

Analysis of the Stryd-data during the Seven Hills Run in Nijmegen, the Netherlands

Seven Hills Run

The Seven Hills Run is an annual 15 km road running race held in Nijmegen, the Netherlands (<https://en.wikipedia.org/wiki/Zevenheuvelenloop>). It has grown into one of the largest road races in the Netherlands with 40,000 participants. In the 2010 edition, Leonard Komon improved the official 15 Km World Record in Nijmegen to 41:13.

In the 2016 edition, both authors of The Secret of Running (www.thesecretorunning.com) participated and ran the race wearing a Stryd foot pod. In this paper, we will analyze the Stryd-data of author Hans van Dijk. He completed the race in 59:34, some 17 minutes behind winner Joshua Cheptegei (Uganda, 42:08). In his age class (M60), Hans finished 2nd out of 819 participants.



The Stryd footpod

In our book, we have already discussed the exciting new options that the Stryd running power meter gives to runners. On a daily basis you can now measure the power of your 'human engine'. This provides the following potential benefits:

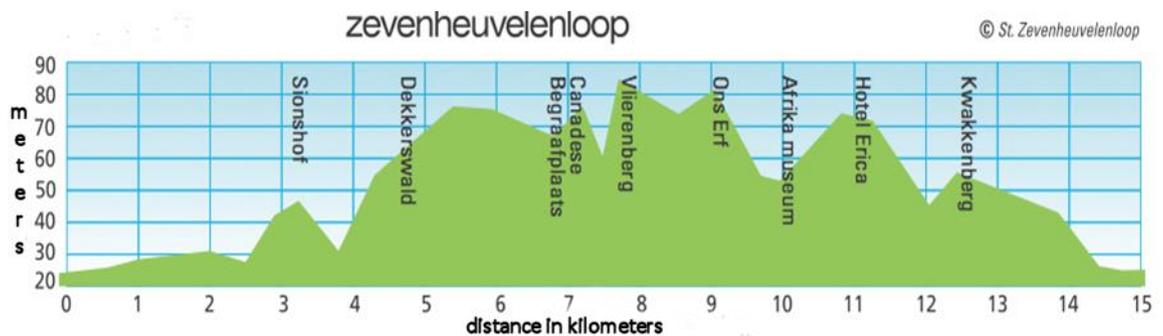
1. ***Optimizing your Running Economy.***
A power meter will tell you (each and every day!) how much power you are using and thus how economically you are running. By changing your running form (e.g. cadence, stride length, etcetera) you can measure whether or not your RE improves.
2. ***Measuring your fitness and shape.***
You can now measure your FTP and your VO₂-max, without the need to have yourself tested in a Sports Medical Center. This means you can now determine (each and every day!) how your fitness evolves.
3. ***Measuring the exact effort of your workout.***
A power meter provides realistic and reliable information, better than pace and HR. This means you can prevent overtraining, adjust your training and optimize your tapering.
4. ***Maintaining the optimal pace in a race.***

Obviously, changing conditions such as wind and hills, will affect your pace. Power data will help you to maintain a constant effort, so you do not blow yourself up or have something left in the tank at the finish.

The results of Hans at the Seven Hills Run

We have made a detailed analysis of the Stryd data in another paper, that can be downloaded from our website www.theseecretorunning.com. Some general results will be presented below.

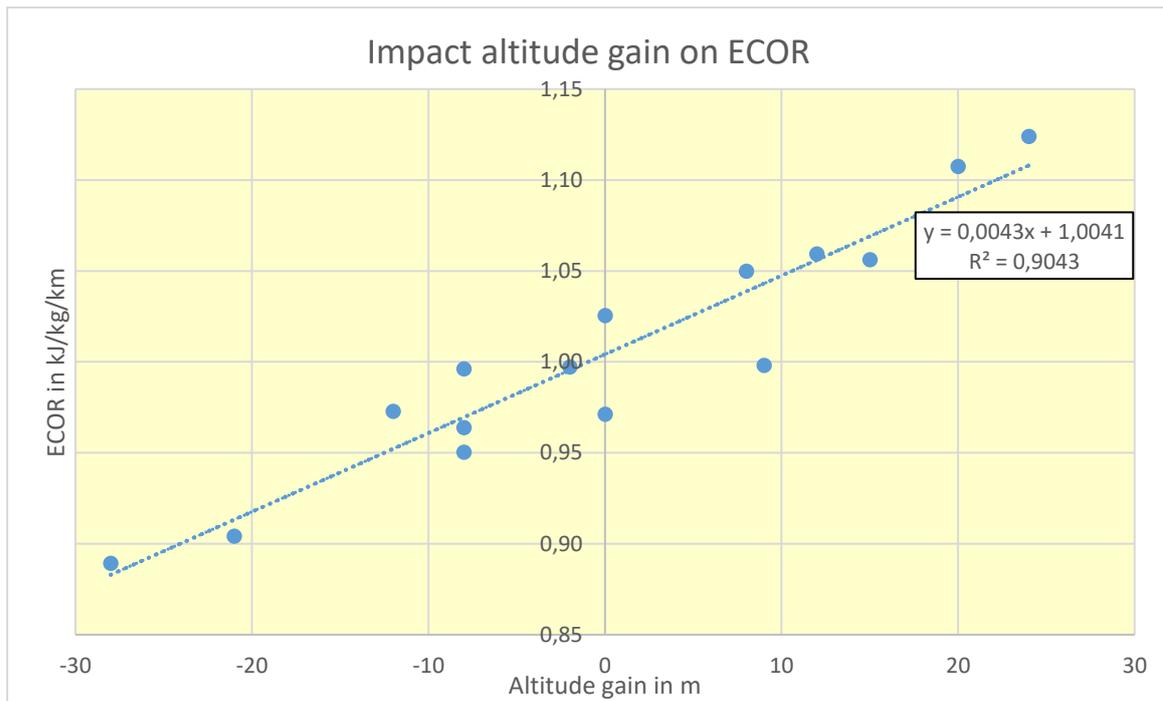
The figure and table below clearly illustrate the big impact of the altitude differences on pace, heart rate, stride length, power and the Energy Cost of Running (ECOR, in kJ/kg/km). Uphill, during km 11, pace and stride were low and ECOR was high. Downhill, during km 14, the reverse was the case.



Distance (km)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Average
Pace (min:sec/km)	3:46	3:49	3:57	4:02	4:12	3:57	3:56	4:09	4:05	3:53	4:20	3:58	4:01	3:45	3:48	3:58
HR (bpm)	150	159	161	161	159	156	155	154	152	151	154	152	152	152	153	155
Stride length (m)	1.38	1.41	1.37	1.35	1.30	1.39	1.39	1.33	1.35	1.41	1.27	1.39	1.37	1.46	1.43	1.37
Power (Watt)	249	253	257	253	255	251	245	247	236	225	251	237	232	229	242	244
ECOR (kJ/kg/km)	0.97	1.00	1.05	1.06	1.11	1.03	1.00	1.06	1.00	0.90	1.12	0.97	0.96	0.89	0.95	1.00

Some main conclusions:

1. Hans should have maintained a constant power of around 244 Watt. Instead, he used too much power in the initial parts of the race and he struggled somewhat in the last parts. As the race took almost 1 hour, we can conclude that his Functional Threshold Power (FTP) will be equal to his average power of 244 Watt. As Hans weighs 58 kg, his specific FTP will be $244/58 = 4,21$ Watt/kg. As discussed in our book, this is equal to a VO_2 max of $4,21/0,0715 = 59$ ml/kg/min. This value matches the result of a recent laboratory test. So, Hans concluded that at the next race, he will try to run at a constant power of 244 Watt. (obviously, for a 1 hour race, as power is dependent on endurance time, see our book).
2. The power data of the Stryd footpad reflect the impact of the hills perfectly. Uphill, the ECOR is higher and downhill it is lower. This relationship is very strong as shown in the figure below. The figure also shows that at a flat track the ECOR is 1.0 kJ/kg/km, which is confirm the theory in our book.



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The Secret of Running
*Maximum Performance Gains Through
 Effective Power Metering and Training Analysis*

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