THE ATHLETICS CONGRESS
OF THE USA

Road Running Technical Committee
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John I. Disley CBE - Hampton House, Upper Sunbury Road, Hampton
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Dear John,

EXAMINATION OF QUALIFICATIONS OF UK MEASURERS

At your invitation I came to Crystal Palace to act as examiner for several UK measurers. The goal was for me to ascertain which of their number might qualify to be named as IAAF measurers.

At the onset I found that all were experienced measurers, with measured courses ranging from half a dozen to over a hundred. Because of this I asked them for advice on how I might fairly and accurately do this job. Friendly conversation resulted, but in the end I had to use a combination of numbers, observations and hunches to reach my conclusions.

We reconnoitered the grounds and found a loop of about 2.5 km that seemed to be rideable, although several turns were overgrown with bushes. I made crayon marks on the pavement, and told the candidates to think of these as curbs, to eliminate riding through the shrubbery and to promote a uniform idea of where the proper line was.

On a straight portion of the course roadway we pounded a nail at one end, and used an existing nail as the other end, to establish a calibration course. We decided to tape it later, since it was raining. I asked everybody to make four precals and four postcals, and as many rides of the whole course as they felt they needed to get a good estimate of the course length. When this was done we ate lunch.

After lunch we divided into four groups of two. Each pair used a different steel tape to measure the length of the calibration course.

After returning to the Hostel, I told the group to use 274.65 metres for the length of the calibration course, and to individually submit to me their own estimate of the length of the loop. I logged in the answers as they were submitted to me. All the answers were tightly grouped, except for Jack Selby's, which exceeded the others by about 12 metres over the 2593 metre consensus.

I then collected from each participant a copy of his calibration and measurement data, to be used in making up the attached computerized summation of the measurements. Upon return to the USA, I found I'd missed some of Max McNally's data, but was able to reconstruct his best ride from his reported figures.

After this, I showed the group samples of my own work, and then individually examined samples of their work which they had brought along. Although their was some variability in the submitted work, it was all of a reasonable quality and showed an understanding of data manipulation and documentation.

Some of the individual estimates of course length differed from the rigorously-calculated values. In examining the data, I found that some measurers had used larger constant rather than average. In addition, some measurers used an "eyeball average" of their four calibration rides, rather than an exactly calculated value. This caused a slight difference between their submitted numbers and the rigorously-calculated ones.

Conclusions

Based on what I saw and heard, I'd recommend Dodwell, Hodgson, Holdsworth, McNally, Smith and Tomlins as IAAF candidates. Although Selby caught on at the end, I believe he needs to work on his data organization and riding a bit more. I think he is on the right track, and just needs to do a few well-documented measurements to show the capability. Since an IAAF measurer's paperwork is likely to be examined by others, it should be near-impeccable.

Some confusion was caused by my brief instructions to the group. This caused, I believe, the inadvertent use of improper calibration figures by some of the measurers. In addition, the pace of the activity was such that not everybody got to work at his own speed. This hampered Selby in his work, in that he felt rushed and consequently got confused.

When an IAAF measurer is dispatched to the field, it should be made clear to him that the proper constant to use is the day's average (average of the precal average and the postcal average). Also the need to be rigorous in riding the mathematically-defined line must be reinforced. In this way measurements by different people will yield similar values.

Measurers should not round off calibration values. It is desirable to retain 6 significant figures, in all calculations, until a final answer is reached. Then that answer can be rounded off to the desired degree without loss of accuracy.

The concept of "measure where the runners will run" is dead. In its place is the "30 cm from the curb, straight lines between turns" concept. In his early rides Selby was using the former. After an instructional demonstration of the latter, he showed that he can ride a good line by doing it.

The course chosen for the exercise was not representative of a real race course, in that it had an inordinate number of turns for its length. This caused the differences to be exaggerated. Much of each measurer's ride was spent carefully hugging turns, with few respites. A normal course will not be so twisty. A rough estimate, from eyeballing the map, shows the course to have about 1600 degrees of curve in it, equivalent to about 18 right-angle turns. It might be a reasonable number of turns for a 10k, but it's a lot for a 2.5 km course. Still, even with all the turns, all 8 measurements occupied a span of 3.2 metres. That would be extraordinary agreement for 8 measurements of a 10k, although slightly excessive for 2.5k.

I would judge the quality of the measurements to be similar to those I have seen in US group measurements in which I have participated.

One of the benefits of a meeting like this is that people from diverse places get a chance to meet and compare notes. This has had a beneficial effect in the US, since once people have measured together they gain confidence that the other fellow knows what he is doing.

The standards for laying out courses are not the same in the US and UK. In the US we instruct the first measurer to lay down the marks. Subsequent measurers stop at those same marks and record their counts. Then, once the numbers have been crunched, we wind up with a number of measurements for the same distances on the ground. In the UK you are still using a different set of marks for each measurer. This will produce an accurate course, but it does not generally leave behind good documentation. For example, if three measurers each stop at their own idea of where the 10 mile split is, the question may later arise "how far is the distance from the start to the 10 mile split?" It is difficult to answer unless the relative positions of the bikes at the 10 mile point have been written down, which is a rare thing.

With the US approach we will have recorded splits at one point, say 9.997, 10.000 and 9.998 miles. Thus we can decide easily what we think the distance is. Using separate marks, one must go out to the roadway to find the answer, since it rarely resides in the recorded data.

On a personal note, I found the group to be as congenial and keen as any I have come across. As with measurers world-wide, all had the same enthusiasm for the job. It has been a privilege to have the opportunity to work with such a group. I hope we'll get a chance to do it again.

Criticism of and commentary on my methods are invited. I'd value any insights I can get.

Best regards,

Pete Riegel

xc: Dodwell, Hodgson, Holdsworth, McNally, Selby, Smith, Tomlins, Helge Ibert

MEASUREMENTS OBTAINED AT CRYSTAL PALACE, LONDON, 9 SEPTEMBER, 1989

PARTICIPANTS - ALL UK EXCEPT RIEGEL

JS - Jack Selby - 15 Tamworth Rd - Coventry CV6 2JM
PR - Pete Riegel - 3354 Kirkham Rd - Columbus, OH 43221 - USA
MT - Mike Tomlins - 56 Squires Ln - Finchley, London N3 2AP
SH - Stuart Holdsworth - 3 Malling Ave - Broughton Astley - N Leicester LE9 6QS
MM - Max McNally - 29 Havercroft Rise - S Hiendley - Barnsley - S Yorkshire S72 9BH
DD - Dave Dodwell - 10A Pencoedtre Rd - Cadoxton - Barry - S Glamorgan CF6 7SD
RS - Richard Smith - 48 Heythorpe St - London SW18 5BN
PH - Paul Hodgson - 29, Rookhope, Rickleton, Washington Tyne & Wear NE38 9HW

CALIBRATION COURSE MEASUREMENTS - ONE MEASUREMENT DONE BY TEAMS OF TWO

PR & JS -	274.67 METRES	30 METRE TAPE
MT & DD -	274.63	50 METRE TAPE
PH & MM -	274.68	30 METRE TAPE
RS & SH -	274.67	30 METRE TAPE

TEMPERATURE WAS 16 C. THEREFORE 1.3 CM SHOULD BE DEDUCTED FROM MEASURED VALUES. LENGTH USED IN CALCULATIONS WAS 274.65 METRES

DATA OBTAINED BY INDIVIDUALS ABOVE:

JS(1)	PR	MT	SH	MM	DD	RS	PH
PRECALIBRATION COUNTS							
2670	2649	2574.5	2560	2587	2564	2608	2647
2669	2649	2574	2561	2586	2564	2608	2645
2669	2649	2574.5	2560	2586	2563	2607	2646
2669	2649.3	2574.5	2561	2587	2565	2608	2645
PRECALIBRATION AVERAGE COUNTS							
2669.25	2649.075	2574.375	2560.5	2586.5	2564	2607.75	2645.75
POSTCALIBRATION COUNTS							
2670	2648	2574	2560	2586	2563	2606	2645
2670	2648.5	2575	2561	2586	2564	2607	2644
2670	2647.5	2574	2560	2585	2564	2606	2646
2669.5	2648.5	2574.5	2560	2586	2563	2607	2644
							2645
POSTCALIBRATION AVERAGE COUNTS							
2669.875	2648.125	2574.375	2560.25	2585.75	2563.5	2606.5	2644.8

PRECALIBRATION CONSTANT, COUNTS PER KILOMETER

9718.73	9645.28	9373.29	9322.77	9417.44	9335.52	9494.81	9633.17

POSTCALIBRATION CONSTANT, COUNTS PER KILOMETER

9721.01	9641.82	9373.29	9321.86	9414.71	9333.70	9490.26	9629.71

DAY'S AVERAGE CONSTANT, COUNTS PER KILOMETER - THIS CONSTANT WAS USED IN FIGURING MEASURED DISTANCES.

9719.87	9643.55	9373.29	9322.32	9416.08	9334.61	9492.54	9631.44

COUNTS OBTAINED ON LARGE LOOP

17959	17767.5	17283	17176	17339	17199	17487	17748
17921	17765	17280	17175	(2)	17199	17488	17745
	17766	17274	17171		17196	17481	17742
					17199	17479	

LOWEST COUNT OBTAINED ON LARGE LOOP

17921	17765	17274	17171	17339	17196	17479	17742

COUNTS OBTAINED ON SMALL LOOP

7327	7241.5	7047	7017	7060	7015	7133	7232
7296.5	7237	7044	7007	(2)	7004	7134	7237
	7236	7044.5	7010		6999	7133	
					7003		

LOWEST COUNT OBTAINED ON SMALL LOOP

7296.5	7236	7044	7007	7060	6999	7133	7232

LOWEST MEASUREMENT OF LARGE LOOP, METRES

1843.75	1842.16	1842.90	1841.92	1841.43	1842.18	1841.34	1842.09

LOWEST MEASUREMENT OF SMALL LOOP, METRES

750.68	750.35	751.50	751.64	749.78	749.79	751.43	750.87

LOWEST TOTAL MEASUREMENT, METRES

2594.43	2592.51	2594.39	2593.56	2591.21	2591.97	2592.77	2592.97

REPORTED BEST MEASUREMENT AT TIME OF INITIAL DATA REVIEW, METRES

2605	2592.51	2594.4	2592.44	2590.81	2591.72	2593.2	2592.26

METRES OVER 2590, BASED ON LOWEST TOTAL MEASUREMENT, METRES

4.43	2.51	4.39	3.56	1.21	1.97	2.77	2.97

NOTE (1): Selby's figures are those obtained on 10 September, after instruction and demonstration of shortest possible route. The first count is what was obtained initially. The second count was obtained after a discussion and demonstration of shortest possible route. On 9 September he reported 2605 metres best ride.

During Jack's ride of 10 September, a gate was closed. Jack rode to one side, until his front wheel touched the fence. He locked the wheel, carried across, and re-started woth the back of the front wheel on the other side of the fence. His counts above include an added 13 counts on the big loop to account for the two diameters of the bike wheel not actually ridden on the course.

NOTE (2): Riegel does not possess McNally's measurement figures, but does have his calibration figures. The figures shown were reconstructed from Max's reported distances and constant used.

P. S. Riegel - September 12, 1989

CRYSTAL PALACE MEASUREMENTS

SEPTEMBER 9 & 10, 1989