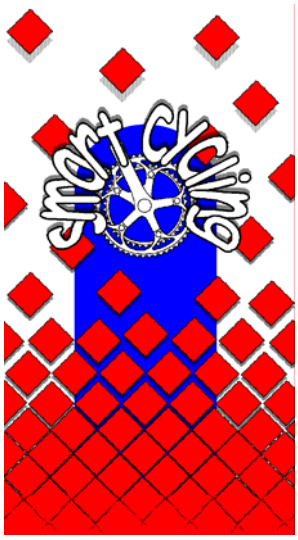

Smart Cycling, Inc.
Website Article #3

Alternative uses for a power-meter system

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Part of the challenge in being a coach is to look at things differently in order to help your athletes. You have to find that one bright spot of hope when all the athlete can see are the clouds. You also have to find new ways to use the things around you to help the athletes improve. That often means using certain tools or equipment in ways they were not originally intended to be used. It also means making use of things that have nothing to do with the sport of cycling.

Over the years various manufacturers have developed devices for measuring the power output of cyclists. Part of the idea was to show the coach how powerful the athlete was and help track improvement during training. However, bicycle racing is really more about saving your energy for the right moment. Therefore it is up to the coach to find ways to teach this to the athlete. Good tactical use of energy should be a continuous goal with any athlete. This thinking should start before the race and go all the way through the race, right up to the finish line. Here are some suggestions for using power meters for other things than maximum power output.

Alternate use #1. Warming up before competition is always a challenge for cyclists because of all the variables that must be dealt with. If the warm up is done out on the road, pavement conditions, traffic, weather, other athletes and course layout can all interfere with a proper warm up. These fluctuating conditions also prohibit being able to do the same warm up each time. Doing the same basic warm up routine each time allows the athlete to assess how they feel and make personal predictions about their chances during competition.

If the warm up is done on a stationary trainer, the athlete can follow the same basic routine no matter where they are competing. This allows the athlete the ability to better assess their feelings prior to the race. Having a set routine helps make things a bit more predictable and diminish the effect of the miscellaneous distractions that occur before every race. The pre-race warm up routine sets the tone both physically and mentally for the athlete during the race itself.

Using a power meter based warm up routine can better determine if the athlete is ready, regardless of the variables. Many coaches develop power based warm up routines for their athletes to perform on stationary trainers before competition. Doing such a warm up on a stationary trainer also allows the coach and teammates to interact throughout the pre-race routine.

The development of reliable, portable power meters adds a lot of options to the pre-race warm up routine. Combining a power meter such as the SRM or Power-Tap with a resistance trainer can give the athlete the ability to follow a structured, power based warm up routine before every race. Athletes with CompuTrainers or TACX Trainers can also follow the same type of pre-race routine. Radio Shack sells an inexpensive 120 volt power converter that plugs into the cigarette lighter in the athlete's car. (*Power Inverter Catalog Part # 22-148 $59.99 140 watt DC to AC*) This allows the athlete to set up their CompuTrainer or TACX Trainer at competitions for doing a watt load based warm up.

The actual pre-race warm up can be as simple or as complicated as the coach sees fit. Each race has its own demands and the design of the warm up can be customized to fit the race. For example, if the race in question is a criterium that has a history of starting very fast, the pre-race warm up may look something like this:

Spin in 42/18 at 75 watts for 5-10 minutes.
Get off and stretch legs.
Shift to 42/19 at 75 watts for 2 minutes.
Shift to 42/17 at 100 watts for 2 minutes.
Shift to 42/16 at 125 watts for 2 minutes.
Shift to 53/19 at 150 watts for 4 minutes.
Shift to 53/17 at 150 watts for 2 minutes.
Shift to 53/16 at 175 watts for 1 minute.
Shift to 53/15 at 190 watts for 1 minute.
Shift to 53/19 at 140 watts for 4 minutes.
Wind out 53/19, 18, 17, 16, 15, 14, 13 over 2 minutes reaching a load of 300 watts.
Shift to 42/18 and spin at 100 watts for 10 minutes.

This is of course a bit oversimplified, but it gives the athlete a different perspective on warming up. Many of the things athletes monitor before competition can be misleading indicators. The course, tension, past results, nervousness and weather conditions are just a few of the things that can affect the athlete's perception of their readiness to race. By using a series of predetermined watt load markers, the athlete can warm up and know that their body is race ready if they hit those markers. Many athletes who use this type of routine actually cover up the displays on their power meters so only watt load is showing. Whatever method you design for your athlete, you should see an improvement in their confidence and race performance.

Alternate use #2. Finding the most energy efficient place to ride in a pack can be a challenge because the athlete's position is always changing. Using a power meter can help the athlete determine the best positions to ride. Rather than monitor the maximum watt load they can produce, the athlete tries to maintain the pace of the other cyclists while producing the lowest amount of watts. Ever since the advent of heart rate monitors cyclists have been crazy about numbers. One of the best ways a coach can get an athlete to focus on tactical riding is by showing them how much energy they can save by riding smarter. Nothing brings that home better for an athlete than by seeing the difference in their workload on the face of the computer.

All the coach has to do is set up the situation for the athlete and send them out to ride. Once the athlete starts working in even a small group of riders it won't take long for them to see not only that they are saving energy, but how much they are saving. Riding at the front of a group at

25 mph may show up as 380 watts on the athlete's computer display. Yet once they drop behind another rider that load can drop by as much as 200 watts. It won't take long for the athlete to start looking for every bit of energy savings they can find. After that the coach won't have to coax the athlete to ride smarter. The athlete will be looking for those energy saving spots themselves. The fun then becomes downloading a day's training sessions and seeing how much speed was maintained for the least amount of work.

Alternate use #3. Finding the fastest way to the front is not easy during a race. Everyone wants to be part of the right move and no one wants to have to chase down the winning break. Moving to the front of a pack of riders requires determination and subtlety. No athlete should be using their energy to directly help an opponent. The idea is to develop methods for advancing race position without giving much help to the competition.

The area behind a rider is an obvious source of shelter from the wind. However, there is also shelter to be found riding along the side of a group of riders. Getting to the front going through the pack is much more difficult than going up the side. There are also more chances of being blocked or caught behind a crash when you try to go through the pack. Sometimes the best way to the front of the group is a hard, swift effort along the side of the pack. Other times, because of the pace or shape of the field the best way to the front is a series of short efforts. Using a power meter can teach the athlete which of these methods works best for them and when is the right time for each.

Having a power meter also allows the athlete to better determine the right gear combination when taking advantage of a drafting situation. Many riders will shift to a slightly larger gear when they are drafting in a group and shift down to a slightly smaller gear when they are doing a hard effort. This allows them the ability to spin the gear more efficiently. With a power meter on board, the athlete can compare cadence, speed, watt load and heart rate to find the best combination for them.

One other method of advancing their position is for the athlete to coast downhill. Many athletes miss their chance to stay in position or advance their position because they miss short opportunities to get into an aerodynamic position and speed up on descents. Practicing descending with a power meter can help the athlete determine how well they are saving energy by comparing their descending with someone who pedals. Have the athlete go out and train over rolling terrain and practice producing zero watts while descending.

Alternate use #4. Determining the energy required to close a gap is like trying to predict the weather. All you can do is make a good guess. However, with a power meter and some careful practice the guesswork becomes more precise. The two areas of concern when closing a gap are; how much energy will it take and how long will it take to recover. Practicing this skill is rather simple and requires as few as two athletes. It is a good idea to practice different size gaps so the athlete can learn when a gap is getting beyond their ability to close.

Once the riders are warmed up and riding at speed, the first athlete to practice allows a gap to form. When the gap reaches the desired length or time frame, the chasing athlete tries to close it as quickly as possible. The athletes will then change roles when the gap has been closed. The faster the gap is closed the better because the longer an athlete rides alone the faster their energy will be used up. If possible, this skill should be practiced in conditions similar to a real race. For

example, many criteriums are held in cities where buildings can block the view of the course. It is important for an athlete to learn how to chase down an opponent who can no longer be seen. This is also a good way for the coach to teach the athlete about split times and what they mean.

The things for the coach to watch for will be the time it takes to close the gap, the watt load required, the cadence during the effort, the heart rate during the effort and the time it takes to recover. Some of this can be seen during the practice, but it will be more practical to analyze this later when the information is downloaded. The drill should be repeated using different length gaps, gearing choices and courses. Once the performance has been analyzed, the athlete will have a more concrete understanding of the own abilities. This will make for sounder on the bike decisions during competition.

Alternate use #5. Determining the best sprint technique for an athlete is not just about hitting a high watt load. Anyone who has watched a bike race can attest to the fact that no two athletes sprint exactly the same way. The last leg of the race is where the athlete attempts to use up their last drop of energy. For some that takes place during a fierce charge off the wheel of their lead out rider. Others jump from wheel to wheel until they are in the clear and burst across the finish line. Even though these riders may achieve victory using these methods, they may not really be the most efficient for them.

Using a power meter allows the athlete to see in black and white when they are getting the most bang for their buck. Not everyone can or should try to explode in the last 100 meters. By tracking the power output of a variety of different sprints, the athlete can see where they get the most speed and duration.

A simple test for doing this is to set up a simulated race finish, with distances clearly marked out in 50 meter increments. When the athlete has been riding for a while at a race like pace, have them sprint for the finish line in whatever way they see fit. Make notes about the starting point of the sprint, the athlete's position on the bike and if possible their use of gearing during the sprint. The athlete should then be given time to recover and replenish their energy. It would also be a good idea to download the power meter and review what took place.

When the athlete has recovered and has been riding at a race like pace, they should sprint again, but using a different technique based on their last sprint. It could be that the athlete can reach a high top speed by winding each gear out one at a time. Perhaps they need to stay seated and not shift at all, but simply push one gear to the end. The possibilities are endless and it is only the imagination of the coach and athlete that will restrict finding the best method. The advantage of doing this with a power meter is that it will provide the concrete proof that one method is in fact better than another.

Alternate use #6. Use a power meter for determining the best acceleration path on a velodrome. Using a power meter such as an SRM or a Power-Tap track wheel can help show the athlete the best path and technique for using the banking and shape of a velodrome. Power-Tap wheels can be converted into track wheels by removing the cassette body from the wheel and installing a Surly Fixxer Fixed Gear body. The parts can be obtained directly from Surly and complete instructions for converting the wheel can be obtained by sending us a request for Help Article #2.

Using a power meter to perfect their riding technique can help the athlete find the fastest path on the velodrome. Every track has its own quirks and the athlete needs an outside observer to monitor their technique in order to find and take advantage of the given track's shape. By using a power meter during practice, the athlete can see output data that can verify if riding one part of the track is more efficient than another. Like with the example of drafting in the pack, the athlete is looking for the highest possible speed for the energy they are spending.

No matter what the skills of the athlete, there is always room for improving efficiency. Using power meters to measure minimum power can perhaps be more useful than looking for maximum output. We all have admired how Lance Armstrong has made history by winning six Tours, but he didn't do that by expending the most energy. He did that by expending his energy to his best advantage. That should be a lesson for everyone who trains measuring power output, use your energy wisely. Have the athlete monitor group training rides to see how little energy they can expend during the ride. Make notes of how they achieved their lowest power output ride. Be creative and think outside the box. Good Luck!