Synergie Coaching

Bike Analysis

Athlete Name: Sample

Date of Assessment:

The bike section of a triathlon makes up approximately 50% of the race duration. in triathlon you will be cycling at variable speeds or power outputs. Whether that be due to establishing your position in & out of transition; uphill & downhill sections or navigating turns.
Changes in pace & power lead to an increase in fatigue, so you need to train across different power/speed ranges [1,2,3].

Remember that your Maximal Aerobic Power, (MAP) the "best effort" you can maintain for around 3-7 minutes [4] will be around 110-120% of your FTP.

Research, observational analysis and experience indicates that for sprint triathlons you will be biking in the range of 90% [5,7] to a 105% of your FTP.
For standard/Olympic events you will be biking close to your FTP (72-75% MAP) [6,7]
Middle distance will be around 80-85% FTP [7,8] & Iron distance approximately 68-78% FTP [7,9]

The Relationship of Bike Intensity (IF) and Bike Time in a *Half Ironman* (expressed as TSS)

Bike Split	Intensity Factor (NP / FTP)													
	75%	76%	77%	78%	79%	80%	81%	82%	83%	84%	85%	86%	87%	88%
3:30	197	202	208	213	[illegible]	[illegible]	[illegible]							
3:20	188	193	198	203	208	[illegible]	[illegible]	[illegible]						
3:13	181	186	191	196	201	206	[illegible]	[illegible]	[illegible]					
3:06	174	179	184	189	193	198	203	208	[illegible]	[illegible]				
2:59	168	172	177	182	186	191	196	201	206	[illegible]	[illegible]			
2:52	161	168	170	174	179	183	188	193	197	202	207	[illegible]		
2:45	155	159	163	167	172	176	180	185	189	194	199	203	208	[illegible]
2:38	148	152	156	160	164	169	173	177	181	186	190	195	199	204
2:31	142	145	149	153	157	161	165	169	173	178	182	186	190	195
2:24		139	142	146	150	154	157	161	165	169	173	178	182	186
2:17			135	139	143	146	150	154	157	161	165	169	173	177
2:10				132	135	139	142	146	149	153	157	160	164	168
2:03					128	131	135	138	141	145	148	152	155	159

Left a little on the table
Safe zone for unsure runners and novices
Good range for most age group athletes with good preparation
For proven, strong half ironman runners only
Run a few miles then walk it in
You are likely blown - try again next year

The Relationship of Bike Intensity (IF) and Bike Time in an Ironman Triathlon (Expressed as TSS)

Time \ IF	67%	68%	69%	70%	71%	72%	73%	74%	75%	76%	77%	78%	79%	80%
6:30	292	301	309	319	328	337	346							
6:20	284	293	302	310	319	328	338	347						
6:10	277	285	294	302	311	320	329	338	347					
6:00	269	277	286	294	302	311	320	329	338	347				
5:50	262	270	278	286	294	302	311	319	328	337	346			
5:40	254	262	270	278	286	294	302	310	319	327	336	345		
5:30	247	254	262	270	277	285	293	301	309	318	326	335	343	352
5:20	239	247	254	261	269	276	284	292	300	308	316	324	333	341
5:19	232	239	246	253	260	268	275	283	291	298	306	314	322	331
5:00		231	238	245	252	259	266	274	281	289	296	304	312	320
4:50			230	237	244	251	258	265	272	279	287	294	302	309
4:40				229	235	242	249	256	263	270	277	284	291	299
4:30					227	233	240	246	253	260	267	274	281	288

NOTE: Intensity Factor (IF) = Normalized Power (NP) divided by Functional Threshold Power (FTP). Training Stress Score (TSS) = IF^2 x Time (in hours) x 100

Left a little on the table
Safe zone for unsure runners and novices
Good range for most age group athletes with good preparation
For proven, strong Ironman runners only
Run a few miles, then walk it in
You are likely blown; try again next year

Assessment Protocol

To benchmark where you currently are we use a Wattbike Pro [10,11], this has a power range up to 2500 watts and is suitable for athletes 5’01” (155cm) in height up to 6’04” (193cm)

You will complete a standardised warm up.

For those racing up to standard distance triathlon (~40km bike) we conduct an aerobic power profile assessment, part of which we can use as a 20-minute Functional Threshold Power Test [12,13,14,15,16]; for those going longer than that we use a 30-minute performance time trial [17,18,19,20].

We cross-reference these assessments with an anaerobic power assessment that you can do either on site or at home and a “Dustbin Lid” assessment [21] that you do in your own time. This assesses your ability & preference of riding around 180° degree “dead turns”.

You have the option of using your own bike & smart trainer set up, as well as the option of blood lactate profiling during the assessment.

FTP Data Capture

Max/Peak Power		**Max/Peak HR**	
Average 20 min Power		**Average HR**	
Average Cadence		**Average Speed**	
L/R Balance %			
Athlete Weight		**Athlete W/Kgs**	

Blood Lactate Response

Pre-Warm Up	
Post Warm Up	
1st 5 min	
2nd 5 min	
3rd 5 min	
4th 5 min	
10 min post completion	

Data Analysis.
Current training zones power ranges based on 20-minute FTP. **Example shown.**

	Power (Watts)		
Power Zone	**Low end zone**		**High end zone**
1 .. Active Recovery		<	103
2 .. Endurance	103	to	142
3 .. Tempo	142	to	169
Sweet Spot	165	to	174
4 .. Threshold	169	to	197
5 .. VO2 max	197	to	225
6 .. Anaerobic capacity	225	to	282
FTP (Watts)	188		
Power to Weight (Watts per Kg)	3.48		

Knowing your relative power in Watts/kg enables you to estimate where you are in normative data tables and allows you to compare yourself against what good looks like. Have a look at https://www.trainingpeaks.com/blog/power-profiling/

Current training zones heart rate ranges based on 20-minute FTP. **Example shown**

FTHR: 155 Calculate

	Heart rate (Beats per minute)		
HR Zone	Low end zone		High end zone
1 .. Active Recovery		<	105
2 .. Endurance	105	to	128
3 .. Tempo	128	to	145
4 .. Threshold	145	to	162
5 .. VO2 max	162	to	187
6 .. Anaerobic capacity	N/A		N/A

Training to heart rate & power, combined with a target cadence is a way to better understand and target your required training needs.
If you wanted to be even more specific you could consider having blood lactate sampling done, during your assessment [22].

Having conducted the main aerobic assessment, when cross-referenced with the anaerobic assessment we can start to build a clearer picture of your strengths as an athlete. By considering your assessments aligned to your A-race(s) course profiles we can advise on the specific training required.

Aerobic & Anaerobic Combined Power Profile [23] **Example shown**

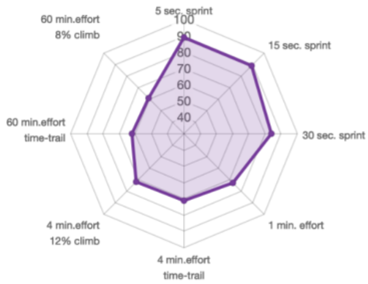
Enter test data

Gender	male	female (selected)
Name of cyclist		
Date Aerobic Assessment	December 2024	
Date Anaerobic Assessment	December 2024	
Length	165 cm	
Weight	54	kg
Peak power (1 sec.)	452	watts
Power over 5 sec.	425	watts
Power over 15 sec.	381	watts
Power over 30 sec.	328	watts
Power over 1 min.	284	watts
Power over 4 min.	202	watts
Power over 20 min.	198	watts
Heartrate over 20 min.	121	beats/min

calculate profile

Results

Name of Cyclist	
Date Aerobic Assessment	**December 2024**
Date Anaerobic Assessment	**December 2024**
Length	**165 cm**
Weight	**54 kg**



Critical period	Power (w)	Watt/kg	Speed (km/h)	Performance index
5 secs. sprint	425	7.9	44.6	40.0
15 secs. sprint	381	7.1	42.9	45.4
30 secs. sprint	328	6.1	40.7	48.6
1 min. effort	284	5.3	38.7	53.1
4 mins. effort (on time-trail bike)	202	3.7	40.2	52.4
4 mins. effort (12% climb)	202	3.7	9.2	54.5
60 mins. effort (on time-trail bike)	197	3.6	39.8	61.0
60 mins. effort (8% climb)	197	3.6	12.9	64.3

Performance Index Reference

Performance Index (PI)	Pro Tour	Elite	Amateur
90-100	Very good to exceptional	Exceptional	Exceptional
80-90	Good	Good to very good	Exceptional
70-80	Moderate to fair	Moderate	Good to very good
60-70	Poor	Fair	Moderate tot good
50-60	Very poor	Poor	Fair to poor
< 50	-	Very poor	Very poor

Comment & Recommendations

We can see that you have a good aerobic base but that, course dependent, you may need to work on your 5-30s sprint capacity. Think of coming into or out of dead turns and your ability to ensure you have the space to ride safely.

This ability to accelerate out of turns can be enhanced with the Dustbin Lid session. https://www.britishcycling.org.uk/search/article/coa20131119-Test-Protocol-4--Dustbins-0

References

1. Theurel, J., & Lepers, R. (2008). Neuromuscular fatigue is greater following highly variable versus constant intensity endurance cycling. *European Journal of Applied Physiology*, *103*, 461-468.

2. Etxebarria, N., Mujika, I., & Pyne, D. B. (2019). Training and competition readiness in triathlon. *Sports*, *7*(5), 101.

3. Etxebarria, N., Ingham, S. A., Ferguson, R. A., Bentley, D. J., & Pyne, D. B. (2019). Sprinting after having sprinted: prior high-intensity stochastic cycling impairs the winning strike for gold. *Frontiers in physiology*, *10*, 100

4. Rumenig, Eduardo & Higino, Wonder & Batista, Carla & Kiss, Maria & Pereira, Benedito. (2021). Time limit at maximal aerobic power, heart rate kinetics and performance in time-trial cycling test of 3 km. Revista Brasileira de Educação Física e Esporte. 35. 171-180. 10.11606/issn.1981-4690.v35i4p171-180.

5. Vivan, L., Dos Anjos, V. R., Engelke, P., de Lira, C. A. B., Vancini, R. L., Weiss, K., ... & Andrade, M. S. (2024). Cycling Intensity Effect on Running Plus Cycling Performance among Triathletes. *International Journal of Sports Medicine*, *45*(14), 1074-1083.

6. Etxebarria, N., D'Auria, S., Anson, J. M., Pyne, D. B., & Ferguson, R. A. (2014). Variability in power output during cycling in international Olympic-distance triathlon. *International journal of sports physiology and performance*, *9*(4), 732-734.

7. Friel, J., & Vance, J. S. (2013). *Triathlon science*. Human Kinetics.

8. Vivan, L., dos Anjos Souza, V. R., Engelke, P., de Lira, C. A. B., Vancini, R. L., Weiss, K., ... & Andrade, M. S. (2024). Key factors influencing cycling performance and overall race time in the Ironman 70.3 for amateur athletes. *Sport Sciences for Health*, 1-10

9. Abbiss, C. R., Quod, M. J., Martin, D. T., Netto, K. J., Nosaka, K., Lee, H., ... & Laursen, P. B. (2006). Dynamic pacing strategies during the cycle phase of an Ironman triathlon. *Medicine and science in sports and exercise*, *38*(4), 726.

10. Wainwright, B., Cooke, C. B., & O'Hara, J. P. (2017). The validity and reliability of a sample of 10 Wattbike cycle ergometers. *Journal of sports sciences*, *35*(14), 1451-1458.

11. Hopker, J., Myers, S., Jobson, S. A., Bruce, W., & Passfield, L. (2010). Validity and reliability of the Wattbike cycle ergometer. *International journal of sports medicine*, *31*(10), 731-736.

12. Friel, J. (2012). *The power meter handbook: a user's guide for cyclists and triathletes*. VeloPress.

13. Vance, J. S. (2016). *Triathlon 2.0: Data-driven Performance Training*. Human Kinetics.

14. McGrath, E. A. N. N. A., Mahony, N., Fleming, N., & Donne, B. (2019). Is the FTP test a reliable, reproducible and functional assessment tool in highly trained athletes? *International journal of exercise science*, *12*(4), 1334.

15. Sørensen, A., Aune, T. K., Rangul, V., & Dalen, T. (2019). The validity of functional threshold power and maximal oxygen uptake for cycling performance in moderately trained cyclists. *Sports*, *7*(10), 217.

16. Mackey, J., & Horner, K. (2021). What is known about the FTP20 test related to cycling? A scoping review. *Journal of sports sciences*, *39*(23), 2735-2745.

17. Vivan, L., dos Anjos Souza, V. R., Engelke, P., de Lira, C. A. B., Vancini, R. L., Weiss, K., ... & Andrade, M. S. (2024). Key factors influencing cycling performance and overall race time in the Ironman 70.3 for amateur athletes. *Sport Sciences for Health*, 1-10.

18. Driller, M. W. (2012). The reliability of a 30-minute performance test on a Lode cycle ergometer. *Journal of Science and Cycling*, *1*(2), 21-27.

19. Perrey, S., Grappe, F., Girard, A., Bringard, A., Groslambert, A., Bertucci, W., & Rouillon, J. D. (2003). Physiological and metabolic responses of triathletes to a simulated 30-min time-trial in cycling at self-selected intensity. *International journal of sports medicine*, *24*(02), 138-143.

20. Partridge, S. M. (2015). A Field Test for the Estimation of Heart Rate at Lactate Threshold: The 30-minute Cycling Time Trial.

21. British Cycling; https://www.britishcycling.org.uk/search/article/coa20131119-Test-Protocol-4--Dustbins-0

22. Mc Grath, E. M. (2022). *A detailed comparison of Functional Threshold Power (FTP) versus Blood Lactate Thresholds, Ventilatory Threshold and Critical Power, proceeded by a trained model for FTP using GxT data [PhD, Trinity College Dublin. School of Medicine. Discipline of Anatomy]. Trinitys Access to Research Archive*.

23. Van Bon, Marco, and Guido Vroemen. "Power speed profile performance model for road cycling (2)." *Sportgericht no. 6/2018* (2018).