





Getting Started with Power Training






The 7 Steps of Power Training | Tim Cusick

Power training vs. heart rate/RPE

POWER TRAINING

-  Precisely measures the exact AMOUNT of work you do
-  Establishes quantifiable baseline fitness
-  Creates SPECIFIC training zones
-  Allows you to measure MICRO-changes in fitness
-  Retesting leads to increased training zones, ensuring progressive overload

HEART RATE/RPE

-  Measures the RESPONSE to the work you do
-  Establishes baseline heart rate
-  Creates GENERAL training zones
-  Allows you to measure LARGE changes in fitness
-  Retesting shows improvement in a variable (not always progressive)

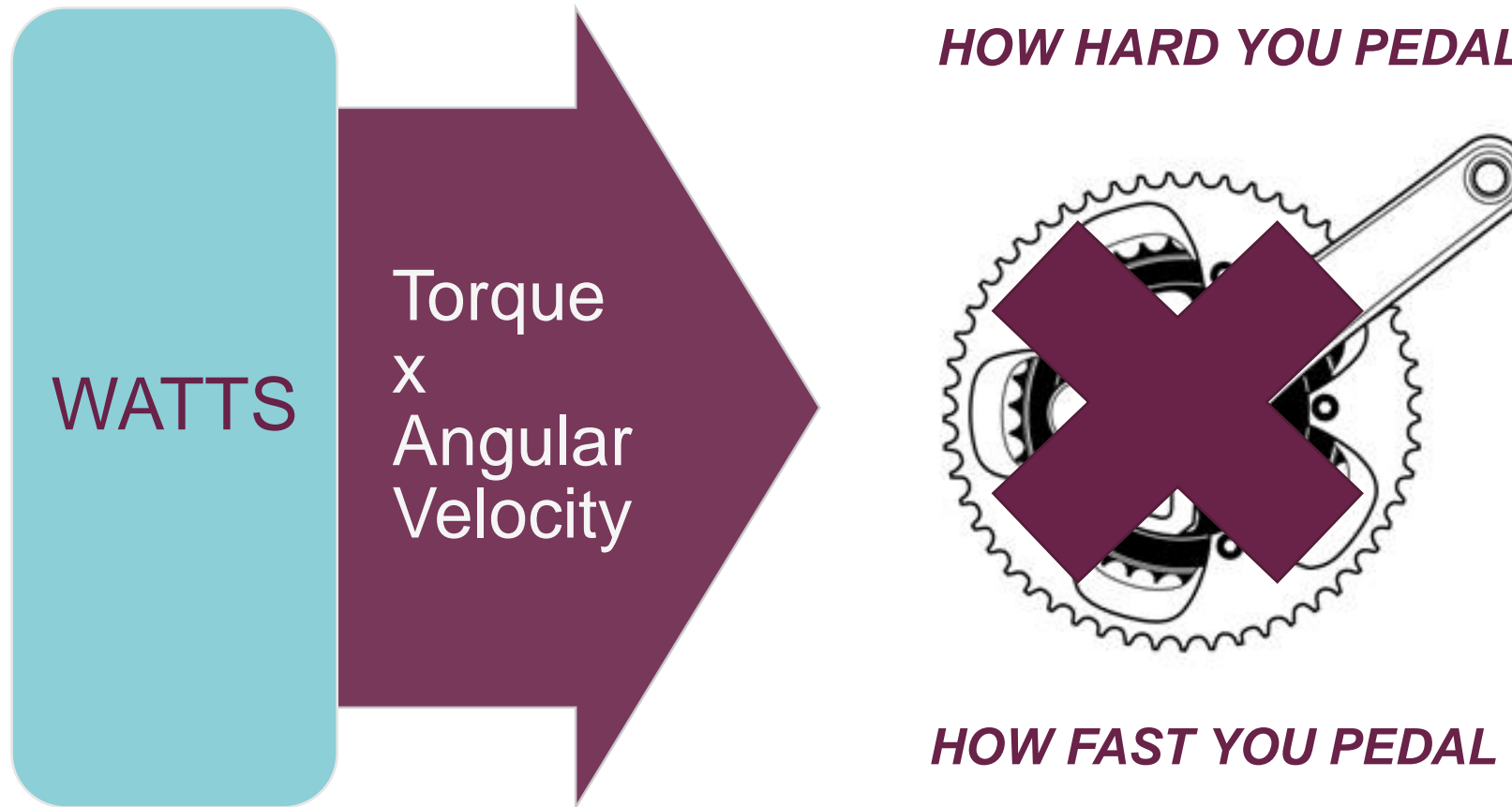
Watts

the energy required to move a mass a certain distance in a known time period

Average power

*the numerical average power put out
for a given time, measured in watts*

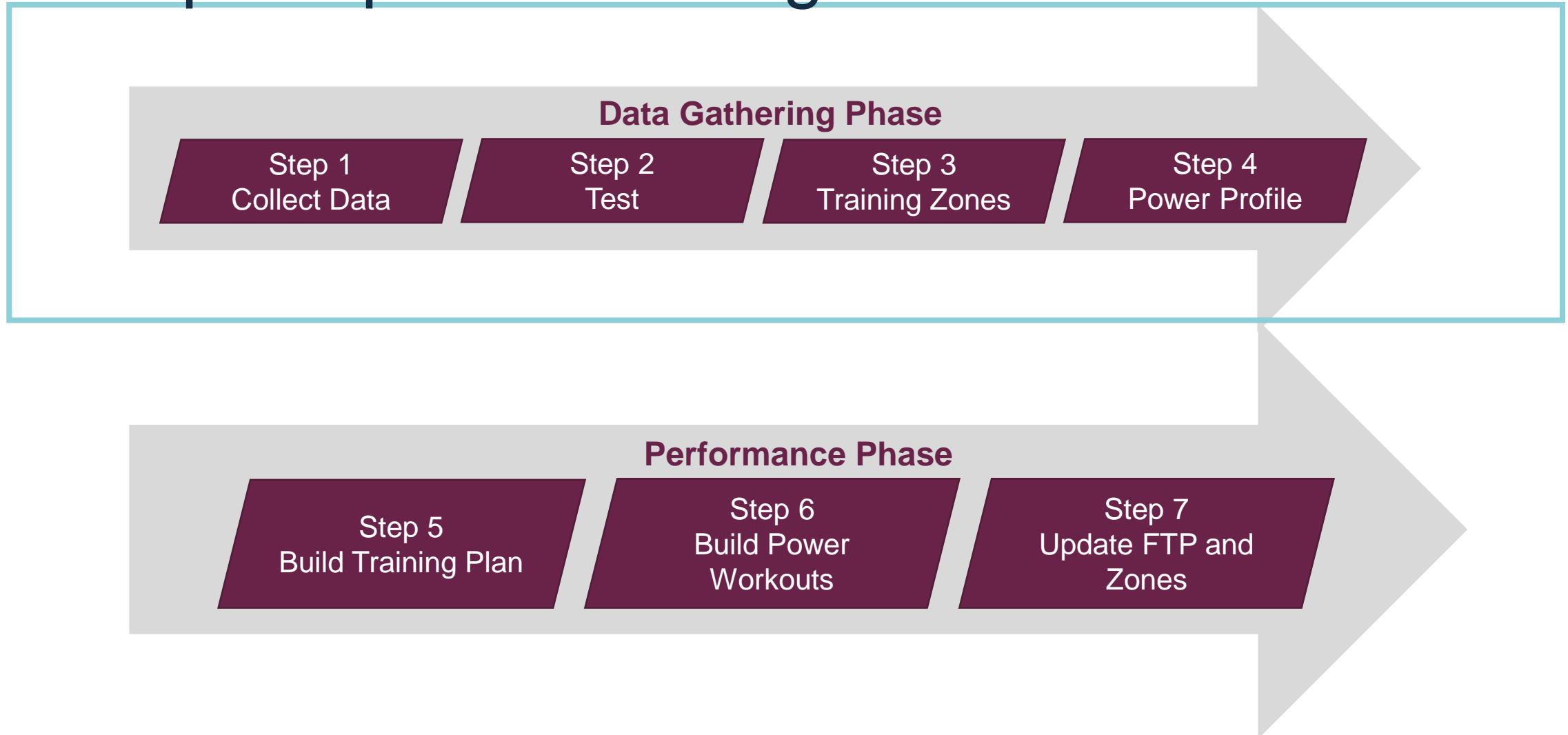
How are watts generated?



Functional Threshold Power (FTP)

the highest power a rider can maintain in a quasi-steady state without fatiguing

7 steps of power training



Step 1: Collect and view data

Collect Data

Develop a basic understanding of the numbers while beginning to collate the effort with the watts

Purpose

- Observe the stochastic nature of power measuring
- Begin to correlate effort and watts for a basis of understanding
- Post-ride data review to build basic understanding of the numbers
- Target: 1-4 weeks



Viewing ride data

Goal: Understand and put a number to exertion



View

- Stochastic nature
- Power on short climbs
- Power on long climbs
- Power in groups

Step 2: Testing

Testing

Once familiar with the numbers, the first step of power training is formal testing.

3-day protocol

Purpose

- Formal, repeatable protocol
- Establish functional threshold power
- Supply data to build a power profile
- Basis of training levels

Train where you belong



Power testing: Day 1

Day 1: 5-second and 1-minute maximal efforts

Day 1	Time	Description	% of FTP
Warm Up	20 min	Endurance pace	65%
	3 x 1 min (1 min RI)	Fast pedaling, 100 rpm	N/A
	5 min easy riding	Easy riding	65%
Main Set	2 x 15 sec (2 min RI)	All-out effort	Max
	10 min	Easy riding	65%
	1 min	All-out effort	Max
	5-10 min	Easy riding	65%
	1 min	All-out effort	Max
Cool Down	15 min	Easy riding	< 65%

Testing:

1. Record peak 5-second effort from the 2 x 15 sprints
2. Record peak 1-minute effort from the 1-minute maximal efforts

Power testing: Day 2

Day 2: 5-minute maximal effort

Day 2	Time	Description	% of FTP
Warm Up	20 min	Endurance pace	65%
	3 x 1 min (1 min RI)	Fast pedaling, 100 rpm	N/A
	5 min easy riding	Easy riding	65%
Main Set	5 min	Opening effort	90%
	10 min	Easy riding	65%
	5 min	All-out effort	Max
Cool Down	15 min	Easy riding	< 65%

Testing:

Record peak 5-minute effort from the 5-minute maximal effort

Power testing: Day 3

Day 3: functional threshold power

Day 3	Time	Description	% of FTP
Warm Up	20 min	Endurance pace	65%
	3 x 1 min (1 min RI)	Fast pedaling, 100 rpm	N/A
	5 min easy riding	Easy riding	65%
Main Set	5 min	Opening effort	100%
	10 min	Easy riding	65%
	40 Kilometers	All-out effort	100%
Cool Down	15 min	Easy riding	< 65%

Testing:

1. Record average power from the 40-kilometer all-out effort
2. Can utilize alternative FTP tests as reviewed

Step 3: Establish training zones

Training Levels

Once Functional Threshold Power (FTP) is determined, power training levels are established.

Purpose

- Focus training on desired physiological response
- Establish accurate training intensities
- Determine specific training intensities for select time ranges



Coggan training zones

Level	Name/Purpose	% of Threshold Power	% of Threshold Heart Rate	RPE	Time
1	Active Recovery	≤ 55%	≤ 68%	< 2	70 -80 years
2	Endurance	56 - 75%	69 - 83%	2 - 3	2.5 hours to 14 days
3	Tempo	76 - 90 %	84 - 94%	3 - 4	2.5 - 8 hours
4	Lactate Threshold	91 - 105%	95 - 105%	4 - 5	10 - 60 minutes
5	VO ² Max	106 - 120%	> 106%	6 - 7	3 -8 minutes
6	Anaerobic Capacity	121 - 150%	N/A	> 7	30 seconds - 2 minutes
7	Neuromuscular Power	N/A	N/A	MAX	5 -15 seconds

Training zones are built on both intensity and time

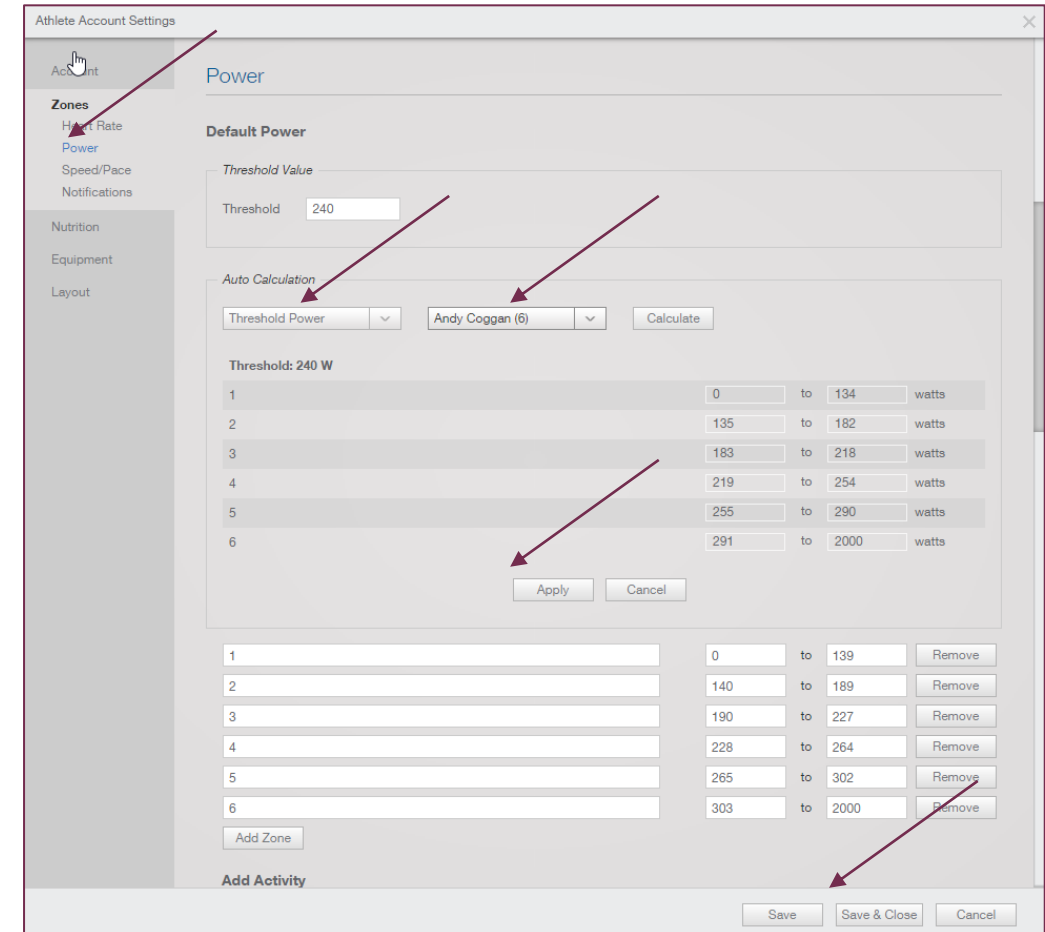
Power profiling

Expected physiological/performance adaptations from training at levels 1-7

	1	2	3	4	5	6	7
Increased plasma volume		✓	✓✓	✓✓✓	✓✓✓✓	✓	
Increased muscle mitochondrial enzymes		✓✓	✓✓✓	✓✓✓✓	✓✓	✓	
Increased lactate threshold		✓✓	✓✓✓	✓✓✓✓	✓✓	✓	
Increased muscle glycogen storage		✓✓	✓✓✓✓	✓✓✓✓	✓✓	✓	
Hypertrophy of slow twitch muscle fibers		✓	✓✓	✓✓	✓✓✓	✓	
Increased muscle capillarization		✓	✓✓	✓✓	✓✓✓	✓	
Interconversion of fast twitch muscle fibers (type IIb -> type IIa)		✓✓	✓✓✓	✓✓✓	✓✓	✓	
Increased stroke volume/maximal cardiac output		✓	✓✓	✓✓✓	✓✓✓✓	✓	
Increased VO2 Max		✓	✓✓	✓✓✓	✓✓✓✓	✓	
Increased muscle high energy phosphate (ATP/PCr) Stores						✓	✓✓
Increased anaerobic capacity ("lactate tolerance")					✓	✓✓✓	✓
Hypertrophy of fast twitch fibers						✓	✓✓
Increased neuromuscular power						✓	✓✓✓

Setting training zones in TrainingPeaks

1. Click your name in the upper right-hand corner to access Settings.
2. Click “Zones,” then “Power” from the left-hand navigation.
3. Enter your threshold power, choose Threshold Power as your type, and select “Andy Coggan” as your auto-calculation method. This will open a preview window of your zones.
4. Click “Apply” to save those zones. If you want, you can enter a different threshold value and click “Calculate” to view what your zones would be with a different threshold value.



Step 4: Review the power profile

Power Profile

Build a full power profile of an athlete to better understand his/her unique power production

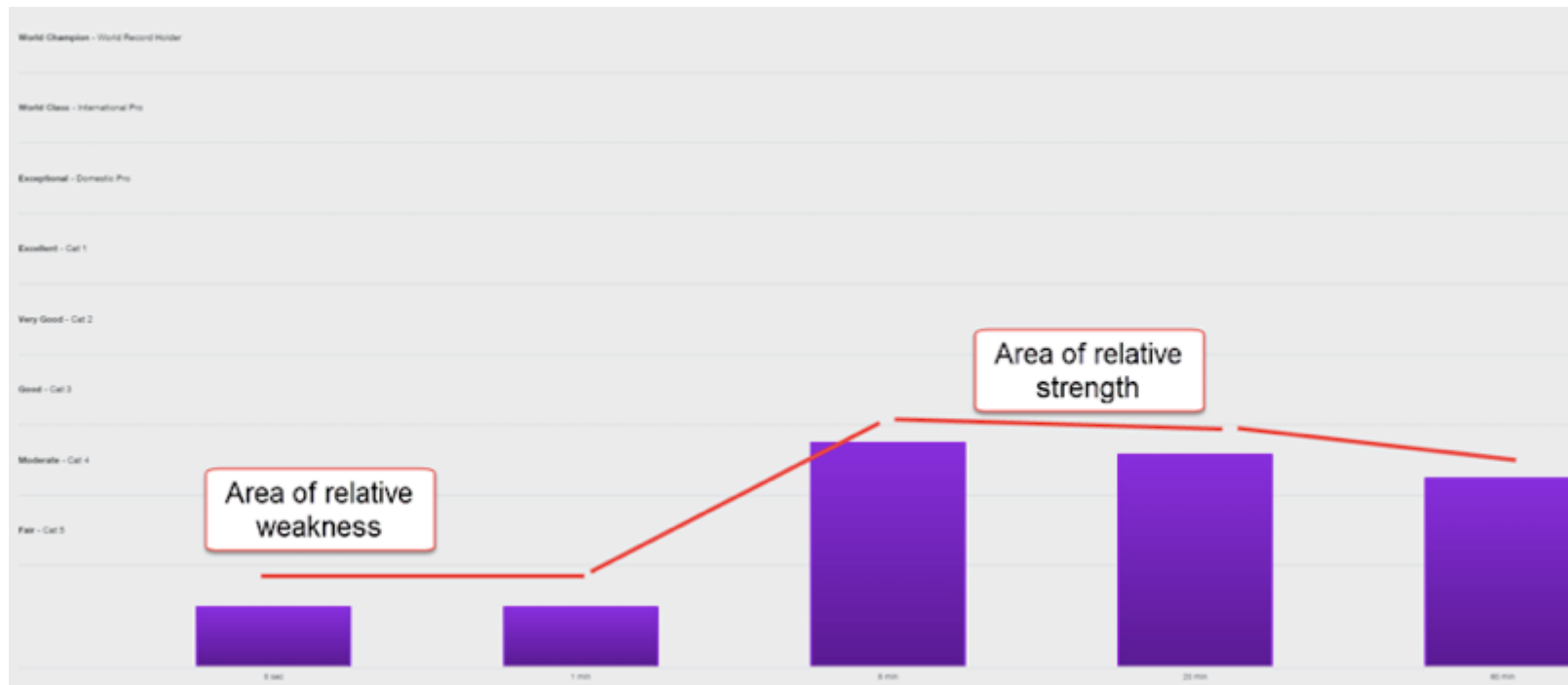
Purpose

- 360-degree view of athlete
- Determine unique athlete power profile
- Determine athlete's strengths and limiters



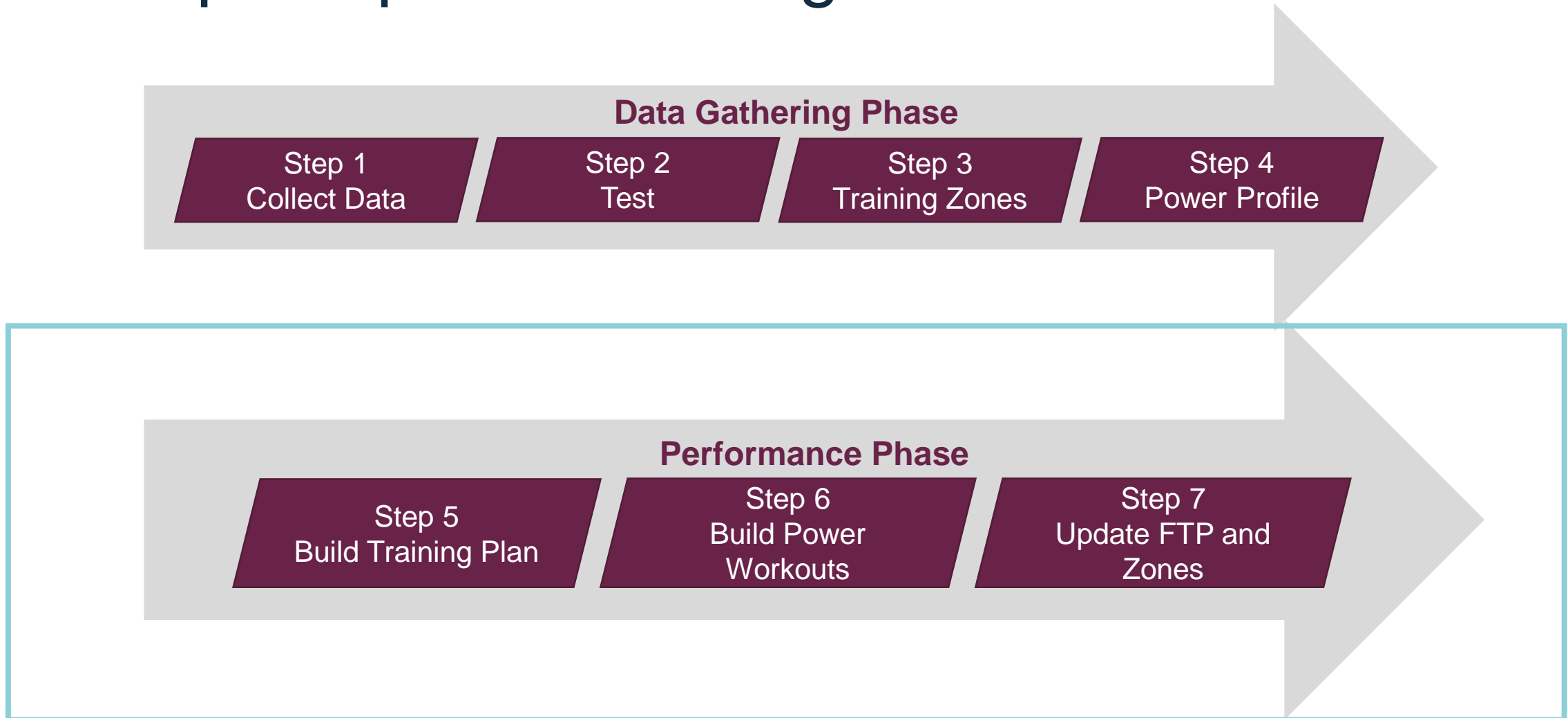
Power profiling

Power profiling gives us insight into an athlete's strengths and limiters



It is not where the athlete ranks that can supply the best data, but rather the shape.

7 steps of power training



Step 5: Build a training plan

Training Plan

Develop a long- or short-term power training plan focused on specific power goals that lead to performance improvement

Purpose

- Organize and focus training
- Structure training toward specific goals and milestones
- Improve results



Training plan overview

Periodization of Training



The aim of systematic *planning of endurance training* is to reach the *best possible performance in the most important competition* of the year. It involves *progressive cycling of various aspects* of a training program during a specific period.

Step 6: Build power workouts

Power Workouts

Create power-based workouts that support the key goals and targets of the training plan

Purpose

- Correctly target specific physiological adaptation
- Appropriate time and intensity of efforts
- Clear targeting of effort
- Basis for compliance



Training zones-based workouts

Workout designed by zones and expressed as **watts**

Watts targets become the carrot and sometime the stick

Measure workout success **by the numbers**

THURSDAY Dec 29, 2016 12:00 am

2:00:00 0mi 125.0TSS*
VO2MAX INTERVALS 5 x 4 CCZ5

	Planned	Completed	
Duration	2:00:00		h:m:s
Distance			mi
Average Speed			mph
Calories			kcal
Elevation Gain			ft
TSS	125.0		TSS*
IF			IF
Work			kJ

	Min	Avg	Max	
Heart Rate				bpm
Power				W

Equipment
Bike: Select Bike

Tags

Description

WU:
10-15 Min Warm Up, progressing to Zone 2
TARGET: (PW: 124 watts - 167 watts)
CADENCE: Self Selected with 2 x 1 minute
Fast Pedals to wake up legs

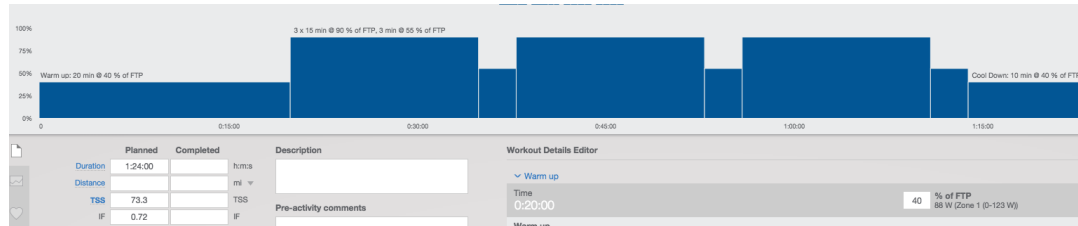
MS:
5 x 4 min VO2Max Intervals
TARGET: VO2Max (PW 234 watts - 266 watts)
REST: 4 min between, easy riding
CADENCE: self selected
**Ride all remaining time in endurance zone

CD:
Cool Down 5-15 minutes
TARGET: (PW: below 124 watts)
CADENCE: small chain ring

Pre-activity comments

Delete Cancel Save & Close

Structured workouts with training zones



WEDNESDAY Nov 2, 2016 Enter Time

0:00:00 0mi 0TSS
Untitled Workout

Upload Summary

Drag blocks to build workout

To begin building, first choose how you'd like to measure this workout.

Duration % Functional Threshold P

Continue

	Planned	Completed	
Duration	<input type="text"/>	<input type="text"/>	h:m:s
Distance	<input type="text"/>	<input type="text"/>	mi
Average Speed	<input type="text"/>	<input type="text"/>	mph
Calories	<input type="text"/>	<input type="text"/>	kcal
Elevation Gain	<input type="text"/>	<input type="text"/>	ft
TSS	<input type="text"/>	<input type="text"/>	TSS
IF	<input type="text"/>	<input type="text"/>	IF
Work	<input type="text"/>	<input type="text"/>	kJ

Workout Details Editor

Description

Pre-activity comments

Post-activity comments

Enter a new comment

Tags

Heart Rate bpm

Power W

Equipment

Bike

Shoes

Workout designed by zones and expressed as **watts**

Watts targets become the carrot and sometime the stick

Measure workout success **by the numbers**

Step 7: Update FTP and zones

Update FTP and Zones

Design and implement a system of testing FTP and updating training zones

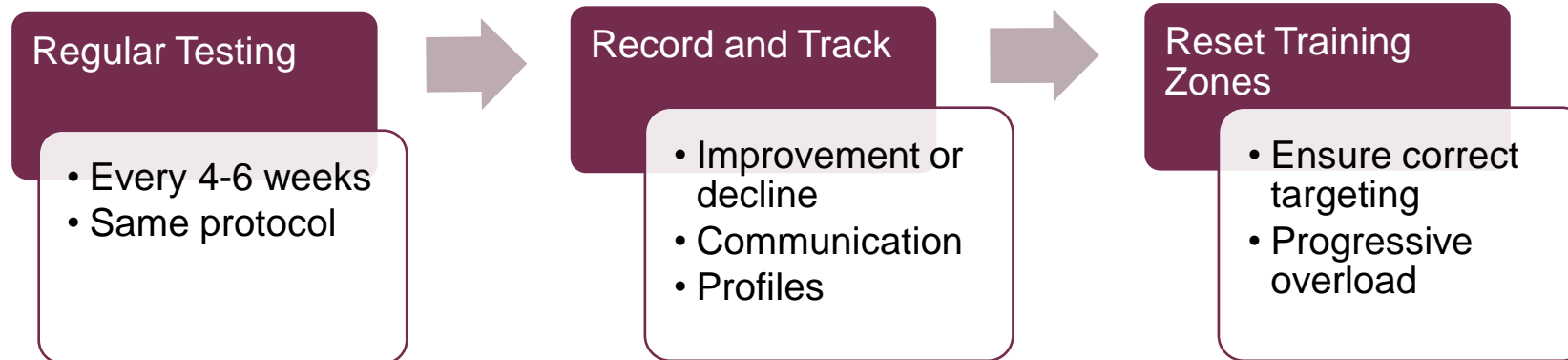
Purpose

- Ensure correct training intensities
- Track and ensure progression



Ongoing testing

Testing on regular scheduled basis allows for the tracking of changes in fitness and ensure accurate training zones.



Want to learn more?

Take the full course!

Click below to sign up:

<https://trainingpeaks-university.thinkific.com/courses/trainingpeaks-power-certification>