BATTLE TOMAHAWK

Wyoming enters the suspension fray

When Battle Mountain Bikes displayed its MacPherson strut frame at the Las Vegas bicycle show last year, the beautiful carbon fiber frame was the only prototype in existence. The *MBA* spies were impressed with the well-engineered design. Others shared our opinion, and orders for the new bike were brisk, leaving Battle Mountain Bikes' two founders with a dilemma: How were two people going to make all those frames? The answer came in a way that could only happen in small-town America.

Wyoming residents Richard Lorenz, a rancher, and Victor Wieburg, an advanced composites engineer, had built a composite mountain bicycle frame that they had hand-carried to the biggest bicycle show of the year. They had worked out a cool version of a MacPherson strut suspension system, borrowing existing MacPherson technology (Horst Link, Noleen shock, etc.) and constructed a prototype to test.

◄ ***Full attack mode: The Tomahawk evoked bravery from all test riders. The carbon fiber warrior was long and rigid, keeping the bike arrow-straight even under the most powerful sprints.***

BATTLE

Weapon of choice?: Newcomers to the full-suspension scene, Battle Bicycles has created a formidable first try. The Tomahawk was rated tops in the stiffness department.

Suddenly, after the Vegas show, they had orders, too. What was missing was the capital to get going in a substantial way. The Chamber of Commerce of Encampment, Wyoming, their hometown in the mountains, population 452, got wind of the fledgling company and made the two an offer they couldn't refuse: set up Battle Mountain Bikes in Encampment, and we will loan you the start-up cash you need. The deal was penned and Richard and Victor were "in business." Only in America! Heck, only in Wyoming!

Battle believes that full suspension is the way off-road bicycles are headed. The Battle Tomahawk has no unsuspended predecessor. It was suspension-built from the ground up. Frame tubes, lugs and fittings are built and tested at Battle's shop; then the various parts are sent out for manufacturing. Battle does the fit-up, bonding and finish work in its tiny factory. Instead of a one-piece, bladder-blown, true-monocoque, composite front section, Battle opted for 6061 alloy lugs and terminals for the oversized round-tube front section and rectangular-tube suspension linkage. Although the Tomahawk is a first effort for the two men, its details and engineering look more like second-generation work—pretty sharp for a couple of mountain men.

FIRST LOOK

Battle didn't stray far from the invisible book of bicycle design when the basic layout of the Tomahawk was penned. Its sloping-top-tube front section is constructed with oversized composite tubes, bonded to alloy lugs. Top and down tubes are 1.5 inches and seat tube diameter is 1.375 inches. Each aluminum lug is actually fabricated from welded tubing that has been pre-machined to slip inside the carbon/Kevlar tubes for bonding.

The swingarm pivot is on center with the bottom bracket shell. All the swingarm and MacPherson strut pivot points are CNC-machined to fit the rear section's .875"x1.25" rectangular tubing. Like the AMP Research design that has become the blueprint for this type of design, the Tomahawk's rear dropouts are fixed to the seat stays. Unlike the AMP, however, Battle chose to put the dropout/swingarm pivot locations in a higher, almost conventional location. The pivot bearings and general design of the swingarm's machined bits are very similar to Answer's Manitou FS. The main benefits of using rectangular tubing are better tire and heel clearance and extra torsional rigidity where it counts most.

The Tomahawk's cable routing stands the test of coolness. The shock mount is machined to double as a cable stop below the top tube, and the rear derailleur cable runs inside the right seat stay, out of dirt and moisture's way.

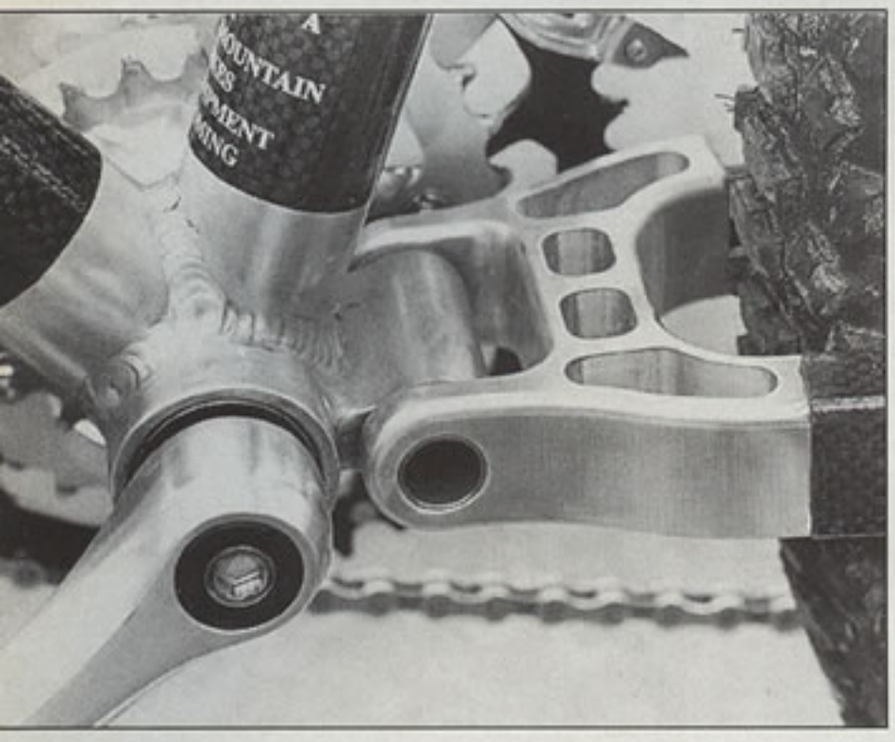
THE NUMBERS GAME

Battle offers its Tomahawk in 14-, 16-, 18- and 20-inch sizes. Our 18-inch frame actually was tall enough to be a 19-inch and sported a whopping 24-inch-long top tube! Chainstays were an even 17 inches and the wheelbase was a longish 42.75 inches. Head and seat angles were a standard-issue 71 and 73 degrees, respectively. Suspension travel up front was 2.375 inches and the rear wheel had a respectable two inches. The shorter rear-wheel travel than front-wheel travel setup is different than most builders. Bottom bracket height was a bit low, at 11.5 inches. Frame weight for our frameset was 5.5 pounds. The complete bicycle as tested tipped the scale at 25.3 pounds. Price for the frame and shock is $1699. With a Rock Shox Mag-21, Lawwill Leader or Manitou III fork, the bottom line swells to $1999. Call (307) 327-5952 or write Battle Mountain Bikes, P.O. Box 327, Encampment, WY 82325.

COMPONENT PICKS

Overall layout of the components was straightforward, for the most part. The 125-gram alloy handlebar and 135mm, ten-degree, TIG-welded, alloy Rocket Science stem sported GripShift shifters and some really funky Dia-Compe brake levers (PC-8 Versa models). An honest-to-goodness Flite Titanium saddle graced an American Classic post. Derailleurs were Shimano Deore XT with a

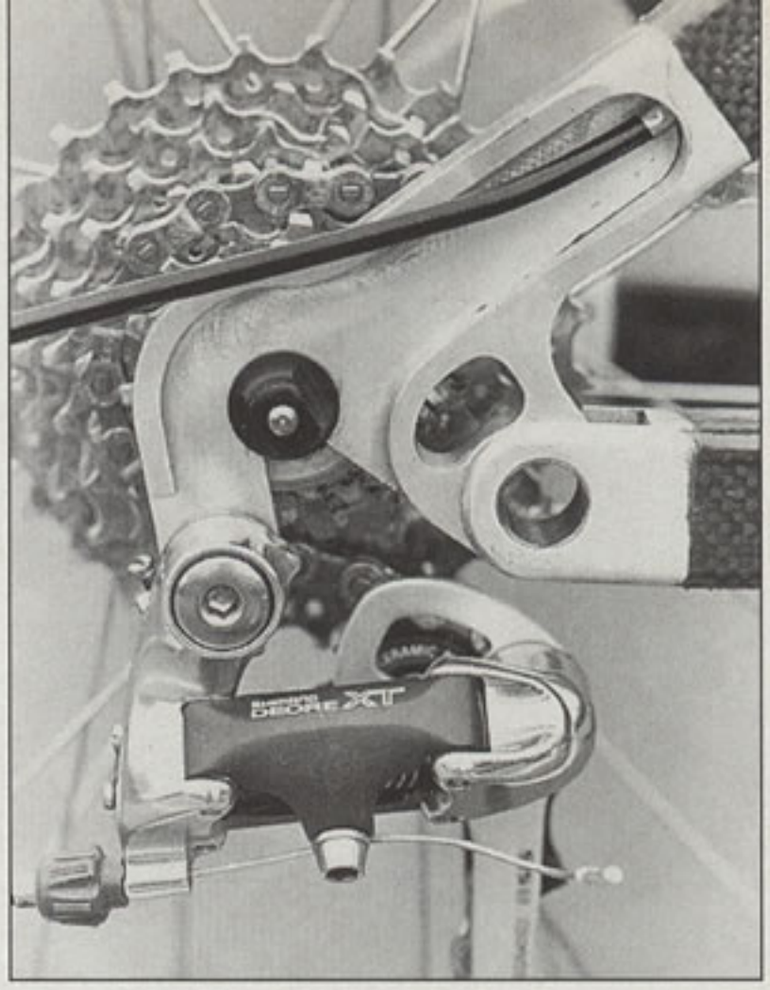

TOMAHAWK



BATTLE

◄ *Where have we seen this before?: A very Answer-esque swingarm junction. Manitou influence made its way into many full-suspension designs. The boys at Battle have done them proud.*

Fancy and functional: The Tomahawk version of a Horst link comes carved from aluminum billet. A more elegant version of the AMP design has yet to be wrought. Large hollow pivot shafts increased the sheer strength of each junction. ►



Compact-Drive Deore XT 24/34/42 crankset. The rear cluster was an eight-speed 11-28 XT cogset. Hubs were rare Wasatch Cycle Works cassette units, laced to Mavic 321 32-hole rims. Tires were a Tioga Psycho K 2.1 front and IRC's Geo Claw 2.1 rear. Joe's Brakes were put in charge of stopping both ends. Oddly, the low-profile brake was up front and a wider, standard type was on the rear (probably to compress the amount of space required to operate a cantilever behind the seat tube).

Suspension was furnished by a long-travel Rock Shox Mag-21 fork and a Noleen shock. Four different rear springs are available in 50-pound increments, which should cover everybody's tuning requirements. Available fork options are Answer Manitou III and the new Lawwill Leader from Control Tech (all for the same price). Battle will sell you a complete bicycle with a variety of top-end U.S.-made components, based around a Shimano drivetrain and your individual taste. That is an ambitious offering from a small company!

ON THE DIRT

Half of *MBA*'s test staff were excited to take the Tomahawk out; the others were lukewarm about the composite flyer. The reason seemed to orbit around the handlebar area. The ten-degree stem on an already tall head tube struck most test riders as a step in the wrong direction. The funky-feeling brake levers delivered marshmallow modulation that made a negative first impression as well. True, looking at the Battle got the blood pumping, so it wasn't long before everyone changed their tune.

As soon as the test riders hit the trail on the Tomahawk they were pleasantly surprised. The bike could be a real joy! Short riders couldn't really appreciate the Battle's strong points due to the bike's excessive 24-inch top-tube length. Six-footers were in seventh heaven (except for the lousy brakes).

The Battle was long and because of this it favored steep, technical downhill sections (watch those brakes). It was best suited to anything fast and choppy. Steering was on the heavy side, especially for tight single-

BATTLE

track or when maneuvering at slow to moderate speeds. The Tomahawk's rear section and bottom bracket area felt super-stiff. It is possibly the most rigid MacPherson bicycle we have sprinted on (it doesn't have to be very stiff for that laurel).

The IRC rear tire and long chainstay measurement called for rearward body english to ensure traction up anything vertically challenging. Out-of-the-saddle efforts were rewarded by the Tomahawk's stiff swingarm and shock spring. Most of the *MBA* crew agreed the Battle would be a fine climber with a different stem, especially considering how light it was. Overall performance was very promising. The frame stayed mechanically sound throughout the test and the Tomahawk eventually became a fave rave of the *MBA* gravity set.

SUSPENSION SPECIFICS

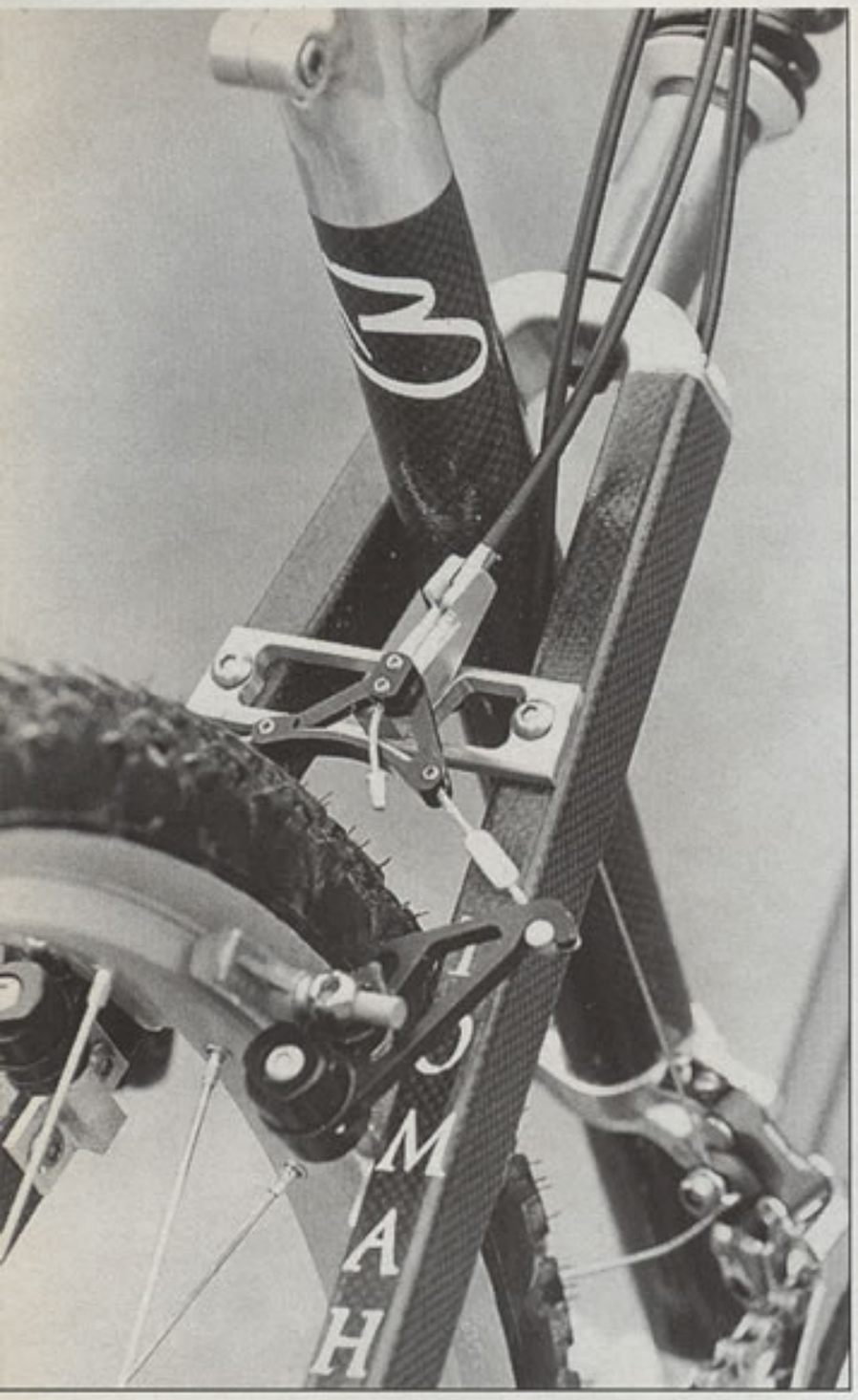
The Noleen shock was a little harsh on the big hits in the low-to-mid speed range (too much compression damping). To balance the rear with the Mag-21's performance, we ran 40 psi in the fork and set the clickers on four. Most test riders ran the shock preload fully relaxed. The bike came with a 500-pound spring; a 450 might have done the trick. Softer compression valving would be a must to achieve a balanced ride with Manitou III's ultra-soft low-speed ride (should you choose that option).

SUGGESTION BOX

Test riders always abound with "if I had my druthers" ideas for setting up test bikes. If we had our druthers, here's what we'd change: (1) The first thing we would dump is the Dia-Compe brake levers. These dual-stage Dia-Compes are for super-rigid brake setups, not suspension forks and MacPherson rear ends. Get some levers that pull some cable! (2) Cable housing flex kept shifting the gears slightly in the rough. Rerouting the rear derailleur housing might solve the problem. (3) Last, but not least, swap the high-rise stem. Even our taller riders wanted a lower stem for cross-country riding. It's a must.

WHAT DO WE THINK?

Don't let the criticism fool you. If you fit this personality profile, the Battle is for you: Do you like rooting for the underdog? Are you a hard-charging aggro rider? Is your penchant for speed? Are you into composites? Then this is your frame. If we had our druthers—and you would if you built the bike up from scratch—we would toss all the components on our test bike and start from scratch. With care and money, the Tomahawk could be built into a top performer. Not too shabby for a first design! ❑



The best and worst: The Tomahawk's bonded, rectangular compression strut kept brake flex to an absolute minimum. Funky rear brakes and cable routing reduced brake performance to a mediocre level, further worsened by Rube Goldberg-type brake levers.