

Technology taking a toll on cyclists

By Ian Austen, New York Times

PÉRIGUEUX, France – In terms of technology, Greg LeMond, the three-time Tour de France winner, was a pioneer. In an age when steel still dominated, LeMond rode bikes made of carbon-fiber composites, then an exotic material mostly used by the military.

At this year's Tour, carbon fiber is the only material used for bikes, and it has also replaced aluminum in wheel rims. The strength, lightness and the design flexibility offered by carbon fiber have ensured its dominance. And its most extreme form, the special aerodynamic time-trial bicycle, was on display Saturday in the 20th stage.

But there has been a catch. Unlike steel or aluminum, carbon fiber does not bend in crashes. Rather the bikes and wheels frequently shatter, often hurling riders to the road and, many fear, increasing the severity of injuries.

"Anyone in a team who's being honest with you will tell you how frequently their bikes are breaking; everybody knows," said Mark Greve, a physician and assistant professor of sports medicine at Brown University who studied injuries to 3,500 competitive cyclists. "Few people in the public appreciate how many bikes a pro team will go through in a season, because they break for one reason or another. The bikes, they completely explode."

Having conquered professionals, who ride frames that retail in the United States for \$5,000 to \$6,000 with forks, carbon fiber is making its way to increasingly affordable models available to the more casual riders.

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