

Al! right, we can hear you saying it already. Titanium spokes? They're too flexy, they're not reliable. They cost too much. Okay, we'll give you that last one. But with the introduction of their new Ti-Dye titanium spokes. Union Frondenberg has blown away most, if not all, of the myths associated with titanium spokes. They still cost a lot, but that's not myth, it's fact.

One of our staffers raced with a titanium-spoked front wheel a few years ago, and he said he actually liked the way it rode and performed. But it didn't go too long before he broke a spoke, and instead of staying with the wheel he decided to go with steel for reliability's sake. That's one of the biggest knocks of titanium spokes, that they fail quickly. Union has solved this problem by using a high-grade titanium alloy and applying a heat treatment specially designed by Union. The result is a stronger, tighter spoke. But don't take our word for it. Union says that it is not uncommon to get 2500 miles of hard racing on a set of wheels built up with their ti spokes.

Perhaps the most significant testimonial is that of Ned Overend, who has been using the spokes with no problems since Mammoth last year. If there's one group of people that is finicky, it's racers, and to get them to race on something consistently is not an easy chore.

We were still a bit skeptical when Union gave us the materials to build up a wheelset. But since it wasn't costing us anything, we figured we didn't have anything to lose. Besides, we were certainly intrigued, to say the least, at the prospect of reducing rotational weight by 45 grams per wheel compared to a double-buttet 15/14-gauge 32 steel spoke wheel, and as much as 100 grams per wheel on a 32 14-gauge spoke wheel. Remember, this is rotational weight, so it can be considered three times as important as static weight because you are reducing the amount of energy you are putting out to make the bike roll forward.

We had our wheels built up using the same exacting techniques as when regular steel spokes are used, tensioned up to 80-90 kilograms and using Sun Chi-nook rims and HUGi hubs. Our wheel builder said that the only difference between the ti spokes and steel was that it was harder to tell when they were getting to the desired tension, making the use of a tension gauge mandatory.

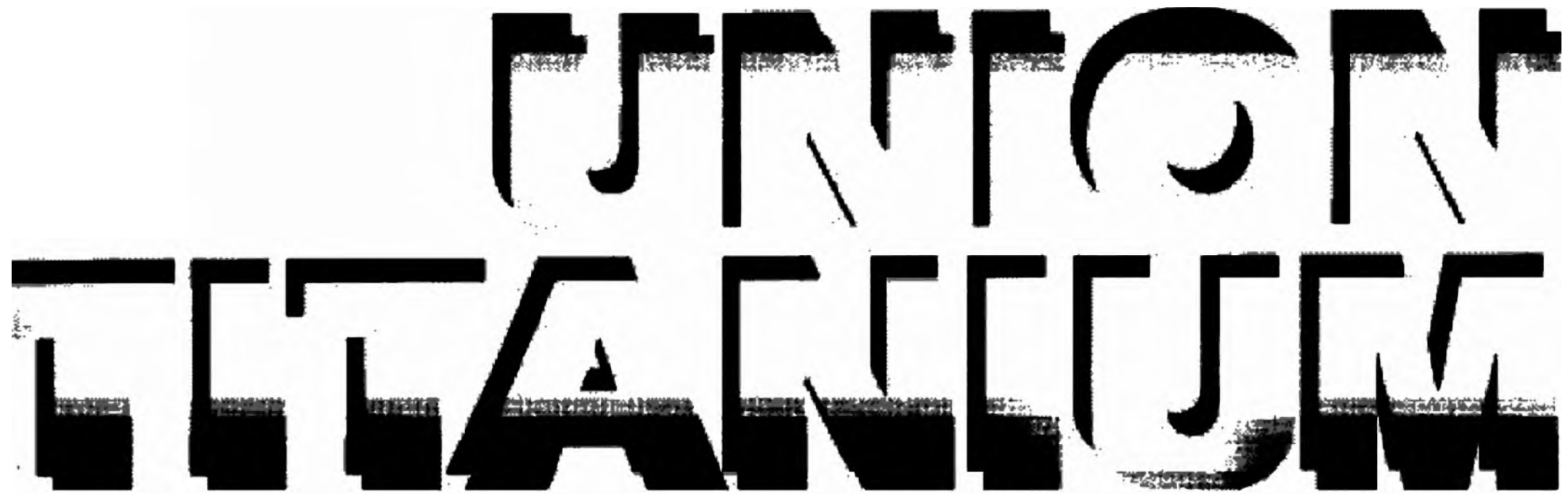
In examining the spokes, our wheel builder was impressed with the quality of the spokes compared to other to spokes he'd seen. The heads are uniform and clean, and the shafts are even

and straight. The anodized colors add a unique appearance that is not too gaudy. Non-anodized spokes are also available for those of you who don't want people asking questions about your spokes.

The difference in ride quality is immediately apparent. Not only were the wheels lighter than steel spoked wheels, acceleration was also noticeably improved. We didn't do a treadmill test to measure

we'd have to say that the ti-spoked rear wheel added to the effectiveness of the rear suspension.

The front wheel didn't seem to be affected much at all, the only noticeable difference being a tad bit more resiliency in corners. This made highspeed cornering a little more controlled, especially when the terrain was rough. Never did we feel like the rim was



Pricey, but perhaps the best use of titanium we've ever seen!

rotational weight, you are not going to get as tired as quickly.

Even more impressive than the added acceleration and climbing power was the shock absorption. Putting the ti spoked rear wheel on a rigid rear end bike, it felt like we had just added a shock with about a half inch of travel. Cornering was improved because the tire would track over ruts and obstacles better, tending to follow the terrain rather than getting bounced around by it. This was most noticeable when riding over ruts running parallel to the trail. We could stay in the saddle and let the wheel kind of mold around the rut as we pedaled. When we threw the rear wheel on a suspended rear end bike, the shock seemed to work just a little bit better, the ti spokes complementing the rear shock, not hampering it or making it too mushy. They're flexier, to be sure, but not enough to detract from the overall ride.\* In fact,

#### QUICK INFO:

**PRODUCT:** Union Frondenberg Ti-Dye titanium spokes

**DESCRIPTION:** Titanium spokes with

**MATERIALS:** colored anodizing

**Titanium alloy 4 gramsper spoke**  
**WEIGHT:**

**COLORS:** Anodized rainbow gold to purple to blue fade \$4.00per spoke

folding or too flexible.

In hard corners and landing off of jumps, the additional flexiness of the spokes caused them to creak a little, sounding almost like when you get on a bike right after truing steel spokes. It also happened when going up really steep bills under a lot of torque. This caused some concern, but after three months and almost 350 miles of hard riding, *there is not one single out of true section on either wheel!* We find it hard to believe, too, but the wheels are literally as true as the day we put them on the test bike. We haven't even had to retension them. You can bet we'll be reporting back to you later when we have some more miles on them.

At around \$3.50 per spoke (non-anodized) and \$4.00 for the Ti-Dye (including nipples), a 32-spoke wheel is going to cost you between \$126-133. Okay, sounds like a lot, right? Considering a titanium seat post, for example, weighs around 20-40 grams less than a comparable aluminum or chro-moly post, and costs around \$150, and is static weight, not rotational, ti spokes are a better deal. In fact, except for titanium pedal spindles (which are a little questionable from a strength standpoint), ti spokes beat out any other component that uses titanium on a cost versus value comparison every time. Plus, you're getting better ride characteristics and your rims will last longer because they're not going out of true as much and you're not having to re-tension them as often. When you factor everything together, ti spokes may not be a bargain, but they're a heck of a lot better deal than anyone would think.