

# SLINGSHOT

## Boom Tube

*No other bike rides like a Slingshot.*

*Maybe that's*

*because no other bike has a steel*

*cable and spring for a down tube.*

*By Ed Carman*

One of these bicycles is not like the others, but then, the Slingshot isn't really like any other bike, suspended or not. Where the down tube should be, there's a cable and spring. The top tube is a swollen refugee from a tandem tubeset. And that top tube is joined to the rear triangle by a fiberglass spring. Even within the fabulously diverse field of suspension bikes, the Slingshot is unique not only in its design but in its purpose: Other bikes use suspension to absorb trail impacts and conserve a rider's energy. The Slingshot is designed to make sure all of its rider's energy is turned into speed as efficiently as possible.

Way back before production mountain bikes were widely available, Mark Groendahl was trying to come up with a workable, lightweight suspension design, albeit in a different genre. Groendahl built his first Slingshot, a BMX prototype, in 1980. He discovered that his bike, even though it was heavy, was exceptionally fast, a quality still evident in his current Boom Tube mountain bikes.

The speed, Groendahl decided, came from the extra power that could be added through the Slingshot design. Groendahl subscribes to the minority opinion that energy isn't lost to frame flex. In this view, all bicycle frames effectively function as springs, storing and then releasing energy with each revolution of the pedals. The coil spring at the Slingshot head tube takes that analogy to a more literal level. It also allows the Boom Tube's frame to move laterally even more than usual when you push on the pedal, say,  $\frac{1}{4}$  of an inch, compared to



Cable and spring stand in for Slingshot down tube.

$\frac{1}{4}$  of an inch. According to Groendahl, that compliance lets the rider push the pedal farther and harder—when the coil spring compresses and the steel cable stretches, the bike can effectively twist and stretch down and sideways.

It also assures there's no energy lost in the transaction. "It's like hitting the sweet spot on a tennis racket, or pulling a truck out of mud with a tow strap instead of a chain," says Groendahl. "You can get more weight and momentum on your downstroke. And you get all your energy back, because there's no friction or any kind of damping on the spring."

That omission separates the Slingshot from other suspended bikes, which incorporate sliding friction, hysteresis (friction generated internally by an elastomer) or oil damping to keep their various moving parts from getting overexcited in rough terrain. The give in the Slingshot's frame, though, allows it many of those systems' advantages: Either wheel can give a little backwards as it rolls over an obstacle and then spring back without lessening the bike's momentum, and the wheels can track somewhat independently of each other, so the bike sticks to the ground on corners or climbs and forgives technical mistakes. Compared to the other bikes we've been testing this month, the Slingshot affords relatively little shock absorption, but its ride is still distinctly smoother than a rigid bike's.







The most distinctive aspect of that ride, though, is its liveliness, which manifests itself as puppylike eagerness to accelerate. It's easy to roll the Slingshot along in the big chainring, or snap it up a short steep climb, or grunt it over obstacles, even in a gear that's too high. The joint is flexing and the spring is springing and the wheels are tracking on their own paths, but the bike feels encouraging and fast. It's light. Our 20-inch frame weighs five pounds, 12 ounces. Built up with a combination of SunTour's XC Pro and XC Comp MicroDrive parts, with Dia-Compe 986 brakes, the complete bike weighs just under 26 pounds.

The execution is sharp, too, both in the materials choices Groendahl has made and in workmanship. The boom-tube top tube itself is a seamless 1½-inch True Temper tube meant to join the bottom brackets on a tandem. The fiberglass spring between it and the seat tube is Scotchply, a 3M product similar to the leaf springs used in Corvette sports cars. The steel coil spring is available in different stiffnesses to suit different riders, and its preload, and thus the cable tension, is adjustable.

To make all these parts work together, Groendahl has done a great deal of detail work. A reinforcing rib is pressed and spot-welded into the seat tube, which is butted True Temper steel, to ensure that

the rear triangle doesn't flex too much, or too unpredictably. Frame flex isn't undesirable in Groendahl's design, but it is properly the springs' job.

Stresses at the head tube are under control too, as a small-diameter tube has been lightly squashed, mitered and nicely welded under the top-tube/head tube joint, just above where the cable is pinned in.

The current Slingshot is impressive, but the evolutionary process continues at Groendahl's Grand Rapids, Michigan, factory. Slingshot sponsors three professional racers, Sara Ellis, Martin Stenger and Mark Smedly. Smedly and Stenger's race bikes drop the top tube about six inches below the top of the seat tube, which has a correspondingly longer seat mast. The dropped joint, according to Groendahl, takes a step toward correcting a flaw he finds in larger-sized bikes. When the Slingshot's front wheel hits a bump, or is decelerated hard, the Slingshot arches its back and shortens its wheelbase. Groendahl says the lowered spring helps the bike flex downwards instead. That changes the bike's handling less and keeps the cable and spring taut.

Other projects include triathlon and road bikes, 80 of which have been sold,

and, in a dramatic use of the Slingshot's bounciness, a single trials bike that Bob Lawson has been successfully barnstorming the national trials circuit on—the only suspended bike in the Expert class.

That brings us to whether the Slingshot's suspension is up to today's standards. After all, the bike has no damping and significantly less travel than any other bike in this test. On the other hand, its suspension is fundamentally different from other bikes'. Instead of allowing the wheels to move up and down, the Slingshot design lets the whole bike conform to the trail and the rider's input, and that feels remarkably fast. Comparing it to heavier and, according to Groendahl, slower systems primarily on the basis of those systems' strengths is misleading. The Slingshot may not be cushy, but it's light, fast, exceptionally lively and fun to ride. It's ready for prime time. □

**Conjunction junction: The Slingshot bends around a hinge of 3M Scotchply, and complicated but careful construction shows at the seat cluster.**

