

# Measurement News



July

1995

Issue #72



New measurers improve their technique with experience in riding. Here is a group from Manaus, Brazil, which took a two-day seminar, in which they measured the same course on two successive days. Inside are comparative measurements of the seminar, and another conducted in Mexico City, in which the same improvement was seen. It's encouraging.

## MEASUREMENT NEWS

#72 - July 1995

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### USATF WOMEN'S OLYMPIC TRIALS MARATHON

**Amy Morss** has volunteered to lead the group measurement of the Women's Olympic Trials Marathon. She will be contacting measurers soon. If you are interested in helping, please contact her (note her new address on last page).

### NEW ADDRESSES

On the last page, note new addresses for **Bob Harrison, Amy Morss, and Gene Newman**

### JONES COUNTER PRICE INCREASE

Paul Oerth reports that Jones Counter prices will increase by \$5.00 effective January 1, 1996. See his letter elsewhere in this issue.

### PRACTICE MAKES PERFECT - COVER STORY

In June I had the pleasure and work of conducting two measurement seminars. One was held in Manaus, Brazil, and the other in Mexico City. The general conditions were the same: I don't speak Portuguese, and stumble badly in Spanish, thus communication was difficult. Most of the measurers were novices, although there were a couple in each city who were experienced, and who helped with translation. Each seminar was nominally four 4 hour sessions, but this included a bit of lost time getting people assembled, getting to the site etc.

I reasoned that the students would benefit more from practical demonstration than from lectures. At each seminar we spent the first session using steel tapes, and seeing how things agreed and differed. The next two sessions were actual measurements of a test course which the measurers had never seen before. I had scouted the area, and prepared maps and data sheets ahead of time. I rode around each course, demonstrating how to ride a correct line. Then the measurers individually did 4 precal rides, rode the course, stopping at some intermediate points, and then did 4 postcals. Then they sat down to calculate.

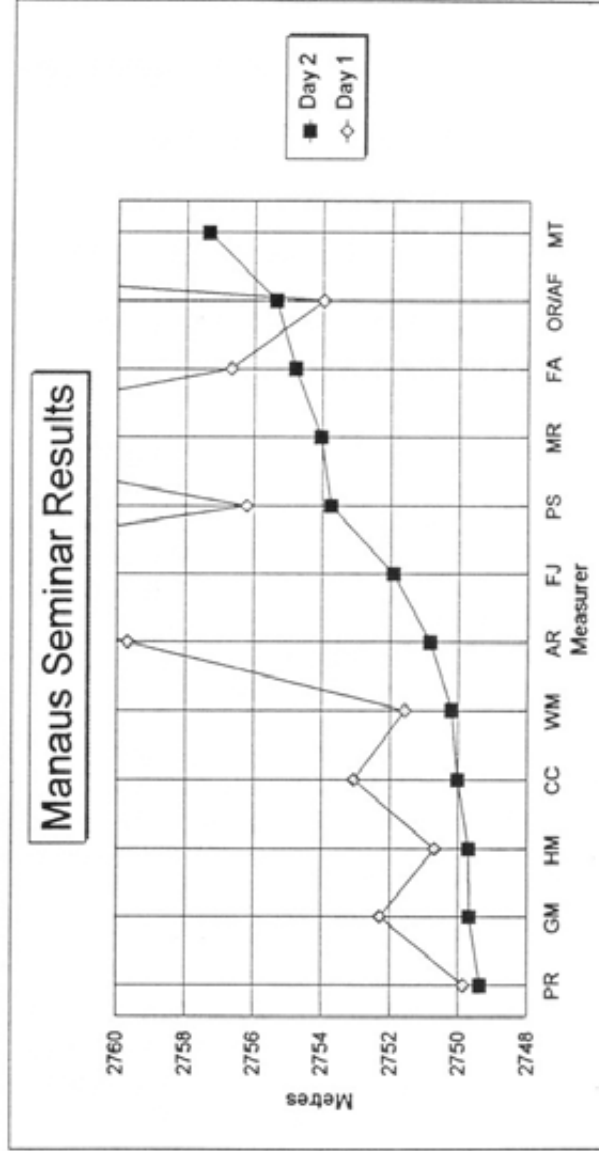
On the first day they were nervous, but as they gained confidence they improved a lot. The ones who learned first talked with those who were slower to learn, and the measurers taught each other. I can only guess what they were saying to each other, but whatever it was the results of the second day clearly show an improvement. They are on their way.

	S/F - R1		R1 - R2		R2 - S/F		R2 - S/F		S/F - S/F	
	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2
PR	757.02	757.16	694.81	694.76	1298.02	1297.45	2749.85	2749.37	2749.85	2749.37
GM	757.36	756.90	695.54	694.86	1299.38	1297.93	2752.29	2749.69	2752.29	2749.69
HM	757.53	757.14	694.93	694.47	1298.23	1298.08	2750.69	2749.70	2750.69	2749.70
CC	758.16	757.48	695.65	694.55	1299.26	1298.00	2753.07	2750.03	2753.07	2750.03
WM	757.93	756.86	694.84	695.06	1298.79	1298.28	2751.57	2750.20	2751.57	2750.20
AR	757.63	757.79	699.13	697.12	1302.93	1295.93	2759.69	2750.84	2759.69	2750.84
FJ	761.11	759.03	691.64	715.20	1316.19	1277.70	2768.93	2751.92	2768.93	2751.92
PS	758.93	757.54	695.74	695.54	1301.55	1300.67	2756.22	2753.75	2756.22	2753.75
MR	759.49	755.10	702.45	740.58	1304.99	1258.37	2766.93	2754.05	2766.93	2754.05
FA	758.81	759.09	697.07	696.06	1300.79	1299.64	2756.67	2754.80	2756.67	2754.80
OR/AF	759.17	758.37	696.87	697.38	1297.95	1299.61	2753.98	2755.36	2753.98	2755.36
MT	762.33	760.87	712.06	696.28	1309.17	1300.19	2783.56	2757.34	2783.56	2757.34

### Calibration Variation

Each measurer takes 4 rides to complete a calibration. In the ideal, there will be no variation. With experience, a measurer will approach the ideal. Here is the average variation for each measurer.

	Day 1	Day 2
GM	2.5	0
OR/AF	1.5	1
PS	2.5	1.5
FJ	4.5	2.5
PR	2.5	2.5
AR	5	2.75
CC	5	3
HM	3.5	3.75
WM	3	3.75
MT	1.5	4
FA	4.5	4.5
MR	8	6.5

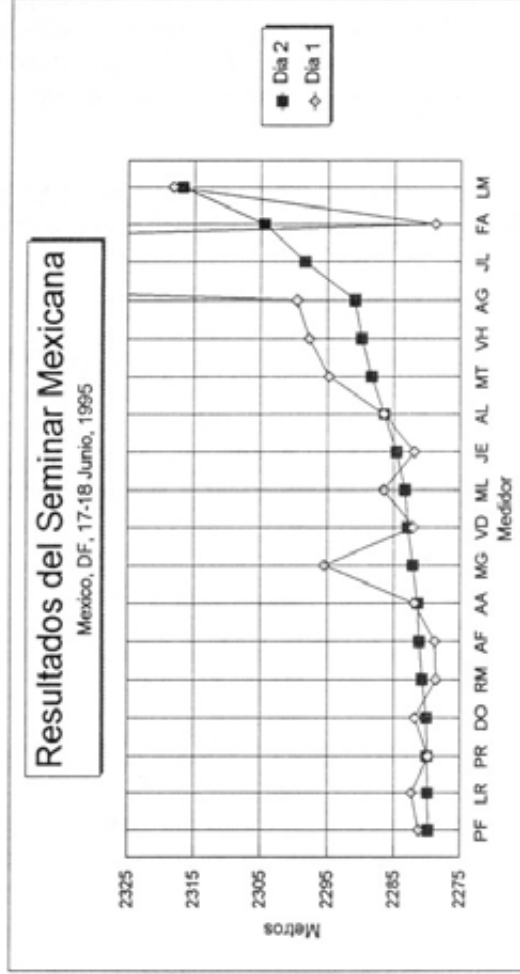


Note the large improvement from Day 1 to Day 2!

	1 - 2		2 - 3		3 - 4		3 - 4		Total	
	Dia 1	Dia 2	Dia 1	Dia 2	Dia 1	Dia 2	Dia 1	Dia 2	Dia 1	Dia 2
PF	433.40	463.01	676.33	646.18	1171.48	1170.65	1170.65	1170.65	2281.22	2279.84
LR	463.53	463.23	647.57	647.01	1171.22	1169.65	1169.65	1169.65	2282.32	2279.89
PR	463.11	463.24	646.33	646.54	1170.40	1170.19	1170.19	1170.19	2279.84	2279.97
DO	463.09	463.05	647.41	646.50	1171.37	1170.50	1170.50	1170.50	2281.86	2280.05
RM	463.11	463.60	646.13	646.41	1169.38	1170.77	1170.77	1170.77	2278.62	2280.77
AF	463.15	463.23	646.17	646.76	1169.46	1171.16	1171.16	1171.16	2278.79	2281.15
AA	463.02	463.39	647.25	646.87	1171.65	1171.12	1171.12	1171.12	2281.91	2281.38
MG	463.38	463.41	651.36	647.50	1180.73	1171.27	1171.27	1171.27	2295.48	2282.18
VD	463.32	463.23	647.14	647.22	1171.65	1172.44	1172.44	1172.44	2282.11	2282.89
ML	463.66	463.26	630.36	647.60	1192.48	1172.46	1172.46	1172.46	2286.50	2283.32
JE	463.10	463.38	647.42	648.40	1171.40	1172.79	1172.79	1172.79	2281.92	2284.57
AL	463.06	464.82	647.92	647.62	1175.54	1173.96	1173.96	1173.96	2286.52	2286.41
MT	464.79	462.97	650.59	648.36	1179.36	1177.02	1177.02	1177.02	2294.74	2288.36
VH	463.50	463.26	653.81	645.52	1180.42	1181.09	1181.09	1181.09	2297.73	2289.87
AG	462.18	463.64	653.63	650.82	1183.81	1176.37	1176.37	1176.37	2299.62	2290.84
JL	551.98	463.00	671.01	647.09	1248.10	1188.34	1188.34	1188.34	2471.09	2298.43
FA	463.15	463.58	646.17	651.12	1169.46	1189.85	1189.85	1189.85	2278.79	2304.55
LM	463.19	463.36	659.38	664.68	1195.60	1188.75	1188.75	1188.75	2318.17	2316.79

### Variación de la calibración

Cada medidor toma 4 paseos a completo una calibración. En el ideal, habrá ninguna variación. Con experiencia un medidor acercase el ideal. Aquí está la variación media por cada medidor.



	Dia 1	Dia 2
PR	0.75	0.75
JE	3.5	1
VH	2	1
AF	7.5	1.5
PF	1.5	2
FA	7.5	2
ML	3	2.5
MG	3.5	2.5
VD	6.25	2.75
MT	4	3
LR	2.5	3
AL	2.5	3
AA	3.5	3
DO	3.5	3.5
RM	7	3.5
LM	7.5	4.5
AG	17.5	5
JL	6.25	11.5

¡Nota la mejora grande de Día 1 a Día 2!

## BOB EDWARDS STEPS DOWN

Pennsylvania's **Bob Edwards** has resigned as certifier. Bob began certifying in 1987, and has certified 311 courses, a lot of work, in addition to personally measuring 34 courses. Thanks to Bob for his excellent service. He will remain a final signatory, empowered to certify the courses he measures himself.

**Bill Belleville** will replace Bob as Pennsylvania certifier. Bill has measured 49 courses since 1985, and is one of the best mapmakers around. Welcome, Bill. We await with bated breath the initials you will choose, since Bob Baumel has BB locked up.

## TWO FOREIGN VALIDATIONS

From **Running Stats**, May 23, 1995: "**Ryan Lamppa** has received a communication from IAAF official **J. F. Delasalle** that April's Laval (France) half marathon course, upon which French master Nicole Leveque tentatively set a French record 70:30 was short. French certifiers **Jean-Marie Grall** and **Christian Delerue** remeasured the course one week after the race and found the distance to be 20,812 meters."

**Dave Bendy** returned to Athens to set up the IAAF World Cup Marathon course, and observed the race. He reports that because of non-adherence to coning restrictions, the course was about 20 meters short.

## US VALIDATIONS

Elsewhere in this issue you will see how US validations have been doing. This year we are having a bad time of it. Of the 5 courses found short, one was a 50 mile and a 50 km, on the same loop course, which artificially depresses the numbers. Let's hope we get some more 1994's coming out better, to bump up the average.

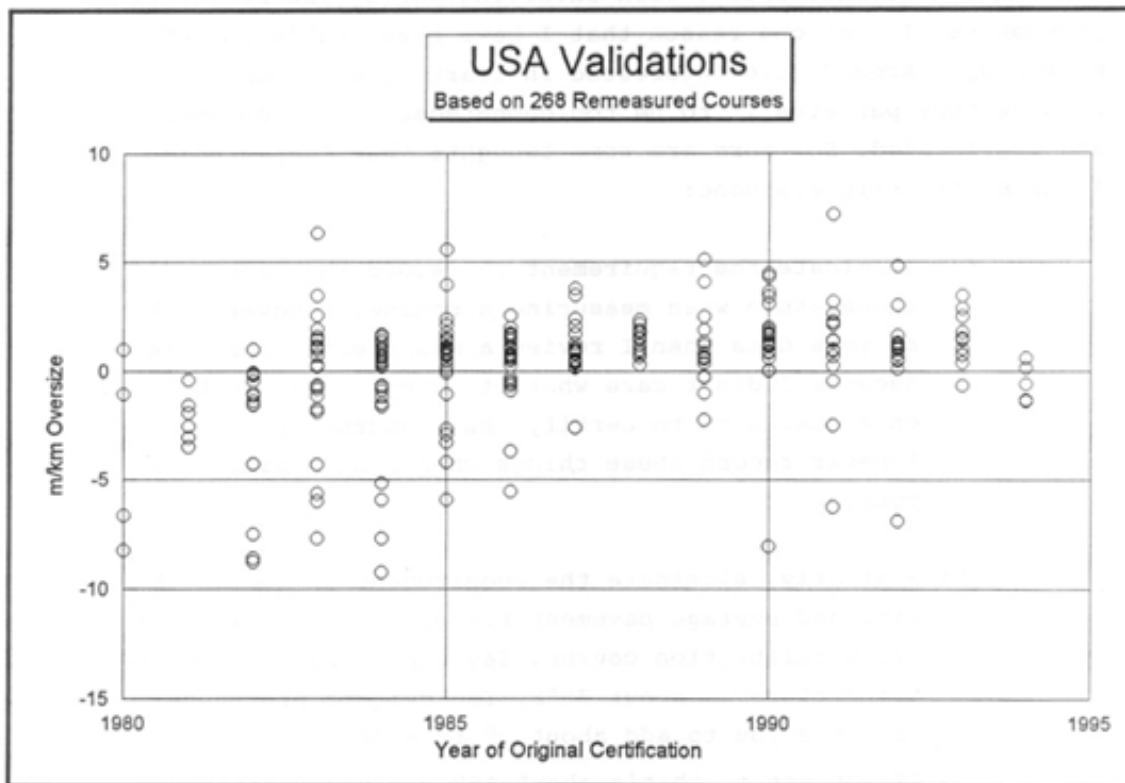
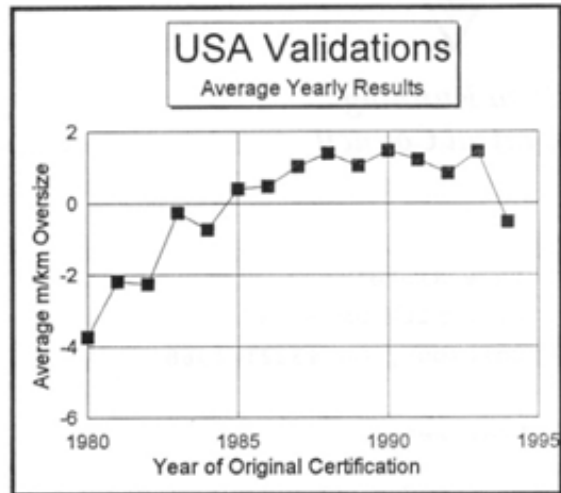
Tom Knight, just for the fun of it, decided to conduct a personal validation of a race near his home. The course as certified had some coning required at corners. The race as run ignored the cones, and came up short. See Tom's report elsewhere in this issue.

## IS TEMPERATURE CORRECTION REALLY NECESSARY?

We ask measurers to make a temperature correction when they lay out a calibration course. **Bob Harrison** thinks that this may be unnecessary, and makes a persuasive case. Is it necessary? See the letters in this issue. Opinions from all measurers are solicited.

# USA VALIDATION EXPERIENCE

Year of Certification	Average m/km Oversize	Number Measured	Percent OK
1980	-3.75	4	25.0
1981	-2.19	6	16.7
1982	-2.26	16	43.8
1983	-0.25	24	58.3
1984	-0.73	31	64.5
1985	0.41	32	81.3
1986	0.49	32	84.4
1987	1.03	19	94.7
1988	1.40	14	100.0
1989	1.04	17	88.2
1990	1.48	25	96.0
1991	1.22	16	87.5
1992	0.84	16	93.8
1993	1.45	11	90.9
1994	-0.51	5	40.0





*Road Running  
Technical Council*

*The National Governing Body for  
Track and Field, Long Distance Running,  
and Race Walking*

*Bob Harrison  
1736 Meadow Oak Court  
Montgomery, Alabama 36117-6830  
(334) 279-5517*

June 12, 1995

Pete Riegel  
3354 Kirkham Road  
Columbus, OH 43221-1368

Dear Pete,

I would like to make a few suggestions which I think will eliminate some unnecessary work involving our course measurement procedures. I feel one reason that I have been unable to get more people around here interested in learning measurement is because they perceive it to be too cumbersome, time consuming, and complicated. So, here are some thoughts that I have which I think will help everyone:

\*\*\* Eliminate the requirement to record the time and temperature when measuring a course. I never look at this data when I review a measurer's paperwork because I don't care what it says. It has no bearing on my decision to certify their course or not. I never record these things when I am measuring a course.

\*\*\* Similarly, eliminate the requirement to record the time and average pavement temperature when measuring off a calibration course. Say the average pavement temperature is about 30°F. The current procedure requires you to add about 3" to a 1000' course. If you don't, that's about 16" per mile that you

don't add to your course measurement. We are already adding 5.28' per mile with the SCPF. So, to me, it's not worth the trouble. If a course flunks a validation measurement check, it will not be because the measurer did not calculate a temperature adjustment into their calibration course measurement; it will be because they did not measure the course properly or made some error with their math.

\*\*\* Require only two rides over the calibration course for both the pre-measurement and post-measurement calibration instead of four rides, but require that the counts agree to within .07% of each other. I think with reinstating the old .07% rule, two rides will give the measurer just as accurate reading as four will. I haven't saved any data, but I have gotten just about the same working constant while doing only two rides over a calibration course when I am measuring a course just to get it accurate but not for USATF certification.

\*\*\* Finally, why not use the sum of the shorter splits (SOSS) to determine the proper measured course length. I know that this would not simplify things per se, but I think that we should start using this at some point in the future. It really does give us a more accurate measurement.

I look forward to seeing what you, the other members of the RRTC, and the readers of MN think of my suggestions.

Sincerely,



Bob Harrison

copy: Wayne Nicoll and Tom McBrayer





## USA TRACK & FIELD

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Chairman, Road Running Technical Council  
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June 15, 1995

Bob Harrison - 1736 Meadow Oak Ct - Montgomery, AL 36117-6830

Dear Bob,

Thanks for your thoughts on aspects of course measurement procedures. I will publish them in the July issue of **Measurement News**, and we will see what response we get.

In general, it is a bad idea to require anyone to do something for which there is no use. Recording the temperature at the time of a bicycle measurement is one of these things. As you say, those temperatures do not affect my decision to certify or not. After many years of measuring I still record temperatures, without questioning much why I do it. At first I was curious about the effect of temperature on calibration change, but I think that question now has been answered as well as it is likely to be. Why ask for temperatures if we don't use the answers? Good question.

When it comes to calibration courses, I think we may be asking more of people than we need to. Our **Course Measurement Procedures** takes six pages to describe the process of laying out a calibration course. I have found that beginners are daunted by all these instructions, when in reality laying out a calibration course is the quickest and easiest part of the measurement process.

As long as the tape is stretched taut, further tension generally has very little effect on length. Temperature has an effect, but as you point out it is also small. A calibration course measured at the freezing point, without temperature correction, will reduce the SCPF from 1 m/km to 0.77 m/km. This will have an effect on course length. Here is how validations would have turned out had all courses had a 0.77 m/km SCPF: I use here courses certified in 1985 or later:

With 1.001 SCPF		With 1.00077 SCPF	
Number	188	Number	188
Pass	166	Pass	162
Fail	22	Fail	26
Percent Pass	88.3	Percent Pass	86.2

The effect would actually be far less than shown, since a small number of calibration courses are measured in cold weather compared to those measured when it is warm. In fact, the net effect could be to **increase** the number of acceptable courses, depending on the percentage of calibration courses that are measured at 20C (68F) or higher. I'd guess we would not see a change at all, since most calibration courses are measured at close to the standard temperature.

I agree with you - eliminating the temperature correction would have little effect. However, a part of me resists abandoning a practice which produces more accuracy, and which I can get with no more work than a one-minute calculation. On the other hand, I have seen people (even certifiers) get the temperature correction backwards, thus doubling the temperature error. All things considered, I will continue to use it, but I don't think it needs to be in the layout procedure. Six pages of instruction for such a simple thing as measuring with a steel tape is overkill. It scares people away. Some actually hire surveyors to do this simple job.

As a guard against ridiculous errors, it would not be a burden to ask the measurer what the approximate temperature was when they did their taping. If they report -40 degrees, then a flag is raised, and the certifier should recommend a correction. I would not expect to see very many calibration courses to be measured during sub-freezing conditions.

Temperature correction definitely belongs in the validation process, however, since we strive there for the utmost accuracy we can get. Certifiers should be familiar with temperature correction. How are they to learn it if it is not in the book? Do we need two books, one to describe the simple layout of a course, and another to describe the extra things needed to wring the last little bit of accuracy out of a measurement?

If temperature data are recorded during calibration course layout, then we have all we need to make any corrections that may be necessary. It isn't necessary for the measurer, who may be a beginner, to know what we are going to do with this data, but it at least makes the data available in case there is a need for it.

As for the number of calibration rides, I think it should stay at four precal rides, four postcal rides. Many measurers are erratic. I can't document the effect that two rides vs four would have, but my gut feeling is that four is better. It smoothes out the effect of erratic riding.

Sum of shorter splits (SOSS) is an excellent tool for obtaining a more accurate course length when riding is erratic. As you point out, though, it would "not simplify things per se." In fact, it would add complexity to the job a measurer must do. The absolute minimum data a measurer must submit is a count at the start and a count at the finish, unless they desire certification for the intermediate splits. In my own measurements, I often have a first ride that is a patchwork of distances that add up to the proper length. Trial-and-error is often needed on the first ride, until things are right. On the second ride I will lay out the splits. Sometimes I'll lay out splits on the first ride, but never when I am worried that the course will not come out right. SOSS is too complicated for most measurers.

**Course Measurement Procedures** was last revised in 1989. When it is time for another printing, I think we should consider your recommendations, along with other things we can do. The goal should be the simplest possible procedure consistent with an acceptable level of accuracy.

Let's see what the readers have to say. Thanks for writing.

Best regards,

A handwritten signature in cursive script, appearing to read "Pete".

MAP OF THE MONTH - by Jay Wight

# Lake Bluff Centennial Run

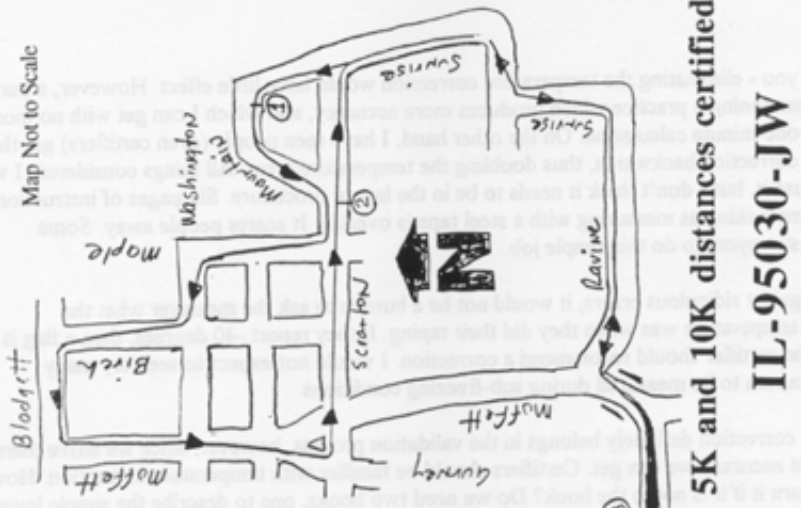
## Lake Bluff, Illinois

Map Not to Scale

- START: PK nail, S edge Sheridan Pl., just W of Vincent Court, at E edge of drain grate along Sheridan at SW corner of intersection.
- 1 MILE: S edge Mountain Avenue, just W of Sunrise and 50' E of round drain grate in intersection of Mountain and Sunrise.
- 2 MILE: S edge Scranton in front of 617, 70' W of W edge drain grate between 617 and Simpson Ave. to the east.
- 3 MILE: Even with N edge of Sheridan Pl., at Evanston Ave., 11.5' W of the nearest corner of the drain grate at the NE corner of the intersection.
- 5K/5K FINISH: Along S edge Sheridan Pl. at west driveway to Lake Bluff Junior High, 19.7' E of center of round drain grate and 12' E of nearest edge of rectangular drain grate.
- 4 MILE: N edge Witchwood Lane, E of Green Bay Road, in driveway to 228 Witchwood and 13' E of fire hydrant in front of 218.
- 5 MILE: N edge Sheridan Pl. between Green Bay Rd. and Pine Ct., 21' E of center pavement joint in driveway to 252 Sheridan Pl.
- 6 MILE: E edge bike path W of Sheridan Road, S of Rockland Rd., 13.5' S of utility pole at "Y" junction of bicycle paths.
- 10K FINISH: Along S edge Sheridan Pl. at west driveway to Lake Bluff Junior High, 21.4' E of center of round drain grate and 10.3' E of nearest edge of rectangular drain grate.

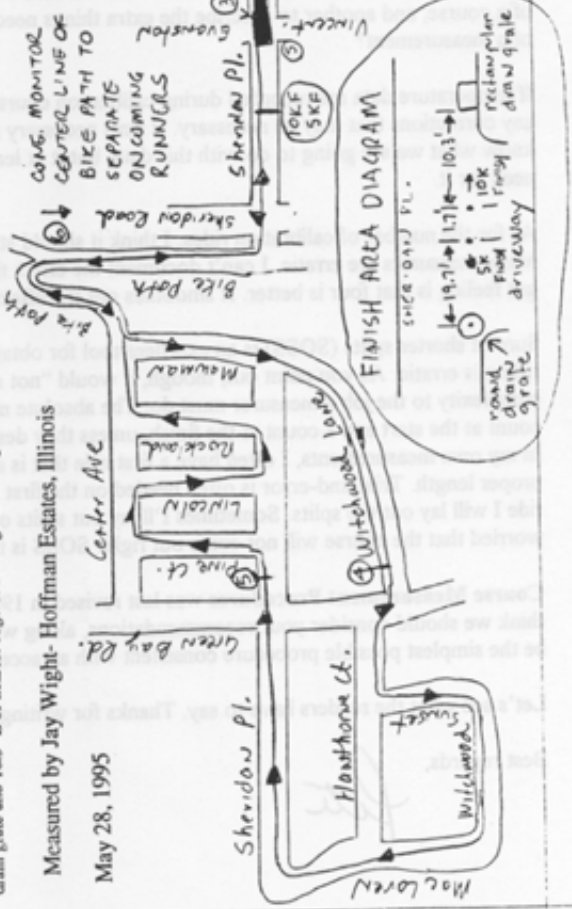
Measured by Jay Wight- Hoffman Estates, Illinois

May 28, 1995



5K and 10K distances certified  
**IL-95030-JW**

Notice to Race Director:  
 Use this Certification Code  
 in all public announcements  
 relating to your race.



15 May 1995

Dear Pete,

Since I train on parts of the Helen Klein 100km course, I was well aware of the problems caused by our recent flooding. The original course was 50 km out and 50 km back with the turn about 200 m from my apartment. This measurement was made in December. The floods cut the bike path close to the 46 km mark, leaving a gully roughly 10 m wide and 2 m deep which was virtually impassable. This was not repaired until early March. In addition, two sections of the bike path were covered by mud slides which again, were not cleared until early March. Flood damage also required rerouting the American River 50 mile (uncertified) held on April 1st.

What I don't understand is why there were so many problems getting an alternate (replacement) course. The Gibson Ranch 100 km course used the previous year would have been a reasonable substitute. The first two weeks in February were essentially dry, making it relatively easy to measure a replacement course on the American River Bike Path. Why this important task was left essentially to the last minute is beyond me.

Finding a national championship course lacking an approved certification, my inclination would have been to measure and certify the course myself. As I read Dan Brannen's report, the segment C-D should have been 25000 meters plus the SCPF. Dan found this segment to be 24998.7 meters, i.e., this segment was 26.3 meters shorter than it should have been. I agree with you Dan should have made a second measurement of the segment C-D. Dan should also have measured (twice) the segments A-B and B-E to complete the measurements necessary for certification. Having done this, since Dan is a final signatory, the effective date of the certification would have been before the race. Hind sight is always better than foresight.

I recall a similar situation with the Mardi Gras Marathon sometime in the early 1980's. The RRCA national convention was being held in New Orleans and many of the attendees were planning to run the marathon the next day. As I recollect, a police strike made it impossible to use part of the original course. At literally the last minute, the decision to use the Ponchartrain Bridge was made. Several measurers as well as Ted Corbett, the only certifier at that time, were in attendance at the convention. The course was measured the night before the race. Ted Corbett received and I believe reviewed the paperwork on the spot. The course was certified.

As you point out, Dan's measurement is not quite a validation since he did not measure the segments A-B and B-E. It is not clear if anyone measured these segments. One can only assume Dennis Scott's paperwork included these measurements. However, even if these measurements were not made, can we consider this course as certified and validated?

Dennis Scott apparently laid out a 25 km + SCPF segment C-D. This, by itself could qualify as a 100 km course, provided of course, the points C and D were not moved. It appears these points were not moved. Let's consider the course as four segments C-D and not worry about any extra distance the runners may have covered. On the basis of Scott's measurements, this course could be certified.

Dan also measured the segment C-D, finding it to be 24998.7 meters without the SCPF. According to the guidelines for validation measurements, the course would be found short if the validation measurement showed a shortness of 12.5 meters (0.05%). Hence, the course as defined by four segments C-D would pass. The measurements of segments A-B and B-E are not necessary for the course to pass.

The problem arises since Dan made his validation the day before the race and should have lengthened the course based on his findings. If he had made his measurements the day after the race, this problem would not have arisen.

This example brings out several points race directors, measurers, and certifiers should keep in mind:

1. When faced with last minute course changes in a national championship race, the race director should make an effort to employ a final signatory to measure and/or complete/review the measurements before the race. There are four final signatories within a two hour drive of Sacramento. I'm sure at least one of these would have been willing and able to carry out these tasks.
2. Race directors need to listen to their course measurers and course measurers sometimes have to be more firm with race directors. Course measurers need to consider the course layout in terms of the number of runners expected, traffic safety, course monitoring, *etc.* I've found race directors generally listen to comments designed to improve their race. In this case, I would have told the race director he can start and finish the runners anywhere he likes, as long as the runners cover four segments C-D which I would certify as the 100 km course.
3. When in doubt, measure it (twice)! We have all been in situations where we should have taken another measurement but didn't. This is a good example.

Well this is my contribution for 1995. Please keep sending Measurement News. Keep up the good work.

Sincerely,



Ken Young

# My First Course Measurement

Alan Jones

Back in 1970 I ran in my first road race which was a local affair sponsored by a church advertised as "20 kilometers." While I didn't run a fantastic time, I knew it was faster than seemed possible. I drove my car out on an Interstate highway and did a rough calibration of my car's odometer and then drove over the course. I found it to be about 11.4 miles instead of the 12.4 it should have been.

It so happened that this was the last running of the race since the priest who had been the meet director for 13 years was retiring and the parishioners did not want to carry it on. A few of us decided to try to pick it up and change it from a point-to-point format to a loop format. About this time an article appeared in *Runner's World* telling how to measure a course quoting Ted Corbitt.

A friend, Tom Young, gave me a revolution counter that was used many years ago in an IBM machine to record the number of hours of use. I still have this counter. It is made of metal and has inscribed on the case:

THE VEEDER M'F'G CO.  
PATENTED  
VEEDER  
OCT.22,1896  
AUG.15,1911  
HARTFORD, CONN., U.S.A.

I figured I might be able to use this somehow but needed a way to make it turn as the wheel turned. I went to a bike shop and dug through a box of old odometer gears. It seems odometers wear out faster than the gears so people come in to get an odometer repaired but the gear part is not replaced. Since every new odometer comes with a gear, the proprietor was developing a collection of them. I found one that I thought I could hook up to the counter.

By filing the circular shaft on the counter into a square cross-section, I was able to attach it to the gear which was then slipped over the front axle of my bicycle. (An old English 3-speed which I found abandoned when I left Purdue in 1963. I still use it for measurements.)

Tom and I then went out to a section of an unfinished Interstate highway and measured out a half-mile calibration course. I didn't know at this time that one should make the calibration course in a location that could be permanent. I rode the bike over it a few times to get a calibration factor and then measured the course we had laid out which was 12 miles long.

I had Ted Corbitt's address from the *Runner's World* article and sent him my data. Much to my chagrin, Ted wrote back asking if I had stretched the tape to a tension of ten pounds. I hadn't since the article hadn't mentioned that. I was really discouraged. However, the next spring we modified the course to a 20-km one and I went out again but this time I was armed with Ted's official instructions. We stretched the tape and did everything right. At that time, Ted did not require a re-calibration after the measurement but I did one anyway since it seemed like a good thing to do. The "before" and "after" runs were not in good agreement. The difference resulted in a discrepancy of 30 yards over the 40 km distance. I sent it in anyway and Ted again turned me down. I did it once more and this time got good agreement between the two calibrations and Ted finally certified the course on May 10, 1972.

Tom Knight  
307 Dartmouth Ave.  
San Carlos, CA 94070  
(415) 594-9406  
May 11, 1995

To: Peter Riegel, Chairman RRTC, USA T&F  
Mike Wickiser, Validations RRTC, USA T&F  
Ryan Lamppa, USA T&F Road Running Information Center  
Mark Winitz, LDR Chair for PA USA T&F  
Carl Wisser, RRTC PA USA T&F  
Kees Tuinzing, Total Race Systems  
Dave Rhody, RhodyCo Productions  
Jane Baldwin, RhodyCo Productions

Enclosed find my data and calculations for my race day validation of the Gimme Shelter 5K Run held on April 9, 1995 in San Francisco, California. By the way I participated in the laying out of both of the Calibration Courses that I used, namely "Great Highway 1000", CA93001 layed out by Wayne Nicoll and me on October 16, 1993 using steel tape for a distance of 1000 feet and also the "Lake Street 1/2 Mile", CA83020CW (PA-8320) layed out on April 2, 1983 by myself, Tom Benjamin and others using an EDM Meter.

The night before the race I had received a call from Mark Winitz, LDR Chair for The Pacific Association of USA Track & Field, asking if I knew if the course on which the race "Gimme Shelter 5K Run" was going to be held was certified. Since I had arrived home at 12:30 A.M. after a very long and tiring work evening at SLAC, I missed his deadline of "please don't call back after 10 P.M.". I did know that Carl Wisser was one of the measurers for this course and also that the Start and Finish were to be moved while keeping the course length unchanged.

Being crazy and knowing that sometime soon I had to go to San Francisco to mark splits for the Bay to Breakers race, I went to sleep at 2:00 A.M. and got up before 7:00 A. M. so that I could do the calibrations and measurement of this course.

Unfortunately I arrived finally at the Start just before the wheelchairs took off and did not want to interfere with the race by trying at the last minute to put my bike on the Start line and then ride quickly ahead of the runners. Therefore, I was forced to start behind most of the runners and walkers and wind my way past the walkers for the first mile before I could get really clear. Not having the certification paperwork with me on race day, after Carl Wisser faxed it to me, I returned to the course on Monday night between 7 and 9:30 P.M. to look at the Start/Finish adjustments and his split marks, some of which I had to locate in the dark with a flashlight.

My measurement of the course showed it to be 24.13 Meters less than 5,000 Meters. I feel that I was able to ride the course as available to the runners on race day. The reason the course came out short is that it was not coned and monitored correctly according to the certified route. In particular the left hand turn from Folsom to Spear allowed the runners to cut the corner as opposed to the certified route out to the

halfway point ( See Map ) [ This cut is about 6 Meters. [The left hand turn from Front to Sacramento Street also allowed the runners to cut as opposed to the certified route out to the halfway point ( See Map ) [ This cut also is about 6 Meters ]. The cuts allowed to the runners over other parts of the course compared to the certified route are less certain. My notes show "Arc on left from Spear to Market", "Left from Battery to Market to right lane angle", and "Right from Spear right angle to Mission" . My remembrance is that the runners could make a considerable cut from the certified route on the final right turn from Spear to Mission. It is interesting to note that if the runners could cut this corner completely compared to going out to the halfway point on Mission as certified, another 9 Meters would have been cut.

Also, if I'm right about the Start/Finish adjustment being off by about 2 Meters, we might postulate the reason for the approximately 24 Meters shortness of the course:

Left Hand Turn from Folsom to Spear	6 Meters	(Between 1 & 2 Mile
Left Hand Turn from Front to Sacramento	6 Meters	(Between 1 & 2 Mile)
Right Hand Turn from Spear to Mission	9 Meters ?	(Between 2 Mile & Finish)
Start/ Finish Adjustment	2 Meters ?	

TOTAL 23 Meters ?

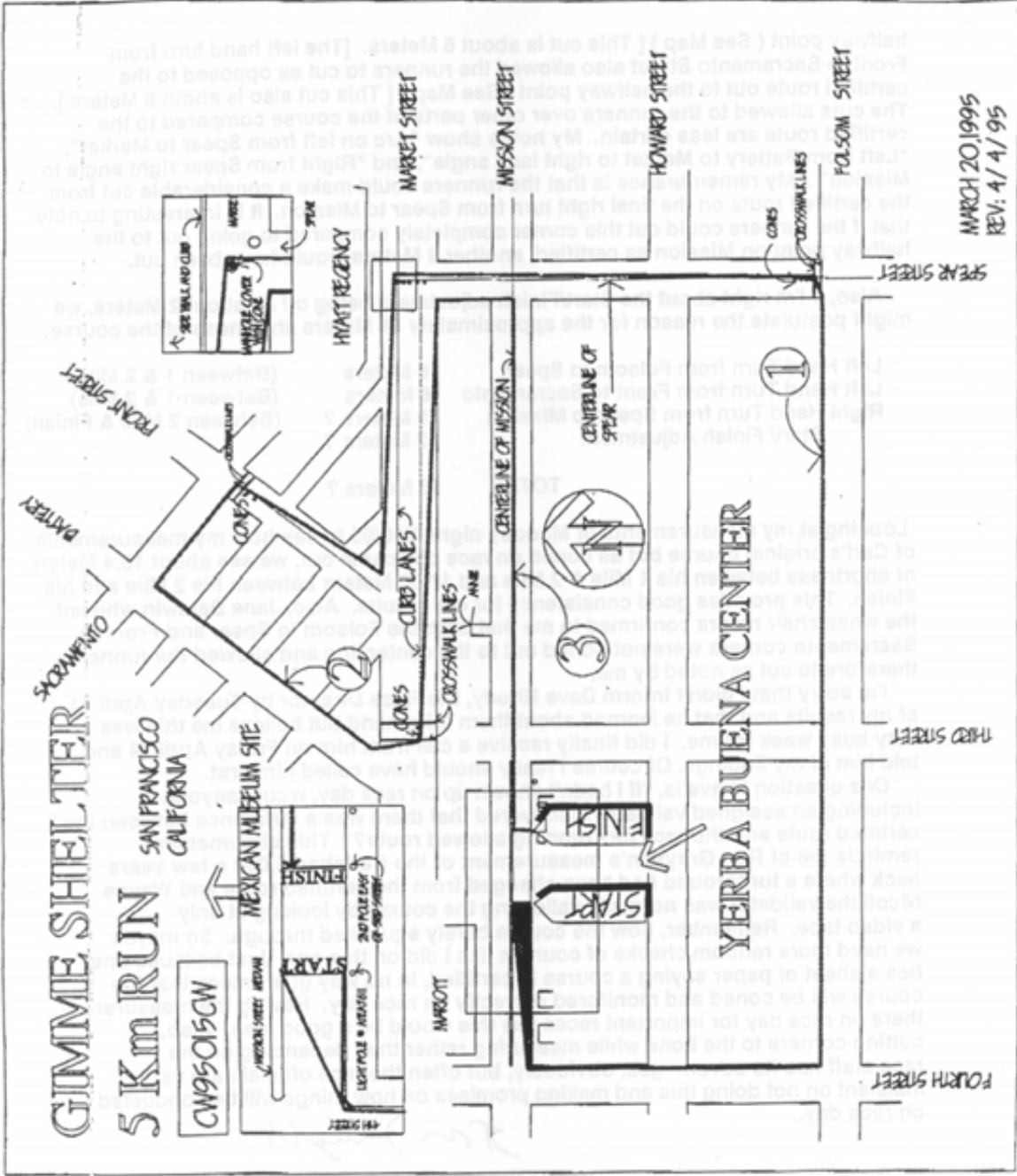
Looking at my measurements of Monday night 4/10/95 to see how my measurements of Carl's original course but as coned on race day came out, we see about 15.4 Meters of shortness between his 1 Mile & 2 Mile and 10.88 Meters between his 2 Mile and his Finish. This provides good consistency for our results. Also, Jane Baldwin who led the wheelchair racers confirmed to me that both the Folsom to Spear and Front to Sacramento corners were not coned out to the center line and allowed the runners therefore to cut as noted by me.

I'm sorry that I didn't inform Dave Rhody, the Race Director by Tuesday April 11 of my results and that he learned about them third hand but believe me this was a very busy week for me. I did finally receive a call from him on Friday April 14 and told him of my findings. Of course I really should have called him first.

One question I have is, "If I hadn't shown up on race day, would anyone including an assigned validator discovered that there was a difference between the certified route and the race day running allowed route?" This circumstance reminds me of Ron Grayson's measurement of the Carlsbad 5,000 a few years back where a turnaround had been changed from the certified route and Wayne Nicoll the validator was normally validating the course by looking at only a video tape. Remember, how the course barely squeaked through. So maybe we need more random checks of courses like I did on this one. Just because one has a sheet of paper saying a course is certified, in no way guarantees that the course will be coned and monitored correctly on race day. Having the measurer there on race day for important races like this would be a good idea. Also, cutting corners to the bone while measuring rather than depending on the race staff has its advantages, obviously, but often the race officials are very insistent on not doing this and making promises on how things will be conducted on race day.

*Tom Knight*





MARCH 20 1995  
 REV: 4 / 4 / 95

## PUZZLE OF THE MONTH

**YOU HAVE 30 SECONDS TO SOLVE IT AFTER YOU READ IT!**

Send your answer, also whether you got it in 30 seconds.

TO: Pete Riegel  
FROM: Libby Riegel  
RE: Measurement Puzzle  
DATE: June 6, 1995

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In the recent movie Die Hard With A Vengeance, Bruce Willis and Samuel Jackson (exhausted after running several miles through Central Park) have to solve this measurement problem at the whim of the satanic Teutonic lunatic bomber.

An empty 3-gallon jug and an empty 5-gallon jug are provided next to a fountain.  
Exactly four gallons of water must be placed on top of the bomb to deactivate it.

How do you do it?

This isn't very sophisticated, but there's an incentive: you have 30 seconds 'til the bomb goes off!

## LAST MONTH'S PUZZLES - HOW THEY WERE SOLVED

### THE REVCO PUZZLE

Count at (out)	Pete Riegel	J.F. Delasalle	Roger Gibbons	Brian Smith	Bill Glauz	Isabelle Marechal	Dave Yaeger	Bernie Conway	Tadeusz Dziekanski	Bob Harrison	Dave Bendy
mile 25	15341	15340	16801.4	16801.4	16801.5	15340	15340	15340	16802	15340	15341
mile 6	16801	16801	16801.4	16801.4	16801.5	16802	16801	16801	16802	16801	16802
40 km	17905	17904	20577.5	20577.5	20577.5	17905	17904	17904	20577.5	17905	17905
10 km	20576	20577	183925.5	183925.5	183925.5	20578	20577	20577	20577.5	20577	20578
turnaround	183927	183925	183925.5	183925.5	183925.5	183925	183926	183925	183925.5	183926	183926
Count at (back)											
10 km		347273				347273					347274
40 km		349946	349946.6	349946.6	349946.5	349946			349946.5		349947
mile 6		351049				351049					351051
mile 25		352511	352511.3	352511.2	352511	352511			352511		352512
turnaround		355331				355331					355332

It was a great relief to me to see everybody agree, more or less, with the actual counts I used when laying out the course. The measurement had me quite nervous at the time.

J. F. Delasalle was first with the correct answer. Some others ignored the instructions to calculate the counts needed to lay out all the points on the way to the turnaround, not on the way back.

### MULTI BLISTERS TRACK PUZZLE

	Length of track, m	Center offset, feet	
Bill Belleville	400	57.865	(Bill's typographical error - he had the first correct answer)
Gene Newman	400	58.865	
Pete Riegel	400	58.865	
Bill Glauz	400	58.865	
Roger Gibbons	400	58.865	
Jean-Francois Delasalle	400	58.865	
Isabelle Marechal	400	58.865	
Paul Oerth	400	58.865	
Dave Yaeger	400	58.865	
Bernie Conway	400	58.865	

DAVE YAEGER  
19 CARONDALE CRESCENT  
SCARBOROUGH, ONTARIO  
M1W 2A9

May 23, 1995

Pete Riegel - 3354 Kirkham Road, Columbus, Ohio 43221-1368, U.S.A.

Dear Pete,

I enjoyed the May 95 issue of Measurement News. Some insights into a just in time "combined" 100 km measurement/validation and course changes for the Disneyland marathon while the race was in progress. The variability of course measurement experiences keeps things interesting. As the chinese proverb/course supposedly goes - may we all live in interesting times!

The requirement to steel tape a calibration course when being used for a validation measurement makes sense. This ensures that any errors in the original measurement due to the calibration course are not carried through to the validation.

I think the use of existing calibration courses depends on the details provided for the end points. When our standard was a 1000 m calibration course measured 4 times I was very careful to take accurate measurements from 3 permanent landmarks to the nails that defined the end points. I have carried this over into my 300 m calibration courses as there are times when an existing calibration course is to be used for the measurement and help is not always available to check the course or lay out a new one. If the nails can be found that is the best. However, if one of the nails cannot be found, "triangulation" with the 3 landmarks can be used to re-establish the end point. Three landmarks is a minimum though since any error will not be picked up with only 1 or 2 landmarks. Also 3 landmarks and a detailed sketch showing the location of the end points indicates the care that has gone into the measurement of the calibration course and adds credibility to the original measurement.

And now for the puzzles. I like your technique for getting two measurements of the out-back portion with one ride. It does take some figuring before hand but the prep time is well worth it.

Ref 2 = 9.2661 km; 5.7577 mi on the way out  
Ref 2 = 40.4904 km; 25.1596 mi on the way back

Location	Counts-Out	Counts-Back
Ref 2	12520	355332
25 mi	15340	352512
6 mi	16801	351051
40 km	17904	349948
10 km	20577	347275
Turnaround =	183926	
24.8783 km; 15.4586 mi		

*These are "long" by one count as I didn't use 1/2 a count at the turnaround. Rounded up for purposes of layout.*

Cheers,

Dave Yaeger

Dear [REDACTED]

This has to do with the certification of the [REDACTED] track is [REDACTED] which you did in December, 1989.

We've run into a problem recently in that the marathon on the [REDACTED] track is not certified per se, albeit it is certified.

For example, I had a call---and problem---with the Boston Marathon in April when one of our marathon runners used [REDACTED] for a Boston qualifier and the Boston folks said that [REDACTED] did not appear on their list of certified marathons.

To be entirely honest about it, our conversation got a little intense when they said they were uncertain about accepting [REDACTED] as a qualifier. I replied that it was, indeed, certified, that we advertised it as such, and we might even have to sue if Boston did not accept it (which would be no financial strain, I pointed out, with three lawyers in the family!).

Anyway, what all this is leading to is this: is there some way we can get a certificate saying that the [REDACTED] track marathon is a certified marathon?

The irony here, far as I am concerned, is that it is a more accurately measured course than any marathon. The 400 meters have been precisely measured and surveyed. As for the 200 meters to make the 42K, we steeled taped every inch (after measuring by wheel). What's more, - just to eliminate any shadows of a "short course", we start our marathon runners 5 yards behind the starting line. Having personally lost some records because of short courses, I take no chances here.

Thanks for your consideration...

Dear [REDACTED]

CERTIFIER'S REPLY - JUNE 23

Your logic regarding the efficacy of certifying a marathon on their track is "steel trap". However, an act of certification must take place before we can call it a certified marathon. By that I mean that the enclosed forms should be adapted to give me the necessary information. Since the track is certified as a 400 meter track (correct?) then it is merely arithmetic to figure that a runner must travel around the track 105 times + 194.99 meters or 639.72 feet. I will need a diagram from you showing the start (located by dimension to a permanent object) and the finish which will be the distance beyond equal to the above figures and located by dimension to a permanent object (please show how this distance was measured.) This will allow me to certify this marathon. The 105 laps is easy - it is the 639.72 feet which makes certifiers nervous if not pinned down with some degree of accuracy.

Please call me for any help you might need.

LETTER  
TO A  
CERTIFIER

JUNE 16



## USA TRACK & FIELD

Peter S. Riegel  
Chairman, Road Running Technical Council  
3354 Kirkham Road  
Columbus, Ohio 43221-1368

614-451-5617 (phone)  
614-451-5610 (fax)

June 24, 1995

Dear [REDACTED]

[REDACTED] has been faxing me copies of your recent letters to him, concerning your problems with the [REDACTED] Track Marathon.

I am puzzled at the second sentence in your letter of June 16 which says that the marathon is "...not certified per se, albeit it is certified." I think you may be confusing certification with accuracy. Certification is not accuracy - it is simply a statement that USATF recognizes the accuracy of a given course. A course may be accurate without being certified, but in the absence of a certificate credibility is lacking. Unless you wish to be loose with words, the [REDACTED] Track is **not** certified at the marathon distance, or at least USATF Certified, which is what the word means in the road running world. It may be accurate - that depends on the race organization. It is no trivial matter to conduct a marathon on a track where records are concerned. The recording of lap times for all contestants can be quite a job, and it is not always done well.

The fact that you advertised it as certified (when it was not USATF certified) probably deluded some runners into thinking they could use it to qualify for Boston. I wrote to you last year about when things are certified and when they are not. Boston's position is understandable - the course was not USATF certified. Your threat to sue over this depressed me.

I urge you to send [REDACTED] the information he needs to certify the marathon course on the [REDACTED] Track, and you will get the certificate you need. Whether the race itself is conducted in a way that conforms to the conditions of certification is a matter for others to worry about, until the time a record may be set. Then evidence of proper lap recording, and race-day location of the start and finish, will be needed. I don't think Boston is so particular. All Boston wants is for the course to be listed as a marathon.

In future, I urge you to be more accurate in your race advertising, for the sake of the runners. A race course is not certified because you measure it accurately. It becomes certified when you submit the measurements for review, and obtain a USATF Measurement Certificate, which includes a registration number for the course. This must be done **before** the race for records to count.

I am confident that your sending the measurements to [REDACTED] will square things away.

Sincerely yours,

copy: [REDACTED]

Re: Early History of Measurement

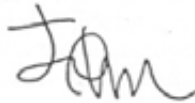
Those readers of MN71 who might have been led to believe that Roman legionaires were between a rod and a fathom tall - as they are credited with covering four-fifths of our mile (1403 yards) in just a milea passuum - might be relieved to know that Roman foot soldiers were well under six foot and counted a pace only when left foot hit the ground.

So in fact their single stride length was just over two feet.

An average days march (instrum iter) was about 15 miles - the legions moved in battle order - while a forced march (magnum iter) according to Caesar in De Bello Gallico-Book VII , was three times that distance.

Interestingly, orienteers use the same double-pace count to estimate distance when running through the forest. My count on a reasonable running surface is 40 for 100 metres - with a 10% S.C.P.F. built-in!

Regards.



John Disley

**FROM RUNNER'S WORLD**

Marty Post sent me the following letter, received recently at **Runner's World**.

"Dear Runner's World,

This is maddening! I just found out that the 20 mile course I'd measured on my car's odometer may actually be only 16 or 17 miles, according to the map. Which to trust?"

I sent the writer material to get him started in measuring courses for certification.

**IS IT TIME FOR THE USA TO GO ALL-METRIC IN ROAD RACING?**

The rest of the world is metric - we are not. International racing is done using metric distances and metric splits. We generally have metric race distances, with intermediate splits in miles. Anyone who has raced using metric splits finds that there is no confusion once the units become familiar. Next you'll see some correspondence on the subject.

Paul Oerth  
2455 Union St #412  
San Francisco, CA 94123  
(415) 346-4165

June 11, 1995

Dear Pete,

Here are 10 of the 16 five digit counters you ordered. I will send the rest as soon as they are available. My supply of both 5 and 6 digit counters is temporarily exhausted. I'm down to 4 five digit counters and 3 six digit counters. Karl is sending me the final batch of 15 sixes, and 5 more fives. I ordered another 500 sprocket gears from midway with 100 to be sent air mail. That was a month ago. You might call Randy Swords at midway and see if anything can be done to expedite the order. I've also ordered 100 hundred more of the five and six digital counters.

Everything has gone up in price. Everything including: sprocket gears, digital counters, delrin plastic, the glue to put everything together, and the cost of mailing. Of course I pay Stephen and Karl, (minimum wage) for their time and effort. I cover all the income tax myself not passing any along to Steve or Karl. I don't put any value on my own time for recording, packaging, and mailing. Considering all, this is not a very good business venture.

Beginning Jan 1, 1996 the price of the counters will be \$60.00 for the five digit counters, and \$70.00 for the six digit counters. As before the foreign orders will be \$5.00 more for each. I intend to pass the extra income along to Steve and Karl. Fortunately I don't need it.

Looking forward to seeing you in Santa Barbara. Best to Joan.

As ever,



Paul



4419 Thornbark Court  
Hoffman Estates, IL 60195

April 14, 1995

Wayne B. Nicoll  
Ragged Mountain Club- P.O. Box 62  
Potter Place, NH 03216

Dear Wayne,

Once again I must apologize for sending a gaggle of these at the same time, but they kept coming in so I decided to kill one less fraction of a tree by saving an envelope. I suppose it will also help the Postal Service be more efficient but hopefully I have better things to worry about.

I thought I would relate an experience I had within the last month. When I measured the Valley Fox Trot 5K in late February I asked Monica Bates, the race director, whether she would like the kilometer or mile splits marked. I've been asking that for a couple of years. She replied that the folks at Elgin Parks and Recreation had talked this over and had decided that they would like the kilometer splits marked. I told her that this was the first time I had been asked to do so (usually I mark miles and only the 5K metric splits) but that it had been a matter of discussion among the RRTC members and I encouraged her one hundred percent. I marked the kilometer splits, sent her the paperwork, and waited for the weather to get warm.

Week before last I got a call from David Patt, the executive director of the Chicago Area Runners' Association. He said that he had contacted Monica and told her that the metric markings on the course would only confuse the runners. He said she was a new race director and this decision was evidence of that inexperience. I tried to convince him that this was the right thing to do, especially in a 5K race where it is very important to be on the right pace early in the race. He agreed that an early split was a good idea, but preferred that it be at the half mile mark.

I gave this some more thought and then last Saturday morning sat down with the Mac and started playing with Microsoft Excel. When I was finished I had a couple of pace conversion charts, copies of which I have enclosed. I called Monica Monday, asked her about her conversation with David Patt, and told her that she was doing the right thing. I faxed the charts to Monica and she seemed pleased with them. She plans to include them in the runners' packets on race day. She's sticking with the metric splits even though I volunteered to come out and set the miles for her.

While I am not a metric "nut" it makes a lot of sense to me to divide the race distance up into splits that are easy to figure without a calculator. It's a lot easier to divide a 40 minute 10K into 4 minute kilometers than 6:26 miles. However not having run (or run in) a race with kilometer splits, how is this pulled off? Is there a split marked (and/or a timer) at every kilometer? At every other kilometer? At the 5K? Does this cause a problem for the race director as opposed to placing a timer at each of the mile marks? How do runners and race directors feel about this? I think this would be a lot easier to sell to race directors if there was a way we could show them that it would make their jobs easier and their runners happier.

As for me, I am still using an English tape since I figure none of my "clients" is going to have a metric one. Nevertheless, my mind is open and the first time someone asks me to locate the points with metric distances to the landmarks I would make the conversions that day and then probably go out and purchase (or at least order) a metric tape the next week.

I'm sure this has been discussed a number of times and I don't want to travel down roads we've all been down before. Nevertheless if we're supposed to be on the "cutting edge" of the technical aspects of the sport we ought to be able to sell our "advances" to the general market. We ought to be able to convince them that metric is the right way to go without shoving it down their throats. Any advice those who are further along than are those of us in the Chicago area can give would be appreciated.

Obviously there is no magic in the pace charts. If anyone else would like to use them it's OK with me. If it would make sense to provide instructions so that anyone could come up with a set I'd give it a shot.

Enough said. Things seem to be going well here and I hope they are with you and Sally as well. Look forward to seeing you at our next opportunity.

Sincerely,

  
Jay Wight

Valley Fox Trot SK  
English/Metric Pace Conversion Chart

Mile Pace	KM Pace	2 KM	3KM	4 KM	5KM
04:30.0	02:47.8	05:35.5	08:23.3	11:11.1	13:58.9
04:40.0	02:54.0	05:48.0	08:42.0	11:35.9	14:29.9
04:50.0	03:00.2	06:00.4	09:00.6	12:00.8	15:01.0
05:00.0	03:06.4	06:12.8	09:19.2	12:25.6	15:32.1
05:10.0	03:12.6	06:25.3	09:37.9	12:50.5	16:03.1
05:20.0	03:18.8	06:37.7	09:56.5	13:15.4	16:34.2
05:30.0	03:25.1	06:50.1	10:15.2	13:40.2	17:05.3
05:40.0	03:31.3	07:02.5	10:33.8	14:05.1	17:36.3
05:50.0	03:37.5	07:15.0	10:52.4	14:29.9	18:07.4
06:00.0	03:43.7	07:27.4	11:11.1	14:54.8	18:38.5
06:10.0	03:49.9	07:39.8	11:29.7	15:19.6	19:09.5
06:20.0	03:56.1	07:52.2	11:48.4	15:44.5	19:40.6
06:30.0	04:02.3	08:04.7	12:07.0	16:09.3	20:11.7
06:40.0	04:08.5	08:17.1	12:25.6	16:34.2	20:42.7
06:50.0	04:14.8	08:29.5	12:44.3	16:59.0	21:13.8
07:00.0	04:21.0	08:42.0	13:02.9	17:23.9	21:44.9
07:10.0	04:27.2	08:54.4	13:21.6	17:48.8	22:15.9
07:20.0	04:33.4	09:06.8	13:40.2	18:13.6	22:47.0
07:30.0	04:39.6	09:19.2	13:58.9	18:38.5	23:18.1
07:40.0	04:45.8	09:31.7	14:17.5	19:03.3	23:49.2
07:50.0	04:52.0	09:44.1	14:36.1	19:28.2	24:20.2
08:00.0	04:58.3	09:56.5	14:54.8	19:53.0	24:51.3
08:10.0	05:04.5	10:08.9	15:13.4	20:17.9	25:22.4
08:20.0	05:10.7	10:21.4	15:32.1	20:42.7	25:53.4
08:30.0	05:16.9	10:33.8	15:50.7	21:07.6	26:24.5
08:40.0	05:23.1	10:46.2	16:09.3	21:32.5	26:55.6
08:50.0	05:29.3	10:58.7	16:28.0	21:57.3	27:26.6
09:00.0	05:35.5	11:11.1	16:46.6	22:22.2	27:57.7
09:10.0	05:41.8	11:23.5	17:05.3	22:47.0	28:28.8
09:20.0	05:48.0	11:35.9	17:23.9	23:11.9	28:59.8
09:30.0	05:54.2	11:48.4	17:42.5	23:36.7	29:30.9
09:40.0	06:00.4	12:00.8	18:01.2	24:01.6	30:02.0
09:50.0	06:06.6	12:13.2	18:19.8	24:26.4	30:33.0
10:00.0	06:12.8	12:25.6	18:38.5	24:51.3	31:04.1
10:10.0	06:19.0	12:38.1	18:57.1	25:16.1	31:35.2
10:20.0	06:25.3	12:50.5	19:15.8	25:41.0	32:06.3
10:30.0	06:31.5	13:02.9	19:34.4	26:05.9	32:37.3
10:40.0	06:37.7	13:15.4	19:53.0	26:30.7	33:08.4
10:50.0	06:43.9	13:27.8	20:11.7	26:55.6	33:39.5
11:00.0	06:50.1	13:40.2	20:30.3	27:20.4	34:10.5
11:10.0	06:56.3	13:52.6	20:49.0	27:45.3	34:41.6
11:20.0	07:02.5	14:05.1	21:07.6	28:10.1	35:12.7
11:30.0	07:08.7	14:17.5	21:26.2	28:35.0	35:43.7
11:40.0	07:15.0	14:29.9	21:44.9	28:59.8	36:14.8
11:50.0	07:21.2	14:42.3	22:03.5	29:24.7	36:45.9
12:00.0	07:27.4	14:54.8	22:22.2	29:49.5	37:16.9
12:10.0	07:33.6	15:07.2	22:40.8	30:14.4	37:48.0
12:20.0	07:39.8	15:19.6	22:59.4	30:39.3	38:19.1
12:30.0	07:46.0	15:32.1	23:18.1	31:04.1	38:50.1
12:40.0	07:52.2	15:44.5	23:36.7	31:29.0	39:21.2
12:50.0	07:58.5	15:56.9	23:55.4	31:53.8	39:52.3
13:00.0	08:04.7	16:09.3	24:14.0	32:18.7	40:23.3
13:10.0	08:10.9	16:21.8	24:32.6	32:43.5	40:54.4
13:20.0	08:17.1	16:34.2	24:51.3	33:08.4	41:25.5
13:30.0	08:23.3	16:46.6	25:09.9	33:33.2	41:56.6
13:40.0	08:29.5	16:59.0	25:28.6	33:58.1	42:27.6
13:50.0	08:35.7	17:11.5	25:47.2	34:23.0	42:58.7
14:00.0	08:42.0	17:23.9	26:05.9	34:47.8	43:29.8
14:10.0	08:48.2	17:36.3	26:24.5	35:12.7	44:00.8
14:20.0	08:54.4	17:48.8	26:43.1	35:37.5	44:31.9
14:30.0	09:00.6	18:01.2	27:01.8	36:02.4	45:03.0
14:40.0	09:06.8	18:13.6	27:20.4	36:27.2	45:34.0
14:50.0	09:13.0	18:26.0	27:39.1	36:52.1	46:05.1
15:00.0	09:19.2	18:38.5	27:57.7	37:16.9	46:36.2



WAYNE B. NICOLL  
Ragged Mountain Club  
Potter Place, New Hampshire 03216  
(603) 735-5721

10 May 1995

Jay Wight  
4419 Thornbark Court  
Hoffman Estates, IL 60195

Dear Jay,

I am responding to your 14 April letter regarding the use of metric distances in USA road racing.

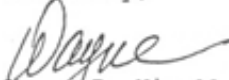
There are a lot of us experiencing the same concerns you have expressed over the resistance of race planners to the incorporation of metric splits in our road races. I was happy to see Monica Bates stand her ground and proceed to use the metric splits. I have also seen the reverse situation. There are now people laying out metric racewalk loops and including the mile splits on the loops! In fact, I was pressured to do that on a 1667 meter loop at DisneyWorld. I have a race director who asked me to lay both the mile and kilometer points in a 5K road event. The Gasparilla 15K marks all of the miles and all of the kilometer points!

I would like to see us go all metric but unless it is done by national decree, we probably will not see it happen. One reason race directors balk at kilometer splits is that it does require more people to call the split times. I don't think the average run participant has an opinion but I know that the foreign athletes sure do! Canadians are not shy in letting you know they would prefer to have kilometer splits. As I anticipate sending our letters to MN, I can see the measurers in other countries having a great laugh over this.

You mentioned using an English tape. In addition to several English tapes, including an old 132' Chicago Steel Tape "chain" and a 200' tape with decimal inches, I have a nice 50 meter tape with English units on the reverse. I recently bought a metric surveyors wheel since I seem to be involved with a lot of racewalk loops. But if I record the distances to key points with it, the race staff will not have a metric measurement device when they go looking for the marks.

I am sure you will hear from Bob Baumel on this. He has been the steadfast promoter of metrics in our measurement community and has left his mark in Oklahoma. I believe they have a high number of courses that are all metric. Perhaps they can contribute some sales strategy for us to use on race directors. Thanks for the pace charts. I will start spreading them around.

Sincerely,

  
Wayne B. Nicoll



## USA TRACK & FIELD

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May 19, 1995

Wayne Nicoll - Ragged Mountain Club - PO Box 62 - Potter Place, NH 03216

Dear Wayne,

I read your letter to Jay Wight with interest and agreement. If I could find a way to get the racing scene to go metric I would do it. Bob Baumel has, over the years, convinced me that it makes sense. The only thing standing in the way - and it is a big obstacle - is the resistance to change on the part of the runners and the race directors.

Race directors want their runners to be happy, and not complain. Some runners will whine at every imperfection they see in a race, and they will bellow mightily if their familiar mile splits are not there. This makes race directors reluctant to change the way they are doing things.

As measurers, we serve the people who ask us to do the work. I have already asked a couple of race directors to go completely metric, with total lack of success. Most of them are metrically illiterate, as are the vast majority of American runners. Even some of the certifiers will report a 10 km distance as 6.21371 miles, instead of as 10,000 meters.

If I could change this at a stroke, I would. However, it is usually a bad idea to give an order that will not be obeyed. While we certify overall distances, the splits can be in any units the race director chooses. I suppose we could see a 10 km race with splits in furlongs, if this was desired by the race director.

Until the runners can be educated, any change will be resisted. One way to educate them would be to start having races marked only in kilometers. They would soon see that what they thought was so hard is really easier. You get your splits more often, and they are even - you have no left-over fraction of a mile to deal with at the end of your 10 km race.

Although the metric benefits are real, the general perception is that the metric system is complicated. We need to act against the perception, not the reality. It is extremely difficult to overcome a prejudice. The dollar coin was a good example of this. I loved it, and was disappointed to see the government back off because of the griping. If they had only hung on for a few more years we'd be using dollar coins today. Considering the buying power of a dollar, a coin is certainly appropriate.

I will continue to urge race directors to consider metric splits only. I also urge all certifiers and measurers to do the same. Until you have actually run a metric course, you don't have a clue how nice it

is to receive accurate information more often along the course. Also, for the even metric distances, all the splits will each be the same length, making pacing simple.

In spite of the advantages of even splits, those races that are early to jump on the metric bandwagon may suffer. The runners who resist metric splits may stay away, reducing the field. Most race directors want their race to be as big as it can be, and they will not want to do anything to displease their customers. We should not kid ourselves - those races that are first to go metric will pay a price. It will likely not be large, but it will be there. I think in time metric splits will be seen as better than miles, but not at first. Complaints from runners are listened to by race directors, and at first they will not like what they hear when they go metric.

If our government would bite the bullet and make a real jump to the metric system, we might see progress. Since most runners also drive, they will remain thinking in miles until odometers and road signs are made to show kilometers. As long as people are shown everything in miles, they are going to think that way, and who can blame them? Although the government pays lip service to the metric system, all public effort has been cosmetic thus far.

This is a rough problem. Racing is international, and we are out of step. I welcome any suggestions as to how we may move in a metric direction.

As a start I will put Wight's letter and pace chart in next MN, also your letter and this one. Maybe we can get a sense of what is possible from reader response.

Best regards,

A handwritten signature in cursive script that reads "Pete". The signature is written in black ink and is positioned to the right of the text "Best regards,".



## USA Track & Field

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1995-05-28

Jay Wight  
4419 Thornbark Court  
Hoffman Estates, IL 60195

Dear Jay,

Wayne Nicoll said he was sure you would hear from me, and so I will respond. Actually, I had almost forgotten about this, but then I received Pete's letter, and now it's clear that I **must** add my voice to the chorus.

As Wayne wrote, we've made great metric progress in Oklahoma. By now, the majority of 5 km, 8 km and 10 km races in this state are marked in kilometer splits only. Last year, the biggest race in the state—the Tulsa Run 15 km (one of the top 100 in the nation)—went all metric. And here in Ponca City where I live, we even have a *marathon* (Cherokee Strip Marathon OK-93028-BB) with splits every kilometer (It's marked every km and every 5th mile—the reverse of most other US marathons).

I have always urged increased metric usage ever since I became Oklahoma certifier in 1982, and I've tried to do this in all my dealings with measurers and race directors as well as other certifiers (e.g., in my position as RRTC Western Vice-Chairman which I held from 1986 to 1992). Nevertheless, the progress we've made in Oklahoma is due mainly to the efforts of several *other* key people who were receptive to the metric idea, and have far more influence than I do in the Oklahoma running scene.

In this regard, I can cite several measurers, including Glen Lafarlette, who in three different years, has been the most active measurer in the country. Glen has learned that even though he is a businessman serving the people who hire him, he can also influence those race directors to increase metric content and improve the quality of their race.

The person *most* responsible for Oklahoma's metric progress is surely Joe McDaniel. Joe was active in the Oklahoma running scene long before I moved to the state in 1981 (and he was even a course measurer in the early days!). Joe was the person I encountered as soon as I inquired about activity of TAC, and then, he was instrumental in my recruitment as Oklahoma certifier. Currently, Joe is Oklahoma record-keeper, co-editor of *Oklahoma Runner* magazine, and every year, he sends a thick information packet to every race director in the state detailing USATF/Oklahoma requirements.

Through these packets, the *Oklahoma Runner* magazine, USATF/Oklahoma newsletters, and state race director conferences that he helps organize, Joe has continually stressed the virtues of the even pacing achieved by kilometer splits in metric races. As a result, Oklahoma is now the US leader in totally metric races.

### Pacing Charts

I was interested to see the pacing chart you prepared for the Valley Fox Trot 5 km. I have also made up metric pace charts, and enclose one with this letter. (I prepared this particular chart two years ago when our Cherokee Strip Marathon was established. It was included in the packets mailed to entrants in that race, and also published in *Oklahoma Runner*.)

Our pacing charts cover different distance ranges, but that's unimportant. (Both were done using computer spreadsheets, and can easily be customized for any desired distances.) What's significant is that your chart is still based on even values of *mile* pace, while mine is based on even values of kilometer pace. That's an important philosophical difference. Runners need to see that in a metric race marked in kilometers, even values of km pace translate to even times at the splits and for the full race distance.

Oklahoma has made great progress in metricating races, but we still have a long way to go. For example, while our biggest race (the Tulsa Run) finally made the switch to km splits last year, our *second* biggest race (Redbud 10 km in Oklahoma City) still uses mile splits.

I am also concerned about the **fun runs** that accompany races. Typically, even though we'll have a 5 km or 10 km race marked in kilometers, it's accompanied by a 1 or 2 *mile* fun run! In an important sense, the fun runs are more important than the races. After all, these are for children and new runners, so they serve an important educational function. Why should we start new runners thinking in miles, and then make them switch to metric later? Let's get them started thinking right (in kilometers) in the first place! Here in Oklahoma, we are only now starting to work on metricating the fun runs.

### US Metrication – Historical Review

Wayne and Pete were both skeptical that races can go metric unless the Federal government mandates use of the metric system. In this regard, it is interesting to review the legal history of metrication in the United States (I hope you enjoy this ramble):

I'll start with the Metric Law of 1866, which legalized use of metric units in the United States. This was at a time when the metric system had been sweeping through Europe. As an interesting result of this law, metric advocates are quick to note, the metric system is the **only** legal system of measurement in this country! (The US "customary" system of inches, pounds, etc. arose haphazardly and was never legislated by Congress. US "customary" measure is actually an *old* form of English measure, including the Queen Anne wine gallon and Winchester bushel, which the British replaced with "Imperial" measure in 1824.)

In 1875, the US was one of 17 original signatories of the "Treaty of the Meter" which established the International Bureau of Weights and Measures near Paris, laying the foundation for international standardization of measurement units based on the metric system. In 1893, the International Bureau presented platinum replicas of the standard Meter and Kilogram to the US, which immediately redefined all of its "customary" units in terms of metric standards. Thus, for more than a century, metric units have been the primary standards of measurement in this country, and all our *non*-metric units have been defined by certain exact ratios relative to metric units.

Our more recent metric history begins in the early 1970s, at a time when all the other English-speaking countries (Britain, Canada, Australia, New Zealand, South Africa) were also converting—or had already done so. In the US, this flurry of metric activity culminated in the Metric Conversion Act of 1975. Like most legislative compromises, it was considerably less than its advocates hoped. It was a "toothless" law that set no timetables, and merely provided for "voluntary" conversion. (And since that time, every politician who commented on metric issues has been careful to emphasize the word "voluntary" in his/her statements.)

One provision of the 1975 metric law established a "US Metric Board" to be appointed by the President. Our President at the time was Gerald Ford, who of all our recent chief executives, was the best supporter of metrication. However, the task of appointing the Metric Board fell to his successor, Jimmy Carter, who had no interest in metric matters, and treated these appointments purely politically; thus, he "balanced" the Board by



including as many metric opponents as proponents!

In those days, certain groups—organized labor and small business—were strongly opposed to metrication. Interestingly, the objections of those groups have now all evaporated. Virtually all groups now agree that metrication is in our economic interest. Today, all that keeps us from going metric is people's natural reluctance to change. But that's a huge obstacle when you've got the political system of the United States, where it's nearly impossible to accomplish something that the majority of people aren't inclined to do.

When Ronald Reagan became President in 1981, one of his first budget-cutting measures was to abolish the Metric Board. The public generally viewed this as a retreat from metrication. But metric advocates shed few tears for the Metric Board, which contained so many metric opponents that it was always deadlocked, and accomplished nothing.

After the demise of the Metric Board, metric activity continued through the '80s and '90s, although generally invisible to the public. A key milestone (uh, kilometer-stone) was the 1988 Omnibus Trade and Competitiveness Act, passed near the end of the Reagan administration. This huge law (over 1000 pages) included some controversial sections that received much press coverage and delayed passage of the law. But reporters generally ignored the law's *metric* provisions, which significantly strengthened the 1975 Metric Act. These provisions required all agencies of the Federal government to use metric in all matters dealing with Industry and Commerce. And it actually set a target date—1992—for that change.

To be sure, the law didn't require these agencies to be fully metric by 1992; it merely required them to have a metrication *plan* by the end of 1992. But while implementation has been uneven, the momentum created by this law *has* had considerable impact. For example, last year, the Federal Highway administration was just about ready to order metric signage throughout the nation's highways. But then they stopped and realized that the public wasn't likely to accept this unless a large public education campaign were conducted. So they postponed the move.

(And by the way, even though the signage wasn't changed, our highways *are* getting more metric: All current highway *construction* work—at least where Federal money is involved—is being done in metric.)

Another important legal action was amendment of the Fair Packaging and Labeling Act, around '92 or '93, to require metric labeling. Since the 1970s, many consumer products have included metric equivalents on their labels, and some products (wines & liquors, soft drinks, etc.) even adopted "hard" metric sizes. But that was all voluntary. Now, the law *requires* metric labeling on all consumer packages (except items measured right in the store).

## **US Metrication – Current Prospects**

This brings us to the present. Now, we must see where the Congressional budget balancing process takes us. The Republican-led House and Senate have both passed resolutions proposing *massive* cuts in Federal spending, intended to balance the budget by the year 2002. Both versions reduce spending by around a million million dollars (I avoid the word "trillion" which is ambiguous to International readers), although the cuts are bigger in the House version which also includes a huge tax cut.

(Wayne wrote that the measurers in other countries are probably having a great laugh over our continued use of archaic measuring units. They are probably also amused that, even though Americans pay lower taxes than citizens of any other developed country, Americans continue to insist on cutting government and reducing taxes even further.)

The proposed changes would eliminate whole departments of the Federal government. Both

the House and Senate versions eliminate the Department of Commerce. The House version also does away with the Departments of Education and Energy.

The Department of Commerce includes NIST—the National Institute of Standards and Technology (successor to the previous National Bureau of Standards). It seems likely that NIST, or at least some key programs within it, will survive by being moved elsewhere in the Federal hierarchy. But clearly, NIST is threatened. Another agency (near and dear to our hearts) threatened by this budget balancing process is the US Geological Survey.

Deep within NIST is the tiny Office of Metric Programs, which employs at most 5 people, and deals with metrication issues. Will this office survive the budget cutting? I have no idea. But in this political climate, I doubt that we can count on the Federal government for leadership on metrication. And, of course, if the Education department is eliminated, we'll have lost one of our best hopes for overcoming the metric illiteracy Pete wrote about.

Whether or not the Federal government provides any help to the cause of metrication, one wonders how long we can remain a non-metric island in a metric sea. Going metric is clearly in our economic interest. Our continued use of archaic measuring units is often described as a self-imposed trade barrier. Increasingly, American companies cannot sell products abroad unless those products are built to metric standards.

Thus, America will undoubtedly continue to become more metric, driven by economic forces. Indeed, many industries have found that it's in their interest to go metric. The automotive industry made this decision back in 1970. Today, American cars are designed and built nearly 100% in metric. (Curiously, the aerospace industry, which is presumably higher tech, stayed much longer with inch-pound units, and is only now starting to move toward metric.)

So, will the private sector lead the way to a metric America? Here, I tend to wonder about the effectiveness of the profit motive in producing desirable social change. Yes, companies convert their operations to metric when they can make money by doing so. But they may find it most practical to do it in a way that remains hidden from the public. For example, the "user interface" of American cars is still based on miles and gallons, and the average consumer has no idea that the car's innards are nearly entirely metric.

Eventually, given such a purely economic-based conversion, there will come a time when the vast majority of Americans are using metric units at work, while still using inch-pound units in everyday life. Finally, the stupidity of maintaining both measuring systems will become obvious to the majority of Americans, and the country will go fully metric. But if this is the way it must happen, the transition will be very long and painful.

Ideally, at some earlier point, government leaders will become more enlightened and move to get the transition over with, once and for all. It is disturbing that, just a few years before the turn of the millennium, one country still resists the common measuring system enjoyed by the rest of the planet. America *will* inevitably be metric (if the country lasts long enough). It's just a question of when. Maybe it will happen after just a few more changes of political administrations. Maybe it will take several more generations.

### **Metrication of Road Running**

Meanwhile, what about road racing? Of course, racing is already *part-way* metric (as it's been since the 1970s); the full course length is usually an even metric distance, e.g. 5 km, 10 km, etc. Nobody seriously wants to change these back to English distances (such as 3 and 6 miles). So, should road running remain indefinitely in its partly metricated state (metric race distances with mile splits) until such time as the larger American society goes metric?

I believe races should go ahead and adopt kilometer splits, without waiting for the rest of

American society to catch up. There are two good reasons for this, and both were already touched on in Pete's and Wayne's letters: (1) because racing is an *international* sport, and (2) because it's *easier* to pace yourself with metric splits. Moreover, the example of Oklahoma shows that the transition to metric is very easy, and the "price" that must be paid is basically non-existent, or at least much smaller than Pete's letter seems to suggest.

The *international* nature of racing is, of course, the reason why most of our race distances are metric. Runners from long-established metric areas, such as most of Europe, have long preferred kilometer splits. Wayne's comment about Canadians highlights an important *new* effect—the impact of *recent* metrication in many English-speaking countries (Canada, Australia, New Zealand, South Africa, etc.). Most of these countries began metricating about 25 years ago. Maybe it takes that long until runners really think in terms of metric pace. But it's happening now, and these runners don't want to revert to mile pacing when they come to race in the States.

Putting this another way: The US is more isolated than it used to be, in its continued adherence to an archaic measuring system!

Pacing yourself in metric races is *easier* with kilometer splits for two reasons: because the kilometer splits come up more frequently, and because the evenly-spaced splits simplify calculations. As we have found in Oklahoma, once runners have run a few races this way, they come to prefer it, and don't want to return to mile splits.

Our experience in Oklahoma shows how much can be done with just a few motivated people urging metric change (although this is not something the certifier can do alone; having a Joe McDaniel in your state helps *enormously!*). Pete noted that races that go metric may receive negative comments from runners. In reality, the number of such comments is far less than you might expect (and the effect on race attendance statistics is undetectable). And Pete entirely ignored the *positive* comments that you receive when going metric.

For example, back in 1981 or '82, when I had first marked all the kilometers of a 10 km race in Ponca City, a runner told me how when she reached the 6 km and 7 km marks, she suddenly realized that she had covered 60% and 70% of the course—and she had never thought about splits that way before! Those comments encouraged me greatly.

When the Tulsa Run adopted metric splits last year, I believe that they received many more positive comments than negative ones. So it seems that metric splits are probably here to stay in the Tulsa Run. In this case, one could argue that the ground was prepared by the many other, more local, area races that had already gone metric. Nevertheless, the Tulsa Run draws runners from a much larger area than those other races.

Another observation about Oklahoma: This is one of the most conservative parts of the country. So if we can accomplish so much metric change here, it can be done anywhere!

### **How Many Split Callers?**

I will now discuss some purely practical matters about metric splits. You asked about the number of split callers. What's most important, as I see it, is to make sure *every* kilometer is *clearly marked*. Runners who care about split times will wear their own time-pieces, so having all the kilometers marked is crucial, but having people to call the times is much less important, and should depend simply on the number of volunteers available. For example, in a local 10 km run in Ponca City, we'll probably have somebody calling times at the 5 km mark and, maybe, somebody at the 1 km mark.

Bigger races need to call more splits. The Tulsa Run 15 km provides split-callers and/or display clocks at *every* kilometer and the halfway point. Nevertheless, when the Tulsa Run adopted metric splits last year, they *decreased* the number of split points! This is a mostly

out/back course, although it starts and finishes on different streets. In their previous course (OK-89041-BB), the half-way point was about 10 meters past the turnaround. In preparation for metric splits last year, we recertified the course (OK-94041-BB) by sliding it back 10 m, so the half-way point now coincides exactly with the turnaround. Before the metric splits, the Tulsa Run provided splits at 12 or 13 points: miles 1–9, 5 km and 10 km, the half-way point, and sometimes the 1-mile-to-go point. Now they provide splits at only *eight* points: kilometers 1–7 (which are the same as kilometers 8–14) and half-way.

### **Metric Documentation on Maps?**

In your letters, you and Wayne and Pete all expressed some reluctance at using a metric tape for documenting distances to landmarks in metric units (for fear that the race director won't have a metric measuring device). I also had some reluctance *at first*: Back in 1983 and '84, I prepared some maps with documentation in *both* meters and feet. But I soon overcame that reluctance. Now, the vast majority of Oklahoma maps are documented only in meters.

You can see this by viewing Oklahoma maps that have appeared as "Map of the Month" in *Measurement News*—most recently, the Redbud 10 km map by Jim Smith and Ken Hardwick in May '94 *MN*; and before that, a racewalk map prepared by me in Mar '90 *MN*. Also, you can find one of my very early maps (from 1984) on page 60 of our *Course Measurement Procedures* booklet (1989 edition).

My 1984 map in the *Course Measurement* book (Kaw City 8 km) shows only kilometer splits, except for a 1-mile point (the race director, Ben Sanders, was very enlightened for the day). Regarding documentation, one crucial distance (Start-Finish separation) was shown in both meters and feet; everything else was shown in meters only.

The 1994 Redbud map by Smith and Hardwick in May '94 *MN* documents all the kilometer *and* mile splits. But all the documentation (even for the mile splits) is in metric only. The fact that this map shows mile splits is unusual, as the vast majority of Oklahoma maps now contain only kilometer splits. However, as mentioned earlier in this letter, Redbud is one of the few reactionary races that hasn't yet adopted metric splits. At last report, they were still calling only mile splits. Nevertheless, as all the kilometer points have been documented, the race organizers *can* easily switch to km splits when they become more enlightened.

The majority of Oklahoma maps are now documented in meters only. Nevertheless, I believe that Oklahoma courses are generally set up just as accurately as courses elsewhere. In part, this is because the person setting up the course on race day is often somebody like Glen Lafarlette, who is very experienced and skilled in metric measurement. But in part, it's also because race directors aren't *really* as metrically illiterate as Pete seems to think. Most race directors *can* do the necessary conversions to measure these distances using the tools they have available (or they can find somebody in their race organization who can do this).

Pete has been particularly adamant in asserting that US courses should be documented in English units. From his viewpoint, that makes sense, because his only real concern is accuracy of the course. And I admit that if you document the course in metric, while the race director has no metric tools, it may increase the risk of errors in course set-up, thereby reducing accuracy.

I am as fanatical as Pete about accuracy, but I also have a second goal—to increase metric awareness. In light of this second goal, I encourage measurers to use metric tapes and provide all their documentation in meters, even if it slightly increases the risk of course set-up errors (and, in practice, the risk turns out to be considerably less than Pete fears). I also take other actions to avoid course set-up errors; I encourage *simplicity* in course layout, measuring a full-road SPR and avoiding special coning arrangements.

Putting this in perspective, the choice of units for documenting distances to landmarks is relatively unimportant because, in general, very few people see our certification maps. (Nevertheless, race directors sometimes do post certification maps at the race site, and in those cases, I strongly prefer metric documentation.) In any case, encouraging races to adopt metric splits has much higher priority.

### Using Metric Units Correctly

This is probably the least important topic in this letter. My main interest is simply to see people *using* metric units, as opposed to making sure their usage is strictly correct. Nevertheless, as a major reason for going metric is international standardization, it defeats the purpose somewhat if we fail to use these units in an internationally standard manner.

When we refer to the “metric system” we actually mean “SI” which is the international abbreviation for *Le Système International d’Unités* (The International System of Units), which is the term adopted in 1960 for the modernized form of the metric system.

When using SI units, it is never acceptable to make up abbreviations peculiar to a particular language. Every unit has a standard international *symbol* which is written the same way in *all* languages (even languages like Hebrew and Chinese that use other alphabets). In writing these symbols, capitalization is significant; for example, “mg” denotes milligram (one thousandth of a gram), while “Mg” denotes megagram (one million grams).

The symbol for “kilometer” is the *two*-letter combination “km” where both letters must always be written in lower-case (even when part of a title!).

Some additional rules for SI symbols: Never place a period after an SI symbol (except at the end of a sentence); these are *symbols*, not abbreviations! Always include a space between the number and unit symbol; for example, “10 km”, not “10km”. SI symbols never change in the plural; e.g., “1 m” and “3 m” denote 1 meter and 3 meters. (Never add “s” in an attempt to pluralize a symbol; note: “3 ms” denotes 3 milliseconds, not 3 meters.)

Another rule is that when writing numerical quantities smaller than one, always include a zero before the decimal marker; e.g., “0.43 m”, not “.43 m”.

The commonly-used term “5K” is not correct SI notation. If a space is added between the number and unit symbol (i.e., “5 K”) it does become a valid SI quantity, but it’s not a distance; it’s a very cold *temperature* of “five kelvins”—just 5 degrees above absolute zero!

I’ll mention one other usage issue, involving pronunciation rather than writing: The correct pronunciation of “kilometer” is **kill**-o-meter, not ki-**lahm**-eter. All SI units with prefixes are pronounced with accent on the *first* syllable; e.g., millimeter, centimeter, kilogram, kilowatt (Try accenting these on the 2nd syllable to see how they sound!). Words like barometer, speedometer, thermometer, are accented on the 2nd syllable, but denote measuring *devices*, not units of measurement.

### Concluding remarks

When Wayne sent me your letter, he noted that this was “treading some old ground.” Actually, I enjoyed writing this letter because I’ve been able to provide updates and new observations on many of these issues.

And of course, Jay, I applaud your support of Monica Bates and her decision to use kilometer splits in her race.

Best regards, *Bob Baumel*  
cc: *Nicoll, Riegel, McDaniel, Lafarlette*

# Metric Pacing Chart

All standard metric distances: 5 km – Marathon

Including km–mile pace conversions  
(1 mile = 1.609344 km)

Prepared by Bob Baumele

Pace (km)	Pace (mile)	5 km	8 km	10 km	12 km	15 km	20 km	25 km	30 km	35 km	40 km	Marathon
00:02:40	00:04:17	00:13:20	00:21:20	00:26:40	00:32:00	00:40:00	00:53:20	01:06:40	01:20:00	01:33:20	01:46:40	01:52:31
00:02:50	00:04:34	00:14:10	00:22:40	00:28:20	00:34:00	00:42:30	00:56:40	01:10:50	01:25:00	01:39:10	01:53:20	01:59:33
00:03:00	00:04:50	00:15:00	00:24:00	00:30:00	00:36:00	00:45:00	01:00:00	01:15:00	01:30:00	01:45:00	02:00:00	02:06:35
00:03:10	00:05:06	00:15:50	00:25:20	00:31:40	00:38:00	00:47:30	01:03:20	01:19:10	01:35:00	01:50:50	02:06:40	02:13:37
00:03:20	00:05:22	00:16:40	00:26:40	00:33:20	00:40:00	00:50:00	01:06:40	01:23:20	01:40:00	01:56:40	02:13:20	02:20:39
00:03:30	00:05:38	00:17:30	00:28:00	00:35:00	00:42:00	00:52:30	01:10:00	01:27:30	01:45:00	02:02:30	02:20:00	02:27:41
00:03:40	00:05:54	00:18:20	00:29:20	00:36:40	00:44:00	00:55:00	01:13:20	01:31:40	01:50:00	02:08:20	02:26:40	02:34:43
00:03:50	00:06:10	00:19:10	00:30:40	00:38:20	00:46:00	00:57:30	01:16:40	01:35:50	01:55:00	02:14:10	02:33:20	02:41:45
00:04:00	00:06:26	00:20:00	00:32:00	00:40:00	00:48:00	01:00:00	01:20:00	01:40:00	02:00:00	02:20:00	02:40:00	02:48:47
00:04:10	00:06:42	00:20:50	00:33:20	00:41:40	00:50:00	01:02:30	01:23:20	01:44:10	02:05:00	02:25:50	02:46:40	02:55:49
00:04:20	00:06:58	00:21:40	00:34:40	00:43:20	00:52:00	01:05:00	01:26:40	01:48:20	02:10:00	02:31:40	02:53:20	03:02:51
00:04:30	00:07:15	00:22:30	00:36:00	00:45:00	00:54:00	01:07:30	01:30:00	01:52:30	02:15:00	02:37:30	03:00:00	03:09:53
00:04:40	00:07:31	00:23:20	00:37:20	00:46:40	00:56:00	01:10:00	01:33:20	01:56:40	02:20:00	02:43:20	03:06:40	03:16:55
00:04:50	00:07:47	00:24:10	00:38:40	00:48:20	00:58:00	01:12:30	01:36:40	02:00:50	02:25:00	02:49:10	03:13:20	03:23:57
00:05:00	00:08:03	00:25:00	00:40:00	00:50:00	01:00:00	01:15:00	01:40:00	02:05:00	02:30:00	02:55:00	03:20:00	03:30:58
00:05:10	00:08:19	00:25:50	00:41:20	00:51:40	01:02:00	01:17:30	01:43:20	02:09:10	02:35:00	03:00:50	03:26:40	03:38:00
00:05:20	00:08:35	00:26:40	00:42:40	00:53:20	01:04:00	01:20:00	01:46:40	02:13:20	02:40:00	03:06:40	03:33:20	03:45:02
00:05:30	00:08:51	00:27:30	00:44:00	00:55:00	01:06:00	01:22:30	01:50:00	02:17:30	02:45:00	03:12:30	03:40:00	03:52:04
00:05:40	00:09:07	00:28:20	00:45:20	00:56:40	01:08:00	01:25:00	01:53:20	02:21:40	02:50:00	03:18:20	03:46:40	03:59:06
00:05:50	00:09:23	00:29:10	00:46:40	00:58:20	01:10:00	01:27:30	01:56:40	02:25:50	02:55:00	03:24:10	03:53:20	04:06:08
00:06:00	00:09:39	00:30:00	00:48:00	01:00:00	01:12:00	01:30:00	02:00:00	02:30:00	03:00:00	03:30:00	04:00:00	04:13:10
00:06:10	00:09:55	00:30:50	00:49:20	01:01:40	01:14:00	01:32:30	02:03:20	02:34:10	03:05:00	03:35:50	04:06:40	04:20:12
00:06:20	00:10:12	00:31:40	00:50:40	01:03:20	01:16:00	01:35:00	02:06:40	02:38:20	03:10:00	03:41:40	04:13:20	04:27:14
00:06:30	00:10:28	00:32:30	00:52:00	01:05:00	01:18:00	01:37:30	02:10:00	02:42:30	03:15:00	03:47:30	04:20:00	04:34:16
00:06:40	00:10:44	00:33:20	00:53:20	01:06:40	01:20:00	01:40:00	02:13:20	02:46:40	03:20:00	03:53:20	04:26:40	04:41:18
00:06:50	00:11:00	00:34:10	00:54:40	01:08:20	01:22:00	01:42:30	02:16:40	02:50:50	03:25:00	03:59:10	04:33:20	04:48:20
00:07:00	00:11:16	00:35:00	00:56:00	01:10:00	01:24:00	01:45:00	02:20:00	02:55:00	03:30:00	04:05:00	04:40:00	04:55:22
00:07:10	00:11:32	00:35:50	00:57:20	01:11:40	01:26:00	01:47:30	02:23:20	02:59:10	03:35:00	04:10:50	04:46:40	05:02:24
00:07:20	00:11:48	00:36:40	00:58:40	01:13:20	01:28:00	01:50:00	02:26:40	03:03:20	03:40:00	04:16:40	04:53:20	05:09:26
00:07:30	00:12:04	00:37:30	01:00:00	01:15:00	01:30:00	01:52:30	02:30:00	03:07:30	03:45:00	04:22:30	05:00:00	05:16:28
00:07:40	00:12:20	00:38:20	01:01:20	01:16:40	01:32:00	01:55:00	02:33:20	03:11:40	03:50:00	04:28:20	05:06:40	05:23:30
00:07:50	00:12:36	00:39:10	01:02:40	01:18:20	01:34:00	01:57:30	02:36:40	03:15:50	03:55:00	04:34:10	05:13:20	05:30:32
00:08:00	00:12:52	00:40:00	01:04:00	01:20:00	01:36:00	02:00:00	02:40:00	03:20:00	04:00:00	04:40:00	05:20:00	05:37:34