



FITNESS PROFILING / HYROX

A marathon engine. Built for the stations.

The first runs were comfortable. Sled work and lunges left the legs heavy, and the next kilometre became a recovery shuffle. Adding more running intervals had not fixed the pattern.

THE ATHLETE

38 years | 76 kg | Men's Open scenario | Five training days | 12-week block

MARATHON BEST

3:02

4:19 per kilometre

HYROX BASELINE

1:34:30

Full standardised simulation

AFTER-STATION 1K

5:20

Fresh controlled 1K: 4:10

THE GOAL

Go under 1:30 while controlling the first run after each demanding station.

The engine needed strength to work with.

The key opportunity was force reserve and repeatability after stations. Training had to connect running fitness with station technique, local recovery and controlled transitions.

7:50

12-WEEK OUTCOME

Faster matched simulation | 1:34:30 to 1:26:40

Worked example. Athlete details, assessment data and results are simulated to demonstrate how profiling informs training.

01 / UNDERSTAND THE CHALLENGE

Fresh fitness did not explain the fade.

The running profile was already strong. A fixed station challenge created a different response, revealing why standalone running pace overstated HYROX readiness.

SPIROFIT VO2MAX

59

mL/kg/min

LACTATE LT2

4:00/km

Fresh treadmill estimate

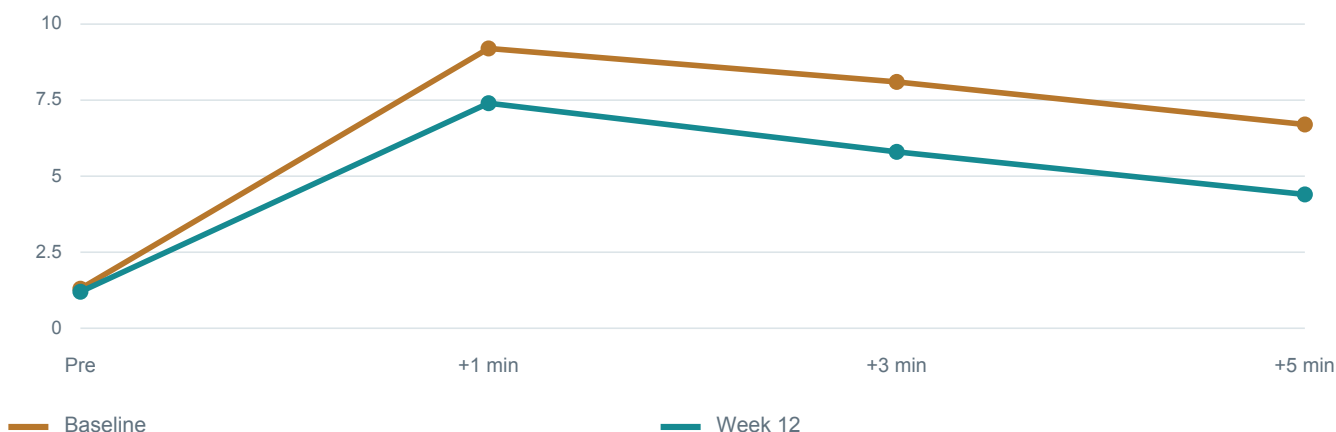
INSCYD VLAMAX

0.34

mmol/L/s | modelled

After stations, blood lactate stayed elevated

Blood lactate (mmol/L) | matched station work + fixed easy recovery



WHAT THE NUMBER MEANS

9.2 mmol/L after the circuit described the net response to the work. It did not identify a single cause of fatigue or mean lactate was a toxin.

PROTECT THE AEROBIC STRENGTH

INSCYD estimated VLamax at 0.34 mmol/L/s. With marathon endurance already established, lowering it further was not the main aim. [2]

THE DECISION

Replace one hard run with coached station-to-run practice. Raise strength capacity first, then learn to leave each station at an effort that allows useful running.

02 / CONNECT THE MEASUREMENTS

Strong lungs. Legs under local strain.

A matched station challenge exposed a loss of force and a change in running timing. Together, the measurements supported a strength-and-transition emphasis.

VALD: jump height after stations

cm | countermovement jump | baseline

Fresh



33

Post stations



25

Ochy: contact time at 4:30/km

ms | fixed treadmill speed | baseline

Fresh



238

Post stations



276

ASSESSMENT	BASELINE	WHAT IT ADDED
ForceDecks: isometric mid-thigh pull	27.0 N/kg	Net peak force above body weight; track own progression.
Train.Red: local recovery t90	78 seconds	Slower return after the fixed station circuit; supportive context.
Sweat rate + sodium	1.40 L/h 1,100 mg/L	Approx. 1,540 mg sodium/h lost in the test conditions.

TRAINING IMPLICATION

Build force reserve, cap early station effort and practise the first 200 metres out. Neither a low SmO2 reading nor an asymmetry score is an injury diagnosis.

SmO2 is a local oxygen supply-demand signal. Use the same device, placement and protocol; a lower value is not automatically worse. Video and force tests support the performance story, not a diagnosis. [3-6]

03 / APPLY THE RIGHT STIMULUS

Make the next run part of the station.

Five training days, with recovery between demanding sessions. Strength and station skill replaced some running intensity rather than being added on top.

01 Build force reserve

Two weekly strength exposures: squat or trap-bar deadlift 3 x 4-6; split squat 3 x 6 each leg; loaded carry 3 x 30-40 m. Keep 2 repetitions in reserve.

Stimulus: a fixed station load uses less of available force capacity.

Check: IMTP improvement and smaller post-station jump loss.

02 Connect stations to running

Once weekly: 4 rounds of 500 m controlled running + 25 m sled push or 20 m loaded lunges + 500 m running. Recover 3 minutes between rounds.

Stimulus: repeat controlled running after local muscle loading. Progress to 5-6 rounds before increasing load.

Check: exit each station smoothly; final 500 m within 5% of the first.

03 Keep the endurance engine

One 60-80 minute easy run and one controlled run session of 3 x 8 minutes at 4:20-4:25/km, with 2-minute jogs. Other running stays easy.

Stimulus: maintain aerobic capacity without excessive fatigue from hard runs.

Check: fresh threshold stays stable while compromised pace improves.

04 Rehearse race execution

Every 2-3 weeks replace the usual circuit with a longer rehearsal. Practise station break plans, 45-60 g carbohydrate/h and 0.6-0.9 L/h fluid as tolerated.

Stimulus: make pacing, transitions and intake repeatable under pressure. Start drink sodium at 1,000 mg/L.

Check: planned breaks, no gut upset, no body-mass gain from overdrinking.

Example week: Mon strength; Tue controlled run; Wed rest; Thu station-to-run session; Fri rest; Sat easy run + short strength; Sun long easy run. Match station loads to the athlete and event division.

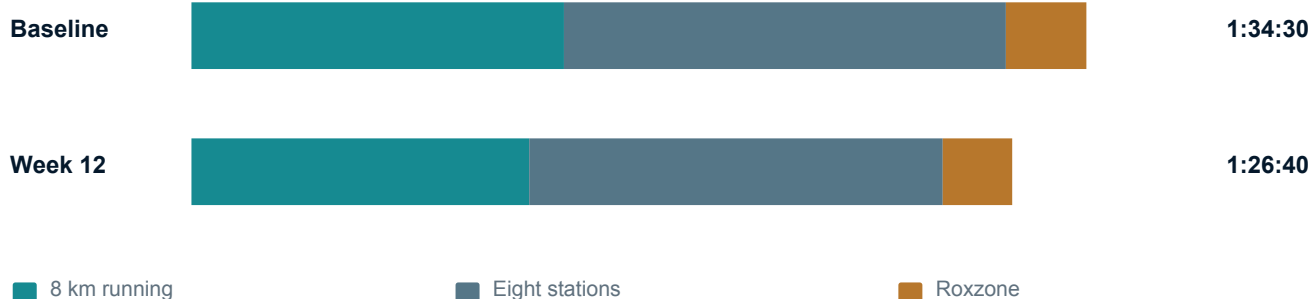
04 / CHECK WHAT CHANGED

Less time recovering between stations.

Week-12 results from the same full HYROX-style simulation, using the same surfaces, equipment and event-format work.

Where the 7:50 improvement came from

Minutes | full matched simulation



OUTCOME	BASELINE	WEEK 12	WHAT CHANGED
Full simulation	1:34:30	1:26:40	7:50 faster
8 km running total	39:20	35:40	3:40 saved
Eight stations total	46:40	43:40	3:00 saved
Transitions / Roxzone	8:30	7:20	1:10 saved
Matched post-station 1K	5:20	4:35	Fresh stays 4:10
Jump loss after stations	24.2%	11.4%	Less force loss

WHAT THE PROFILING MADE POSSIBLE

The athlete made use of the running fitness they already had. Stronger station work, better pacing and quicker transitions mattered more than a large rise in VO2max.

APPENDIX A / ASSESSMENT RECORD

The numbers behind the story.

Baseline and week-12 values are simulated. Direct observations, calculated results and model estimates are separated so the numbers can be interpreted properly.

MEASURE / SOURCE	BASELINE	WEEK 12	UNIT / INTERPRETATION
SpiroFit: VO2max	59	60	mL/kg/min; gas exchange
SpiroFit: VT1 / VT2	4:58 / 4:02	4:54 / 3:58	min/km; ventilatory estimates
Blood lactate: LT1 / LT2	4:55 / 4:00	4:50 / 3:58	min/km; curve-based estimates
INSCYD: VLamax	0.34	0.35	mmol/L/s; effectively stable
INSCYD: FatMax / peak fat	5:35 / 0.72	5:30 / 0.74	min/km and g/min; modelled
Lactate at +1 / +5 min	9.2 / 6.7	7.4 / 4.4	mmol/L after fixed station work
ForceDecks: IMTP net peak	27.0	31.0	N/kg; body weight subtracted
ForceDecks: CMJ fresh / post	33 / 25	35 / 31	cm; matched station challenge
DynaMo: knee extension L / R	610 / 650	700 / 720	N; fixed seated position
Ochy: contact fresh / post	238 / 276	237 / 252	ms at fixed 4:30/km
Train.Red: recovery t90	78	50	s; derived from SmO2 trace
Sweat rate / sodium	1.40 / 1,100	Plan retained	L/h and mg/L; condition-specific

LT1/LT2: lower/upper blood-lactate threshold estimates. VT1/VT2: ventilatory thresholds. These are related markers, not identical measurements. VLamax and fuel-use values shown here are modelled, not direct instrument readings.

APPENDIX B / REPEAT THE RIGHT TEST

A result is only useful if it is comparable.

The protocol links the finding to the goal. These case-study protocols span several visits, including follow-up; they are not all delivered inside one three-hour appointment.

FRESH RUNNING PROFILE

Four-minute treadmill stages at 1% incline with end-stage capillary lactate; separate maximal gas-exchange assessment. INSCYD uses an appropriate valid running input protocol. Do not treat a running model as a model of sled or lunge energy demand.

MATCHED STATION CHALLENGE

Three rounds: 25 m sled push, 20 m sandbag lunges, 500 m row. Fixed load, surface, work pace and rests at each visit. On separate days use this same challenge for (A) a 1 km controlled-effort run; (B) blood lactate / Train.Red recovery; (C) post-work CMJ and matched-speed video.

FAIR COMPARISON

Performance trial uses the same work and perceived-effort instruction. Biomarker recovery uses the same easy walking speed; t90 from end of work to 90% SmO₂ return towards pre-work value. Sensors on marked right vastus lateralis. Sweat trial: 60 minutes, 22 C / 50% RH; intake-corrected mass balance plus wearable sodium estimate.

HOW TO READ THE EVIDENCE

Across visits: same time of day, food and caffeine routine, equipment and warm-up; avoid hard training for 48 hours. Repeat key tests after familiarisation. Small changes may sit within measurement variation. The results describe this athlete; they do not establish injury-risk cut-offs or rankings.

Sweat rate = (pre-exercise mass - post-exercise mass + drinks - urine) / duration, approximating 1 kg as 1 L. Sodium loss estimate = sweat rate x sweat sodium. Regional wearable readings are estimates; confirm unexpected values. Intake is adapted to comfort and conditions, not automatic 100% replacement.

Training response in this worked example: follow-up changes are internally consistent examples, not causal proof or guaranteed outcomes. Thresholds and training doses require individual review.

APPENDIX C / SUPPORTING READING

The methods, in context.

Sources support the assessment approach and general training principles. They do not validate the invented athlete values or the example improvement shown in this document.

1. SpiroFit: measured gas exchange and ventilatory thresholds

<https://spirofit.de/frequently-asked-questions/>

2. INSCYD: interpretation and estimation of VLamax

<https://inscyd.com/wp-content/uploads/2021/11/INSCYD-Whitepaper-VLamax.pdf>

3. VALD: strength and running assessment rationale

<https://valdhealth.com/news/optimizing-endurance-running-performance-and-rehabilitation-a-q-and-a-with>

4. Ochy: video-derived running metrics

<https://www.ochy.io/science>

5. Train.Red: running assessment and muscle oxygen context

<https://train.red/blogs/news/running-assessment>

6. Sweat measurement: fluid loss and body-mass method

<https://www.precisionhydration.com/performance-advice/hydration/how-to-measure-your-sweat-rate/>

7. Durability: test design and control of fatigue protocols

<https://pubmed.ncbi.nlm.nih.gov/40150840/>

8. Strength training and running economy: systematic review

<https://pubmed.ncbi.nlm.nih.gov/38165636/>

9. ACSM / Academy / Dietitians of Canada: sports nutrition

<https://pubmed.ncbi.nlm.nih.gov/26920240/>