ... the best ... period!!



C-8000
HOT-CROSS
GLOVE
\$27.95

C-8700
JUNIOR
HOT-CROSS
GLOVE
\$14.95



C-8900
WARRIOR
MX WARS
GLOVE
\$29.95



C-3000
CROSS
COUNTRY GLOVE
\$26.95

... Castre Gloves are Superior—
Cycle World™
Feb. 1981

ORDER BLANK

Please send the following post-paid items to:

Name _____
Address _____
City _____ State _____ Zip _____

A. Official Castre T-Shirt of the finest quality blend of 50% cotton and 50% polyester. Blue with white lettering **\$5.00**

B. Blue and White Official Castre nylon mesh cap with silver and blue embroidered patch. **\$5.00**

C. Castre Patch and two blue and white Castre Stickers. **\$2.00**

TOTAL

CAP @ \$5.00
(One size fits all)
QUAN. _____



PATCH, 2 STICKERS @ \$2.00
(Pa. residents please add 6% sales tax.)
QUAN. _____

T-SHIRT @ \$5.00
QUAN. _____



Small _____
Med. _____
Large _____
X-Lrg. _____

CASTRE
CASTRE, INC.
836 Flory Mill Road
Lancaster, Penna. 17601

Excalibur INDUSTRIES INC.

TOLL-FREE NUMBER 800-526-0736

In N.J. and CUSTOMER SERVICE

call (201)-362-9275

SATISFACTION GUARANTEED!

EXCALIBUR CHEST PROTECTOR
Red/White
Bk/Yellow \$59.95
Blue/Yellow

PLAIN JERSEYS
R/W/B, Rd/Wh, BI/YI, Bk/YI, BI/YI/Wh, Rd/BI \$15.95
Sizes: Adult-S,M,L,XL
Children-S,M,L

DELUXE MX NYLONS w/ removable knee pads, liner, inside pocket, padded hips & many other extras. (State waist size.)
Red/Wh/BI Bk/YI \$69.95

KIDNEY BELT \$18.95
Yellow/Black Blue/Red

CASTRE GLOVES
Adult 8000 \$23.95
Child's 8700 \$12.95

EXCALIBUR ECONOMY GLOVES \$9.95

GRAB ON GRIPS \$5.75

ANCR TIE DOWNS
Red 1"x6 \$13.95
Blue 1"x5 \$10.95

BELL HELMETS
Moto III, YI, Wh, Rd, BI \$94.00
Mg III, Wh, Bk, Rd, YI \$67.00
RT, Wh, Bk, Rd, BI \$53.00
State size.

RACING JERSEYS (vented nylon, w/ 12" elbow pads)
Honda, Yam, Suz, Kaw. (Factory Colors) \$17.95
Sizes: Adult-S,M,L,XL
Children-S,M,L

MX DENIMS, 14 oz. denim, padded, leg zippers.
Many Extras.
18" to 24" \$20.95
26" to 42" \$22.95
44" to 46" \$25.95
For Honda, Yam, Suz add \$2.00.

MXL BOOTS
Enduro or MX Tread \$109.95

Sidi Pro MX Boots Bl, Rd, Bk ea. with YI trim. \$139.00
M. Robert Plastic MX Bl or Red \$109.95
Vendramini Childrens Blue & Yellow
Sizes- Children's 12 and 1 thru 5 \$64.95

CLYMER MANUALS \$8.95



Start an exciting career as a . . . MOTORCYCLE MECHANIC AMS "THE CALIFORNIA SCHOOL OF THE PROFESSIONALS"



AMERICAN MOTORCYCLE SCHOOLS, INC.

GO WITH THE WINNERS!

If you're serious about becoming a top-notch motorcycle mechanic you'll want the best possible training available. You can't afford second best and neither can we. If you think you have what it takes to become a professional . . .

Call Toll Free 1-800-423-4678

Calif. Residents Call Collect (213) 944-0123

Approved for Veterans Training

RESIDENCE SCHOOL HOME STUDY

AMERICAN MOTORCYCLE SCHOOLS
10025 Shoemaker Ave. • Santa Fe Spgs, Ca 90670

NAME _____ AGE _____
ADDRESS _____
Street City State Zip
PHONE _____ DB6

DIALING IN YOUR FORKS

(continued from page 45)

toolbox. That way they can make a needed adjustment for a particular condition without going through yet another experiment.

Take the time to do this at least once. Go out and find what levels, oil weights and pressures will do to your forks. Once you get a "feel" for this, you'll quickly become the local expert on suspension. You'll be able to dial in your buddy's forks in a short time and amaze him in the process.

Guidelines

There are no real hard, fast rules. But, as a general guideline, the less oil you run in the forks, the later they'll firm up in the stroke. The higher the oil level, the earlier they'll start resisting hard bumps.

Try not to use too much air. The less the better, with zero air being the desired goal. Of course, some forks are designed to run with a fair amount of air. You'll have to take this into consideration when adjusting.

Keep everything clean when you work with the forks. Grit can destroy seals and bushings quickly. Have patience. Keep notes. Be a real pro when it comes to your forks, and it'll pay off when you ride your bike.

* We are Distributors for Mossberger Reeds - call for prices.

* Call us for prices on the following: Dunlop Tires, Metzler Tires, Enduro Tank Bags, Enduro time card holders, O'Neal handle bars, Oury grips, Griff MX pants, Pro Levers Ratio Rites, Super Seer Goggles, Jones Goggles, Poly helmets, duffle bags, D.I.D. chain, sprockets, Tsabaki chain, Morteck ignitions, visors, face shields, Yuasa batteries, O'Neal air filters, Cycle-Am fenders, Epo motorcycle carriers.

* Also thousands of items for street bikes.

* Dealer inquiries invited (write on your letterhead).

* Free catalog with order or send \$1.50 for catalog (refunded with first order).



CALL US FOR PRICES ON DUNLOP M/X DIRT TIRES

SHIPPING CHARGES

Must be added to all prices

Min. Order \$10 Total

ITEM	Zone #1	Zone #2	Zone #3
Helmets: Windjammer Shields	1.85	2.50	3.20
Sidestreamer Saddle Bags	4.80	6.70	8.30
Front Tires/Boots	2.60	4.10	4.40
Rear Tires	3.80	5.10	6.15
All Others	1.80	2.80	3.35

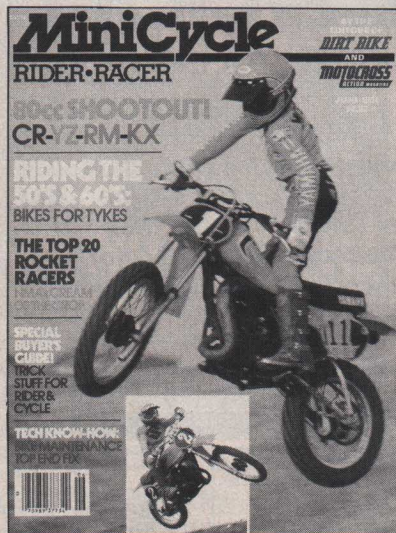
AK, HI, PR, APO FPO use Zone #3. \$2.50 Canada add \$4 to Zone #3. All orders shipped fully insured. C.O.D. add \$1.50 to shipping charges. 25% deposit req. with C.O.D. No C.O.D. to APO FPO or foreign orders. Other foreign orders add \$10 for shipping, excess will be refunded. Add \$50 for each \$100 over first \$100 for insurance.
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Excalibur INDUSTRIES, INC. P.O. BOX 604 U.S.A. BLAIRSTOWN, N.J. 07825

QTY	DESCRIPTION	COLOR	SIZE	NAME	PRICE EACH	PRICE

VISA BA MASTER CHARGE AMERICAN EXPRESS PERSONAL CHECK CERTIFIED CHECK C.O.D. 25% DEPOSIT

NAME MODEL YEAR _____
NAME _____
ADDRESS _____
CITY STATE ZIP _____
PHONE _____
SIGNATURE _____



THE ONLY MAGAZINE FOR MINI RIDERS & RACERS!

Looking for the inside line on small bikes? You can find it in MINI-CYCLE RIDER/RACER, the only magazine that covers the mini scene from top to bottom! Inside, you'll find complete tests on the latest racers, the most fun play bikes to ride, and the best bikes for beginning riders. There are also stories on keeping your bike together, suspension basics, and even one on how to start racing! MINI-CYCLE RIDER/RACER has it all!

Make check or money order payable to: MINI-CYCLE RIDER/RACER Box 317, Encino, California 91316

Name _____

Address _____

City/State/Zip _____

(Please enclose \$2.50, plus 75 cents postage and handling for each copy ordered. Canada add \$1.50 and all other foreign add \$2.50 postage and handling for each copy ordered. All items will be shipped by surface mail. U.S. funds, please.)

DB6-1