

Science of Endurance

Vaaka Kayak Cadence Sensor

Cyclists and runners have been using cadence or stride rate to aid their training for many years. By controlling cadence specific training outcomes can be gained such as, bike big gear efforts at a low cadence to help develop strength or maintaining a high cadence on long climbs to evenly balance the physiological load across the muscular and cardiovascular system. To use cadence effectively during training and racing first you must know what it is in real time. That's where the Vaaka kayak cadence sensor comes in.

Designed and produced by Dunedin based sport technology company 'Insight Sport', the Vaaka kayak cadence sensor fills a void in kayak training data collection and training methods. Under the guidance of National Coach Gordon Walker, the New Zealand kayak team have been using cadence based training for the past two years with great success. Interested to know more about this exciting new piece of technology and how multisport athletes could benefit from it, I caught up with Brendan O'Neil who is a kayak coach and one of the master minds behind the sensor to have a chat.

Q: What lead you to come up with the Vaaka kayak cadence sensor?

A: As a kayak coach I am used to using a stopwatch to give athletes feedback on paddle cadence. For that to work I have to be able to see the training session and mostly I coach from a kayak so it's not ideal. With the increasing use of GPS watches in kayaking it seemed like an obvious step to build a sensor to provide that cadence data. I tapped into some of the expertise available in Dunedin and with the help of a small team have produced a product which does the job and is robust enough to withstand abuse from kayakers. I can now structure the training sessions around cadence and heart rate, the athletes can see exactly what they are doing. After training sessions I can review the data on the GPS watch software to make sure athletes are sticking to the plan.

Q: Give me a run down on the Vaaka cadence sensor and how it works.

A: The sensor utilises the widely used ANT+ wireless technology allowing it to be used with any ANT+ capable device such as the popular Garmin Forerunner and Edge models commonly used by multisporters. The sensor can be easily attached to both spilt and fixed paddle shafts using the rubber clips. Once paired with your device, cadence will be appear in real time in double strokes per minute. Meaning that paddling on the right and then the left side is counted as 1 stroke. By setting up the data screen on your watch with multiple fields it is possible to see heart rate, distance, speed and cadence all at the same time.

Q: Why do kayakers need to know cadence?

A: The goal of any training program or training aid is to improve performance. For kayaking this means going faster and there are only two ways to achieve this. 1) a longer more efficient paddle stroke or 2) an increase in cadence. Knowing your cadence is important for developing both of these aspects. For example as with swimming if you can maintain the same speed with a lower stroke rate you know your technique and efficiency have improved. It's all about distance per stroke. If you can

produce more speed at the same cadence you have more distance per stroke and therefore more power per stroke. So one way to train with the Vaaka sensor is to work on increasing speed at a fixed cadence. It is also important to train at different paces even if you are an endurance athlete so another way to use cadence is as a guide to training intensity. A cadence of around 34 will be fully aerobic so most endurance training will be at this level. For threshold sessions, cadence will be about 40 and a couple of these sessions a week will help with aerobic conditioning. All the time athletes need to work on distance per stroke so the aim is to hold cadence and increase speed. For max speed and to help develop neuromuscular pathways some faster cadence work can be helpful too up to 55 double strokes per minute.

Q: I hear that the Vaaka cadence sensor has helped the New Zealand Olympic kayak squad.

Yes, our first prototype was in 2009 and the New Zealand team immediately ordered ten sensors. With their feedback we have improved and refined the sensor, now its pretty much bomb proof. You can leave it on your paddle, it goes to sleep when not in use and wakes when you jump back in your kayak. We have got the battery life to about 12 months but it takes a standard alkaline AAA battery so changing the battery is no big deal. Lisa Carrington was using the Vaaka cadence sensor as part of her build up to the World Champs in 2011 and Olympic Gold in 2012. Lisa is great and raves about the Vaaka sensor and continues to train with it every day. We held back on its release until after her Olympic Gold so it's only been available to her competition since August last year.

Q: What about the future?

The Vaaka is a world first, there is nothing similar for kayaking out there. Australia and New Zealand have been our main market so far but we are coming into the European summer and their kayak season so we are busy marketing the Vaaka sensor in Europe. All local sales are through our insightSPORT website but for international sales our preference is to sell through local dealers in those countries so that is the focus of our energy at the moment.

In the next Science of Endurance article I will outline specific cadence based training sessions that you can incorporate into your training.