Understanding Your Bikelab Inc Training Zones

Why Training Zones are so Important. For cyclists, training zones (power and heart rate) represent the "gauge" by which riding intensity is measured (monitored). In some ways, it is a bit like the tachometer in a car, showing bike riders how hard they are "revving" in relation to maximum capacity.

How many zones are there? Although it varies from system to system, there will usually be somewhere between 5 and 7 zones. Bikelab Inc uses six zones, but given Z1 is not used in a training capacity, there are really five functional training zones. Z2 is the lowest training zone and Z6 the highest. Most training systems utilise an algorithm, applied to a measured or tested FTP (usually maximum 20-minute power) to estimate training zones. Although this approach works for simplicity, it has no real capacity for pin-pointing the most effective physiological range for each zone. It is not possible to simply calculate zones a simple % of FTP because there is enormous variation in terms of what is happening in an athlete's body when riding at intensities both above and below FTP. This is why we use testing to pinpoint the most effective training zones, thereby maximising every rider's adaptation windows and create customised zones for all riders.

How Bikelab Inc creates customised training zones. The Field Test is actually a series of tests, where each individual protocol collects information about the unique capacity of each cyclist. A Bikelab Inc Test will actually pinpoint, through direct measurement:

- Maximum 20min power (often referred to as FTP/20)
- Maximum Aerobic Power (MAP)
- Sub-threshold Aerobic Efficiency
- Anaerobic Power & endurance
- Supra-Threshold (above threshold) Fatigue Index

Once these points have been identified, truly customised training zones can be calculated, dramatically increasing the efficiency of training.

Matching zones to adaptation windows. In exercise science terms this refers to the intensity "window" (training intensity) at which certain adaptations will occur. Training at a particular intensity produces a specific set of outcomes, here are a few examples;

- Training in Z2 builds aerobic efficiency, conditions the body to use more fat as a fuel and increases the activity of aerobic enzymes which improves endurance fuelling of muscles.
- Training in Z3 steadily builds aerobic power (increases the aerobic threshold) making it more likely that these far more efficient aerobic processes can be utilised at ever-increasing cycling speeds and power outputs. Very good aerobic power means much less build up of lactate once the going gets tough.
- Training in Z4 (which is usually a very small power range) increases tolerance to lactate in the blood which improves fatigue resistance. It is important to note that these gains are actually very limited without having first built aerobic efficiency and aerobic power.

The adaptation window is determined by the physiological processes taking place at a particular time. The physiological conditions need to be favourable for the adaptations to occur and these conditions cannot be easily guessed or extrapolated from a simple FTP test.

It is very common that, when tested, two riders who have almost identical FTP will have vastly different training zones. The relative size of each zone must be identified through a specific test otherwise it is highly likely that adaptation windows will be missed and training sessions end up being performed at ineffective intensities. In this case, a cyclist's progress will be slow and any gains will probably be short-lived.

Training Zone Data:

ZONE	POWER(Watts)	HEART RATE(BPM)	Description
One	0 - 162	REST - 105	Restorative - social riding walking (not relevant as programming tool)
Two	162 - 260	105 - 135	Used for active recovery and extensively in base phase. Also used for spin segment after intervals and higher intensity sets. When Aerobic Fitness is good, this zone is quite big meaning riders are able remain aerobic at quite high Heart Rates and Power levels.
Three	260 - 319	135 - 170	Tempo zone - sustainable medium term but lactate is likely to be rising. When aerobic fitness is low, the tempo zone is larger and kicks in at lower Heart Rates and Power numbers
Four	319 - 329	170 - 175	Threshold Zone - Intensity that is sustainable for 20min and up to 1 hour (depending on fatigue resistance), lactate is accumulating and athlete is at the limit of sustainable intensity.
Five	329 - 388	175 - 183	VO2 Max zone - Sustainable for 5-10min, used sparingly in training programs.Very rapid lactate rise. The tolerance for training in this zone varies greatly between athletes.
Six	388 - MAXIMUM possible watts	183 - MAXIMUM	Maximal output usually used for anaerobic development in intervals of 1-3 mins.

Despite a very impressive FTP of around 325w (mid Z4), notice the relatively low Z2 (35 beats below threshold)? This is due to the rider showing relatively low aerobic efficiency during the Bikelab Field Test. This is an example of completely customised training zones, that keep the riders training sessions in line with their adaptation windows.

Zone One. Z1 is the lowest intensity zone and is not used for training. It is sometimes used in rehabilitation programs or for athletes returning from a long break or illness.

Zone two. Z2 is the zone of "aerobic efficiency" and is sometimes called the endurance training zone. It is where cyclists must train, should they require improvements in aerobic fitness for "base miles" and to train the ability to use fat as an endurance fuel source. From an "adaptation window" perspective, Z2 must be where the rider's physiology has been measured as highly aerobic. Lactate levels should be very low, which ensures that aerobic pathways are working hard. If Z2 is incorrectly "estimated" (rather than tested), a rider may actually be riding in Z3 (where there is a higher bias towards anaerobic function) and missing most of the very important aerobic gains. This is a very common error.

Zone three. Z3 is that "crossover zone" where there is still a very strong contribution from aerobic energy pathways but the athlete is very close to the upper limits of their aerobic system. It is very important for this zone to be pinpointed accurately because it is the maximal intensity level that cyclists can maintain for long periods, but avoid excessive build up of lactate (often described as the riding "sweet spot"). Too low and the riding speed suffers, too high and fatigue sets in very quickly. Measurement is the ONLY way to accurately define Z3.

Zone four. Z4 is the threshold zone and functionally speaking, the maximum riding intensity that can be maintained for between 20-60 minutes (depending on a rider's fatigue resistance). It is usually determined through an FTP test (maximum sustainable power on a 20 minute ride) but is sometimes simply estimated through riding history. It is the zone where a rider's lactate levels are rising and fatigue is inevitable. Overshoot this one by just a little and instead of riding for 20 minutes, you may find the "axe" falling in less than 5. Most training systems calculate all other zones from this figure and so any errors in the testing process are magnified through the rest of the zones.

Zone five. Z5 is sometimes referred to as the "VO2 Max zone". When riding in Z5, lactate levels rise quickly and usually this intensity can be sustained for between 3-5 minutes. To set the limits for this zone, riders really MUST complete a supra-threshold fatigue test.

Zone six. Z6 is the MAX intensity zone. Sometimes referred to as the "neuro-muscular power zone". Essentially it is the power band (limit) that a rider can hit for very short periods (less than 12 seconds) along with the **absolute** peak power a rider can hit. This is the domain of the sprinter / track cyclists and used very rarely in training programs for the majority of endurance cyclists.

Training Zones are very important for cyclists and coaches. Knowing them is great but having them measured and accurately defined is critical.