

BRUNO  
KUNZ

# NEW PRODUCTS

By Fred Zahradnik

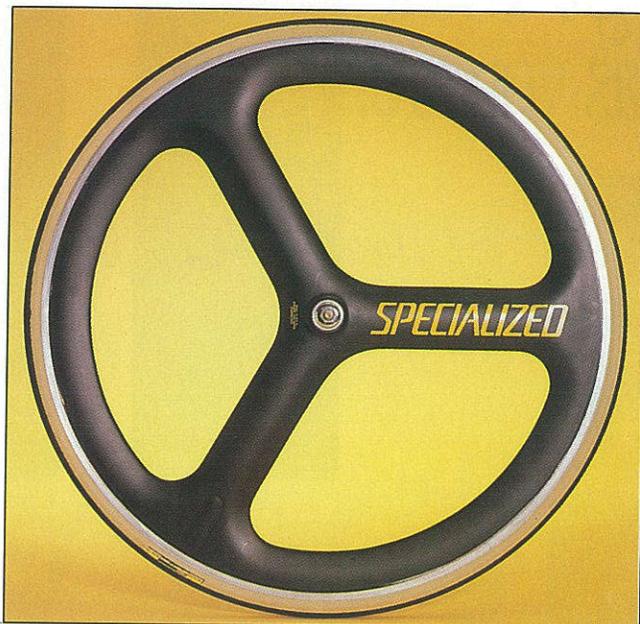
## DISK BEATER

The Specialized "Composite Wheel" is a rolling wing that slices the air and performs well in crosswinds. It's made of carbon, Kevlar, and glass fibers molded over a foam core. Specialized claims the \$750 700C wheel is faster than a disk and can lop 10-15 minutes from a fast century, compared to riding a bike with 36-spoke wheels.

Composite-spoke wheels are permitted in triathlons and U.S. Cycling Federation time trials, but not mass-start races, though the latter restriction is under review.

Specialized's target weight for a front or rear wheel is 2.8 pounds, including axle, bearings and quick-release, and our prototype was 2.9. A conventional 32-spoke clincher wheel weighs about 2 pounds.

Disks have proven their speed in competition, but a crosswind or fast descent can make bikes with a front one unwieldy. Disks also have some surface drag due to their large area. In a 15-20-mph crosswind, the Specialized wheel tugs at the handlebar a bit more than a conventional type, but not nearly as much as a disk. It was easy to pedal a straight line at any speed. When riding some downhill stretches of my club time trial, I was able to use a bigger gear than normal. They felt slightly harder to accelerate than standard wheels due to the extra weight, but Specialized claims that the aerodynamic



benefits outweigh this at speeds greater than 17 mph.

While Specialized isn't the first to offer a composite-spoke wheel, its entry into the market is notable for the role of Du Pont's Advanced Composites division. The 2 companies spent \$1 million on research and development. Du Pont engineers Mark Hopkins and Frank

Principe spearheaded the design. In '88 they carved a prototype from a piece of Hopkins' plywood workbench. Then, using NASA airfoil data and Du Pont's Cray-MP supercomputer, they created a more sophisticated model (below).

In Specialized wind tunnel tests, a prototype wheel registered 75 grams of drag at 30

mph, some 25 grams less than a flat disk. In a 10-degree crosswind, lift from the airfoil shape of the spokes and rims actually lowered drag to 35 grams. A convex disk was slightly better, registering 25 grams, and a flat disk had 75 grams.

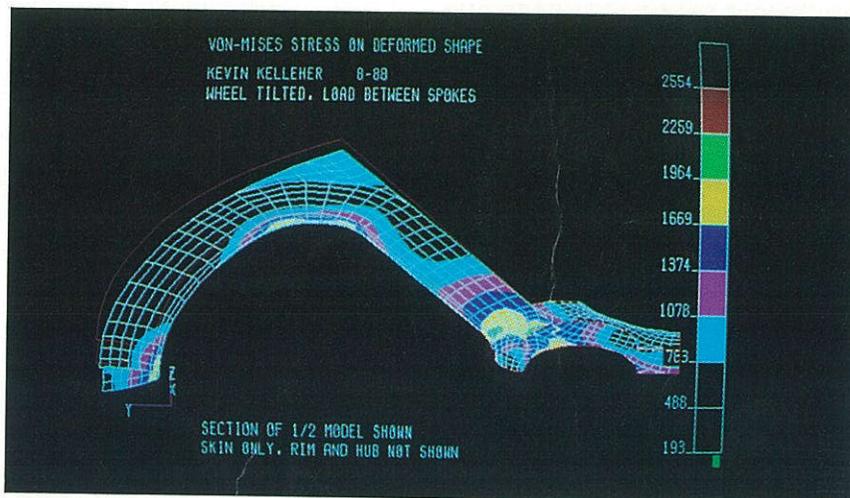
Specialized opted for aluminum rims (available for clinchers or tubulars) to provide durability and normal braking feel. However, the rim is bonded and can't be replaced. The aluminum hub accepts a standard axle and sealed cartridge bearings and is threaded to accept a free-wheel. Cassettes can't be used, and this limits gearing to 7 cogs. A wheel can fit in front or back by using a different axle, spacers, and quick-release.

Du Pont says it has subjected the wheel to vertical loads of 1,000 pounds without damage. (Nonetheless, it's not recommended for tandems.) A top-quality 36-spoke wheel buckles at 600-900 pounds, according to Du Pont tests. I rode over pot-holes and rail crossings with-

out problems. The Specialized wheels are noisier than conventional models, but less so than a disk. When sprinting or climbing, they felt as laterally stiff as standard wheels.

Specialized wheels come with hardware and spacers for the front/rear changeover and an adapter for Avocet cyclecomputer hub rings. A 26-inch off-road version is

being developed. For the nearest Specialized dealer, call: 408/779-6229. ►



**Du Pont's Cray-MP supercomputer munched on this partial wheel model to predict stresses. The scale shows pounds per square inch, and the colors correspond to the load.**