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# Power meter has become indispensable tool for pro riders

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PRESS DEMOCRAT

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Watch today's stage of the Tour of California, especially during flatter sections, and you are likely to see the riders periodically dip their heads for a few seconds at a time. They are not necessarily stretching their necks, or gathering concentration, or praying.

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Chances are, they're checking the power meter.

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"It's kind of a problem, because it can become addictive," said Phillip Gaimon, who rides for the Jelly Belly Cycling Team. "It's like there's a little spring in your neck, and you're always looking down."

All but unknown to the casual race fan, the power meter has become an indispensable tool for professional cyclists. Not even the riders knew of them a decade ago. Meters started showing up at the Tour de France maybe six years ago. "Now," said Glen Mitchell, team manager for Bissell Pro Cycling and a Santa Rosa resident, "75 percent of pro riders are using some kind of power meter."

Elite cyclists and their coaches have always been drawn to hard measurements — speed, heart rate, altitude, cadence (the rpm of

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the tires) — as well as the riders' subjective descriptions. But each is unreliable in its way. Speed and cadence change dramatically based on grade, wind and road surface. Heart rate and personal reports can be affected by internal factors.

“Sometimes I’ll use heart rate as a secondary measure,” said Jason Tullous, a coach for Carmichael Training Systems, based in Tucson, Ariz. “If it’s way above what you’d expect, I’ll ask, ‘Hey, how’d that feel? How hard was it on a scale of 1 to 10?’ If they answer ‘10’ and you know it shouldn’t have been that high, I’ll want to talk about that. If they have an outside job, are they working a lot? How’s the family? Are they getting enough sleep?”

Riders still wear heart monitors to measure their pulses. And the modern power meter includes traditional gauges, like speed and cadence. The innovation is measuring the watts generated by the athlete while pedaling.

There are two main types of high-end power meter. The SRM model is mounted on the crank system. The PowerTap is

mounted on the rear hub. Both pick up minute deformations in the metal of the bike, which tells you how much force is being applied to the pedals.

The data is constantly available to riders, displayed on a cyclometer mounted on the handlebars. Competitors check the power meter during races, but it is much more important after the race, or while training.

In any case, the numbers are stored in a database that can easily be downloaded by coaches. That’s especially handy in an age when riders often work remotely with coaches who may be thousands of miles away. When Tullous walks into his office each day, he checks e-mail from his riders and opens attachments — basically Excel spreadsheets — with their power-meter results. He pulls this into software called TrainingPeaks or CyclingPeaks, which graphs the wattage in a series of jagged spikes.

If you want to see what the data look like, check out a description of Gustav Larsson’s profile from Stage 5 of the Tour of California here: <http://home.trainingpeaks.com/races/2009-tour-of-california-race-file-analysis/stage-5-larsson-.aspx>.

A coach can zero in on any particular moment of a ride. And he can chart the whole, called the rider’s “power profile.” Measured in kilojoules (equivalent to the number of calories burned), it’s the distillation everyone is looking for.

Most elite cyclists can pump out 1,800 watts at maximum effort. It is said that Lance Armstrong could generate 500 watts for 30 minutes of climbing when he was winning the Tour de France annually. It’s actually a little humbling when you consider that a typical hairdryer or coffeemaker has a 1,500-watt heating element, and the average high-definition TV runs on about 250 watts.

Riders and trainers alike stress that the power meter is only one tool at their disposal, and will never fully replace more subjective observation. Where it really seems to help is in tracking progress over time, and in conjunction with rider reports. If the feeling doesn’t match the number, it can send up a red

flag.

“Say I do a five-minute effort every Friday,” Gaimon said. “Each week I track it. Then when I’m peaking, maybe one week it’s 40 watts lower. Sure enough, the next day I’ll get a cold.”

Some veteran pro cyclists still ride without a power meter. Others check the numbers compulsively, even to a fault. “A lot of times I’ll have guys put black tape over the number, because it can play mind games with them,” said Tullous.

One thing is clear. Within a few short years, the power meter has gone from novelty to necessity.

“It’s like a coach on the handlebars,” said Steven Cozza, who lives in Petaluma and rides for Garmin-Slipstream. “There’s really no cheating.”

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