

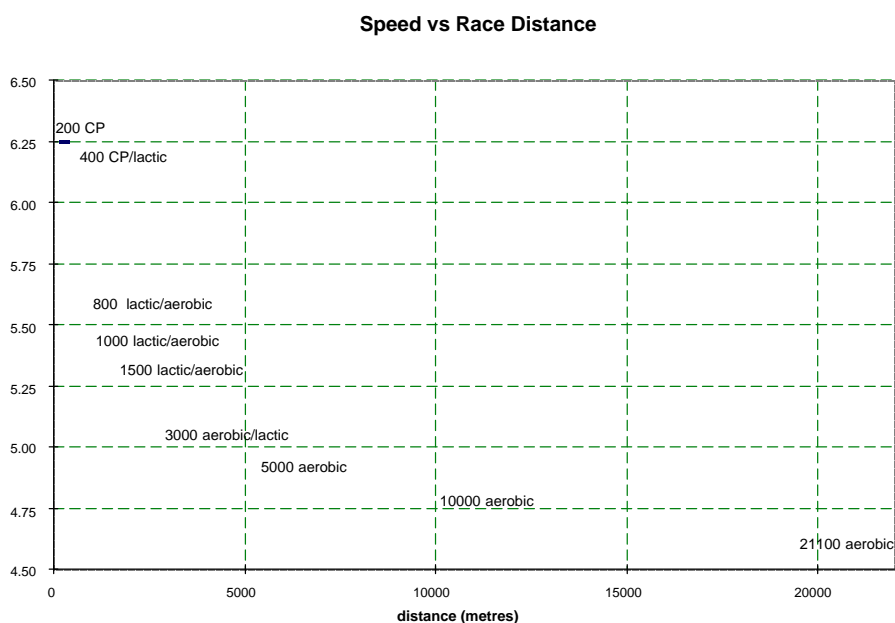
The Effect of Distance on Speed – Peter Sandery

There is an activity you can do to analyse your race performances over a range of distances to provide a guide as to what to emphasise in training. The table below shows my best 2002 (age 60) race times for distances from 200m to the half marathon. I'm not suggesting that anyone can be equally good (or bad) over this range of distances. Most people tend to have physical characteristics that pre-dispose them to be either sprinters or distance runners. A lot of masters runners still want to be able to compete in more than one class of race – sprints, middle distance, long distance.

I calculated my speeds for each race by dividing distance by time. You can generate your own table for the distances you have raced or print my table and fill in the blanks for your times, etc.

The effect of distance on speed						
race distance	my time	your time	my speed	your speed	ratio of	your ratio
(metres)	(secs)	(secs)	(metres/sec)	(metres/sec)	speeds	of speeds
200	32		6.25			
400	64		6.25		0.90	
800	143		5.59		0.97	
1000	185		5.41		0.98	
1500	282		5.32		0.92	
3000	610		4.92		0.99	
5000	1025		4.88		0.96	
10000	2131		4.69		0.96	
21100	4680		4.51			

When my race speeds are plotted against distance, the following graph is obtained.



A similar shape curve is obtained by plotting world record speeds for each distance, the difference being that the curve is smoother and the speed range goes from around 6.2 m/s to 10.2 m/s.

The curve for my results suggests to me that my 800m to 3000m speeds should each be a little higher to fit into a smooth curve. If I wanted to improve over these distances, one thing I could try would be to emphasis training designed to lift my lactic threshold, the level of demand where blood lactate levels start to rise.

The 100m and 200m distances are largely anaerobic Creatine Phosphate (CP) races and the 400m is anaerobic CP and lactic in its energy demands. At the 800m distance, the aerobic system has started to contribute significantly and from there on, the ratio of aerobic to anaerobic energy contributions to speed increases. The 800m, 1000m and 1500m races are grouped together as middle distance because these are the races where speed varies significantly with distance.

For training purposes, you can use your best 100-200m repetition speeds as indicators of your CP fitness, 300-500m as indicators of lactic fitness and 1000-3000m pace as an indicator of your best maintainable aerobic speed ($vVO_{2\max}$).