

Running-based Anaerobic Sprint Test (RAST)

Introduction

The Running-based Anaerobic Sprint Test (RAST) was developed at the University of Wolverhampton (United Kingdom) to test an athlete's anaerobic performance. RAST is similar to the Wingate Anaerobic 30 cycle Test (WANT) in that it provides measurements of power and fatigue index.

The Wingate test is more specific for cyclists whereas the RAST provides a test that can be used with athletes where running forms the basis of their sport/event.

Required Resources

To undertake this test you will require:

- (400 metre) track - with a 35 metre marked section on the straight
- Two cones to mark the 35 metre section .. perhaps a second cone at each end 5m beyond the 35m cones .. runners should target the second cone, but be timed at the 35m cone.
- Stop watch
- An assistant
- Calculator

How to conduct the test

The athlete

- is weighed prior to the test
- undertakes a 10-15 minute warm-up session
- has a 5 minute recovery
- completes six 35 metre runs at maximum pace; (10 seconds allowed between each sprint for turnaround)
(standing, crouch or 3 pt. start)

The assistant

- records the time taken for each 35 metre sprint to the nearest hundredth of a second
- makes appropriate calculations

Calculations

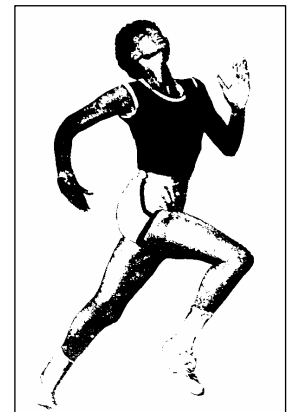
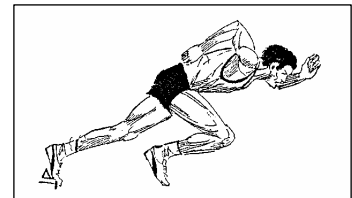
Power output for each sprint is found using the following equations:

- $Velocity = Distance \div Time$
- $Acceleration = Velocity \div Time$
- $Force = Weight \times Acceleration$
- $Power = Force \times Velocity$ OR $Power = Weight \times Distance^2 \div Time^3$

From the six times calculate the power for each run and then determine:

- Maximum power - the highest value
- Minimum power - the lowest value
- Average power - sum of all six values \div 6
- Fatigue Index - $(Maximum\ power - Minimum\ power) \div Total\ time\ for\ the\ 6\ sprints$

Source: Sports Performance Bulletin
21/12/06



It is **important** that each time the test is completed, the same (**precisely** the same) pre-test protocols are followed; e.g. same or very similar track, time of day, test conditions, same warm-up, ...

Example

Athlete's weight is 76 Kilograms and the times for each 35 sprint are:

1. 4.52 seconds
2. 4.75 seconds
3. 4.92 seconds
4. 5.21 seconds
5. 5.46 seconds
6. 5.62 seconds

The power ($\text{Weight} \times \text{Distance}^2 \div \text{Time}^3$) for each 35 sprint are as follows:

1. 1008 watts ($76 \times 35^2 \div 4.523$)
2. 869 watts ($76 \times 35^2 \div 4.753$)
3. 782 watts ($76 \times 35^2 \div 4.923$)
4. 658 watts ($76 \times 35^2 \div 5.213$)
5. 572 watts ($76 \times 35^2 \div 5.463$)
6. 525 watts ($76 \times 35^2 \div 5.623$)

Maximum Power = 1008 watts
Minimum Power = 525 watts
Average Power = 736 watts
Fatigue Index = $483 \div 30.48 = 15.8 \text{ watts/sec}$

Analysis:

Analysis of the result is by comparing it with the results of previous tests. It is expected that, with appropriate training between each test, the analysis would indicate an improvement.

Maximum Power: Is a measure of the highest power output and provides information about strength and maximal sprint speed. Research range is 1054 watts to 676 watts.

Minimum Power: This is the lowest power output achieved in the six 35 metre sprints and is used to calculate the Fatigue Index.

Average Power: This provides an indication of an athlete's ability to maintain power over time. The higher the score indicates the athlete's ability to maintain anaerobic performance.

Fatigue Index: Indicates the rate at which power declines for the athlete. A low value (<10) indicates the ability for the athlete to maintain anaerobic performance. A high fatigue index value (>10) indicates the athlete may need to focus on improving their lactate tolerance.

How to use

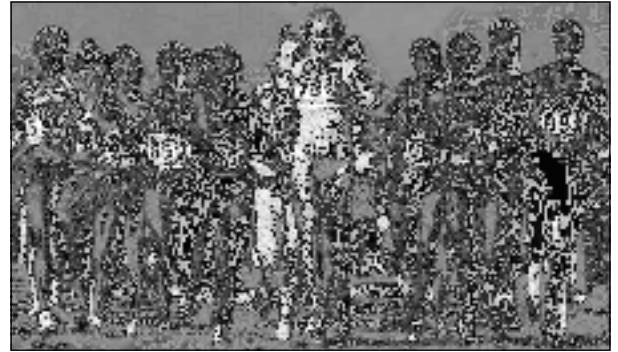
The test is conducted on a regular basis throughout the training program. Results should be compared with the athlete's previous results to determine if the training program is achieving the desired results. Results can then be used to appropriately adjust the athlete's training program.

When to use

RAST can be used on a regular basis (3 to 6 weeks) throughout the season. The period between tests will be determined by the training phase and the amount of training being conducted.

Target Group

This test is suitable for sprint and endurance athletes and players of endurance sports such as football, rugby, and running.



Name	Wt. (kg.)	Dist. 35m	Dist²	Time	Time³	Power = Wt. x Distance² ÷ Time³
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Date: _____ </div>				1.		
				2.		
				3.		
				4.		
				5.		
				6.		

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