BICYCLE GUIDE

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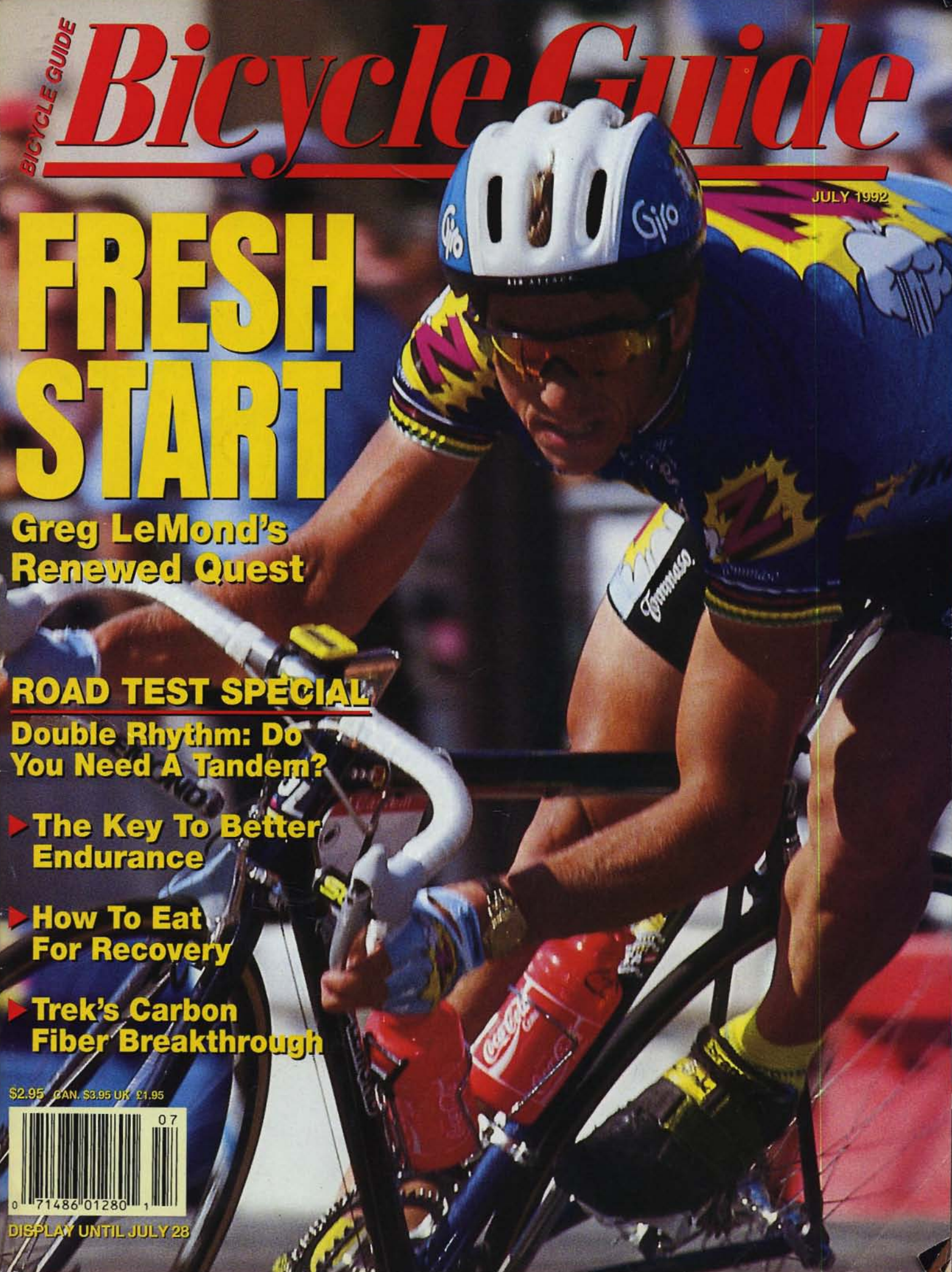
JULY 1992



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Rick Jorgensen

Interview by Christopher Koch

In his other life, Rick Jorgensen designs earthquake-tolerant (he hopes) bridges for the California Department of Transportation. But when he goes home, he uses his understanding of structural loads to perfect his Tango tandem designs, a passion he's had since the early '70s. Although he has made just 50 tandems to date (prices start at $5000 for his custom-only framesets), his outspoken theories and revolutionary Uptube design have made him one of the most influential—and controversial—authorities on current tandem design in the U.S.

How did you discover tandems?

I bought my first tandem in the early '70s. It was an English Jack Taylor, which I used to go touring with my girlfriend. But trying to ride that bike, which had a mixte frame in the back with panniers front and rear, was really difficult. What we ended up doing was just off-loading equipment until we barely had carrying capacity to make the tour realistic. It was like riding a bike down the road with newspapers on a rear rack when you were a kid. The back end of the bike just went in all kinds of different directions from the front of the bike. I saw it being a real problem, but at the time, I didn't know what to do about it.

How did you solve that problem?

I went through a number of other tandems, but I could never find one that I really liked. By that time I had gone to engineering school and had studied a little bit about what makes structures work. So I sat down and decided what was important for me in a bike.

The first thing was to fix that torsional instability [twisting in the frame] you get with flexible tandems. I say the bike handles poorly in an emergency maneuver if the back end of the bike and the front end of the bike go in different directions. It's that feeling when you try to avoid a pothole on a tandem—or the bike with the newspapers on the back.

In addition, the bike doesn't track true when you get that load going back and forth on the back. It causes a lot of upper body fatigue for the captain because you have to correct by actually steering the bike down the road. You find that, on old tandems and wimpy tandems, when you ride down the road you actually make a steering adjustment for every pedal stroke because the bicycle is snaking down the road. And when you get off the bike you don't even notice you were doing it because you make those corrections automatically. But then you get on a single bike and you find you're swerving back and forth with every pedal stroke. To me that was really eye-opening. So the first goal I had in designing a tandem was to make the bike torsionally rigid so it performs well in an emergency maneuver.

How can you eliminate the twisting effect that causes instability in tandems?

There are two ways to make things stiffer. You can make the tubing bigger, or you can cut the length of the tubing down. You cut the length down by making the rear end of the bike shorter and bringing the stoker forward toward the bike's center of gravity so there's not as much flex going on in the rear end.

If the rear end is shorter, the bike does act better. But then the stoker is so close to the captain that builders do some weird things to compensate. Sometimes they lay back the seat angle and do other weird stuff. I think that's all wrong. You have to design the bike around the rider. You put the person in their optimal riding position, which is close to what it's going to be on their single bike. You use a similar seat tube angle and a similar saddle-to-handlebar distance—just a little more upright on the back of a tandem so you can look around the captain.

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ALISON PORTELLO / THE DAVIS ENTERPRISE

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You decided to build your bikes with oversize tubing then?

I opted to give the stoker more room and use oversize tuhing ro give the bike torsional rigidity. Not only does a rigid bike perform well hur it feels secure. It makes you a better rider. It puts you in this reassuring feedback loop that says the hike is capable of doing what I'm capable of doing, which makes you a ber-ter rider, which makes you a safer rider, which makes you more confident.

But oversize tubing couldn't have been the entire answer, because you went a srep furrher with the Uptube design, adding an oversize tube between the front bottom bracket and rear seat cluster.

The Uptube idea addresses the two major torsional loads applied in a tandem. One is the twisting at the rear rider's center of gravity, and the other is front bottom bracket deflecrion.

Ar the office we were looking ar bridges and trying to figure out how to resist loads at an unsupported corner of a structure, like a door frame. Well, obviously, putting in a diagonal member is how you want to do it. So I thought that would work in a randem, by putting a tube between the front bottom bracket and rhe rear seat cluster. You need to tie in that rear seat cluster to keep it from moving, and you need to help the front bottom bracket resist lateral deflection. The Uptube seemed like a real natural way to take care of those problems. My bikes weigh a little more because of it, but weight is something that I let fall out of rhe bottom of the equation. A good bike that works well with a rider will outperform a light bike that doesn't work well with the rider.

Your randems also have a reputation for unique steering geometries.

Thar's somerhing that I stole from Jack Taylor. Man, I rhink he dialed it in really well: 73-degree head angle and 2¾ inches of fork rake. That leaves you with a trail of abour 1¾ inches. On the surface that would seem very strange, especially for a big bike where you'd want ro have a lot of stability. A trail dimension that small would seem backwards.

So why do you rhink this strange geometry works, rhen?

Well, on a tandem bike you're getting some steering stability out of the longer wheelbase. You don't need to draw stabiliry from your trail as much as you do on a single bike.

But trail also kind of bites you in the butt on another thing and that is something I call lean steer. On a tandem the more trail you have, the more the front wheel tends to flop in steering maneuvers. And that's bad because on a tandem when you're turning sometimes you have rhe back person leaning differently than the front person, which can cause a litrle bit of instability—not in the structure but just in steering geometry.

Should steering geometry be the same for an off-road randem as it is for a road tandem?

Well, an off-road bike is different, and the way ir's different is primarily in what I call rhe pneumatic trail, which has to do with the size of the rire's contact patch on the ground. When you go from road to off-road, what you're primarily changing is tire size, rire shape and rire pressure. The lower air pressures used off-road ehanges the size of rhe tire's conract patch enough that the pneumatic trail becomes significant. It slows the steeriug of rhe bike down so that it handles comfortably off-road.

I've done some experiments measuring road shock, and I don't think it's quite what people have made it out to be.

So the end result is that Jack Taylor's road geometry works just as well off-road as it does on the road. It's one of those things where when God was designiug the world he did a prerty damn good joh. Jack Taylor must have had input from God.

The randem's Achilles heel has always been the perception that it transmits too much shock to the stoker. Do you agree?

I've done some weird experiments on my own on road shock and I don't think it's quite what people have made it out to be. I've road-tested a lot of bikes, and I've done a lot of experiments where I've put accelerometers on bike frames and put them on Fred Flintstone rollers where we bounce them up and down and impact rear wheels and measure shock rransmission. Man, rhat's what we do out here when we're bored [laughs].

And I found a lot of things that don't jihe with what everybody in rhe world rells you. Road shock is a function of air pressure and tires. Everything else is secondary. Yes, a Vitns [light-gauge aluminum frame] absorbs more road shock than one of my bikes with oversized chrome-moly. How much? Oh, about five pounds of air pressure [laughs]. With air pressure and tire size and tire shape, you have so mnch more control over road shock than with anything else.

Another issue is the fact that the stoker can't see the bumps. We found that when you ride your single bike, you cannot keep from unloading the saddle when you see a bump—it's just instinctive. And unloading the saddle is orders of magnitude more important in curting down shock than anything else. But you can't unweight instinctively on the back of a tandem. So what happens is rhe shock hits you in the butt and it hits you harder.

That problem is amplified on tandems with short rear ends, because the stoker is put in a more upright riding position. If they're more upright, they have more weight on the saddle, which means they'll feel even more road shock. So what we do is we lengthen out the rear of the bikes so you get more of a standard weight distribution for the stoker.

What do you see as the tradeoffs or advantages between 26-inch wheels and 700C wheels on a randem?

If you want to go ultimately fast I think you have to go 700C. For everything else iu the world, you should go 26-inch.

Why?

Smaller wheels are stronger for a given number of spokes, and larger cross-sectiou tires are more comfortable. Then again, in the past, we've always talked abour 700C tires being narrow, 26-inch tires being wide. Bur there's so much crossover in the industry now berween narrow 26-inch wheels and wide 700C wheels. We didn't have 43C x 700C tires a few years ago. Now you do. That tempers it some. □