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BY MATT PACOCHA

SHOCK AND AWE

Cane Creek and suspension-giant Öhlins drop a rear shock bomb



Nestled in a valley of the same name, Cane Creek calls the town of Fletcher, North Carolina, home. The company traces its origins to the late 1980s, when it was the U.S. headquarters for Japanese component company Dia-Compe. After separating from the parent company in 1992, Cane Creek turned to the bike industry's growing aftermarket sector. By creating unique partnerships with private inventors, Cane Creek has introduced innovative products over the years, including the Aheadset, Thudbuster and Crono wheels. The company also had a hand in early production of RockShox forks.

With a similar focus on innovation, the Swedish shock manufacturer Öhlins was formed some 30 years ago by a motocross racer with access to a machine shop. Today, in the world of performance motorsports, Kenth Öhlins's shocks are the benchmark. The fact that big names like Valentino Rossi and Tony Stewart pay to ride Öhlins says a lot about the shock's performance. And the cutting-edge technology isn't cheap — the latest TTX40 shock for racecars goes for $3000 per wheel.

When Cane Creek discovered that Öhlins's U.S. headquarters were located just a few miles away in Hendersonville, North Carolina, the possibility of a partnership to help advance its current line of premium air shocks seemed promising. "When we contacted them, they were receptive," said Joe Ward, the VP of marketing and product development at Cane Creek. "[They even] admitted to having thought about the cycling market with no good way to enter."

The two companies teamed up with the goal of creating the best rear shock on the market — regardless of price. Based on the expected high cost and on Öhlins's experience producing race-quality car and motorcycle suspension, the new team opted to work on a downhill-oriented product, which would be the quickest to market. Project "Double Barrel" was born.

THE TECHNOLOGY

The Double Barrel shock is a coil design with a choice of titanium or steel springs. Both models use the same dampers. The shock looks like an ordinary piggyback shock damper at first glance, but the Double Barrel is a different breed. The "Twin Tube" design of the Double Barrel allows fluid to travel through a true damping circuit. This sets it apart from the majority of other bicycle shocks and makes it one of the most tunable options on the market.

Unlike other designs that send oil displaced by the shaft out to a reservoir and back, the Double Barrel pumps the oil displaced by the entire piston through a continuous circuit from one side of the piston to the other. This is the heart of the Twin Tube technology, and it provides several unique advantages: a better resistance to cavitation, or foaming of the shock oil; lower gas pressure in the reservoir; and the ability to virtually adjust the shock's shim stack externally with numerous damping options. On a dynamometer the shock also showed a lower seal drag and longer seal life.

Throughout the early development stages of the Double Barrel, Cane Creek had been working exclusively with Öhlins Sweden, so when Doug Shaw, the customer support manager at Öhlins USA, first saw a prototype, he was taken aback. "This design has only been available for cars since last September," Shaw said. "This means they were co-developing the bicycle application alongside the consumer motor sports version. I was pretty impressed." In addition to the technology, the Swedish company's engineers insisted on maintaining an extraordinary level of manufacturing detail. They also stressed the importance of product testing, so every shock the company builds will be tested on a dynamometer before it leaves the factory. That means when you buy a Double Barrel shock, you will be able to look at lab performance tests unique to the shock you purchase.

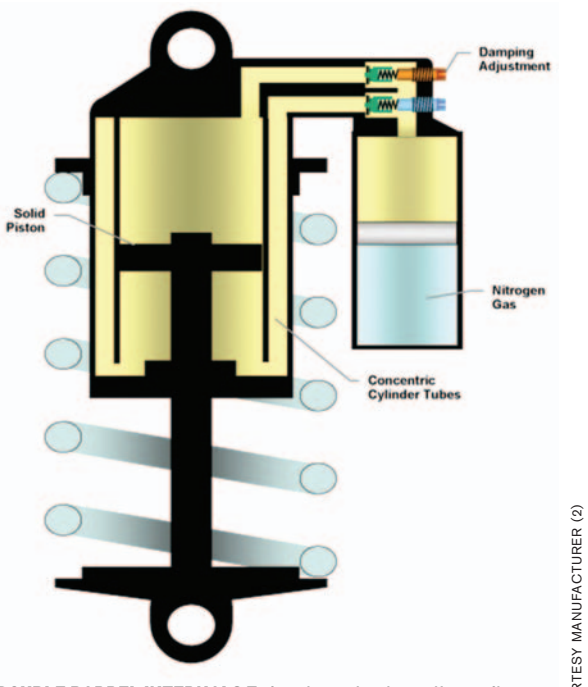
THE MECHANICS

Once the Double Barrel's spring weight is matched to a rider's style and body weight, the monumental task of tuning the shock through damping begins. The Double Barrel offers four separate damping adjustments: high-speed compression and rebound, and low speed compression and rebound. Compression damping sets this shock apart from others on the market, so the first step in learning how to tune the Double Barrel is to throw all you know about damping out the window. It might help to keep this oversimplified principle in mind: Compression damping force keeps your wheel on the ground, while rebound damping force keeps your wheel off the ground. The more your tire is on the dirt, the more control you have.

Most mountain bikers leave shock stroke control up to the rebound damper. This works well on cross-country bikes because the forces are much lower and compression damping can be used as a lockout. When you depend on rebound damping to control the stroke of a downhill or freeride shock, however, things get sticky. When a shock takes a big, high-speed hit, it stores the energy in the spring. The rebound damper then controls the release of that stored energy. If you absorb more of the force with compression damping, the spring does less work and it's much easier for the rebound damping to control the energy release.

For example, if your suspension takes a hit that puts 600 pounds of force into a shock using standard damping

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DOUBLE BARREL INTERNALS Twin tube technology allows oil to move from both sides of the damper piston.

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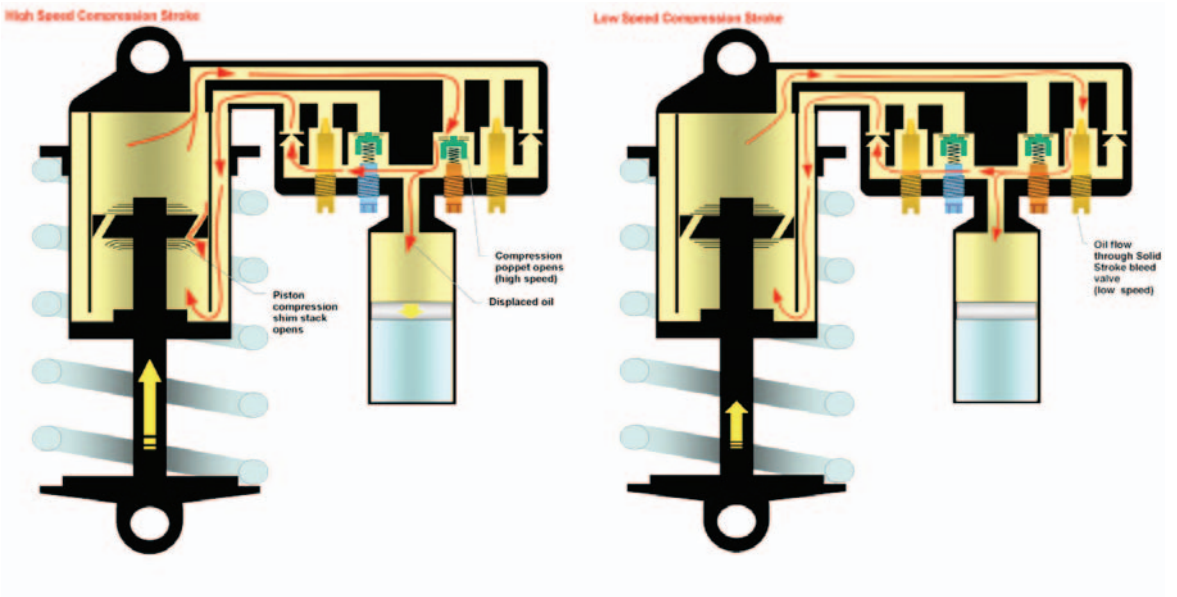
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HIGH SPEED VS. LOW SPEED The graphic on the right illustrates low-speed feedback as it travels through the compression circuit. Low-speed feedback does not produce enough force to open the high-speed valving. The oil path in the high-speed compression circuit (left) bypasses the low-speed valve.

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technology, compression damping may only compensate for 100 pounds of force. The other 500 is stored and unleashed on the rebound damper. In the case of the Double Barrel, you can adjust the compression damping to take a much higher percentage of the force. This requires the shock's spring to store less of the energy, allowing for less rebound damping. Ultimately, this keeps your rear wheel in contact with the ground, providing more control. It also potentially allows you to run a softer spring, which makes for a more supple shock.

The Double Barrel also features two other damping adjustments: Low speed adjustments for both compression and rebound. In this case, "low speed" refers to the shock movement, not the speed of the bike. Low speed damping is used to fight the input of pedaling feedback on the shock. Both SPV and Pro Pedal are forms of low speed compression damping. Cane Creek simply calls it what it is, "low speed compression damping," and refers to your ability to tune the shock for "pedaling friendly" characteristics.

What sets the Double Barrel apart from its competitors is that the low speed adjustment is separate from the high-speed adjustment. In existing designs, adjusting the "platform" changes other characteristics of the shock. In the Double Barrel, the transition is indiscernible. The level of low speed "pedaling friendly" damping can be adjusted with no effect on the shock's high-speed characteristics.

THE RIDE

My first few runs on the Double Barrel were not impressive. Luckily, I had the Cane Creek test staff and the head engineer at my disposal, and we dialed in the ride after two more runs. Once properly adjusted, the ride was smooth, bottomless and confidence inspiring. My rear wheel felt more stuck to the ground than I have ever experienced, and I never felt like I used all of the shock's travel.

The transition from low-speed, pedaling-friendly damping to high-speed damping was seamless, and the pedaling efficiency was impressive. Last year I raced cross-country on an air shock with a platform, and I can say with certainty that the Double Barrel-equipped bike with six inches of travel pedaled better, both on flats and uphill.

So, what's the catch? At $650 for the steel spring version and $850 for titanium, the Double Barrel is a big chunk of change, even for those used to paying top dollar for technology. That said, once riders feel the Double Barrel's enhanced performance, they may be willing to splurge.

A bigger obstacle for Cane Creek will be convincing consumers not to judge the shock on the parking lot test. Even pro level downhillers have problems recognizing the differences in how the shock works. "I have friends, well respected world class professional downhillers, who have pushed on my bike in the parking lot and told me they could never ride [the Double Barrel]," said Chris Herndon, a pro racer sponsored by Cane Creek. When pushing on the seat or rolling into curbs, the properly set-up shock can feel slow and soft. So Cane Creek will need to persuade the public not to judge the Double Barrel until they have tried it — properly tuned — on the trail.

The Double Barrel is a sophisticated product so introducing it to the tech-savvy downhill set was the right choice. Just turning knobs can get you into trouble and might even make the shock ride worse. Cane Creek has the tough task of educating users on the capabilities and proper tuning of the product. To put it in perspective, the big motor sports teams that use this same technology pay hundreds of thousands of dollars to tune their versions.

By the time the first shocks ship, Cane Creek should have a reasonable database of baseline settings for rider weights and bike designs. These will provide a good starting point. But if you want to ride the Double Barrel, be prepared to study your shock's damping graphs and spend more than a few days or weeks dialing it in. The set-up won't be simple, but if you take the time, the Double Barrel will provide you with more options than are currently available and a performance ride that is sure to impress. VN

COURTESY MANUFACTURER (2)