Is Boston Unfairly Excluded by the New Rules?

by
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We are all familiar with the controversy caused by the recent change in the TAC rules which allow, for record purposes, only those courses which have a net drop of less than 1 meter per km and whose start and finish are within 30% of each other. One course which is often cited as being unfairly excluded by this rule is the Boston Marathon. I heard Amby Burfoot being interviewed on National Public Radio in January and he stated that in addition the drop rule, allowance should be made for the amount of up and down in the course which might make Boston actually a harder course than some of the existing flatter ones.

It so happens that we have had in our hands a tool for doing the suggested evaluation. In the January 1989 issue of Measurement News, Bob Baumel presented a method he developed.[1] Baumel's method consists of computing the slope along each piece of the course, squaring it, and summing them. In addition, he computes the sum of the drop on each section. This second computation results in the "net drop" referred to in the TAC rule. The first term (the squared one) gives a measure of the slowdown effect caused by hills. These two numbers based on the net drop and the net "hilliness" are multiplied by numbers based on treadmill tests. I subsequently used his method to evaluate a local 20 hilly kilometer race and compared my own time on it versus another flat 20 km race and found very good agreement between my slowdown and the predicted slowdown.

I purchased 1:25,000 scale metric topographic maps which covers the route from Hopkinton to Boston and had a friend, Fred Bostrom who has run the race many times, highlight the course for me. I then measured the distance to every contour line (3 meter intervals) which crossed the course and applied Baumel's formula. What I found is summarized in the graph of the course profile.

The net drop of the course is 130 meters or 3.1 meters/km after dividing by 42.195 km. Baumel's factor for drop is 4.5 meters per meter of drop. That is, every meter of drop of a course has the effect of shortening a course by 4.5 meters. Therefore, the 130 meters of drop has the effect of shortening the course by 585 meters. The hill effect is obtained by multiplying 5 by the steepness integral. The hills of the Boston course have the effect of lengthening the course by 90 meters. The net effect is then 495 meters shortness. A person running a 2:10:00 marathon on a flat course can expect to run one minute and 32 seconds faster on the Boston course. Likewise, a person running a 3 hour marathon can expect to run 2 minutes and 7 seconds faster at Boston.

From this analysis, it seems clear that it is proper that courses such as Boston are excluded by the new rule. Remember that we measure courses to an accuracy of 1 meter per kilometer and, by this rule, are allowing courses to have a net drop of 1 m/km which has the effect of shortening a course by 4.5 m/km. When this fact was pointed out at the Road Running Technical Committee at the TAC meeting in December, someone suggested that maybe the rule should be even tougher than 1 m/km. However, it was realized that no course is perfectly flat so the shortness effect is rarely this much. Also, the rule for running tracks is 1 m/km and the I.A.A.F. has adopted a 1 m/km rule and it was felt important that the U.S. standards be similar to those in use internationally.

At the TAC meeting some protested that the Boston course must be tough because no world records have been set on it. However, a look at the U.S. records shows us that 10 of the best 20 times for American runners have been set at Boston.[2] These are :

RANK	NAME	YEAR	TIME
1	Alberto Salazar	1982	2:08:52
2	Dick Beardsley	1982	2:08:54
3	Greg Meyer	1983	2:09:00
5	Bill Rodgers	1979	2:09:28
7	Ron Tabb	1983	2:09:32
10	Bill Rodgers	1975	2:09:56
11	Benji Durden	1983	2:09:58
13	Ed Mendoza	1983	2:10:07
15	Bill Rodgers	1978	2:10:14
16	Jeff Wells	1978	2:10:16

If we add 1:32 to the above times to remove the benefit derived from the drop, Salazar's 1982 performance would rank 11th among American marathon times.

If we find that this analysis proves of value in determining the difficulty of courses, one could envision a further amendment to the rule to allow hilly courses which have a net drop of greater than 1 m/km to still qualify for records if it is shown that the hills slow one down more than the drop helps. However, I suspect that very few courses would fall into this category. Boston certainly doesn't.

1. Bob Baumel, Hill effect to second order, Measurement News, 33, pp. 41-43 (1989).

2. TACSTATS/USA Marathon Rankings, 1988.

Boston Marathon Profile