

SUSPENSION

THORKS: THORWALDSON LEADING LINKS

Looking ahead through the rear window

By Jody Waisel



It may look like the front fender was put on the rear end and the bike is being ridden backwards, but modern suspension is undergoing another revolution.

□ It would seem that Roger DeCoster has started the industry thinking about the pros and cons of conventional tube and slider front suspension. But in fact, it was Rich Thorwaldson who got Roger thinking in the first place. Radical Richard Thorwaldson was one of America's premier motocrossers in the '70s. Rich spent four years on Team Suzuki. In 1976 Rich retired to start up his successful manufacturing business. Thor Racing Inc. makes aluminum swingarms.

Richard started thinking about leading link forks several years ago, and built a prototype pair last year and had Roger test them. Roger DeCoster obviously liked them, but at the time Suzuki and Kaysaba commitments kept him from testing or using them. In 1979, Roger cleared up his commitments and contacted Valentino Ribb to build him the unusual quadrilateral suspension he unveiled on the Grand Prix circuit this season.

WHAT ARE THEY

Leading link forks are not new. They are, perhaps, one of the oldest successful forms of controlling front end action. Greeves, DKW, Sachs and even BMW motorcycles came stock with leading links for years. The move to long-travel suspension in 1974 ended the leading links' reign.

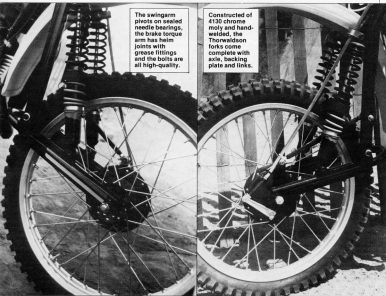
In the commonest definition, leading links are nothing more than a swingarm turned around backwards. The controversy has raged back and forth regarding the advantages and disadvantages, but one thing is fact—they now make sense.

HISTORY OF THE FALL AND RISE OF THE LEADING LINK

When long-travel suspension became the rage, leading links became extinct. The links of the early '70s were made from mild steel, had no-dive attributes, and were harnessed with the primitive shocks

of the day. The weight, rising front end, and bad shocks made tube and slider hydraulic forks seem to be light years more advanced. So advanced, in fact, that Harley and Buell tried to mount forks on the rear.

Leading links fell out of favor, but bikes got taller, longer, and shocks got better. To make the forks longer, they have to be made stronger. To make them stronger, they have to make them heavier. Leading links, with the aid of chrome moly, are almost four pounds lighter than stock 12-inch forks. To get more travel out of a motocross bike, it has to be made longer. When the forks are compressed all the way, a stock YZ400 will be five inches shorter than its fully extended length. It must be long at rest to avoid being too short in motion. Get it too short and it will dance and swap. So, bikes which used to be 96 inches long are now 98 or 99 inches long. A leading link doesn't make the



The swingarm pivots on sealed needle bearings, the brake torque arm has helm joints with grease fittings and the bolts are all high-quality.

Constructed of 4130 chrome moly and hand-welded, the Thorwaldson forks come complete with axle, backing plate and links.

THORKS



Fully bottomed you can see the rotation of the swingarm and the direction of travel of the front wheel. Because the bike doesn't get shorter, it stays stable.



Rich Thorwaldson is a craftsman. Each piece is carefully finished and snugged up with care.



A full-on bermshot off of a three-foot bank. No sweat.

motorcycle drastically shorter on compression, thus geometrically you will be dealing with a standard handling quotient.

During the full movement of a set of standard tube and slider front forks, the rake of a motorcycle can vary from 24 to 45 degrees. The rider has to make minute adjustments over every dip and bump. The more pronounced the changes of terrain, the greater the effect on the machine.

Leading links eliminate a large number of negative handling effects, while leading in their own peculiarities. Standard forks flex—it is a fact that we have all adjusted to—but flex is the enemy of precision. And precision is the key to successful racing. Leading links don't flex. They are so rigid that not even the works Honda's 41mm tubes or Fox Fork 44mm tubes even come close.

Because tube forks must transfer lateral blows into vertical movement, there is a great deal of stiction, binding and stress on the legs and sliders. Leading links have a roll-over effect. The pivoting arm is not bound or misdirected in its arc. Thus a leading link fork will go over whoops with ease, or actually clear a downed bike without too much trouble. Tube and slider forks are less than ideal in these situations. Leading links will positively return to the desert in force within the next year.

Leading links weigh less, give the same amount of travel, don't flex, offer roll-over effect, don't change the wheelbase, are stronger and can be made to dive or no-dive.

DO THEY WORK

Thorwaldson leading link forks work, but only when the rider adjusts his riding style to take advantage of the advantages.

Because the wheelbase doesn't change so radically, the wheelbase of the motorcycle can be made shorter. An inch and a half gets the machine back down to its optimum length for both straight line stability and quick cornering. The front end really sticks, and the bike can cut inside almost anyone at will.

It can turn better than anything on the market. The YZ400 and YZ250 are not renowned turners, but with a set of Thorks they can carve circles around everything else. They go through whoops like they aren't even there, and handle jumps just as easily. Front-wheel landings won't ruin your moto-shorts anymore.

DO THEY WORK THAT GOOD

They take a lot of getting used to. Precision is a touchy subject. DeCoster is precise. He can hit the same spot in a corner lap after lap. A 250 Junior is lucky to hit the corner. When you aim a set of leading links around a corner, you had better be prepared to go that way. More than once our test riders carved out of a



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THORKS

berns with such gusto that they ended up in the snow fence. They just weren't used to going where they aimed. There is a lot of left-over mental slop from standard fork flex. Forks that don't flex, don't change the wheelbase, and travel in a consistent arc with the terrain require more competency than normal.

Because there is very little wheelbase change when jouncing into a corner, there doesn't appear to be any dive, but Thor's forks are set up to dive. The bike isn't going to get shorter and steeper, it is going to maintain its stable base. Thus, there is a tendency for the front end to appear to rise up in a corner, but the rise is caused by perceptual error. The wheel moves almost straight upwards, instead of up and back. You can be fooled by the sight of the front wheel coming into view.

We used S&W Shokor II shocks on our forks. They worked all right, because of the constant cooling breeze, the lighter work load, and selection of spring rates. Better shocks can and will work even better.



The handlebar clamps line up the steering axis, clamps and axle. Control is at the end of the grips. Grab it.

THE DIFFERENCES

Although the bike becomes one and a half inches shorter, it doesn't really become as short as a standard motorcycle in the rough. The brakes work differently. The normal light switch YZ brakes become very progressive thanks to the workings of the parallelogram brake anchor arm. People will stare a lot and ask questions.

Do they work? Yes, better than regular forks, but not without having to pay the price of adjusting to unusual traits.

How much heavier than stock are they? They are over four pounds lighter than stock YZ400 forks, although different shocks and reservoirs could raise the weight. The forks are made out of thin-walled 4130 chrome moly tubing that has been heat-treated and stress-relieved. There are no triple clamps, bolts, springs, oil, damper rods, seals or sliders to add weight.

How much travel do they have? Eleven

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THORKS



Visually, it takes some getting used to. Although they differ from Roger DeCoster's forks, they maintain the attributes.

and a half inches, but different shock lengths or mounting brackets could make the travel vary from zero to 14 inches. The wheel bottoms out on the front of the fender, not under the triple clamps. The bike actually sits marginally lower than stock.

Doesn't the brace hit the fender? No, the brace goes away from the fender. It is at its closest when the bike is sitting on the stand.

Will they both right on? Thorwaldson leading links will slip right on Yamaha, Honda or Suzuki motocross bikes, but you have to have your backing plate modified to adapt the brakes. Thor will send you a modified backing plate in exchange for

your stock one. It is a snap to slip on.

Does it make the bike faster? It makes the bike lighter, thus it probably would make the bike faster if no one was on it, but the rider makes a bike faster. If you adjust to the traits, and can go fast enough to get the benefits, it will make you faster. If you don't try new lines, banana passes through the rough, carving inside the pack in the third turn or pulling off nifty inside stuff, it won't do them for you.

What do they cost and who makes them? Thorwaldson leading link forks retail for \$375 without shocks, or you can buy the complete setup for \$475. Write: Thor Racing Inc., 6805 Oslo Circle, Buena Park, California 90620. □

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