

# MEASUREMENT NEWS



#14 - December, 1985

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Measurement News (MN) is distributed free to all members of the Road Running Technical Committee of TAC (everybody listed in NRDC News). Some foreign people are also included in the free distribution.

Subscriptions are available for \$15 per year. Back issues are available for \$2.50 each.

NOTE: If you save MN you are not missing #11. I mistakenly put out two #10's, then skipped to #12. There is no #11.

MN is our way to talk to one another, so that we all know what's going on. It also serves to provide guidance from the RRTC Vice Chairmen to the regional certifiers.

MN wants to make measurement as good as it can be. All opinions and grievances are solicited. No cows are sacred. If you have a new measurement technique, or if you think things should be done differently, send in your contribution to MN. Your opinion will be given space. Nothing changes until somebody tries!

Nice, clean typed stuff is most welcome, but send what you can.

\* \* \* \* \*

## ROTTERDAM/LONDON


Inside you'll find Lennart Julin's narrative of the Rotterdam measurement, and Helge Ibert's one-piece-of-paper summarization of the way things came out. I provided the Knight diagram. Of course, we all generated more paperwork, but I can't possibly put it all here. Early in the measurement it became apparent that the Europeans have the same concept of Shortest Possible Route as we do. The ride was highly competitive. Sufficient minor mistakes were made to cloud the issue of who "won" the measurement, and it was gratifying to see all of us in such close agreement, and the course so definitely OK. After riding with Julin, who validated London, I have to believe that London is OK too. These guys know how to measure!

## MULTIPLE SETS OF MARKS

When Gaby Duguay did the measurement experiment (See MN last month) involving all those Canadian measurers, he had each measurer lay out his own idea of where the finish was. After I mentioned this to him he wrote:

"In response to your 9-27-85 letter, you are right. It might be good if you mentioned this fact in M'News. Everyone was shown the course by truck and given a map of the course prior to the measurement.

Each rider did establish where his idea of a finish line would be. By having all the individual finish lines (for 10k) written on the ground, every other measurer could compare themselves right there and then, as every rider thought he (she) had measured an 'accurate' 10 km course.

I agree, all 'experts' would be 'close' together. That's why I will recommend, all measurers that don't come closer than 5 meters to my measurement, should get more experience in riding the SPR." 

Opinion Poll - Bob Letson sent out an opinion poll in October and requested those polled to answer some questions and send the answers to me. He included some essays by me and him. Here's how it came out:

1) "To what extent do you agree or oppose the views expressed by Peter Riegel and Bob Letson in the attached essay?"

agree	7
disagree	0
mixed feelings	4

2) "Should the SMU 400m track be rejected because it MIGHT be short?"

yes	0
no	10

3) "Should an ANALYSIS OF SIGNIFICANCE be required for every validation measurement?"

yes	3
no	3
?	5

4) "Should rejection be based on insignificant data?"

yes	1
no	5
?	3

5) "If the world were under your total control, what changes would you make to the current rules/policies/practices?"

George Delaney says: "(1) Recognize the reality that a tolerance band exists surrounding every measurement that is ever made and reported, (2) Be consistent and even-handed in the application of measurement 'rules/policies/practices'."

Scott Hubbard (see letter elsewhere) and Al Phillips would like to see courses shortened to some consistent distance after a validation measurement is performed.

Kevin Lucas suggests "allowing room for change of rules/policies/practices where little or no testing has been performed."

Tom Ferguson - see letter elsewhere - P.4

Bill Hughes - "...be very careful we don't split hairs... If everyone follows the proper procedures we won't have short courses"

Fete Riegel - The questionnaire was a surprise to me. At the IAC convention two things happened that set a few precedents that I liked. First, the Salazar NYC '81 run was not accepted as a record. Second, the SMU track was considered to be an OK track. Further investigation is going on into just how much allowance for measurement error should be applied to tracks. I suggested using the present IAAF rule that allows a maximum of 13 cm between measurements, since this can be interpreted to allow some tracks that measure short to be considered OK. The number we come up with may not be 13 cm, but it will be greater than zero.

As for roads, I have vacillated on this. The only thing that keeps me from uncritical acceptance of zero shortness is the certain knowledge that when a marathon is flunked at 42193 meters there will be an unholy stink. It will not be perceived as just.

I counsel patience. TAC and IAAF are going to get together on layout and validation standards, and there is no point in setting our own in concrete, only to have to change them later. Negotiation and compromise may be necessary. Let's not be in a hurry. Things are moving in a positive direction.

John I. Disley CBE  
Hampton House,  
Upper Sunbury Road,  
Hampton,  
Middlesex.

01. 979 1707



Pete Reigel,  
3354 Kirkham Road,  
Columbus,  
OH 43221  
U.S.A.

October 15th 1985

*Dear Pete,*

First, thank you for stepping across the Atlantic and associating yourself with the re-measurement of the Rotterdam Course. Apart from you added weight to the measurement team I was delighted that you had the opportunity of seeing us Europeans at work. I trust that you found no great differences in either technique or philosophy?

I have suggested to Allan Steinfeld that there should be an international Measurers Seminar in the States very soon which several of the senior guys from Europe would attend. The object - to cement our modus operandi together before there is a chance for unilateral development.

I have just received MN 13.

Can I just make the European point of view (and action) on Validation

As you know Rotterdam is now re-measured and given a Validation. London was Validated on the day of the race by the method which we believe is fairest. This is that the Certifier witness the course taken by the lead runners on the day of race and then signs a Validation certificate that says - the course that was run was that which was certified.

London was done this way with Max Coleby, (on the IAAF and AIMS list of measurers) being with Lennart Julin when the Course was certified, actually running the race with Ingrid Kristianson. He finished just 2 seconds in front of her and was able to check the course run against the one he measured for the entire route.

We in AIMS in Europe do not see the point of re-measuring an already certified course (as long as it has been measured by an acknowledged authority), it is not going to shrink like an old pair of socks in the wash.

Of course, if you have not been percipient enough to anticipate a world or national record and have not ensured a top quality certificat-



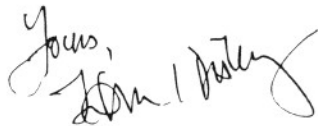
-ion team and arranged to have one or more of that team witness the race from the lead car, then you will have to, in our opinion, revert to the second best form of Validation, ie. measurement after the race.

I hope that this concept can be discussed in the columns of MN.

I look forward to meeting US measurers as soon as Allan can organise a suitable date and venue.

Incidentally, we have our first AAA official course for measurers in England in November. At this week-end we will 'certifiacte' measurers - two grades for area and national. These officials will have the same status as time-keepers and judges. We are pleased to have made this progress.

With best wishes,



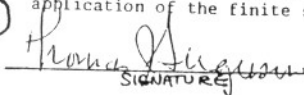
John I Disley  
ATMS European Co-ordinator for Measurers

CONT. FROM P 2:

- Q5. If the world was under your total control, what changes would you make to the current rules/policies/practices?

Write all rules and specifications, and whatever, in concrete terms. Use nothing but "will," "shall," "required," et al. I believe in dealing with the accepted terms for standards of measurement our wording should be just as precise. An inch, or centimeter or millimeter, or yard is comparable anywhere in the world. We should not allow the factors of judgement, wisdom, experience, et. al., in deciding to what to accept or what to reject. True, there are situations where the intuitive (mysterious at best) may apply, but only when there is doubt to the accuracy of the data or professional competence of the original measurer, certifier, or validator. But, this should not occur if those who pass on standards are as demanding on the person as they are to the application of the finite standards of internationally accepted units of measurement.

④

  
SIGNATURE

5 November 1985  
DATE

REPORT OF VALIDATION MEASUREMENT "STAD ROTTERDAM MARATHON 1985"

To fulfill the AIMS requirement of having the length of its course validated before the end of 1985 the organisers of "Stad Rotterdam Marathon" had invited me to perform a measurement during the second weekend in October.

To observe and assist in the procedure ~~two~~ two other experienced course measurers - Pete Riegel (TAC, USA) and Helge Ibert (AIMS, FRG) - had come to Rotterdam. During the bicycle session they both performed independent measurements of the course, while we worked together as a group otherwise.

Before coming to Rotterdam I had been contacted on telephone by Mr Mario Kadiks of the Rotterdam organisation who wanted to know what kind of preparations that had to be made in advance.

After arriving in Rotterdam in the early afternoon we spent the rest of the Friday to get acquainted with the course with the help of Mr Kadiks and of Mr Jos Hermens who on race day had followed the race from the lead-car. We drove by car around the course (which took a couple of hours due to the traffic) and after that we spent another couple of hours watching the official video-recording of the race. We also received copies of the special course map with detailed maps for the start, finish and 5 km-points.

Our most important observations concerning the course:

- \* The course was "well-defined", i.e. the section of the roads permitted for the runners had "natural" limits (curbs, bushes, etc) except for the section passing the bridges and for a U-turn on a road.
- \* On race-day the course was very well marked with cones and barriers making it virtually impossible for a runner to make un-allowed short-cuts without having to climb fences or run through bushes. Cones were also used to make turns less sharp
- \* On three parts of the course the road had been changed since race day. In two of those areas the road constructions were still underway.

On Saturday we finalised our preparations for the bicycle session early next morning:

- We went to the calibration course which was set up on a straight bike-path in northern Rotterdam. The end-points of the calibration course were marked by nails in the road. The course had been measured with an EDM giving the length as 1089.03 m according to a protocol shown to us by a member of the group who had measured the marathon course for the race (a measurement made by surveyor's wheel calibrated on this calibration course). Our measurement made with a 100m steel tape yielded the result 1088.983 m. The difference of less than 5 cm was negligible (approximately half a count on a Jones counter) and we decided to use 1089.00 m as the length for our future calculations. (The road was not absolutely flat and those depressions would make the length of the course measured by a bike wheel following the surface of the road instead of the straight line of light slightly longer, meaning that we probably were well on the safe side by choosing a value marginally shorter than the EDM figures.)
- We went out on the course to first measure (with the steel-tape) those sections of the road where we - due to the construction works - could not run our bikes along the ideal line of running on race day. At the three sections we marked reference points just outside and steel taped the distances between them. In doing this we almost certainly measured a shorter path than that available to the runners.
- We also used the opportunity to once more study the critical passages on the route and to mark approximate locations of the 5 km-points according to the maps we had got. (There has never been any marks on the road for those points, on race-day signs were put up according to the same maps.) We would use our marks as check points in our bicycle measurement.
- We rented bikes - standard type with 28" wheels, one gear and no hand-operated brake - and mounted our Jones counters on the front wheels.
- Pete Riegel prepared maps of the referencepoints and the construction areas as well as data sheets for the bicycle measurement session.

A few notes from our Sunday morning activities:

1. We went out to the calibration course at 4 a.m. meaning that it still was dark. Unfortunately there was no light on the road where we should do the calibration. We positioned one car with their lights on at each end of the course. The light on my bicycle was not working so I did one up-and-down run without seeing much between the end-points. After that I made one more up-and-down run some ten meters behind Riegel's bike which had functioning lights. It felt safer seeing a little bit more but the figures showed that I had ridden just as well in the dark. (See calibration results.)
2. We went back to the start on the course where we met the two policemen on motor-bikes that were to escort us and make our measurement safe despite the fact that we mostly would ride against the direction of the traffic. We also met Jos Hermens who on his bike would lead us the correct way. Also accompanying us were Mr Kadiks on a bike and one man from the Rotterdam organisation with a car.  
The starting line - as well as the finish line - was still visible on the road although they had been painted over with black paint since the race to avoid confusion for the normal traffic on the street.  
Along the course we normally rode in the order Hermens - Ibert - Riegel - Julin - Kadiks and at times it stretched out to a couple of hundred meters. I chose the position far back to be able to see every turn and other complications in good time to make certain that I did follow the shortest possible path.
3. On the course we only stopped at the 5 km- and the reference points we had marked the previous day. In the road construction areas we did try to measure as good as possible with the bikes, which would give a good indication that no major errors had been made in our steel tape measurements.
4. Thanks to the help from the police and our familiarity with the course after being out on it the previous day we were able to follow the "ideal line" well. Personally I can only remember two or three parked cars that stood in the line I wanted to follow, which perhaps meant a couple of meters extra. However I gained back the approximate equivalent distance when I mistakenly followed Riegel into a lane not available to the runners coming off the bridge section. Also we did probably make a few turns sharper than the runners had them when on race day there were cones positioned on the road to smoothen the bends.  
This together with what I said previously about the steel taped sections makes me totally convinced that we measured a line that was shorter than the ideal line available to the runners during the race when also barrier feet forced them to run a little bit wider than we rode on some turns.
5. We completed the measurement on the course in approximately 3 hours. After that we returned to re-calibrate our bikes. Coming to the calibration course and seeing it in day-light we discovered that we had used one incorrect end-point in the morning. The point used was between 2 and 3 meters off the correct one. However this was no big problem. We steel taped the separation and found it to be 2.76 m giving the total length of the calibration course used as 1091.76 m, and we re-calibrated on this same course. Personally I also made one up-and-down ride on the original calibration course immediately afterwards.
6. We returned to the hotel and made quick preliminary calculations of the total length of the course getting values between 42,218 and 42,229. It was a our joint conclusion that this proved beyond any doubt that the course used for the 1985 Stad Rotterdam Marathon was sufficiently long with the "true" length falling in the interval 42,195 - 42,237 m. (Further comments on the results are made on a separate paper.)
7. We spent a couple of more hours discussing marathon measurements in general and this measurement specially before we had to break up because Peter Riegel was to leave for the USA by an afternoon plane.

We were all quite happy with especially two things;

- \* That it had conclusively been proved that this WR course was correct.
- \* That it been established a good relationship between measurers on both sides of the Atlantic based on the fact that we are obviously doing the same things in the same way giving results without any significant differences. It is our hope that this co-operation and exchange of experience will continue in the future and that it will expand to incorporate all parts of the marathon running world.

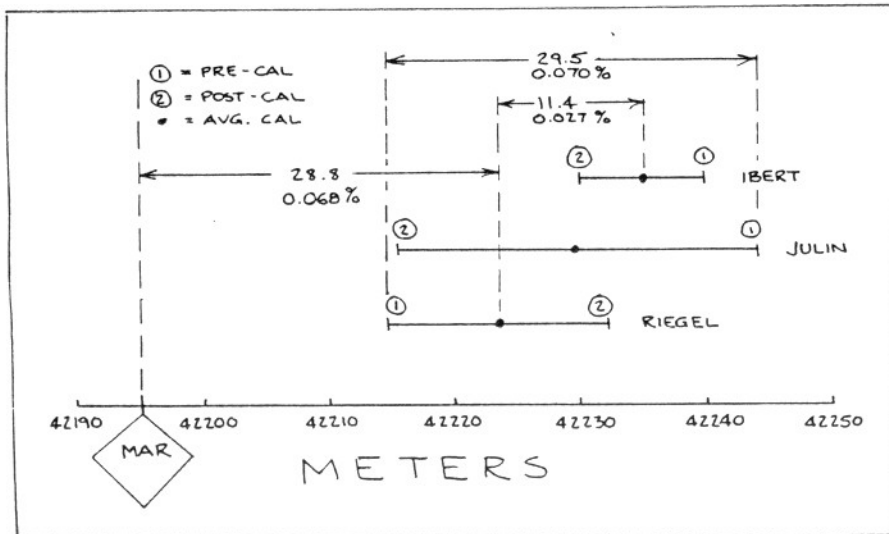
#### Marathon

At last I would like to thank the people of the Rotterdam for the total co-operation and assistance which made this occasion close the ideal for a validation measurement of a marathon course. A special thanks to Mr Mario Kadiks who put up with all our dull measurement talk and who fulfilled all our requests concerning equipment, tools, maps etc.

Sincerely,



A. Lennart Julin  
Gästrikegatan 14  
S-113 34 STOCKHOLM  
SWEDEN



DIPL.-ING. HELGE IBERT, WESTENDALLEE 100 D, D-1000 BERLIN 19, TEL. (030) 304 08 71

STAD ROTTERDAM MARATHON 1985 - Validation Measurement - Date: October 13, 1985

SUMMARY OF MEASUREMENT RESULTS

Updated October 29, 1985

Name of Measurer	Av.Counts / Length = Calibr. Constant
Lennart Julin, Stockholm (AIMS, Sweden)	10210.00 / 1091.76 = 9.35187 counts/m
Helge Ibert, Berlin (AIMS, Germany)	10201.44 / 1091.76 = 9.34403 counts/m
Peter Riegel, Columbus Ohio (TAC, USA)	10264.88 / 1091.76 = 9.40214 counts/m

Split Point	Increment Count			Increment Distance (m)			Steel Taped	Measured 5 km-splits		
	Julin	Ibert	Riegel	Julin	Ibert	Riegel		Julin	Ibert	Riegel
km 5	46689	46697		4992.5	4997.5			4992.5	4997.5	
km 10	46786	46755	94050	5002.8	5003.7	10003.0		5002.8	5003.7	10003.0
km 15	46780	46736	47045	5002.2	5001.7	5003.7		5002.2	5001.7	5003.6
(R.1)	1835	1835	1845	196.2	196.4	196.2				
(R.2)	(536)	(541)	(530)				57.15			
km 20	44134	44132	44353	4719.3*	4723.0	4717.3*		4972.6*	4976.0	4970.7*
(R.3)	(3337)	(3364)	(3407)				355.72			
km 25	43568	43557*	43806	4658.7	4657.0*	4659.2		5014.5	5012.7*	5014.9
km 30	46720	46650	46953	4995.8	4997.0*	4993.9		4995.8	4997.0*	4993.9
km 35	47039	46994	47243	5029.9	5029.3	5024.7*		5029.9	5029.3	5024.7*
(R.4)	12996	12980	13060	1389.7	1389.1	1389.0				
(R.5)	(613)	(606)	(611)				52.61*			
(R.3)	17011	16996	17093	1819.0	1818.9	1818.0				
(R.6)	(3463)	(3465)	(3524)				364.75			
km 40	13030	13019	13090	1393.3	1393.3	1392.2		5019.4	5018.7	5016.6
Finish	20560	20535	20651	2198.5	2197.7	2196.4		2198.5	2197.7	2196.4

JonesC 387148 386886 389189 41397.9 41404.6 41393.7  
StTape (7949) (7976) (8072) (850.0) (853.6) (858.5) 830.23

Total 42228.1 42234.8 42223.8

R.1..R.6 means Reference Points before and behind construction areas.  
( ) recorded counts by riding the bikes outside the steel taped portions.  
+ measured short by about 4 or 5 m on incorrect route outside allowed lanes.  
\* Jones Counter has been read 4.5 m behind 25 km-split point, difference has been taken in account calculating the preceding and following distances.  
\* corrected length of steel taped portion due to rechecking of field notes.

Comments:

- 1) The total length of the course is correct within the interval 42195 to 42237 m.
- 2) The three independent measurements differs only by 11 m, and this difference would be even less if the short measurements mentioned above (+) were considered.
- 3) There are four 5 km-portions with remarkable deviations:  
km 15 to 20 (with bridges and several S-bends) is about 25 m short,  
km 20 to 25 and km 35 to 40 (construction areas) are 15 to 20 m long,  
km 30 to 35 (with U-turn on the road) is about 30 m long.

Berlin, October 29, 1985

  
Helge Ibert  
Ved. 10.30.85



Bob Baumel - 129 Warwick Road  
Ponca City, OK 74601 - 13 Oct 85

Gaby Duguay - 2903 Pierre-Tétreault - Montréal, Québec H1L 4Z6

Dear Gaby,

Concerning your recent query published in Measurement News concerning gravel vs. pavement, the most likely reason why you would get fewer counts for a given distance on gravel than on pavement is that the wheel SLIPS relative to the road surface on the gravel. Remember that the Jones Counter is mounted on your FRONT wheel which is basically passive; i.e., the torque to rotate the front wheel comes only from friction between the wheel and the ground (since the front wheel isn't driven by the pedals). Thus, loss of traction between wheel and ground causes the front wheel to make FEWER revolutions than if it were rolling without slipping. Conversely, slippage between your BACK wheel and the ground would cause it to make MORE revolutions than if it were rolling without slipping.

To demonstrate this explicitly, I mounted Jones Counters on both my front and back wheels. Since I didn't have handy nearby parallel paved/gravel courses, I chose to use grass instead of gravel. The precise lengths of my parallel paved(asphalt) and grass courses are not known, although from the number of bicycle counts, I estimate that they are just under 140 metres. In any case, the paved and grass courses were exactly the SAME length. The well-tended grass (in a city park) was slightly wet as it had rained earlier in the day (which would increase the chance of slippage). All rides shown below were done on Oct 12, 1985, and were all done in the same direction (north to south). My tires were inflated to 665 kPa (kilopascals) in front, and 700 kPa in back.

<u>Surface</u>	FRONT	BACK
Paved	1303.5	1306.5
Grass	1295.5	1314
Paved	1303.5	1305.5
Grass	1296.5	1313

Note that my front wheel got about 0.6% FEWER counts on grass than on pavement, while my back wheel got about 0.6% MORE counts on grass than on pavement. The effects on grass and gravel are probably similar -- just more pronounced on grass. You may wish to check this by re-riding your paved/gravel course using Jones Counters in both front and back.

The explanation I've just given is probably well known to Bob Letson who first did experiments on the effects of different surfaces. I'm surprised that Pete Riegel didn't think of it, and instead thought it might be related to his corrugated surface calculations.

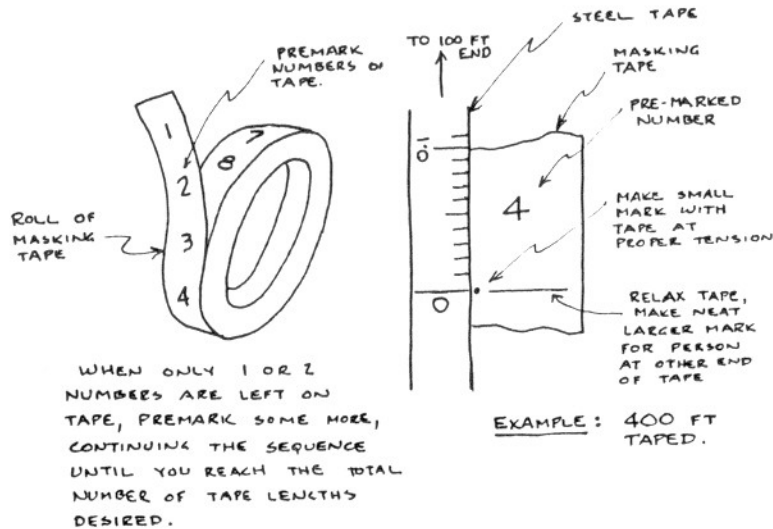
Actually, I HAVE been getting some results that may be related to Pete's corrugated surface calculations. I now have two nearby 1 km calibration courses in Ponca City. Both are on paved roads, although one of those roads is much smoother than the other. And I have been typically getting about 4 to 5 more counts/km on the rough cal course than on the smooth cal course. That's enough to make about a 5 m difference in a 10 km race course! I'll write this up in detail as soon as I've collected a little more data. But it should definitely serve as a note of caution. We are still pretty far from fully understanding all the sources of error in our measuring procedures!

cc: Pete Riegel  
Bob Letson  
NRDC

Sincerely,

*Bob Baumel*

BEGIN TAPING AT ZERO.



Steel-Taping Aid - While measuring the NYC Marathon, Wayne Nicoll and I learned a neat taping trick from Bob Letson. He uses a roll of masking tape to stick a writing surface on the pavement. So do lots of us. But he has a nifty trick. He rotates the roll, writing 1-2-3-4-5 etc before he tears off pieces. When there's more tape exposed, he writes more numbers, continuing the sequence. This eliminates mis-numbering as can happen when one sticks the tape down and then tries to remember the last number correctly when numbering the current mark. It's a very good way to keep from making miscounting mistakes. It may not be new to you, but it was to me so I'm passing it on.

921 Bath  
Ann Arbor, MI  
48103

Dear Pete,

Let me explain once again my feeling about one aspect of validation rides. In your Oct '85 IM, you take up the issue I wrote about over the summer. In your discussion, I can't tell if you agree with my feelings, or not. Let me run over it again.

If I should find a 25 km course to be 25009 meters on a validation ride, the course would pass the validation test. In addition, I feel the "extra" 9 meters should be dropped from the course for future years. It doesn't make any sense to me to not only retain the 9 meters, but to add an additional 16 meters to account for the SCPP.

If I have ascertained that the course is at least 25 km, then why have runners be required to run any extra distance in the future? You say that the course might be validated again in the future. Why? If it's done once, what's going to change to require any more validations?

It seems to me that we add the SCPP for two reasons. One, we want to ensure that the course will be at least as long as it's stated to be. Two, if a record is set and the course is validated, the "extra" distance will help the course be as long as it should be. The latter reason accounts for measurement error.

We're all agreed that we really don't know exactly how long any course is. Therefore, we should seek ways to make courses be as close to accurate as we can. Leaving a validated 25 km course at 25009 meters does nothing to move toward accuracy. It admits degrees of inaccuracy that should be dealt with, and as a "former" track runner, I feel uncomfortable with.

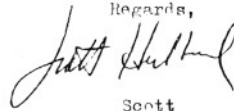
On another related topic, I can't remember who said it, but I don't like working with the larger constant in course measurement. I believe in making a course be as close to the projected distance as it ought to be. It doesn't take a math wiz to figure out the averaging approach.

Please, keep up the good work in IM. What I read makes me think about my methods and procedures.

11/26/85

cc: Len Young

Regards,

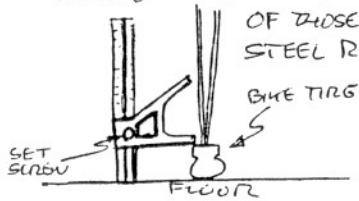


Scott

25-NOV-85

DEAR MR. DUGAY

I'M WRITING YOU REGARDING YOUR LETTER APPEARING IN PETE RIEGEL'S "MEASUREMENT NEWS" REGARDING THE FEWER NO. OF COUNTS YOU ENCOUNTERED ON GRAVEL. FIRST I'VE ENCLOSED A COPY OF A LETTER I SENT TO PETE & TO BOB LETSON IN SAN DIEGO. AS YOU CAN SEE A NUMBER OF US HAVE BEEN PUZZLING OVER THIS FOR SOME TIME. AT THAT TIME I OUTLINED THE PREMISE TO AN ENGINEER FRIEND WHO DID SOME PRELIMINARY CALCULATIONS & WHO CONCLUDED THAT THE CONCEPT WAS PROBABLY CORRECT BUT WAS NOT SATISFIED WITH THE FIGURES HE WAS COMING UP WITH. SINCE THAT TIME I DECIDED TO TAKE A CRACK AT IT MYSELF & I'M SENDING YOU A COPY & ONE TO PETE RIEGEL & BOB LETSON. YOUR DATA HAD MORE SPECIFICS TO WORK WITH & I THINK IT SHOWS THE CONCEPT TO BE RIGHT. IT WOULD REALLY NEED A PHYSICIST'S ATTENTION TO BE ABSOLUTELY SURE BUT I THINK THE FIGURES ARE IN THE BALLPARK. I'D BE INTERESTED IN KNOWING THE TIRE SIZES YOU & PIERRE LARUE USED THAT DAY & YOUR INDIVIDUAL BODY WEIGHTS - THEN I'LL PLUG THAT INFORMATION IN. IF IT ISN'T TOO MUCH TROUBLE I'D ALSO LIKE TO KNOW HOW MUCH YOUR INDIVIDUAL BIKE RIMS DEFLECT WITH TIRES INFLATED TO PROPER PRESSURE & RIDER IN PLACE. I MEASURED A BIKE IN A LOCAL REPAIR STORE ON A CONCRETE FLOOR BY



OF THOSE THINGS THAT SLIDE UP & DOWN ON A STEEL RULE & CAN BE LOCKED WITH A SET SCREW. NOT VERY SCIENTIFIC BUT CLOSE ENOUGH FOR OUR PURPOSES. I HOPE THIS HAS HELPED SOLVE YOUR MYSTERY. AT ANY RATE I'M

THROWING IT OUT TO THE MEASURING COMMUNITY FOR THEIR COMMENTS.

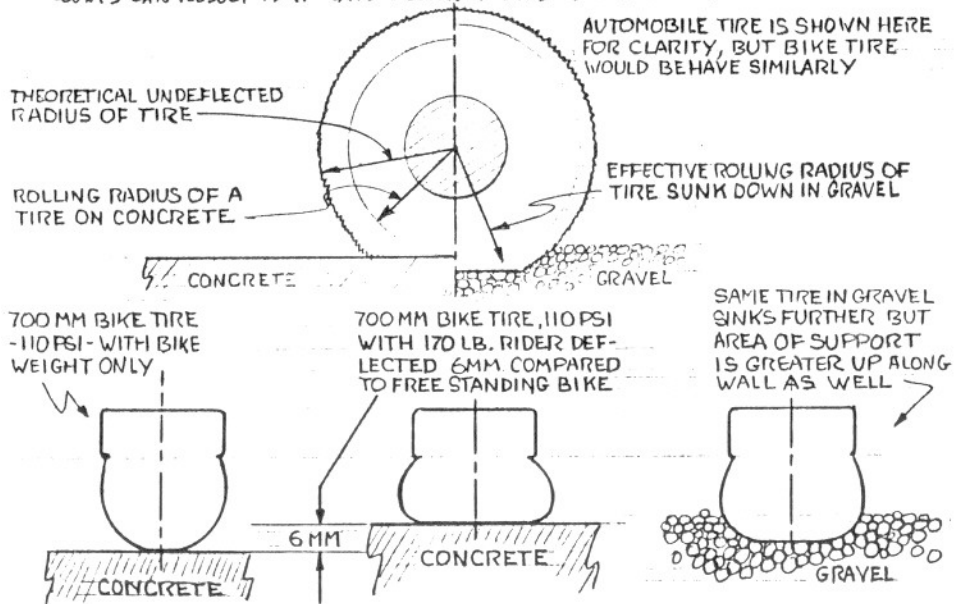
YOURS SINCERELY,  
*Allan L. Philips*

ALLAN L. PHILIPS, 7833 HILLCREST BLVD., WESTLAND MI. U.S.A. 48185

PROPOSED SOLUTION TO THE RECORDING OF FEWER COUNTS ON JONES COUNTER OVER THE SAME DISTANCE ON A SOFTER SURFACE

AL PHILLIPS 25-NOV-85

FIRST I MEASURED THE DEFLECTION OF A LIGHT WEIGHT BICYCLE EQUIPPED WITH 700MM TIRES AT 110PSI. THE DEFLECTION OF THE TIRE WITHOUT A RIDER WAS NEGLIGIBLE AND WITH A RIDER WEIGHING 170 LBS, THE TIRE DEFLECTED A SURPRISING 6MM ON A CONCRETE FLOOR. USING THE INFORMATION SUPPLIED IN GABY DUGAY'S LETTER - #13 MEASUREMENT NEWS OF OCT. '85 - I THEN CALCULATED HOW MUCH LESS THE TIRE WOULD NEED TO DEFLECT TO ACCOUNT FOR A DECREASE OF 13 COUNTS. OBVIOUSLY THE ONLY HARD DATA I HAD WAS GABY'S COUNTS FOR 1 KM & I MADE AN ASSUMPTION THAT A 700MM TIRE DEFLECTED 6MM WAS CLOSE TO THE CONDITIONS ENCOUNTERED BY GABY & PIERRE LARUE & ALSO THAT GABY MIGHT WEIGH 170 LBS (SORRY GABY IF THIS MAUGNS YOU). MY CONTENTION IS THAT A SOFTER SURFACE - GRAVEL, OR ROBERTSON'S FAMOUS SAND - ALLOWS THE TIRE TO SINK DOWN FURTHER BUT BECAUSE IT ALSO SURROUNDS THE SURFACE OF THE TIRE MORE, IT GIVES IT A GREATER SUPPORTING SURFACE & A RESULTANT INCREASE IN THE EFFECTIVE "ROLLING RADIUS." THE ONLY WAY FEWER COUNTS CAN RESULT IS IF THIS ROLLING RADIUS IS EFFECTUVELY LARGER.



## MATHEMATICS OF DUGAY DATA

ASSUMPTIONS; WHEEL D/A. 700MM (RADIUS 350MM); WIDTH OF TIRE 25MM;  
DEFLECTION OF TIRE WITH RIDER 6MM; HARD SURFACE COUNTS  
FOR 1KM. 9379.375; COUNTS ON GRAVEL FOR 1KM. 9366.375 (13 LESS)

- WITH A DEFLECTION OF 6MM, EFFECTIVE ROLLING RADIUS WAS  $350 - 6 = 344$  MM
- 1 REV. OF TIRE = CIRCUMFERENCE, 1 REV OF TIRE OF 344MM R. = 2161.4208 MM  
 $2\pi R = C$ ,  $2\pi \times 344 = 2161.4208$  MM
- $9379.375$  COUNTS FOR 1KM AT 20 COUNTS PER REV. =  $468.96875$  REVS.  
 $\frac{9379.375}{20} = 468.96875$
- ONE COUNT IS EQUAL TO  $\frac{1411}{9379.375} \rightarrow \frac{1,000,000 \text{ MM}}{9379.375} = 106.6169$  MM
- THEREFORE 13 COUNTS ARE EQUAL TO  $106.61691 \times 13 = 1386.0198$  MM
- AT 1386.0198 MM FOR 468.96875 REVS., 1 REV =  $2.955463$  MM  
 $\frac{1386.0198}{468.96875} = 2.955463$  MM
- THEREFORE CIRCUMFERENCE NEEDS ONLY TO BE INCREASED BY 2.955463MM  
TO REDUCE THE 1KM COUNT BY 13 COUNTS
- INCREASE TO R/R TO INCREASE 1 REV. BY 2.955463MM IS - 0.47036MM  
 $2\pi R = C$ ,  $R = \frac{C}{2\pi}$ ,  $\text{NEW R} = \frac{C + 2.95463}{2\pi}$ ,  
 $\text{NEW R} = \frac{2161.4208 + 2.955463}{6.2832}$ ,  $\text{NEW R} = 344.47036$   
INCREASE = NEW R - OLD R, INCREASE =  $344.47036 - 344$  OR 0.47036MM

\* THEREFORE DEFLECTION OF TIRE TO ACCOUNT FOR 13 COUNTS NEEDS ONLY  
TO BE REDUCED BY 0.47036 MM

CONCLUSION: THE SAME RIDER ON BOTH SURFACES WITH EQUAL WOBBLE  
WOULD REDUCE THE REQUIRED INCREASE IN THE EFFECTIVE R/R. THE  
ABOVE FIGURE INCLUDES THE EXTRA DISTANCE ON GRAVEL INDUCED BY WO-  
BBLING AS WELL AS ANY EXTRA SLIPPAGE. DUGAY'S DECREASE IN COUNT REP-  
RESENTED A DECREASE OF 0.1386019%, LARUE'S WAS ONLY 0.063103%.  
I SUGGEST THAT A POSSIBLE DIFFERENCE IN BODY WEIGHT, TIRE SECTION &  
OR RIDING TECHNIQUE COULD ACCOUNT FOR THE DIFFERENCE.

*Wayne had your watch - was -*

*Wayne Nicoll's*

## FOOTRACE SERVICES

P.O. Box 4537

(404) 860-0712

Martinez, Georgia 30907

October 7, 1985

Julia Morrison, editor  
Carolina Runner  
P.O. Box 144  
Concord, North Carolina 28026

Dear Julia,

You have probably already had some inquiries about the disparity in the winning time reflected in your magazine for Marcia Manaur at the Midnight Flight 10K at Anderson, SC on August 30th. The finish line photo on the cover of your October '85 issue clearly shows Marcia finishing with a time of 35:40 displayed on the race clock, yet the narrative lists her as lowering the course record with a 35:50.

As the chief timer at the Midnight Flight I was puzzled over this obvious discrepancy. I studied the select times taken on a tape recorder and learned I had given Marcia, wearing number 11, a 35:50. A time of 35:50 was recorded on the finish tape for the women's winner. I had personally programmed the times on the finish line race clock and had not noted any discrepancies in the visual clock, the print-out times, or the stop watch splits I had taken on the male overall winner. What happened?

It took me awhile but I've solved it. I set up the clock and watched it run. The race clock is an electronic device that has mechanical digit segments. The two digits which represent the seconds being recorded do not change simultaneously. The digit representing single seconds changes a tiny fraction of a second before the digit that records tens of seconds. There is a distinct "clunk-clunk" as the two digits change. The clock was in the process of the change from 35:49 to 35:50 at the instant the photo was taken. The single second digit had already changed from nine to zero but the four had not flipped to five. Thus the time was correctly reported by your correspondent as 35:50.

This is certainly a rare occurrence in footrace timing and photography!

Sincerely,

*Wayne*  
Wayne B. Nicoll



## GRANITE STATE RACE SERVICES

11/23/85

To: Road Race Course Measurers  
From: Bob Teschek

I'm sure that most of us who measure race courses frequently have developed hand signals for communicating with our "support vehicles". However, these crude visual cues can be frustratingly ineffective at times and certainly are limited. I had been using some inexpensive two-way radios for race direction purposes and had the idea of trying them while measuring on my bike. What a difference!

I can now talk directly to my support team and they to me. We can discuss upcoming turns in the road (I can even send them ahead to check) so that I am better able to ride the shortest possible route. As a split approaches, my assistants can let me know (car odometer) and can even read the next Jones Counter count to me from my prepared worksheet. On the second course ride, they can help me spot the first set of marks and can even act as recorders as I read the count to them (carefully, twice).

But perhaps the nicest feature of all is the added safety afforded by this improved communication. On busy routes with frequent lane changes, I have a car or bike in front AND behind. At my request, they can stop traffic, pull ahead to guard a dangerous curve, etc. This becomes especially critical when I use inexperienced help.

Interested? I bought my equipment through a DAK Industries mail order catalog (1-800-325-0800) order # 9810 (winter 1986 issue). Cost per unit is \$29.95. The range is plenty for most situations encountered. They advertise a 30-day trial with money back option if not satisfied. If looking for comparable (or better?) units, be sure they include hands-free operation. Good luck!

Copies: NRDC  
Pete Riegel  
Wayne Nicoll

I forgot to mention in my letter (about the 2-way radios) that I use a head set with a mouth piece. The main unit clips on at the waist. Thus hands-free operation (and no hollering) are possible.

← P.S. 12/5/85



To: RRTC Members  
From: Bob Baumel

Date: 5 Dec 1985

Subject: Some Issues in Road/Track Certification/Validation

Lately there has been some heated discussion in the RRTC, or at least among several of its members, concerning the issue of when race courses are valid for record purposes. The "zero shortness" validation tolerance for road courses has provoked controversy ever since it was announced in 1982. The issue has resurfaced with added intensity during the past year in the context of track measurements. I will now summarize some of the problems and will then suggest some possible solutions. Among my proposed solutions, the most significant would be the creation of a new RRTC panel to render judgments in disputed validation cases.

#### PROBLEMS

##### Road Courses

The concept that a road course measure no less than its advertised distance first appeared in IAAF Rule 145.5 (which also specifies an UPPER limit, namely 1.001 x advertised distance, for certain major international meets). Within the context of this IAAF rule there is no ambiguity in enforcing either the lower or upper bound, as they both refer only to LAYOUT measurements performed before the race -- since IAAF rules do not provide for post-race validation measurements.

When that same strict numerical requirement (that the course measure no less than its advertised distance) is applied in the context of a post-race validation measurement, it becomes more problematical. It creates a high level of anxiety. The laws of probability assure us that cases will occur in which all measurement procedures were proper, and the course was used correctly in the race, but the validation finds it short. (Note that the error can be in the validation measurement rather than the course). Thus, although there is a definite need for post-race validations, all principles of logic and decency argue that they be interpreted more realistically.

The requirement that the distance measured in the validation must exceed the advertised race distance is not as objective as it appears: The process of reducing all the measurement data down to a single number (i.e. measured distance, or even "most probable" measured distance) can be quite arbitrary. For example, when the '84 Olympic Marathon measurement data was analyzed by Riegel, Letson and myself, we devised at least 7 or 8 different ways of computing each cyclist's measured distance, and were unable to agree on a "most accurate" calculation. (Fortunately it didn't matter in that case, since it was a LAYOUT measurement, and all calculations were close enough for that purpose).

It has been proposed that a certain error allowance (perhaps 0.05% for all validations done by bicycle) be made, so that the course wouldn't be rejected unless the validation result is this far BELOW the advertised distance. This shares the assumption of the standard "zero shortness" algorithm that the measurement data can always be uniquely and unambiguously reduced to a single number. It also assumes that we can categorically state the measurement error with no knowledge of the circumstances of the individual measurement. And furthermore it assumes that our estimates of these errors

will not change as we gain more knowledge of our measuring techniques.

Note: I recently did experiments (which I promise to write up soon) comparing the effect of calibrating a bike on a smooth or rough surfaced calibration course; my results show that the bicycle technique can have more error than we had thought.

#### Tracks

The same basic arrangement is presently used for certifying both road courses and tracks: Anybody (experienced or not) is permitted to do the measurement if he or she can produce paperwork acceptable to the RRTC Reviewer. But the word "certification" no longer has the same meaning for both road courses and tracks. Road course certification is now a preliminary screening process (intended to produce reasonably accurate courses that are probably long enough to pass validation tests), while the final word on whether a road course is acceptable for road purposes is determined by VALIDATION measurement. Track certification, on the other hand, is still accepted as the final word on acceptability of the track. Or is it? In a letter to Tom O'Brien dated 13 Sep 85, Ken Young wrote that the certification of the SMU track is good, but that this certification doesn't show the track to be valid for record keeping. (If not, then what IS the certification good for?).

Most tape measurements performed for checking a track do not achieve any better accuracy than about 1/5000 (or about 8 cm in 400 m). If extra precautions are taken, maybe an accuracy of about 1/10000 (or 4 cm in 400 m) can be achieved.

The "safety factor" (if any) used when building a track is almost always smaller than the error we would make when checking the track. (A typical safety factor seems to be about 2 cm for a 400 m track). One wonders whether such a minuscule safety factor was enough to cover the errors in the original survey measurements. (Note that even if the track itself was laid out with great care, the CURB may be installed sloppily, failing to properly align with the track. Also, curbs sometimes have removable sections that may be flimsily constructed, failing to accurately reproduce their previous positions after being removed).

The TAC and IAAF rules governing track measurement are ambiguous. The famous statement that "The length of the running track should not be less than 400 metres" does not occur at all in the TAC rulebook, but appears only in IAAF Rule 161.1, which nevertheless gives no hint on how it should be interpreted in practice when measuring a track. IAAF Rule 145.2 states that two independent measurements of a 400 m track should agree to within 13 cm (a fairly generous allowance) but doesn't say how these measurements should compare with the track's advertised distance.

Actually it's hard to tell whether IAAF Rule 161.1 means that the track's EXACT MEASUREMENT (to the last decimal place) must exceed 400 m, or simply that IAAF meets shouldn't be held on tracks whose NOMINAL length falls below 400 m (such as a 200 m track). The latter sort of interpretation was obviously intended for IAAF Rule 148.7(d) (that for records at 200 m or more, the track must not exceed 440 yards -- this is also TAC Rule 183.8) and IAAF Rule 148.8 ("For walking records, the track must be an oval from 350 metres minimum to 500 metres maximum).

According to TAC Rule 62.2, track length is to be measured "upon a line 30 centimeters (12 inches) outward from the inner edge of the track," which apparently views 30 cm and 12 inches as functionally equivalent, even if the measured track length differs by 3 cm depending on which you use. IAAF Rule 161.2 states only the metric figure of "0.30m". Note: to the accuracy stated (two decimal places) there's no difference between 0.30 m and 0.3048 m = 12 inches. Surely, the IAAF rule writers knew that most tracks in England and the United States were measured at 12 inches; so they probably stated the "0.30m" figure to only two decimal places so as to avoid disqualifying all the tracks measured at 0.3048 m.

Another suspicion: that in the view of TAC and IAAF rule makers, the 3 cm difference due to measuring at 30 cm or 12 inches from the curb is trifling, considering that IAAF Rule 145.2 allows a variance in measurements of 13 cm.

#### SOME PROPOSED SOLUTIONS

First, in order to better account for the range of opinions on these subjects within RRTC, and to better utilize the expertise within this committee, and to give the RRTC a greater voice in deciding when courses are valid, I propose formation of a new RRTC panel to render judgments in cases of "close calls" in validation situations (for either road courses or tracks). Those judgments would serve as recommendations to help the Records Committee reach decisions on validity of possible records.

The panel should probably have about three members, one of whom should certainly be the RRTC Validation Chairman. The remaining members would either: (a) automatically consist of certain officers of RRTC, or (b) be selected from the RRTC membership at large. The panel would be considered a subcommittee of the RRTC Validation Division.

In reaching judgments, the panel should AVOID criteria based on fictions such as: (1) that measurements can be performed without error, or (2) that results of any measurement can be unambiguously boiled down to a single number, or (3) that we know in advance just how much error a measurement by a particular technique (e.g. the bicycle method) will have. My proposed criteria, which are necessarily somewhat qualitative, are stated at the end of this essay.

The concept of track certification, as it now exists, should be done away with. Track measurements by inexperienced measurers are probably almost always less accurate than the original survey measurements done when the track was built, and are therefore of dubious value in determining whether the track is long or short. In place of "certification", we should do only VALIDATIONS of tracks, which would be treated analogously to road validations and could only be performed by skilled RRTC personnel.

Anybody who validates a track should make every effort to make the measurement as accurate as possible. For example, a "calibrated" tape should be used, and all available calibration data must be properly utilized in the measurement. To increase the accuracy of the temperature correction, tracks should not be measured in conditions of direct sunlight. (An overcast day is nice. Measurement at night under stadium lights would be good if you can arrange it).

Criteria for acceptability of race courses (for record keeping)

The following criteria would be used by the RRTC judging panel whose existence I proposed on page 3:

- a) A solid effort to measure the course as accurately as possible (i.e., "validation" measurement) must have been undertaken by a measurer who is known to be highly skilled, and who was not involved in the original certification (road course) or construction (track), and who has no association with the race organizers or any other possible conflict of interest.
- b) The measurement described in (a) must have obtained good quality data that succeeds in tying down the possible course length, with high confidence, to a rather narrow interval, based on what is judged to be technically feasible.
- c) The measurement described in (a) and (b) must not have demonstrated the course to be SHORTER than the advertised race distance.

Bob Baumel

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THINGS TO DO

- 1) RE-READ OCT MN. DO THE CALIBRATION EXPERIMENT & SEND TO PETE. PRELIMINARY RESULTS (4 SO FAR) INTRIGUING
- 2) SEND SUGGESTED CHANGES TO MEASUREMENT BOOK TO PETE. HE'S KEEPING A FILE. NEXT EDITION WILL HAVE SOME CHANGES.
- 3) MEASURE A LOCAL CURBED TRACK IF YOU CAN FIND ONE. SEND DATA TO PETE.