# For the love of the ride inside and out 

## IMPROVING <br> YOUR POWER

# WORK /THEORY ON PROFILES BY DR. COGGAN 

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| dueation | moximum ava Pow |  |
| :---: | :---: | :---: |
|  | (Wisk) | \% |
| 5 seconds | 15.75 | 35\% |
| 1 minute | 8.4 | 43\% |
| 5 minutes | 5.50 | 5\% |
| 60 minutes | 5.16 | 70\% |

Time Trialist


# WORK /THEORY ON PROFILES BY DR. COGGAN 



Time Trialist


Sprinter


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| Rider | Timo Tralls (male) |  |
| :---: | :---: | :---: |
|  | Div. 3 Professional, "strong time trali |  |
| duration | muxmmmaga powz |  |
|  | (Whog) | \% |
| 5 seconds | 15.75 | 35\% |
| 1 minute | 8.4 | 43\% |
| 5 minutes | 5.50 | 5\%\% |
| 60 minutes | 5.16 | 70\% |

Time Trialist


| RIDER | Sppintra (mate) |  |
| :---: | :---: | :---: |
|  | Cat 3 roadie with "amazing spint" |  |
| dueation | meximumava power |  |
|  | (Whk) | \% |
| 5 seconds | 19.90 | 68\% |
| 1 minute | 8.29 | 41\% |
| 5 minues | 4.05 | 27\% |
| 60 minutes | 3.69 | 35\% |

The "Shape" of the graph shows

Sprinter

performance
relative to
world record
holders.

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| RIDER | Time Tralls (mat) |  |
| :---: | :---: | :---: |
|  | Div. 3 Protessional, "strong time tralist" |  |
| dusation | muximmang. Power |  |
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CYCHEUSION

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| :---: | :---: | :---: |
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(i) ${ }^{1}$ ICI/PROORO
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- Generalists - will look for respectable numbers all around cyctusion


## CYCLING FUSION POWER PROFILES



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Dr.Andy Coggan's original work with
Training Peaks showing power relative to World Record Holders

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Watts per pound provides a different "shape" to the graph (using the same data).

This may be easier to remember.

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Watts Per Pound

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## POWER PROFILE ENDURANCE RIDER

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| Cycling <br> Fusion <br> Intervals |
| :--- |
| Hypothetical Endurance Rider Watts Watts/Lb World <br> Class Percent Weight <br> in Lbs   <br> $\mathbf{1 m}$ 320 2.00 5.22 $38.34 \%$  <br> 3 m 288 1.80 5.22 $34.51 \%$  <br> 5 m 272 1.70 3.45 $49.31 \%$  <br> $\mathbf{2 0 m}$ 256 1.60 2.76 $58.02 \%$  |

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Watts/Lb for an Endurance Rider will reflect a much smaller range of power across all zones.

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Endurance Rider

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| Hypothetical Climber |  |  |  |  | 160 |
| 1 m | 634 | 2.40 | 5.22 | 46.01\% |  |
| 3 m | 488 | 2.30 | 5.22 | 44.09\% |  |
| 5 m | 342 | 1.90 | 3.45 | 55.12\% |  |
| 20m | 265 | 1.30 | 2.76 | 47.14\% |  |

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Climber


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## POWER PROFILE SPRINTER

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| Cycling Fusion Intervals | Raw Watts | Watts/Lb | World Class | Percent | Weigh tin Lbs |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Hypothetical Sprinter |  |  |  |  | 160 |
| 1 m | 634 | 2.90 | 5.22 | 55.59\% |  |
| 3 m | 488 | 2.30 | 5.22 | 44.09\% |  |
| 5 m | 342 | 1.50 | 3.45 | 43.51\% |  |
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The steepness of the graph really gives this rider's profile away. This is what it takes to win races; explosive power.

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| Hypothetical Generalist |  |  |  |  | 160 |
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Weight: $70 \mathrm{~kg} / 155 \mathrm{lbs}$
Height: 180 cm
Resting heart rate: 32-34
VO2ml/kg: 83.8
Max power at VO2: 600 watts

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Lactate Threshold HR: 178
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| Power Output to Weight (Watts per Kg) at Lactate Threshold (from Saris Group) |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Race Category Level | Watts/Kg (W) | Watts/Lb (W) | Watts/Kg (M) | Watts/Lb (M) | Kg to Lb factor |
| USCF Category 4-5 | 2.5 to 3.0 | 1.1 to 1.4 | 3.0 to 3.5 | 1.4 to 1.6 | 0.45359237 |
| USCF Category 2-3 | 3.0 to 3.5 | 1.4 to 1.6 | 4.0 to 4.5 | 1.8 to 2.0 |  |
| US Domestic Professional | 3.5 to 4.0 | 1.6 to 1.8 | 4.5 to 5.0 | 2.0 to 2.3 |  |
| Successful Pro Tour Pro | 4.0 to 4.5 | 1.8 to 2.0 | 5.0 to 5.5 | 2.3 to 2.5 |  |

Taken From The Saris Group: http://wnw.saris.com/wattscalculator.aspx

## IMPROVING YOUR POWER

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- Managing Training Load - The Key To Raising Limiters
- Metabolic Load;Your Body's Response To Power Generation
- Foundation Established, High Zone Riding Is Next


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| Training Load | Heart Zones® |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Zone 1 | Zone 2 | Zone 3 | Zone 4 | Zone 5 |
|  | 1 | 2 | 3 | 4 | 5 |

## HOW MUCH TIME PER ZONE

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- Think periodization - base building specificity
- Increase time in higher zones as base is established


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|  | 1 | 2 | 3 | 4 | 5 |

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- Speed \& Power Chart

|  | 3\% | 4\% | 5\% | 6 | 7\% | 8\% | 9\% | 10\% |  | \% |  |  | \% |  |  | 18\% | 19\% | 20\% |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 4.0 | 0.3 | 0.3 | 0.4 | 0 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1. | 1.7 | 1.7 |
| 5.0 | 0.3 | 0.4 | 0.5 | 0. | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1. | 1.5 | 1.6 | 1. | 1.9 | 2.0 | 2.1 | 2.2 |
| 6.0 | 0.4 | 0.5 | 0.7 |  |  |  |  | 1.3 | 1.4 | 1.6 | 1 | 1.8 | 2. | 2. | 2.2 | 2. | 2.5 | 2.6 |
| 7.0 | 0. | 0.6 | 0.8 |  |  |  | 1.4 | 1.5 | 1.7 | 1.8 | 2. |  | 2.3 | 2.4 | 2.6 | 2.8 | 2.9 | 3.1 |
| 8.0 | 0. | 0.7 | 0.9 |  | 1.2 | 1.4 | 1. | 1. | 1.9 | 2.1 | 2.3 | 2.4 | 2.6 | 2.8 | 3.0 | 3.1 | 3.3 | 3.5 |
| 9.0 | 0.6 | 0 | 1.0 |  |  | 1.6 | 1 | 2 | 2 | 2.4 | 2 | 2.8 | 3. | 3.1 | 3. | 3. | 3. | 3.9 |
| 10.0 | 0.7 | 0 | 1.1 | 1.3 | 1.5 | 1.7 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 3. | 3.3 | 3.5 | 3.7 | 3.9 | 4.2 | 4.4 |
| 11.0 | 0.7 | 1.0 | 1.2 |  | 1.7 | 1.9 | 2.2 | 2.4 | 2.6 | 2.9 | 3. | 3. | 3.6 | 3.8 | 4.1 | 4.3 | 4.6 | 4.8 |
| 12 | 0.8 | 1.0 | 1.3 |  | 1. | 2.1 |  | 2.6 | 2.9 | 3.1 | 3.4 | 3.7 | 3. | 4.2 | 4.5 | 4.7 | 5.0 | 5.2 |
|  | 0.9 | 1.1 | 1.4 |  | 2. | 2.3 | 2. | 2.8 | 3.1 | 3.4 | 3.7 | 4.0 | 4. | 4.5 | 4.8 | 5.1 | 5.4 | 5.7 |
|  | 0.9 | 1.2 | 1.5 | 1 | 2.1 | 2.4 | 2.8 | 3.1 | 3.4 | 3.7 | 4.0 | 4. | 4. | 4. | 5.2 | 5.5 | 5.8 | 6.1 |
| 15.0 | 1.0 | 1.3 | 1. | 2 | 2 | 2.6 | 3.0 | 3.3 | 3.6 | 3.9 | 4.3 | 4.6 | 4.9 | 5.2 | 5.6 | 5.9 | 6.2 | 6.6 |
|  | 1.0 | 1. | 1 | 2. |  | 2.8 |  | 3.5 | 3.8 | 4.2 | 4. | 4. | 5.2 | 5.6 | 5.9 | 6.3 | 6.6 | 7.0 |
| 17 | 1.1 | 1.5 | 1.9 | 2. | 2.6 | 3.0 | 3. | 3.7 | 4. | 4.5 | 4. | 5.2 | 5.6 | 5.9 | 6.3 | 6.7 | 7.1 | 7.4 |
| 18.0 | 1.2 | 1.6 | 2.0 | 2.4 | 2.8 | 3. | 3.5 | 3.9 | 4.3 | 4.7 | 5.1 | 5.5 | 5.9 | 6.3 | 6.7 | 7.1 | 7.5 | 7.9 |
| 19 | 1.2 | 1.7 | 2.1 | 2.5 | 2.9 | 3.3 | 3.7 | 4.2 | 4.6 | 5.0 | 5.4 | 5.8 | 6.2 | 6.6 | 7.1 | 7.5 | 7.9 | 8.3 |
| 20.0 | 1.3 | 1.7 | 2.2 | 2.6 | 3.1 | 3.5 | 3.9 | 4.4 | 4.8 | 5.2 | 5.7 | 6.1 | 6.6 | 7.0 | 7.4 | 7.9 | 8.3 | 8.7 |
|  | Y <br> Love O | The Ri |  |  |  |  |  |  |  | $\frac{58}{\text { xis }}$ |  |  |  |  |  |  |  |  |

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## IMPROVEMENTS FOR RACING

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- Speed required to win, be in contention, or at least be competitive.


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- The ability to ride (not push) an entire event provides the feeling of strength and accomplishment you are looking for
- Use the same tool the racer uses; the Speed and Power Chart.


# EXAMPLE: RACE OR RIDE 

| The Pittsburgh Dirty Dozen Cimbs |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CMCDS | This hill's Grade Ranges | Avg. Grade | Range of Watts/Lb Req | Average <br> Watts/Lb | Miles | Time in Min. | Vertical Feet |
| Center Ave | 8\% to $19 \%$ | 8.7\% | . 9 to 2.1 | 1.1 | 0.84 | 10.1 | 386 |
| Garmin | 5\% to $16 \%$ | as done on 9/19/10 during training: |  |  | 0.73 | 8:11 | 5.5 mph |
| Ravine St. | 6\% to 18\% | 11.7\% | . 7 to 2.0 | 1.3 | 0.65 | 7.8 | 397 |
| Garmin | 10\% to $18 \%$ | as done on 9/19/10 during training: |  |  | 0.67 | 8.5 | 4.7 mph |
| Berry Hill Rd. | 15\% to $27 \%$ | 17.9\% | 1.6 to 3.0 | 2.0 | 0.19 | 2.3 | 183 |
| Garmin | 11.5\% to 26\% | as done on 9/19/10 during training: |  |  | 0.21 | 3.3 | 3.8 mph |
| High St. | 6\% to 20\% | 13.5\% | . 7 to 2.2 | 1.5 | 0.24 | 2.9 | 171 |
| Garmin | 3\% to 16\% | as done on 9/19/10 during training: |  |  | 0.37 | 4.7 | 4.7 mph |

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## READY FOR POWER WORK

- Finally Ready For Stress \& Adaptation
- Establish a Baseline In The Zone of Interest
- Drills vs Tests
- Drill slightly under and slightly over established MSP
- Drill no more than 2 to 3 times per week
- Drill using same format or similar to test protocols
- Test no more than once every 2 weeks

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- All tests above must be averaged
- Make sure to "lap" HR monitors, and reset power meters


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- If you hit Threshold less than $25 \%$ into the test, you have simply picked the wrong power target, abort the test


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- RECORD YOUR DATA!
- Study cadence and gear/resistance combinations to find your "Sweet spot" for RPMs at each power zone
- Look for related aspects to better power generation days


## PAPER LOGS, SPREADSHEETS...

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## Paper Logs

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| 90 Days Workout Log <br> 90 Days Nutrition Log <br> Progress Chart <br> Annual Workout Record <br> Food Composition Guide <br> Heart Rate Zone Training Guide |  | =- |  |

## Paper Logs

## Spreadsheet

| crackusion |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Training Load Progress | Wk1 | Wk 2 | Wk 3 | Wk 4 | Wk 5 | Wk 6 | Wk 7 | Wk 8 | Wk9 | Wk 10 | Wk 11 | Wk 12 |
| Emil | 751 | 401 | 599 | 531 | 765 | 785 | 326 | ? |  |  | 1,100 |  |
|  |  | -47\% | 49\% | -11\% | 44\% | 3\% | -58\% | 4 | 4 | 4 | 4 | -100\% |
| Lisa | 685 | 740 | 850 | 700 | 929 | 914 | 987 | 915 | 348 | 1,040 |  | 1,539 |
|  |  | 8\% | 15\% | -18\% | 33\% | -2\% | 8\% | -7\% | -62\% | 14\% | -100\% | 48\% |
| Victor | 865 | 867 | 838 | 863 | 239 | 405 | 977 | 1,030 | 1060 |  |  |  |
|  |  | 0\% | -3\% | 3\% | -72\% | 69\% | 141\% | 5\% | 3\% | -100\% | $\triangle$ | 4 |
| Steve | 600 | 647 | 671 | 690 | 1138 | 720 | 750 | 780 | 463 |  |  |  |
|  |  | 8\% | 4\% | 3\% | 65\% | -37\% | -34\% | 4\% | -41\% | -100\% | $\triangle$ | 4 |
| Terri | 496 | 549 | 558 | 596 | 643 | 674 | 722 | 762 | 822 | 878 | 1,045 | 1,336 |
|  |  | 11\% | 2\% | 7\% | 8\% | 5\% | 7\% | 6\% | 8\% | 7\% | 19\% | 28\% |
| Denise |  |  | 305 | 10,117 | ? | ? | ? | 823 |  | 869 | 977 |  |
|  |  | 4 | 4 | 3,217\% | - | 4 | 4 | $\triangle$ | -100\% | $\triangle$ | 12\% | -100\% |
| Lisa 2 | 514 | 533 | 561 | 574 | 617 | 640 | 678 | 712 | 756 | 774 | 816 | 859 |
|  |  | 4\% | 5\% | 2\% | 7\% | 4\% | 6\% | 5\% | 6\% | 2\% | 5\% | 5\% |
| Paul | 914 | 953 | 1,079 | 1,095 | 1134 | 584 | 1,142 | 1,209 | 1251 |  |  |  |
|  |  | 4\% | 13\% | 1\% | 4\% | -49\% | 1\% | 6\% | 3\% | -100\% | $\stackrel{4}{4}$ | 4 |
| Tom | 297 | 561 | 348 | 522 | 115 | 627 | 309 | 520 | 391 |  |  |  |
|  |  | 89\% | -38\% | 50\% | -78\% | 445\% | -51\% | -17\% | -25\% | -100\% | 4 | 4 |
| Chris | 4,741 | 743 | 771 | 814 | 850 | 885 | 415 | 933 | 1005 | 1,056 | 1,108 | 1,170 |
|  |  | -84\% | 4\% | 6\% | 4\% | 4\% | -53\% | 5\% | 8\% | 5\% | 5\% | 6\% |
| Jason | 957 | 1,013 | 1,121 | 1,112 | 1174 | 776 | 579 | 1,156 | 1,397 |  |  |  |
|  |  | 6\% | 11\% | -1\% | 6\% | -34\% | -25\% | 100\% | 21\% | -100\% | 4 | 4 |
| Nina | 889 | 857 | 927 | 948 | 1001 | 496 | 1,038 | 1,086 | 1063 | 1,214 | 1,204 | 1,298 |
|  |  | -4\% | 8\% | 2\% | 6\% | -50\% | 4\% | 5\% | -2\% | 14\% | -1\% | 8\% |
| Jodi | 566 | 405 | 926 | 543 | 676 | 382 | ? | ? | ? |  |  |  |
|  |  | -28\% | 129\% | -41\% | 24\% | -43\% | 4 | 4 | 4 | $\wedge$ | $\wedge$ | $\wedge$ |

## WEB SOFTWARE...

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## WEB SOFTWARE...



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## AND NOW MOBILE DEVICES, SO THERE ARE NO EXCUSES

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## iPhone Screenshots


iPhone / iPod Applications

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## SNEAK PEAK OF INDOOR CYCLING SPECIFIC APPS

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## Indoor \& Outdoor Cycling Progress

Tightly Integrated with Indoor Equipment


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## Indoor \& Outdoor Cycling Progress

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Instructor Application


## 

## BRINGING INDOOR AND OUTDOOR CYCLING TOGETHER

