

ANDY POTTS ON AMBITION, RESPECT, THE OLYMPICS & KONA

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talkin' 'bout a

revolution

By Brad Culp

In the pursuit of the perfect ride, Zipp has gone from leading the pack to way off the front with the Firecrest 404 Carbon Clincher, a wheel that will change your relationship with the road.

"Revolutionary" is an overused term in brand marketing. This is especially true in the bike industry. New styles of water bottle cages have been called "revolutionary." I'm pretty sure I've seen the term applied to handlebar tape and arm warmers. This should not be allowed. In order to trumpet a technology as "revolutionary" a company must first create something that makes every other product in the market look as though it missed a major revolution. Zipp has done exactly that with its Firecrest Carbon Clincher. Simply put, it's the best all-around wheel we've ever ridden, and it's bound to change the way the rest of the world's aerodynamic wheel manufacturers go about doing things if they're keen to keep up.

THE SHAPE. Over the past two decades Zipp has become really good at making the front end of its wheels very aerodynamic across a wide range of yaw angles. Conventional wheel-building wisdom has preached that the tire is the leading edge of the aerodynamic foil and wheels have been designed to be as fast as possible with this concept in mind. This resulted in aerodynamic profiles like the traditional "V" profile and Zipp's popular "hybrid-toroidal" shape, essentially a "V" shape with a bulge in the middle.

When Zipp Design Engineer Michael Hall went to the wind tunnel to revamp the company's popular hybrid-toroidal profile, he did something that's never been done before: he started by changing the trailing edge of the rim (the part farthest from the tire), because after all, the trailing edge becomes the leading edge as air moves to the back half of the wheel. Hall sought a shape that would make the wheels fast with the tire or the nose of the rim as the leading edge.

The resulting "Firecrest" shape (Hall names all his designs after birds) might look a bit beefy, but don't let looks deceive you. While traditional thinking has held that narrower and deeper is faster, tunnel results from the Firecrest prototype proved this isn't always true. The 404 (58 mm rim depth) with a Firecrest profile tested as fast as the 808 (81 mm) with Zipp's "old" shape at wind angles between 0 and 10 degrees of yaw. But what was most impressive (and unexpected) was how well the Firecrest shape performed at angles greater than 10 degrees. When the wind angle was thrown to 15 degrees the 404 Firecrest outperformed the 2009 iteration of the 808 by almost 60 grams of drag. That's a ridiculous savings. We're talking minutes, not seconds, over the course of a 90K bike leg.

THE HEAT ISSUE. Zipp was a latecomer to the carbon clincher game. The company's reluctance to enter the market was based solely on the products they had seen from other companies over the past few years. While Zipp believed carbon clinchers showed plenty of promise as a versatile wheel for both training and racing, they had serious reservations about the safety and durability of the carbon clinchers they'd seen.

"We didn't want to bring a wheel to market that wasn't safe to use under the most extreme conditions," says Zipp Technical Director Josh Poertner. "When you overheat a tubular the brake pads pulse and it's annoying. When you overheat a carbon clincher you can end up with catastrophic rim failure and serious injuries."

Enter Zipp Test Engineer John Fearncombe, whose main job is to develop machines that destroy really expensive pieces of carbon fiber. Fearncombe and his team developed a machine to test heat dissipation and braking forces on the rim, going so far as to include an infrared camera to measure temperature on an area as small as a single pixel. Fearncombe began testing resin from just about every manufacturer on earth before coming across a supplier that could make a resin that was sufficiently tough and heat resistant. The new resin can withstand pressure up to almost 400 psi and temperatures 100 degrees Fahrenheit higher than the resin of their competition. Zipp understandably will not provide the name of this supplier, but did note that its resin is designed for use in Formula One racing.

"The Firecrest carbon clinchers are built to the point that you can treat them just like you would an alloy rim from a braking standpoint,"

Poertner says. "No one has been able to say that about a carbon clincher before."

THE RIDE. I've never used the word "best" in a product review. Never have I tested a bike, or a pair of bib shorts, or anything else that I've been convinced is the single "best" product in a certain market. That changed after my first ride on the Firecrest 404 Carbon Clinchers. I can say without a doubt that these are the best all-around wheels I have ever tested—and I've tested a lot of wheels.

While there are literally dozens of design characteristics that contribute to the overall quality of the ride, the most tangible (and significant) benefit of the Firecrest rim shape is the way it acts in a crosswind. When a rim is met with crosswinds the air pushes the wheel to one side, essentially steering the bike and forcing the rider to correct. With traditional aero wheels the center of pressure of the crosswind is close to the front of the wheel, creating that "twitchy" feeling that we're all familiar with. The reduced drag of the rear half of the Firecrest rim actually pulls that center of pressure back, putting it almost directly on top of the steer axis. The result is that the wheel feels like it's correcting itself while negotiating crosswinds. Australian pro cyclist Baden Cooke, who was one of the first to test Firecrest, put it best when he said, "It's like the wheel rides within the wind instead of against it."

Many triathletes will find that the single biggest benefit of Zipp's carbon clincher technology is not how well it performs while riding, but how quickly it can get you back on the road after a flat. Gone are the days of struggling with a tire lever on the side of the road as scores of racers pass you by. With a few minutes of practice, you should be able to swap out the tube on a Firecrest carbon clincher in roughly 30–40 seconds. I've seen people do it in less than 20. It's that easy. When the tire is flat it simply falls off the bead with little more than a pinch. When the new tube is installed the tire cinches back onto the bead with such ease that a toddler could apply enough pressure to do it. It's a god-send for athletes whose biggest fear is a flat tire in the middle of an "A" race.

If I were forced to come up with one knock against these wheels it would be the price. At \$2,700 a set, these wheels run more than most triathletes' bikes. Is the difference in ride quality worth almost three grand? That depends on how much three grand means to you, but if you're anxious to blow that kind of money on bike technology, absolutely do not spend it without trying these wheels first. 