



MATT MILLER

THE BRAKE POWER METER IS A WORLD-FIRST BRAKING ANALYSIS METER, COLLECTING DATA THAT WILL HELP CYCLISTS IMPROVE THEIR RIDING PERFORMANCE.



BRAKE POWER METER

THE TECHNOLOGY

What wins races? Speed. In downhill and cross-country mountain biking, speed is a result of how hard you pedal (propulsive power) and how little you slow down – or brake. Cyclists have long been able to measure their propulsive power using power meters, and analyse this data to focus training on improving their speed and fitness. Now, in a world first, Massey University's Sport and Exercise scientists Matt Miller and Dr. Phil Fink have invented the Brake Power Meter. It automatically measures when, how long and how hard you brake, during the course of a ride.

Why is this important? Research proves braking power and time spent braking are directly related to lap times. More skilled, faster riders brake powerfully over a short space of time, whereas slower, less skilled riders brake with less power over a longer time period. Changing the way you brake can make you ride significantly faster.

Drawing on his ten-plus years of elite mountain bike racing in America, Matt came up with the idea when he realized he was able to beat faster, fitter riders simply by braking less. Instead of riding the brakes, he would apply them harder and faster, resulting in a quicker overall time.

“It automatically measures when, how long and how hard you brake, during the course of a ride.”

Matt and Dr Fink's research uncovered distinct differences in the braking patterns of trained and untrained mountain bikers. This shows the level of a rider's skill, indicating that focusing on skill training can improve rider's times. Better braking also reduces rider fatigue, which, particularly over a longer cross-country race, can give riders the edge over their competition.

The Brake Power Meter allows riders to study their own braking patterns so they can use the data to adjust their braking style.

THE RESEARCH AND DEVELOPMENT

Matt and Dr Fink spent more than 2 years researching the importance of braking patterns on race performance and rider fatigue. Working with several national-level mountain bikers, they noted huge variation in the time it took to complete a descent without pedaling. The differences in braking as they practiced the track proved that by targeting braking training, they were able to increase speed and performance. Changing braking habits alone resulted in the downhill runs being over 10s faster.

The first prototype of the Brake Power Meter took the front and rear brake calipers and mounted them to brackets that allowed the caliper to move slightly during braking to determine the torque that was being generated. Taking the torque number and multiplying it by the wheel's velocity determines the watts generated.

During testing on trail bikes they generated up to 10,000 watts, but they expect even higher numbers once they start getting elite downhill racers on the device.

The second generation prototype is a drastically smaller unit that relies on a strain gauge and an accelerometer encased in carbon fiber and mounted directly to the rotor.

THE COMMERCIALISATION

Market research indicates top mountain bikers and trainers are keen to get their hands on the meter as soon as possible. It's a game changer for the industry. The market for the device is large, with 50 million mountain bikers in the US, 5.5 million in the UK, 4 million in Germany and 200,000 in New Zealand. Cyclists spend more on accessories than bikes themselves, with 21% of frequent cyclists owning a specialist accessory such as a cycle computer.

Seamus Powell, a professional mountain bike racer from the Giant Factory is always looking for a competitive edge. He thinks being able to analyse his braking could improve his performance. Harlen Price, a professional mountain bike instructor says "braking is something we are always thinking about as MTB skill coaches – being able to measure this would be great!"

To inform commercial decisions Massey undertook significant market validation, including the survey of mountain bikers attending the gravity Enduro race in Rotorua, on-line surveys and analysis of online data and statistics.

Matt's attendance at the Interbike International Bicycle Expo in Las Vegas in September 2016 generated a huge amount of interest in the Brake Power Meter. The media coverage that followed resulted in several leading bike component manufacturers expressing an interest in the technology.

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Massey and Sensitivus (Denmark), a bike component manufacturer who has expertise in bike power meter development are undertaking co-development of the next prototype with the agreement to share IP and a view to enter into a commercial arrangement.

Massey's Director Business Development and Commercialisation, Mark Cleaver says, "This is a great example of how University researchers who believe in the commercial benefits of their technology and are prepared to develop it further can progress and take it to market.'

Matt says he just wants "to make riders faster."