Measurement News

November 1999 Issue #98

COLUMBIA, SC: US WOMEN'S OLYMPIC TRIALS MARATHON MEASURING TEAM: Standing, left to right: Carol McLatchie, Holly Hargroder, Janice Addison, Carol Kane, Karen Gerweck, Kathy Vierzba, Amy Morss. Seated, Laura Sawyer, Ed Prytherch.

PITTSBURGH, PA: US MEN'S OLYMPIC TRIALS MARATHON MEASURING TEAM: Left to right: Pete Riegel, Mike Wickiser, Dwane Dover, Larry Grollman, Paul Hronjak, Bernie Conway, Joe Sweeny, Jim Gerweck, Wayne Nicoll.

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HISTORICAL LISTINGS OF CERTIFIED COURSES

Malcolm Heyworth's massive retyping/reworking of the NRDC course books is probably the best look we will ever get at the past, before the 1980's. Over 3000 courses certified between 1963 and 1984 are documented. See Malcolm's article in this issue.

The listing may be downloaded as a tab-delineated ASCII file from:

http://members.aol.com:/riegelpete
It is also accessible through the RRTC web page.

The file is a compressed file in ZIP format and is called "history.zip." It contains two files. One is a "readme" file that tells about the listing. The other file, "earliest," is the listing itself.

The organization of this old listing is different from our current organization, as you will see from Malcolm's article.

Certificates and maps are NOT available for any courses in the historical listing.

OH 00001 PR

Above will be the number of the first course I will be certifying in the new millennium, assuming it's in Ohio. Considerable discussion has taken place on MNForum on the matter of whether we should change to a seven-digit number format, with some taking the view that sorting the list will be difficult if we don't include the entire year. Others believe that the fewer numbers people must use, the fewer will be the mistakes made. Opinion is about evenly divided on the subject.

So, there will be no change in our course numbering scheme unless circumstances should show that we have a serious problem.

MEASUREMENT OF THE 2000 US WOMEN'S OLYMPIC MARATHON TRIALS
COLUMBIA, SC - AUGUST 8, 1999

Here is an account of the measurement as it appeared in Tom and Mary Anne McBrayer's newsletter.

Measure Up

October 1999 Volume 12, No 3

The Women's USA Olympic marathon trials will be held in Columbia, SC on February 26, 2000. It's been measured and certified and in August it was validated by a team of women measurers. One of the measurers was Kathy Vierzba of Waco. Here's her story as she originally wrote it for her company newsletter.

Adventure in Columbia

Our group of 7 women stayed in a hotel about four blocks from the capitol building. Columbia is much like other cities: the downtown area had been deserted in favor of the suburbs and malls, but an extensive restoration project has had excellent results. Many solid brick walls have been painted to look like apartment windows or store fronts with personalities. The new medical center was built around a beautiful old church with stained glass windows instead of tearing it down and building over it. I found one restaurant called the Cat and Cleaver Catering Company. Reminded me of a Three Stooges episode where they are running a restaurant and a cat under the table lets out a horrible shriek every time the cleaver hits the cutting board.

We were introduced to one another at dinner on Friday night. I met the race's technical director, Ed Prytherch, an engineer for Westinghouse with an excellent eye for detail. Laura Sawyer is the Executive Director of the Carolina Marathon Association, a liaison between the Women's Olympic Marathon Trials and the rest of the world. She was part cheerleader and persistent bulldog in getting media attention and assistance from the Highway Patrol. Carol McLatchie of Houston is Chair of Women's National LDR Committee and is a national record holder for the Masters 20K & 30K, records that have stood for 6 or 7 years. She organized all the activity leading up to the weekend: budget, transportation, meals, even some ego soothing. Amy Morss, an EMT from New Hampshire and New York State Certifier, was responsible for the actual ride and number crunching that followed. Four others were to ride and measure with us, one of whom has qualified to run in the marathon trials.

Saturday morning was hot and humid. Jumping in a car, we followed the map and drove the marathon course. Rolling hills became mountains when I thought about having to actually run on them! Then we laid out a calibration course of 1000 feet in easy biking distance of the hotel and race start and finish. Excellent teamwork made the process go as quickly as possible, but we were all stuck to our shirts by the time it was over. The second measurement landed EXACTLY on top of the first set of marks. I've never seen that happen! A trip to Outspokinϕ bicycle shop allowed us to bike back to the hotel on brand new cross training bicycles, each selected for us personally by the shop owner.

Sunday morning started at 5:45 in the hotel lobby, where we appeared dressed and ready to ride. It is not light in Columbia at 5:45, so we calibrated our bikes by flashlight. We were at the race start and on our way by 7am after having met the Highway Patrol officer that was to accompany us. We headed off into the sunrise, all 8 of us dressed in matching T-shirts, with a sag wagon and the Highway Patrol. Every 5K we stopped at the mark on the road and took our measurement numbers. The course winds through five communities, mostly residential areas and Fort Jackson. There were some very nice, challenging hills coming back into Columbia for the finish. Sure hope it will be cooler in February, as I was drenched by the time we crossed the finish and rolled over the calibration course!

We returned the bicycles, jammed our sweaty bodies into cars and headed back to the hotel for incredibly wonderful showers and fresh clothes. Down in the hotel restaurant corner, Ed's laptop computer and several calculators were busy checking numbers. Successful results were announced (which were verified again the next day by the race director) and we all headed for the airport and home.

I had an excellent time, an excellent ride, met some fantastic people and am hoping they will call me the next time an adventure rolls their way!

(Editor's Note: Kathy received high marks from Carol McLatchie for her fine work.)

MEASURED LENGTH OF COURSE

	By precal	By postcal	By Average
Amy	42143	42219	42181
Kathy	42206	42235	42221
Carol K	42194	42252	42223
Ed	42195	42253	42224
Karen	42198	42253	42225
Janice	42218	42248	42233
Carol M	42216	42251	42233
Holly	42214	42258	42236
Danny	42194	42286	42240

MEASUREMENT OF THE 2000 US MEN'S OLYMPIC MARATHON TRIALS
PITTSBURGH, PA - AUGUST 28, 1999

Measurement Team participants:

Larry Grollman - UPMC Pittsburgh Marathon Race Director acting as liaison and course guide
Mike Wickiser - Team Leader & measurer
Pete Riegel - Data Acquisition
Bernie Conway - Measurer
Dwane Dover - Measurer
Jim Gerweck - Measurer
Paul Hronjak - Measurer
Wayne Nicoll - Measurer
Joe Sweeny - Police guide

Preliminary Actions:
In preparation for the measurement of the Men's Trials

- A team of measurers was recruited from notices in Measurement News ands MNForun.
- Contact was made with the race director, Larry Grollman.
- A trip to review the course and set tentative calibration courses was completed.
- From this, the entire group was contacted via postal and email with information prior to the actual measurement.
- It was decided in advance to utilize a median of the measurements acquired to determine course distance.
- A calibration course close to the start & finish was measured by Mike Wickiser & Bernie Conway. This was used in preference to the ones previously laid out by virtue of a better location.
- All members of the group met the evening prior the measurement to discuss the following days activities.

Measurement of the Course:
The measurement team assembled in the hotel lobby and rode bikes to the calibration course on the Eliza Furnace Trail. All measurers calibrated and Pete Riegel recorded tire pressure and temperature data. Once completed, the group rode to the Start line and met with the policeman who would be providing protection for the group measurement.

The team takes a break at 14 miles as Officer Sweeny looks on.

The measurement of the course was done with Larry leading and the police trailing except when needed to clear traffic. Pete Riegel rode along with Larry and made notations at selected points along the way. During the measurement the group was not always able to follow the SPR, due to unfamiliarity with the course as well as traffic concerns. At these times different members of the team were on course for different sections. For this reason it was later determined to make adjustments to the measured length and to discard the median measurements. The Sum of Shortest Splits method rendered a more acceptable distance in everyone's opinion.

Upon completion of course measurement, time was taken for photos. This done, the group rode to the calibration course for post calibration. After post calibration was obtained, Pete Riegel again took tire pressures and size data for Mike Sandford to analyze and to aid his ongoing work on temperature effects for measuring tires.

A meeting was arranged for later that afternoon to review the day's work. Pete was able to compile enough data to determine each measurer's total distance and copies of all data were given to all measurers. This data was checked for accuracy and distances were checked by all. This done, the data was deemed accurate and used to determine the validation distance.

Course Distance:
Utilizing the SOSS and adding adjustment for deviations from the S.P.R., the Validation distance is 42216.8. This is in excess of the required distance of 42195 by 22 meters and as such I would add this course to the approved list as an acceptable PRE-VALIDATED course. All measurers agreed that the ride could have been better. I therefore make no recommendation to adjustment of the course length. The following pages include a course certificate and description, all measurement data and copy of the Eliza Trail calibration course certificate. My sincere thanks participants for their contributions, patience and assistance.

Michael A. Wickiser, measurement team leader

MEASURED LENGTH OF COURSE

	by precal	by postcal	by average
PH	42193	42252	42222
BC	42199	42257	42228
DD	42212	42272	42242
JG	42207	42288	42247
MW	42233	42269	42251
WN	42238	42279	42258
SOSS			42217

The Temperature Sensitivity of Pneumatic Tyres

Lead Author: M.C.W.Sandford, 22 Stevenson Dr., Abingdon, OX14 1SN, UK. Email: m.sandford@lineone.net.
Co-authors (providing data, ideas, text): P.Riegel, R.Gibbons, H.Jones, E.T.McBrayer, J.Gerweck.
Submitted 17 October 1999.

Introduction

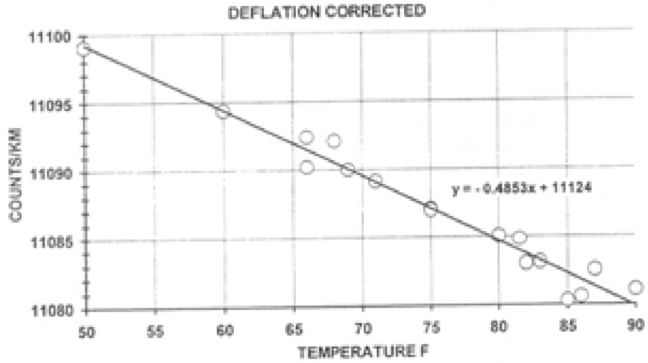
Solid tyres have the disadvantage that their calibration constant varies strongly with surface roughness, so measurers need to consider using pneumatic tyres. Pneumatic tyres are the norm for bicycles and they give a smoother, and some find, more stable ride. However, their calibration constant changes with temperature much more than for the very best solid tyres. We have measured the temperature coefficient of the calibration constant for 12 pneumatic tyres in order to characterise their variability and find the best tyres to recommend for measuring.

Experimental Method

The full details of the method are given in the technical appendix, but it can be simply summarised. At least two times a day for a series of about five days, we rode our bikes along a calibration course and recorded the temperature. The times of the rides were chosen so that there were significant temperature changes, nearly always more than 5 C and sometimes more than 10 C. These large temperature changes match what happens when measuring under unfavourable weather conditions.

We also investigated the deflation of the tyre by setting the pressure before the first ride and not adjusting or measuring it at all until after the end of the measurement series several days later.

FIG. 1. PR's SPECIALIZED TURBO A at 123 psi, DEFLATION CORRECTED



Temperature Coefficient

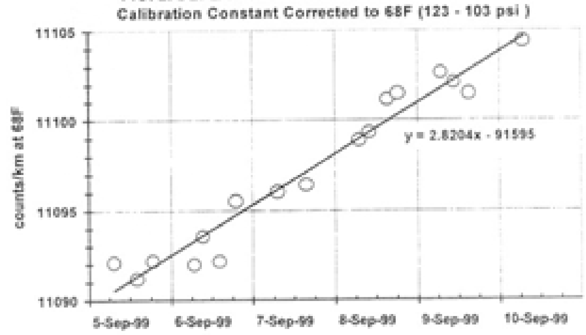
To illustrate the calculation of the temperature coefficient for one of the data series, we show in Fig. 1 a plot of the different values of calibration constant against the temperature. In order to allow for the deflation of the tyre, which over 5 days in this case amounts to a change of 13 counts/km, the values have been corrected for the amount of deflation that occurs each day. This deflation has been derived as described in the following section.

The data fit a straight line very closely. The greatest distance of any point from the line is about 2 counts/km. So by measuring the temperature, and if necessary correcting for deflation, we can predict the calibration constant to within 2 counts/km. The temperature coefficient is given directly from the slope of the line, in this case - 0.486 counts/km/F. When comparing different tyres it may be more useful to convert this to the parts per million (ppm) change, i.e. (- 0.486/11090)*1,000,000*(9/5) = - 79 ppm/C, where 11090 is the counts/km at 20C.

Deflation

To find out how the deflation affects the calibration constant we have to remove the effects of the temperature changes. This is done by adjusting the calibration constant to the value it would have been at some fixed temperature. I have chosen 68 F, so for measurements when the temperature is not 68 F, we just need to add or subtract the temperature difference times the temperature coefficient times the calibration constant. The resulting plot in Fig. 2 shows that over 5 days the tyre's calibration constant increased steadily by 2.82 count/km each day.

FIG. 2. DEFLATION of PR's SPECIALIZED TURBO A: Calibration Constant Corrected to 68F (123 - 103 psi)



Does Tyre Pressure Really Matter?

It has always been measurement practice to pump tyres up hard, certainly fully up to the maximum recommended pressure marked on the tyre wall. The origin of this is lost in the mists of time. Nowadays many people rationalise it by suggesting that the tyre will perform less well if under inflated. In particular the suggestion is often made that it will exhibit a higher temperature coefficient and thus be more susceptible to temperature changes.

We have been able to test this using the data for two tyres at a range of pressures. The table of results on the right shows there is very little change of temperature coefficient when the pressure changes by a factor of two. So, it is not possible to justify a recommendation for high pressure on the grounds of obtaining a low temperature coefficient. It is not clear why else the recommendation is made. That low pressure causes more temperature variation seems to be another measurement myth.

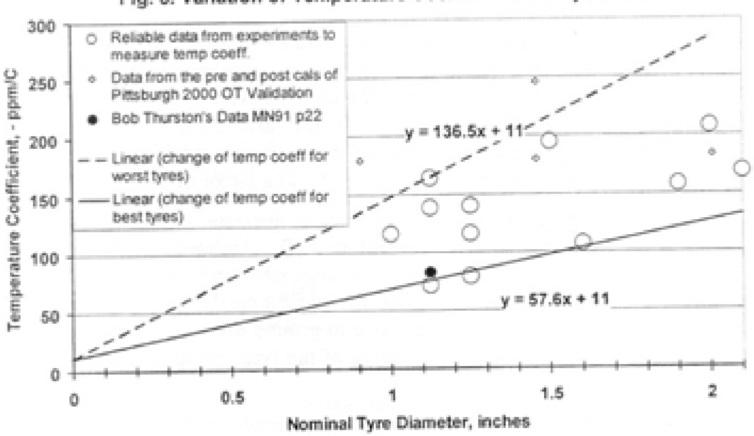
Tyre	Pressure, psi	Temp Coeff, ppm/C
MS's Vee Rubber 27 x 1.25 Max. Recommended Pressure 80 psi	~ 110	- 144
	105	- 140
	100 to ~75	- 128
	~ 90	- 144
	~ 63	- 144
PR's Specialized Turbo A 27 x 1.25	123 to 106	- 79
Max. Recommended Pressure 120 psi	59 to 53	- 75

RIDER - TYRE	Nominal Diameter inches	Calibration Const change cts/km/10F for 10,000 cts/km	Temp Coeff ppm/C
HJ - Michelin World Tour	1.125	- 4.0	- 72
PR - Specialized Turbo A	1.25	- 4.4	-79
Bob Thurston (MN 91, p22)	1.125	- 4.6	- 83
ETMcB - Continental Goliath	1.6	- 5.9	- 107
MS- Michelin Tracer	1	- 6.4	- 116
MS - Michelin World Tour	1.25	- 6.4	- 116
MS - Continental Super Sport	1.125	- 7.7	- 139
MS - Vee Rubber	1.25	- 7.8	- 140
MS - Vee Rubber	1.9	- 8.3	- 158
RG - Shrinka Golden Boy	1.125	- 9.1	- 164
PR - Kenda	2.125	-9.4	-169
JG – Avocet Cross	1.5	-10.8	-195
RG - Rocktrax	2	-11.6	-208
Pittsburgh men's 2000 OT Validation, pre & post cals only			
BC - Vittoria	0.9	- 9.9	- 179
PH - Performance	1.46	- 10.0	- 180
DD - Specialized Team	2.0	- 10.2	- 183
JG – Avocet Cross	1.46	- 13.7	- 246

The Best Tyres for Measurement

The table on the left summarises all the data from different tyres, and these are plotted in Fig.3 against the width of the tyre. The straight lines show how the temperature coefficient would vary if it was proportional solely to tyre width. The scatter of points between the two lines with slopes differing by a factor of 2.4 could mean that not only does the temperature coefficient depend on tyre width as expected, but there is also another source of variation present. This could be variations in the composition of the tyre casing. The 'best' tyres, ie those with the lowest temperature coefficient for their diameter, are those close to the lower line. These are HJ's Michelin World Tour, BT's unknown tyre, PR's Specialized Turbo A, and one of the fatter tyres, ETMcB's Continental Goliath.

Fig. 3. Variation of Temperature Coefficient with Tyre Size



Conclusion

In Fig. 3 the temperature coefficients of 13 pneumatic tyres for which we have good measurements are compared. Skinny tyres do tend to be a bit less sensitive to temperature changes than fat mountain bike tyres. Data from other measurers would help build up a fuller picture.

The temperature coefficient multiplied by the temperature change could be used to calculate corrections to the calibration constant, which could occasionally be useful to measurers experiencing large calibration constant changes.

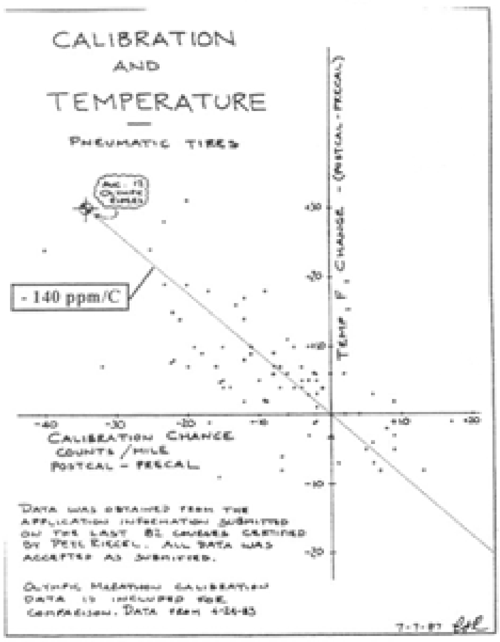
Technical Appendix by M.C.W.Sandford

Our main objective has been to summarise this work within two pages, in a form that can be quickly understood by the busy measurer. The purpose of this appendix is to present greater detail and to cover aspects omitted from the summary pages. Firstly, in the historical survey the new results are related to what was previously known. Secondly, full details of the experimental method are given, which will enable others to see exactly how the experimental data was acquired and afford them the opportunity to duplicate the experiments on their own tyres. Thirdly, I address deflation and an opposing effect, creep. Fourthly, I make some remarks on a phenomenon I call hysteresis. Fifthly, I give examples of using the temperature coefficient to correct measurement data. Sixthly, I summarise implications of the technical appendix. Finally, the calibration ride data are tabulated, which enables anyone to check the analysis behind the graphs presented. If required, additional information covering calibrations not on the table, weather conditions, tyre pressures, etc. are available either from the individual riders or from MS.

1. *Historical Survey*

In MN 8, p3 March 1984, PR gave the results of the calibration rides of 12 pneumatic tyres used at the Los Angeles Olympic Marathon measurement the result was 139 ppm/C with 1 standard deviation of 29. The other major source of information is two articles in MN 74, p12-16, March 1995. The first is in Spanish by Rolando Czerwiak (RC), Professor of Thermodynamics at Buenos Aires University and a leading Argentinean measurer, who presented a theoretical calculation of the temperature coefficient of a pneumatic tyre. In the second article, PR presented a different model, and compared the results from both models with experimental data which had been collected from calibrations in 82 measurement reports, and which PR had previously published in MN 25, p11, Sept 1987.

In summary, RC's model gave a temperature coefficient of - 117 ppm/C for a very thin tyre with a tube diameter of 2.4 cm. PR's model gave - 15 ppm/C. The experimental data given (see figure below) agreed more much closely with RC's result.



Working through RC's mathematics without fully translating the Spanish text, I deduced that RC's model was based on the expansion of the air in the tyre on the assumption that the pressure remains constant as the temperature changes and the tyre casing stretches or contracts. This simplifying assumption might be approximately true for a tyre which was stretched to many times its uninflated size. However, for an average tyre, inflated to less than twice its uninflated size, this assumption will not be true. An increase of the air pressure is required to expand the tyre by increasing the amount by which the casing is stretched.

A further problem arises with RC's model in that the variables which it contains are only tyre's circumference and cross-section. It can therefore provide no explanation for the discovery reported in this article that tyres with the same circumference and cross-section exhibit variations of temperature coefficient by up to a factor of 2.4.

PR's model was based on an inelastic tyre which would maintain a constant volume. PR calculated the rise in pressure as the temperature increased, and then deduced the reduction in size of the contact patch which would be required to support the weight on the front wheel. Geometrical considerations were then used to calculate the variation of the axle to ground distance. This approach gave an unrealistically small temperature coefficient, because the stretching of the tyre casing with increasing pressure was ignored.

The contrast between these two approaches is interesting. I suspect the truth lies somewhere between these extremes in a model which also incorporates the variation with temperature of the elasticity of the tyre wall.

The plot reproduced above is interesting because it shows the limitations of collecting data from measurement reports, as compared with data produced in the well defined experiments such as those we have carried out. The tyre dimensions are rarely recorded on measurement reports so data from many different tyres are mixed together. Measurement reports give no information about how the temperatures were measured. In fact quite a number of measurers probably rely on rather crude temperature estimates. There can be no correction for deflation. An individual point is obtained from each report and there is no way of demonstrating that a measurer is producing consistent results by plotting a graph of the type shown in Fig 1. While the coefficient for the average of the 12 Olympic Marathon rides was - 139 ppm/C (on the assumption of an average constant of 15000 counts/mile), which is within the range reported in our experiments, the scatter of the other points on the graph is very much greater than we have observed. For the reasons noted above it would be unwise to expect that this scatter is a true reflection of the scatter of the underlying temperature coefficient of different tyres.

It was these limitations of using data from measurement reports that prompted me in 1996 to undertake a careful series of calibrations using methods which have evolved into that described below in Section 2. The first set of my data were published in an article in MN 80, p5, Nov 1996. The data in that article were analysed by essentially the same method as used here. That article concluded with the words,

"With precise temperature plots such as Fig. 2, I hope to investigate the performance of different pneumatic tyres under different conditions in my search for the perfect pneumatic tyre with a low temperature coefficient."

It has taken exactly three years to realise that ambition and it has only been possible by combining the efforts of a team of experienced measurers.

2. *Experimental Method*

This is a refined version of the call for data which was issued in MNF #0377 by PR. It identifies the key experimental steps. Pete said, "We are hoping for data from a wide variety of tires. The job is not hard. It takes 5 days. Here's what we want."

Preliminary: These data need only be recorded once, before you begin:

- Record all the data from the tire side wall – tire manufacturer, model, size, recommended pressure, etc.
- Pump up the tire to the pressure at which you customarily use it. Record it. Don't pump the tire again until the series of rides is done.
- Measure the width of the tire, from side wall to side wall. Record it.

Daily Data:

- Go out in the morning when it's cool and do at least two good calibration rides of at least 3000 to 4000 counts. If you know the distance, great. If you don't, just make sure the ride is on the same course each time. Try to estimate at least to the nearest 1/2 count.
- Go out again later in the day when the temperature has risen, and do a couple more rides. If you manage to get 3 or 4 points at various temperatures in one day this may give slightly useful extra data.
- Record the temperature in the shade when you do the calibrations, and the time of day. Be sure the bike has reached temperature equilibrium, and has not just emerged from the garage. Temperature measured on the verge out of sun is just OK - provided the day when you are going to do the experiment will have a big temperature change say 10C or more. Better is a thermometer waved in the air in the shade to measure air temperature. Better still is a digital aquarium thermometer mounted on the bike with the probe taped near the wheel and shielded from the sky (and sun) but NOT the wind with some aluminum cooking foil. (MS believes air temperature = tyre temperature when you are riding at 10 mph)
- After 5 days you will have at least ten rides done. Send PR the data, and he will summarize it and forward it to MS for final analysis.
- If you can, record the tire pressure when you are done.
- If you are not sure whether what you have in mind is OK, email PR or MS. Please help. This data can help us understand the tool we use.

3. *Deflation and Creep*

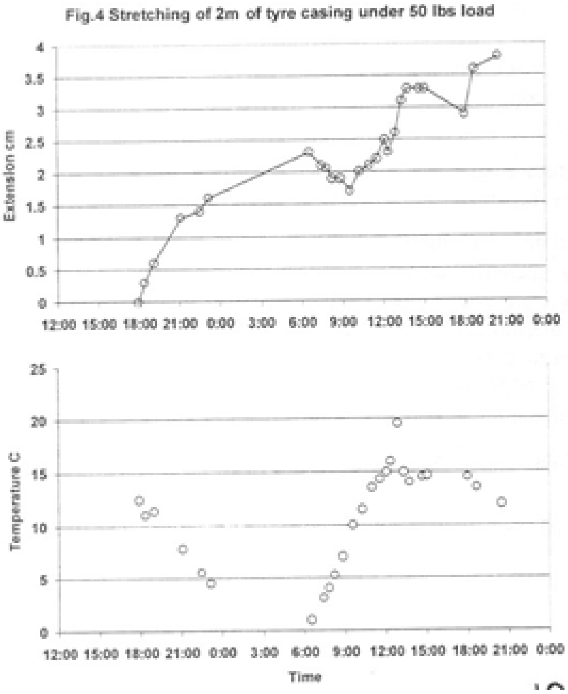
For the majority of the tyres tested here, if we compare calibrations taken at a constant temperature, or if we correct the data for temperature changes, then we find that tyres deflate at a constant rate. This was shown in Fig. 1, which shows that the data can be fitted by a straight line and we can determine from the slope of the line the rate of the deflation in counts per day. The deflation shows up as an increase in the calibration constant of between 0.9 and 4.2 cts/km each day. The variation from tyre to tyre doubtless depends on the permeability of the inner tube. The data are summarised in this table.

Rider - Tyre	Diameter inches	Deflation cts/km/day
MS - Vee Rubber	1.9	-1.6
RG - Shrinka Golden Boy	1.125	- 0.3
MS - Vee Rubber	1.25	- 0.8 to +0.9
MS - Michelin World Tour	1.25	+ 1.3
RG - Rocktrax	2	+ 1.3
JG – Avocet Cross	1.5	+ 1.9
HJ - Michelin World Tour	1.125	+ 2.0
ETMcB - Continental Goliath	1.6	+ 2.0
MS- Michelin Tracer	1	+ 1.6 to + 2.2
PR - Kenda	2.125	- 7 to +3.1
PR - Specialized Turbo A	1.25	+ 2.8 to + 4.2
MS - Continental Super Sport	1.125	Not measured

A few tyres show a decrease in constant over several days. These tyres appear not to be deflating but actually increasing in diameter. I first reported this in MN 80, p5, Nov 1996 for my 1.25 inch Vee Rubber. I looked carefully for the same effect in the Michelin Tracer which I tested in 1997, but did not see it. I found some indication of creep in the very short series of data on my 1.9 inch Vee Rubber, but with only 5 measurements the confidence is these data was not very high.

At the time of the 1996 observation I had convinced myself that the effect was real by the following experiment. I took a discarded tyre, cut off the wire reinforced bead, and cut and straightened out the loop of the tyre. I firmly clamped one end of the 2 m length of casing to a ladder leaning against a wall. At the lower end I clamped a weight of about 50 pounds. I recorded the distance between the weight and the ground. In the plots below I show the increase in extension that occurred after the weight was initially applied, and also the temperature which varied by 20 C of the 27 hour duration of the experiment, which ended when the tyre had stretched about 4 cm and the weight came into contact with the ground. Had I anticipated that the creeping would be so large (over 2% of the unstretched casing length), I might have started the experiment with more ground clearance.

Fig.4 Stretching of 2m of tyre casing under 50 lbs load



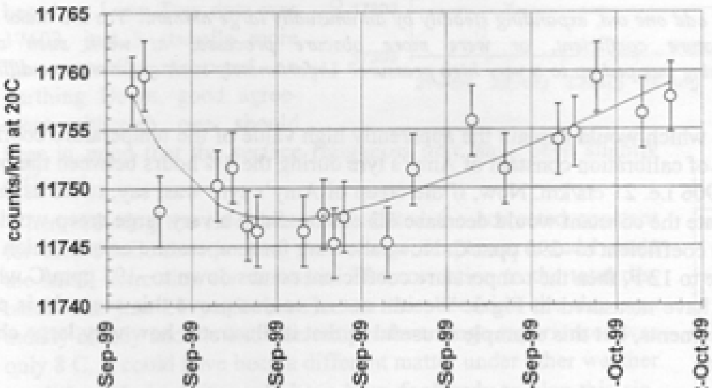
Overall, the tyre casing showed an increase in length with time. The overall trend suggests this might have continued for several days before the tyre stabilised. This of course was qualitatively consistent with what I had just observed on the Vee Rubber tyre, and thus confirmed the reality of the phenomenon which I had observed in my calibration data.

One intriguing detail which I noted was that between 6 am and 9 am on the second day as the temperature rose from 1 C to 6 C, the tyre casing contracted by about 5 mm. At first sight one would have thought that the observed creep and normal expansion of the tyre with increasing temperature would have reinforced one another during this period to give a clear increase of length with time. The unexpected contraction is evidence that there are more complex processes present in the polymer composite which forms a tyre casing. Reference to text books on material properties confirmed the complexities of polymers, summed up by the statement that the coefficient of elasticity, Young's Modulus, varies with temperature and time.

It is very interesting now to find the creep phenomenon in two further tyres. RG's Shrinka Golden Boy gave a very slight decrease in constant amounting to 1 cts/km over the 4 days after he pumped the tyre up hard to 78 psi. In the case of PR's Kenda, the effect was very marked, the tyre initially appearing to inflate by 7 cts/km in one day. Since Pete obtained a good series of data it can be analysed in detail.

Pete's first inclination was to disregard his first few points. However, I noticed that the points followed the general trend seen twice before in my Vee Rubber tyre: an initial expansion for a few days followed by a steady deflation. I therefore constructed a correction which comprised two parts. For the deflation I chose a linear function with time, which I have found fits all tyres. The only variable parameter in this is the slope. A value of 3.3 cts/km/day fitted the best. For the initial creep I chose an exponential decay. This has two parameters, an initial amplitude, 20 cts/km in this case, and an 'e-folding time' of 1 day. The 'e-folding time' of 1 day means that every day the creep correction is reduced by 1/2.7. In order to produce the curve show in Fig. 5, the two corrections are applied to the value of the calibration constant which I estimate the tyre would have had on 25 Sept had creep not been present, ie 11738 cts/km. The curve fits the data fit very well. The error bars show an estimate of the standard deviation of each point, ± 3 cts/km. This error corresponds to a temperature error of 2 C. So part of the scatter could easily have been due to unavoidable errors in measuring the tyre temperature.

Fig. 5 PR's Kenda: Cal Constant Corrected to 20C



It is clear that tyres differ in their propensity to creep after inflation. In fact, we have more examples of tyres where creep has not been detected than where we have seen it. This is yet another example of the variation in properties of the polymer matrix used to construct tyre casings. I expect that the magnitude of the creep will also depend on how much the tyre has been stretched by pumping up at the start of the series. Creep could be avoided by making only small changes to the pressure, or by leaving the tyre for a few days to stabilise.

It is interesting to speculate whether creep could explain some of the anomalous effects which are occasionally seen in calibrations for measurement. For example when I inspected the results of the 7 riders of validating the women's marathon trial for the 2000 Olympics, I noticed quite high values for the temperature coefficients of the tyres. I can most easily quote my MNF #0353 posting on 14 August 1999.

RIDER	*Description of Tyre*	*Temp Coeff ppm/C*
Kathy	*medium width road*	*-159*
Janice	*medium width road*	*-160*
Carol M	*medium width road*	*-185*
Holly	*70 psi road*	*-238*
Karen	*medium width road*	*-291*
Carol K	*knobbly mountain bike*	*-310*
Amy	*knobbly mountain bike*	*-409*

The pre cal temperature was 80F. The post cal temp was 88F. Ed Prytherch said, "The recorded temperatures probably understate the change in tire temp .... since they are shade temperatures. The pre calibration ride was in the dark, but the post measurement cal had hazy sun for the validation....." I have calculated temperature coefficients for the tyres using an 8F change and ignoring a possible few F extra increase in the sun. In my experience the temperature of a tyre being ridden at 10 mph in bright sun is within 4 F of the shade temperature because the temperature of the air rushing past rather than that of the road contacted in one small area or the direct sunlight.

The temperature coefficients can be compared with ordinary touring and racing pneumatic tyres, 23 mm to 32 mm width, which I have measured to have coefficients in the range of -80 to -150 ppm per degree C. Thus Amy's knobbly mountain bike tyre has about 2.7 times the coefficient of any tyre I have seen, including one fat knobbly mountain bike tyre which I once tested and was somewhat surprised to find that its temperature coefficient was in the same range as thinner pneumatics. Simple reasoning would suggest that the coefficient should be roughly proportional to the thickness of the tyre. But I suspect that the composition and structure of the tyre casing also plays an important part in determining the expansion coefficient. Please can anyone who regularly uses a fat tyre report their calibration coefficients with measured temperatures, for about 5 occasions when there has been a reasonable temperature change say at least 5F, so that I can calculate more examples of coefficients for this type of tyre.

Despite the inclusion of two novices, I do not have any doubt about the riding performance of this measuring team. I am sure it was their tyres which were behaving strangely. For example looking at the 5 km splits measured by Amy, these varied steadily during the marathon. Initially she was measuring about 2 m per 5 km more than Ed and Danny's layout, but by the end it had steadily decreased to about 3.5m per 5 km less. By contrast the other riders in the validation showed small irregular changes and which averaged 4m per 5 km more than Ed and Danny and had no overall trend throughout the 42 km. The 4 m per 5 km more than Ed and Danny arises primarily from use of the average constant for the validation.

It does seem that Amy's tyre was the odd one out, expanding steadily by an unusually large amount. Was it a make of tyre with an unusually high temperature coefficient, or were more obscure processes at work such as the relaxation of the tyre casing after being pumped up to a very high pressure? Unfortunately such questions are difficult to answer for a borrowed tyre.

We can now construct a scenario which would explain the apparently high value of the temperature coefficient of Amy's tyre. The actual change of calibration constant of Amy's tyre during the 4¼ hours between the pre and post calibration was 11927 to 11906 i.e. 21 cts/km. Now, if the creep of Amy's tyre was, say, twice as large as that of Pete's Kenda then I calculate the constant would decrease 6.2 cts/km. Such a very large creep would thus reduce the calculated temperature coefficient to -290 ppm/C. Now, allowing for temperature errors, which might change the observed 8F difference to 12 F, then the temperature coefficient comes down to -193 ppm/C which is within the range of the tyres we have measured in Fig 3. We can not of course prove this scenario is correct without additional data or measurements, but this example is useful in that it illustrates how very large changes of calibration constant can happen.

4. *Hysteresis*

By hysteresis I mean that the tyre does not follow exactly the linear temperature coefficient during the day. In my data in section 7 there are examples of days when the tyre expands following the expected coefficient early in the morning when the temperature is rising fast, but later in the day when the temperature increases only slowly the tyre continues to expand much less than would be expected. I have found examples of days when this effect would cause an error of 30% in the value of the correction one would be applying for the temperature change. This effect is small but may limit the ultimate accuracy of any temperature correction method which ignores it. Unfortunately, to investigate it requires a lot more data than we have acquired so it may not be an issue worth pursuing. I mention it here in case anyone with more than 3 calibrations in one day is ever confused by the data.

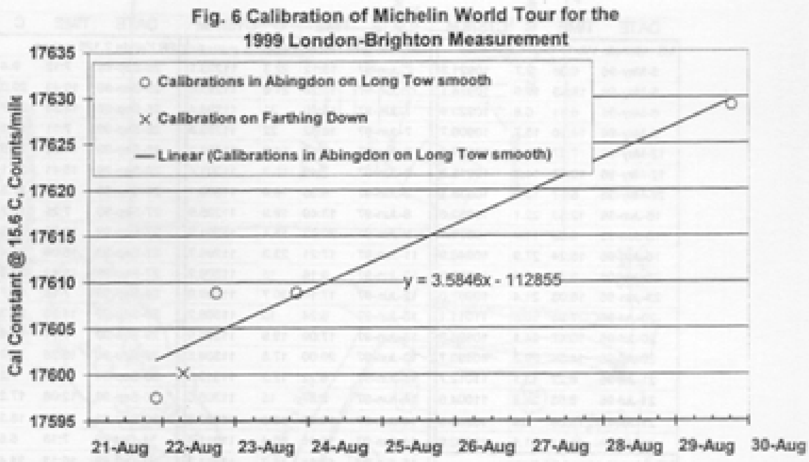
5. *Temperature Corrections for Course Measurements*

I shall now outline how I used my knowledge of my temperature coefficient in a recent measurement which I performed of the 54 mile 198 yard London to Brighton route for the 1999 race.

For various logistical reasons, I performed my calibrations on my home calibration course on Long Tow in Abingdon, but these were necessarily separated in time by 20 hours. I started my ride in line with Big Ben on Westminster Bridge at 05:00. Outside London at 15 miles I had laid down a 300 m calibration course on Farthing Down, one of the very few possible locations en route. I also had a very short calibration course at the finish in Brighton. However, when we arrived at 12.30 I had no time for a reacalibration, if I was going to take advantage of a lift back from the race director, so in view of the modest temperature change I decided to recalibrate in Abingdon. The data obtained are in the table on the right.

Date/Time	Temp C	Cts/mile	Cal Course
21/8 22:00	13.0	17602.8	Long Tow
22/8 07:00	12.6	17607.0	Farthing Dn
22/8 17:47	18.6	17601.1	Long Tow
23/8 20:15	17.6	17608.8	Long Tow
29/8 18:20	21.7	17629.2	Long Tow

Using my measured temperature coefficient for the tyre of -120 ppm/C, I corrected all the calibration data to a convenient temperature, 15.6 C. They are plotted in Fig. 6. Ignoring for the moment the Farthing Down data point, I fitted a straight line and its slope 3.6 cts/mile/day gives rate of deflation. Reading from the straight line, at the time of the Farthing Down calibration, the constant based on Long Tow data was 17603, just 3 cts/mile more than actually measured on Farthing Down, good agreement although one should bear in mind that the surface roughness may have been slightly different.



When reducing the ride data, I calculated the corrected constant for each 5 mile stretch using the average temperature, and I made the small correction for deflation. The correction to the total distance was just 20 yards because on this occasion the day was mostly cloudy and the extreme temperature range experienced was only 8 C. It could have been a different matter under other weather conditions. Indeed, it would have been foolhardy to plan this single ride measurement of over 7 hours duration without the knowledge of my tyre's characteristics and the plan to carry out this correction method.

Constant of the Day	Distance
Largest of pre and post cal ('Standard Method')	54m 178y
Average of pre and post cal ('Allowed by IAAF/AIMS')	54m 183y
From detailed temperature and deflation corrections	54m 198y

6. *Implications for Measurers*

This technical appendix has been long and detailed. Measurers need not wade through all the details unless they wish to copy my methods. You can obviously get good results by intelligently following the well established methods. However, my experience has been that often when a group of riders take the same measurement, the difference between the results is sometimes surprisingly large. This work is aimed at understanding, and perhaps also reducing or correcting, such differences for pneumatic tyres.

1. Measure the temperature coefficient of your tyre. Try a different tyre if the coefficient is large (over about 140 ppm/C.)
2. Look out for evidence of creep: your tyre expanding at constant temperature for a few days after you have pumped it up. If you are very unlucky and happen to have large creep, greater than 10 cts/km/day, then you should let your tyre settle for a day or two after inflating it, or possibly try another tyre.
3. If you wish to guard against very large temperature changes during a measurement and so obtain a good result, but you need to measure the temperature at each split en route. You also will need to know your tyre's temperature coefficient and possibly the rate of deflation. The calculations would be tiresome and prone to error if done by hand, but if you can master a spreadsheet they are trivial.
4. The temperature correction method should be considered for use by experienced measurers when validating another measurer's work. It should always give a more accurate result than use of the average constant and may occasionally avoid falsely failing a marginal course due to adverse temperature changes.

7. *Data from the calibration rides*

DATE	TIME	C	CTS/KM
MS -Michelin World Tour 1.25inches			
5-May-96	6:36	3.7	10921.3
5-May-96	18:43	10.9	10914.1
6-May-96	6:41	0.8	10923.9
6-May-96	14:10	15.7	10909.7
12-May-96	7:27	6.4	10927.5
12-May-96	16:07	14.6	10918.3
29-May-96	5:57	13.4	10938.1
15-Jun-96	12:53	22.1	10952.6
16-Jun-96	6:33	11.7	10971.1
16-Jun-96	16:24	27.9	10946.9
23-Jun-96	8:40	15.4	10969.9
23-Jun-96	16:03	21.4	10967.0
20-Jul-96	7:05	15.3	11011.1
20-Jul-96	10:42	24.1	10996.3
20-Jul-96	14:54	29.8	10990.7
21-Jul-96	6:22	13.1	11012.7
21-Jul-96	8:53	21.3	11004.6
21-Jul-96	13:09	29	10993.3
21-Jul-96	16:11	31.5	10992.9
MS -Vee Rubber 1.25 inches			
20-Apr-96	10:42	16.4	11009.3
20-Apr-96	12:10	16.9	11011.8
24-Apr-96	7:52	12.5	11013.2
24-Apr-96	8:22	14	11010.7
24-Apr-96	13:50	21.7	10995.7
24-Apr-96	19:36	16.7	11004.8
24-Apr-96	20:15	14.9	11012.0
26-Apr-96	17:20	21.4	10998.2
26-Apr-96	20:39	14.1	11009.4
27-Apr-96	6:20	4.8	11021.3
27-Apr-96	9:50	13.3	11007.5
27-Apr-96	11:57	17.1	11001.8
27-Apr-96	16:05	19	11001.2
27-Apr-96	20:36	14.6	11010.7
28-Apr-96	10:21	12.5	11007.0
28-Apr-96	16:40	14.2	11007.4
28-Apr-96	17:22	13	11010.6
4-May-96	7:00	2.2	11028.6
4-May-96	12:15	10.2	11016.6
5-May-96	7:05	4.1	11026.9
6-May-96	7:08	2.1	11029.0
6-May-96	13:53	13.9	11012.7
12-May-96	15:38	13.4	11019.1
29-May-96	6:30	13.6	11032.3
29-May-96	14:47	18.2	11029.5
29-May-96	15:05	18.4	10996.3
29-May-96	15:18	18.4	10996.1
29-May-96	19:46	15.5	11001.6
30-May-96	5:41	13	11003.5
30-May-96	17:14	25.2	10984.0
30-May-96	21:42	19.1	10997.0
31-May-96	5:47	12.4	11003.6
31-May-96	17:25	16.2	10999.3
1-Jun-96	6:03	9.2	11009.5
1-Jun-96	19:08	15.1	10998.8
2-Jun-96	15:26	19.4	10991.9
5-Jun-96	19:22	25.3	10991.0
7-Jun-96	18:20	26.9	10988.7
8-Jun-96	6:55	13.4	11008.8
8-Jun-96	19:03	21.5	10997.1
15-Jun-96	12:19	21.7	11000.0
16-Jun-96	7:03	13.3	11017.5
16-Jun-96	15:51	27.1	10993.8
20-21 July: 7 further sets.			

DATE	TIME	C	CTS/KM
MS - Michelin Tracer 1 inch			
7-Jun-97	15:12	22.3	11293.1
7-Jun-97	15:28	21.6	11293.8
7-Jun-97	15:40	21	11294.4
7-Jun-97	16:52	22	11293.8
8-Jun-97	6:45	14.3	11303.1
8-Jun-97	7:49	15.9	11301.4
8-Jun-97	8:35	16.9	11300.1
8-Jun-97	13:40	19.9	11295.9
8-Jun-97	20:52	15.4	11301.9
11-Jun-97	17:21	23.3	11296.7
12-Jun-97	6:16	15	11308.2
12-Jun-97	17:14	20.7	11299.9
13-Jun-97	6:24	15	11308.2
13-Jun-97	17:09	19.9	11303.9
13-Jun-97	20:00	17.5	11308.5
14-Jun-97	6:22	12.2	11315.8
14-Jun-97	8:57	15	11308.5
14-Jun-97	10:45	16.6	11307.5
14-Jun-97	16:16	15.4	11311.4
15-Jun-97	12:05	16.7	11311.3
15-Jun-97	16:21	17.4	11311.2
21-Jun-97	6:33	12	11325.5
21-Jun-97	6:46	12.2	11325.4
21-Jun-97	12:57	15.4	11320.5
21-Jun-97	13:09	16.4	11319.2
21-Jun-97	13:20	17.1	11318.6
22-Jun-97	12:21	15.9	11323.0
22-Jun-97	14:15	17.7	11320.6
22-Jun-97	17:23	14.8	11329.0
23-Jun-97	21:12	14.1	11331.0
24-Jun-97	17:48	16.3	11327.8
4-Jul-97	17:59	18.6	11335.9
5-Jul-97	8:12	14.4	11342.3
5-Jul-97	12:54	20.4	11334.5
5-Jul-97	17:42	22.6	11334.3
6-Jul-97	8:09	15.6	11346.3
6-Jul-97	12:03	23.3	11332.7
6-Jul-97	14:58	23.6	11334.4
12-Jul-97	7:25	14.3	11360.2
12-Jul-97	9:20	18.4	11353.3
12-Jul-97	15:08	24.1	11347.7
12-Jul-97	22:25	17.7	11360.8
13-Jul-97	7:50	16.5	11362.4
13-Jul-97	13:46	24.3	11347.7
19-Jul-97	14:36	25.1	11360.1
19-Jul-97	15:23	25.2	11252.3
19-Jul-97	15:34	25.4	11252.0
19-Jul-97	21:35	18.4	11264.4
20-Jul-97	6:33	11.1	11272.9
20-Jul-97	7:41	14.5	11268.2
20-Jul-97	9:18	19.4	11259.8
20-Jul-97	11:18	23.2	11255.0
20-Jul-97	13:42	24.4	11254.8
20-Jul-97	15:43	25.6	11254.7
20-Jul-97	19:12	23.9	11260.0
20-Jul-97	21:44	18.2	11268.0
26-Jul-97	7:43	15	11278.8
26-Jul-97	19:10	20.8	11273.0
27-Jul-97	7:14	14.8	11281.2
27-Jul-97	9:25	17.6	11276.4
27-Jul-97	12:37	22.2	11267.2
27-Jul-97	14:55	24.4	11267.8
27-Jul-97	20:03	21.5	11276.2
27Jul to 30 Aug: 44 further sets			

DATE	TIME	C	CTS/KM
PR Kenda 2.125 inches			
25-Sep-99	7:12	9.4	11779.3
25-Sep-99	10:43	20.0	11759.6
25-Sep-99	14:58	26.7	11734.8
26-Sep-99	7:11	11.1	11767.8
26-Sep-99	11:22	25.6	11740.7
26-Sep-99	15:41	31.1	11724.8
26-Sep-99	18:27	27.8	11730.9
27-Sep-99	7:25	16.7	11752.9
27-Sep-99	12:58	22.8	11742.2
27-Sep-99	16:06	24.4	11736.5
27-Sep-99	18:49	23.9	11739.7
28-Sep-99	7:15	16.7	11751.9
28-Sep-99	14:23	28.3	11735.0
29-Sep-99	7:11	20.6	11754.5
29-Sep-99	16:26	13.9	11763.7
30-Sep-99	7:21	7.2	11779.5
30-Sep-99	12:06	17.2	11760.3
30-Sep-99	18:21	18.3	11762.7
1-Oct-99	7:18	5.6	11785.1
1-Oct-99	15:13	24.4	11748.9
RG - Rocktrax 2.0 inches *			
*In counts, = approx 12000 cts/km			
28-Sep-99	7:57	12.3	3917.0
28-Sep-99	14:55	15.8	3912.0
28-Sep-99	18:15	14.1	3914.8
29-Sep-99	8:12	14.0	3915.6
29-Sep-99	13:21	16.8	3914.6
29-Sep-99	15:55	18.3	3911.8
29-Sep-99	19:06	15.2	3915.0
30-Sep-99	8:12	12.67	3916.7
30-Sep-99	15:28	15.5	3913.3
1-Oct-99	7:46	10.5	3918.7
1-Oct-99	15:36	14.33	3917.3
RG -Shrinka Golden Boy 1.125 inches*			
*In counts, = approx 9000 cts/km			
7-Sep-99	18:28	19.8	3189.8
7-Sep-99	19:55	16.4	3191.7
8-Sep-99	7:15	12.1	3193.0
8-Sep-99	10:47	23.7	3187.1
8-Sep-99	14:12	23.7	3187.5
8-Sep-99	18:59	20.9	3189.3
9-Sep-99	6:55	13.0	3193.5
9-Sep-99	10:27	20.0	3188.8
9-Sep-99	15:28	21.7	3188.4
9-Sep-99	19:31	13.6	3192.5
10-Sep-99	16:38	19.8	3189.6
ETM -Continental Goliath 1.6 inches			
12-Sep-99	6:55	25.56	9997.1
12-Sep-99	14:55	37.22	9986.3
13-Sep-99	5:25	25	10000.0
13-Sep-99	13:20	33.33	9989.8
14-Sep-99	7:15	23.89	10002.5
14-Sep-99	13:15	33.89	9994.5
15-Sep-99	5:55	23.89	10005.3
15-Sep-99	15:10	34.44	9992.9
16-Sep-99	5:20	22.78	10008.2
16-Sep-99	21:35	27.22	10005.2
MS -Vee Rubber 1.9 inches			
27-Jul-96	10:18	20.0	11629.9
27-Jul-96	12:17	22.6	11622.8
28-Jul-96	6:12	15.0	11637.6
28-Jul-96	10:55	21.5	11624.8
18-Aug-96	07:38	19.8	11612.5
18-Aug-96	13:52	32.8	11591.0

DATE	TIME	C	CTS/KM
PR 123psi Spec. Turbo A 1.25 inches			
5-Sep-99	7:24	20	11092.1
5-Sep-99	13:51	28.3	11083.9
5-Sep-99	18:45	26.7	11086.4
6-Sep-99	6:45	18.9	11092.9
6-Sep-99	9:20	23.9	11090.1
6-Sep-99	14:05	29.4	11083.9
6-Sep-99	19:02	27.5	11089.0
7-Sep-99	7:00	20.6	11095.6
7-Sep-99	15:30	27.8	11089.7
8-Sep-99	7:00	15.6	11102.8
8-Sep-99	9:58	21.7	11097.9
8-Sep-99	15:15	32.2	11090.5
8-Sep-99	18:21	30.6	11092.3
9-Sep-99	7:00	18.9	11103.6
9-Sep-99	10:47	23.9	11098.7
9-Sep-99	15:08	30	11092.8
10-Sep-99	7:02	10	11113.1
PR 59psi Spec. Turbo A 1.25 inches			
10-Sep-99	8:57	15.6	11170.1
10-Sep-99	12:09	22.2	11163.4
10-Sep-99	15:20	25.0	11160.6
11-Sep-99	7:01	9.4	11181.0
11-Sep-99	14:13	28.9	11163.1
11-Sep-99	18:06	28.9	11168.5
12-Sep-99	7:10	15.6	11179.1
12-Sep-99	10:07	22.8	11172.3
12-Sep-99	15:54	32.2	11164.5
13-Sep-99	7:06	20.0	11180.8
13-Sep-99	14:38	23.3	11177.2
14-Sep-99	7:33	10.0	11190.0
14-Sep-99	11:05	21.1	11179.6
14-Sep-99	15:24	25.6	11180.3
14-Sep-99	19:01	20.6	11186.5
15-Sep-99	7:03	8.3	11195.2
HJ -Michelin World Tour 1.125 inches			
7-Sep-99	9:42	20.5	9374.0
7-Sep-99	11:42	22.5	9372.6
8-Sep-99	6:42	14.5	9381.8
8-Sep-99	7:55	16.5	9378.7
8-Sep-99	9:37	18	9378.0
8-Sep-99	11:18	21	9375.9
9-Sep-99	6:43	13	9389.4
9-Sep-99	7:32	13	9388.6
9-Sep-99	9:44	17.5	9380.8
9-Sep-99	13:19	21	9378.2
10-Sep-99	6:44	12	9383.3
10-Sep-99	7:35	13	9386.5
10-Sep-99	9:15	16	9383.3
10-Sep-99	11:48	21	9380.0
10-Sep-99	13:31	23	9379.4

Carrabba's Classic Half-Marathon

RALEIGH, NC

Measured for Certification by Dwane Dover

July 25, 1999

USA Track & Field Certified Course
Certification Code: NC-99026PH

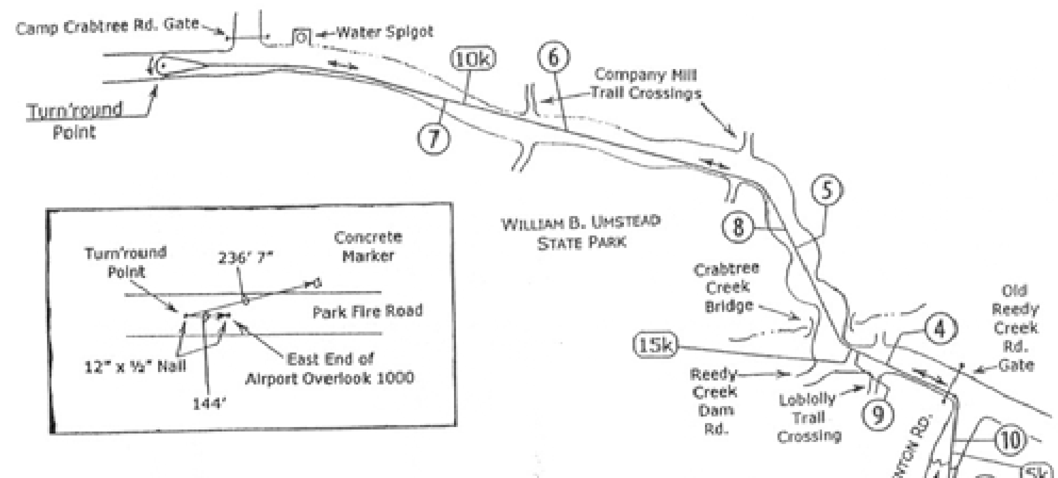
Use this code in all correspondence

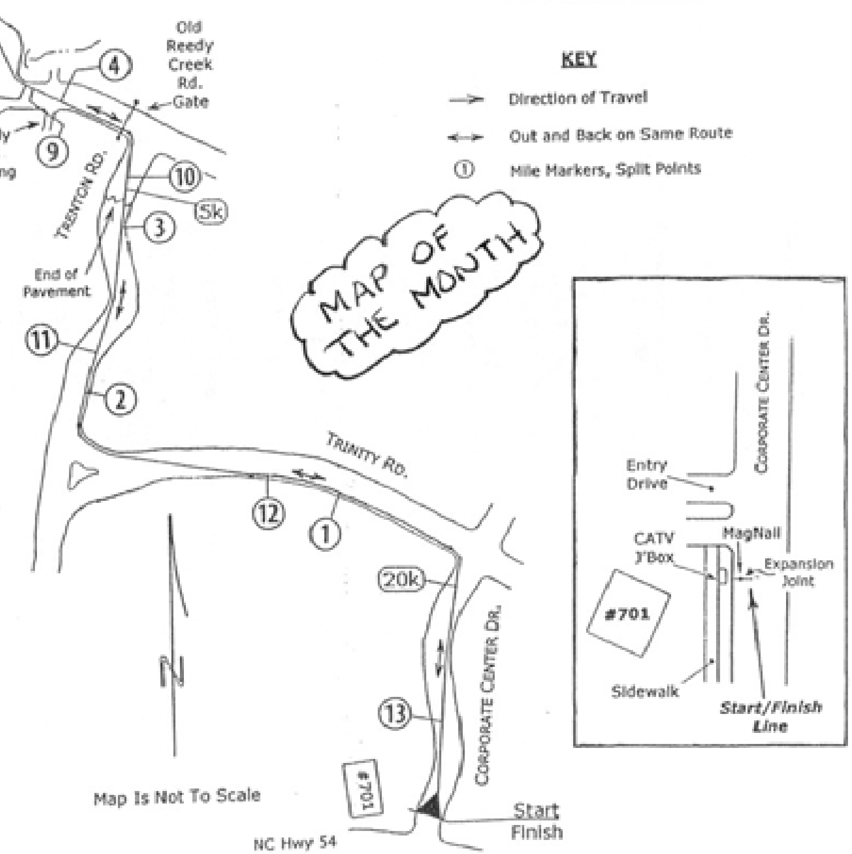
KEY

→ Direction of Travel

↔ Out and Back on Same Route

① Mile Markers, Split Points





Measured Points:

Start/Finish	At a magnail on the West side of Corporate Center Dr. in line with the 1st curbing expansion joint South of the drive for #701 (HealthSource)
Mile 1	On Trinity Rd. at the telephone pedestal West of the driveway for #5711 A&B
Mile 2	On Trenton Rd. 122' South of the edge of the driveway for #2506
Mile 3	On Trenton Rd. at the North property line of #3501
5 Kilometers	On Trenton Rd., 40' 6" Northeast of CP&L pole #KM78 BL, and in line with the 7th East-side fence post North of the end of the pavement
Mile 4	At a 12" x ½" nail at the edge of the Park fire road, 0.23 miles East of the center of the intersection with Reedy Creek Dam Rd.
Mile 5	At a 12" x ½" nail at the edge of the Park fire road, 0.34 miles East of the eastern Company Mill Trail crossing
Mile 6	At a 12" x ½" nail at the edge of the Park fire road, 105' East of the western Company Mill Trail crossing
10 Kilometers	At a 12" x ½" nail at the edge of the Park fire road, 1003' West of the western Company Mill Trail crossing
Turn'round	At a 12" x ½" nail at the center of the fire road, 144' West of the East end-point of the Airport Overlook 1000 course and 236' 7" West of the concrete marker on the North side of the roadway
Mile 7	At a 12" x ½" nail at the edge of the Park fire road, 422' West of the western Company Mill Trail crossing
Mile 8	At a 12" x ½" nail at the edge of the Park fire road, .24 miles east of the eastern Company Mill Trail crossing
Mile 9	At a 12" x ½" nail at the edge of the Park fire road, 687' East of the center of the intersection with Reedy Creek Dam Rd.
15 Kilometers	At a 12" x ½" nail at the edge of the Park fire road, 950 West of the Loblolly Trail crossing
Mile 10	On Trenton Rd., 115' North of the end of the pavement
Mile 11	On Trenton Rd. just North of #2514 and 87' South of CP&L pole #K894
Mile 12	On Trinity Rd. East of the I-40 bridge, adjacent to the end of the South-side guard rail
20 Kilometers	On Corporate Center Dr. 39'8" South of the expansion joint at the end of the sidewalk across from #1100
Mile 13	On Corporate Center Dr., 377' South of South edge of Nortel Entrance #2

RACE NAME CHANGES

MEMO

September 16, 1999

To: Peter S. Riegel Chairman, Road Running Technical Council
Ryan Lampaa RRIC
Ron Scardera, USATF/RRTC National Certifier

SUBJECT: 12km CERTIFIED COURSE CA99002RS

This 12km course was measured 9/19/98 and the course paperwork measurement date was 01/15/99. The name of the race in 1999 was *Fastest 12Km in the West*.

Beginning with the year 2000 race, Jan 23, the name of the race has been changed to CALIFORNIA 12KM.

Reason for the change: too many potential entrants backed away from the race because they interpreted "fastest" as referring to elite runners instead of to the race course itself. (Live and learn!)

If more information is needed, please contact Paul Reese 308 Forest Ct Auburn,CA 95603 e-mail BERP@neworld.net

Date: 9/21/99
To: BERP@neworld.net (Paul Reese)
CC: RRScar, RLamppa514

Dear Paul,

We received your note about the name change from "Fastest 12 km in the West" to "California 12 km," referring to course number CA99002RS.

The easiest thing to do has been done. A new line in the course list has been created, so that the new name now has its own line. The old name remains. Thus, two race names, using the same course, now share the same course number.

You will be able to note the change next time the entire list is posted to the web, which will happen around November 1.

Best regards, Pete Riegel

Date: 9/21/99 12:34:04 PM Eastern Daylight Time
From: BERP@neworld.net (Elaine Reese)
To: Riegelpete@aol.com (Pete Riegel)

Hi, Pete

Thanks for so quickly confirming that our California 12Km is now on the list of certified 12Km races.

Runners are very lucky to have people like you and Ryan Lamppa working to keep courses certified and records accurate. Unfortunately, too few runners are aware of all the time/effort this behind the scenes action involves.

Best wishes, Paul Reese

<u>The "Earliest" File on the Website</u>

Malcolm R Heyworth (JHeyworth@aol.com)
6755 North Chicora, Chicago, IL 60646

I was fascinated by an article Ted Corbitt wrote in <u>MN</u> of Nov, 1997 (#86, pp 17-19) and wrote him about it (I included what I had of his running record and he extended it into 1974, when he stopped keeping records). He had written about the certification of three marathons that now appear on the website as:

Course Id	Location	Course Name/Race	Drop	Sep	Expired
NY 65Oct16	Yonkers	Yonkers Marathon		0	70Dec31
CA 65Dec05	Culver City	Western Hemisphere Marathon		0	69Nov17
MA 67Apr03	Boston	Boston AA Marathon		p/p	78Mar11

Then I saw Pete Riegel's (generous?) offer in MNF #0336 22July99A:

... type in the data ..., which includes around 2000 courses. ...
Anyone wishing to [do so] will be welcome. Contact me if interested.

I've already mentioned in MNF that there were <u>3</u>041 records, but ... I immediately let him know I was *interested*, only no one else had volunteered, and a couple of months passed before I asked him to send what he had. Even the early marathons *interested* me as I typed just them, especially the "other" two of the earliest three:

CO 65Jun	Denver	Mile High Marathon	0	71Dec31
NY 65Oct16	Yonkers	Yonkers Marathon	0	70Dec31
MN 65Oct19	Minneapolis	City of Lakes Marathon	0	66Nov07

The last course here was the first of *any* distance with a record of being recertified, on the 66Nov07 it Expired. I emailed Pete noting no cert for:

1970 Seaside, OR: Caroline Walker's "WB?" [certified Feb 01, 1971!]
1971 Philly: Beth Bonner's "WB?" (but Corbitt 14th)
1971 AAU & PAGTrial/Eugene inaugural (Moore, Shorter 1-2)
1976 NYC, the first five-borough race
Also, among other women's "WBs" SOMEtimes claimed, on courses usually acknowledged as short:
1963 Western Hemisphere at Culver City (Merry Lepper)
1971 Brockton, MA (Sara Mae Berman)
Neither of these [has a cert in the file] either.

I am glad I decided not to stop after just the 700-odd marathon certs. I had already realized that by continuing I could have a complete set of these records even if no one else was *interested* then, but I had also realized that the set was surely incomplete anyway, and I was only one-quarter done. Having become addicted, however, I was delighted with one discovery and emailed Pete:

In particular, I just came across
CO Denver Washington Park Dec63
It's the earliest so far, and earlier than I'd thought these records went back. ... I believe John Jewell began measuring in 1961 in Britain but am curious who did some of this other early stuff over here. I see Ted first ran the 52 1/2 mi between London and Brighton on Sep 29, 1962. I'm sure he was curious before then, but that trip may have piqued his interest and spurred him into action, if only to start making enquiries.

The *two* pre-1965 certs in the latest/Earliest file:

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10.00 mi  CO 63Dec  Denver  Washington Park 10mi                0   84Dec31
 2.204mi  CO 63Dec  Denver  Washington Park 2.204mi clsd loop   0   84Dec31
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I believe Mexico City was chosen for the 1968 Olympics only in 1964, at Tokyo, so while these certs precede that decision, perhaps the Mexico City altitude prompted the Mile High Marathon to be the first certified in this file? This begs a chronology. This is where I start getting a distinct excess of questions over answers, so all help is appreciated, in MNF or anyhow else:

1954 Jim Peters with a tailwind wins his fourth successive Poly in record time, the last three in WBs, and The Times reports "Peters was running some 150 yards fewer than last year--thanks to a careful remeasurement of the route" (that's *all* I know)

1961 John Jewell measures the Bristol Marathon

1962 Ted Corbitt runs his first London-Brighton Sep 29 (returns 1964-66, '69 & '73: in '66 & '69 has extended stays, also running track races of 50 and 100 mi [13:33:06], but, on '73 vacation, runs only 134.7 mi in 24 hours!)

1963 Buddy Edelen runs the first of three more successive WBs at the Poly (Heatley 1964, Shigematsu 1965) on a course reportedly later validated, and earliest known US certs are given for two courses in Denver

1964 Abraham Lincoln Monteverde, the second-earliest-born marathoner in my records, dies in July aged 94, having contributed to Corbitt's Measuring Road Running Courses first printed the following month, thereby neatly linking the earliest to the modern, and Edelen is 6th at Tokyo

1965 20 more US certs appear in the records, and Edelen, despite continuing sciatica, runs the Poly within 6s of his WB but is only 3rd

1966 32 more US certs appear in the records, and Edelen returns to the US, goes to Adams State, Alamosa, CO, and wins the Mile High at Denver, 2:51!

1967 25 more US certs appear in the records, and, of these...

I believe Edelen measured

```
CO 67Aug18   Alamosa      Alamosa Marathon                 0   84Dec31
```

The race was inaugurated Sep 03. Edelen may have been the RD too? I also wonder if he ran it (he reportedly ran 13, but only 12 are known)? I have just the winner, and Corbitt 5th. I am wondering if *he* was there primarily to certify it for the following year when, at 7540-odd feet, it was the Olympic Trial for Mexico City (also the AAU)? Edelen is reported *not* starting that (but, as noted above, one dnf who did not run his second marathon for three years was Frank Shorter).

I plead for answers to more than just these questions. I specified in MNF that I used Pete Riegel's copies of Certified Road Running Courses, 1982-84. He had handwritten more of *his* courses in them. Surely other certifiers have courses of theirs that are not yet in the Earliest file?

No track (400 m, nor 440 yd) is in the file. Such certs first appeared in the 1985 book, listed last, after *other* closed loops!

A list of all *pre-1968* records now in the file appears on the next two pages, in chrono order. No Drop is available for any of them.

Distance	Course Id	Location	Course Name/Race	[Drop]	Sep	Expired
10.00 mi	CO 63Dec	Denver	Washington Park 10mi		0	84Dec31
2.204mi	CO 63Dec	Denver	Washington Park 2.204mi closed loop		0	84Dec31
25.00 km	CA 65Apr25	Inglewood	Sentinella Park 25K		0	84Dec31
20.00 km	CA 65May05	Los Angeles	Griffith Park 20K		0	84Dec31
15.00 km	CA 65May	Goleta	Semana Nautica 15K		0	68Jun08
6.00 mi	CA 65Jun18	San Fernando	San Fernando 6mi		?	
20.00 km	CO 65Jun	Denver	Washington Park 20K		0	84Dec31
25.00 km	CO 65Jun	Denver	Washington Park 25K		0	84Dec31
42.20 km	CO 65Jun	Denver	Mile High Marathon		0	71Dec31
20.00 km	MA 65Jul18	Needham	Needham 20K		0	84Dec31
1.06 mi	NY 65Jul	Bronx	Bronx Markets 1.06mi closed loop		0	84Dec31
25.00 km	NY 65Aug15	Queens	Milk Run		0	84Dec31
30.00 km	NJ 65Sep09	New Brunswick	New Brunswick 30K		0	84Dec31
20.00 km	NY 65Sep	Poughkeepsie	Poughkeepsie 20K		0	84Dec31
1.037mi	NY 65Oct12	Bronx	Van Cortlandt Pk S 1.037mi clsd loop		0	84Dec31
4.863mi	NY 65Oct12	Bronx	Van Cortlandt Pk S 4.863mi clsd loop		0	84Dec31
42.20 km	NY 65Oct16	Yonkers	Yonkers Marathon		0	70Dec31
42.20 km	MN 65Oct19	Minneapolis	City of Lakes Marathon		0	66Nov07
25.44 mi	NY 65Oct24	Bronx	Van Cortlandt to Zappan Zee		0	
15.00 mi	CA 65Nov22	Phelen	Phelen 15 (mi)		0	
10.00 mi	CA 65Dec05	Pasadena	Rose Bowl 10mi		0	84Dec31
42.20 km	CA 65Dec05	Culver City	Western Hemisphere Marathon		0	69Nov17
9.602mi	CA 66Feb20	Montebello	Montebello (9.602mi)		0	
30.00 km	MD 66Mar13	Silver Spring	National Senior AAU 30K		0	
45.00 mi	NY 66Apr03	Bronx	Bronx 45mi		0	
42.20 km	NE 66May01	Curtis	Curtis Country Lane Marathon		0	
5.217mi	NJ 66Jun23	Camden	Farnham Park (5.217mi)		0	
42.20 km	PA 66Jun23	Philadelphia	Penn Relays Marathon		0	
8.83 mi	NJ 66Jun27	Camden	Cooper River Park (8.83mi)		?	
12.26 mi	NJ 66Jun27	Camden	Cooper River Park (12.26mi)		?	
12.87 mi	NJ 66Jun27	Camden	Cooper River Park (12.87mi)		?	
17.17 mi	NJ 66Jun27	Camden	Cooper River Park (17.17mi)		0	
3.67 mi	NJ 66Jun27	Camden	Cooper River Park 3.67mi closed loop		0	
50.00 mi	NY 66Jul09	Staten Island	National AAU 50mi (1966)		0	66Dec31
20.00 km	PA 66Sep19	Philadelphia	East River Drive 20K		0	84Dec31
4.00 mi	NY 66Oct22	Bronx	Harlem River 4mi		0	
3.00 mi	NY 66Oct22	Yonkers	Marine Corps League 3mi		0	
5.00 mi	MN 66Nov07	Minneapolis	Minneapolis 5mi		?	84Dec31
10.00 mi	MN 66Nov07	Minneapolis	Minneapolis 10mi			

Distance	Course Id	Location	Course Name/Race	[Drop]	Sep	Expired
42.20 km	MN 66Nov07	Minneapolis	City of Lakes Marathon		0	73Sep17
3.00 mi	MN 66Nov07	Minneapolis	Minneapolis 3mi		?	
15.00 mi	MN 66Nov07	Minneapolis	Minneapolis 15mi		?	
20.00 km	MN 66Nov09	Minneapolis	Minnehaha Park 20K		?	84Dec31
42.20 km	KS 66Nov12	Humboldt	Humboldt Marathon		0	
25.00 km	NY 66Nov13	New York	Central Park 25K		0	
42.20 km	MA 66Nov19	Holyoke	Holyoke [Mountain Park AA] Marathon		0	71Jun05
25.00 km	MN 66Nov	Minneapolis	Minnehaha Park 25K		?	84Dec31
30.00 km	MN 66Nov	Minneapolis	River Road 30K		?	84Dec31
42.20 km	NY 66Dec10	Bronx	Cherry Tree Marathon		0	68Jan27
25.00 km	HI 66Dec	Honolulu	National Junior AAU 25K		0	84Dec31
15.00 km	NY 66Dec	Bronx	Macombs Dam Park 15K		0	84Dec31
30.00 km	NY 66Dec	Bronx	Macombs Dam Park 30K		0	84Dec31
20.00 mi	NY 66Dec	Bronx	Macombs Dam Park 20mi		0	84Dec31
10.00 km	NY 66	Bronx	Van Cortlandt Park XC 10K		0	84Dec31
42.20 km	MD 67Feb04	Beltsville	Washington's Birthday Marathon		0	70Feb14
30.00 km	MD 67Feb	Rockville	National Senior AAU 30K		0	68Feb12
42.20 km	MA 67Apr03	Boston	Boston AA Marathon		p/p	78Mar11
42.20 km	CA 67Apr05	Santa Barbara	Santa Barbara Marathon		0	77Sep25
10.00 mi	MN 67Apr	Minneapolis	Fred Kurz Handicap 10mi		0	84Dec31
2.00 mi	NC 67May27	Ahoskie	Health 2mi		?	
9.178mi	IA 67May	Des Moines	Des Moines (9.178mi)		?	
10.00 mi	NC 67Jun18	Ahoskie	Aulander to Ahoskie		p/p	84Dec31
20.00 km	IN 67Jul08	Michigan City	Michigan City 20K		0	84Dec31
42.20 km	CO 67Aug18	Alamosa	Alamosa Marathon		0	84Dec31
25.00 km	NM 67Aug25	Albuquerque	National Senior AAU 25K		?	84Dec31
50.00 mi	NJ 67Sep08	Atlantic City	Atlantic Avenue 50mi		0	84Dec31
5.00 mi	NJ 67Sep10	Atlantic City	Atlantic Avenue 5mi		0	84Dec31
42.20 km	NJ 67Sep10	Atlantic City	Atlantic City Marathon		0	72Oct21
10.00 km	NJ 67Sep19	Atlantic City	Atlantic Avenue 10K		0	84Dec31
25.00 km	NJ 67Sep19	Atlantic City	Atlantic Avenue 25K		0	84Dec31
30.00 km	NJ 67Sep19	Atlantic City	Atlantic Avenue 30K		0	84Dec31
10.00 mi	NJ 67Sep19	Atlantic City	Atlantic Avenue 10mi		0	84Dec31
9.00 mi	NJ 67Sep19	Atlantic City	Atlantic Avenue 9mi		0	
4.312mi	NY 67Oct22	Queens	Alley Pond Park 4.312mi closed loop		0	84Dec31
50.00 mi	NY 67Oct	Poughkeepsie	US Route 9 50mi		0	84Dec31
42.20 km	CA 67Nov04	Point Reyes	Point Reyes Marathon		0	84Dec31
10.00 km	IL 67Nov19	Chicago	Washington Park XC 10K		0	84Dec31
42.20 km	CA 67Dec06	San Diego	Mission Bay Marathon		0	69Jul04
15.00 km	WA 67	Bangor	Bangor 15K		?	84Dec31

RUNNING SHORTS WITH SCOTT HUBBARD

Here's an exerpt from Scott's monthly column in Michigan Runner & Fitness Sports:

As finish line announcer at the Crim races since '82, I've said a lot of names and seen plenty a great finishes. In 1989, Cathy O'Brien ran so fast I was unprepared to bring her home with the recognition her time deserved. The '88 US Olympic marathoner's time of 51:47, a course record by 1:23, surprised everybody. Sure I drew attention to her victory but it took several minutes to process her time and what it meant, World Record! Announcement of that got the crowd buzzing but what I wouldn't have given to acknowledge the performance as she streaked down Saginaw St.

About 15 minutes after O'Brien's finish I was told runners had been led off course. My immediate thoughts aren't for publication. Anyway, I took an active interest as a fan of the sport who still felt giddy with O'Brien's time and as the course maps, It seemed runners were simply led the wrong way around a rectangle. Even so, I wondered would any records count if the course weren't run as measured. Basically, since human error was at fault and it wasn't an intentional act, how the 'new' course measured would be OK.

I measured the affected rectangle late that afternoon and two other sections run ditterently than certified that evening. The next day I remeasured the entire route as run race day, The course was about 20' long of 10 miles. Three weeks later, an independent course validator, chairman of US course certification Pete Riegel, came in and confirmed that the course was just over 10 miles. O'Brien's time was a new World Record. Her time has been beaten since but she still owns the American record by 40 seconds over the next fastest.

STORY TIME. On Sunday of Labor Day weekend, I turned the corner from Broadway onto Park at about the 23-1/2 mile point while measuring the Detroit Free Press Marathon. Instead of looking at new Tiger Stadium construction progress I found two barricades blocking my way with a police car off to the side. A voice over the police intercom told me to stop. I didn't want to stop because I was tired and thirsty and almost done measuring. The voice insisted, I stopped, walked over to the officer and explained what I was doing and where I wanted tto go. He called on his radio for an answer to my query.

While waiting he asked to see my bike pump. I'd taken it from behind my back where I'd tucked it in my shorts. He pumped it a couple times and handed it back without a word.

Another car came flying up and a sergeant asked for ID. I handed it to him and he started writing info down then handed it to the other guy who repeated the process. I asked the sergeant why he needed ID and I was told, 'Because you might be a terrorist." They said I couldn't go through the area for 1-1/2 - 2 hours. I wasn't happy about this but knew I wouldn't get anywhere with the cops because they were acting stern and uncommunicative. I asked a third cop what was going on and he said, "I can't tell you." OK, fine.

I found a Channel 4 truck over by Woodward and asked a reporter inside what was going on. 'Al Gore's in the church' he replied nodding at the Central United Methodist at Adams and Woodward. Oh. This would explain the cops' behavior, all the "suits" wandering around and the score of police motorcycles, cars, limos and the ambulance. I took up a terrorist position over on the grass. hoping the Vice-president would hurry up. Fifteen minutes later it was all over and I resumed measuring.

The previous Sunday I was in Windsor measuring the marathon and about a mile from the tunnel on Wyandotte. Wyandotte is lined with businesses for miles and parked cars for half of that. My thoughts had just turned to my trip through the tunnel when a guy in a parked car opened his door in my path. Two seconds later I was sitting on the pavement after somersaulting off my bike for the second time in a year and a day.

I assessed my damage and thought about what had happened. I was dinged in a few spots, my lower back a little sore and I recalled hitting my helmet as I flipped toward the ground. I got up in a few minutes and felt mixed emotions. I was too angry to be happy I wasn't hurt worse, yet just happy enough I wasn't hurt worse to let the driver know how angry I was. I don't have the heart to tell my mother about this latest accident. There've been too many the past few years. But if I wanted to I could because I wore a "brain bucket." As I have twice now in the past year, I'm going a to urge you to wear a helmet while cycling if you don't already. Please.

PUZZLE OF THE MONTH

Date: 10/4/99 9:14:45 AM Eastern Daylight Time
From: Zgerweck (Jim Gerweck)
To: Riegelpete

Hi Pete,

I've got a question on a measurement I did. Give it a cursory look-see if you have the time, and see if you can see anyhting obvious I may have screwed up.

Constant: 11377.199/km

1st ride:
Finish 19350
2.5k 47792.5
Start 76236

2nd ride:
Start 76236
2.5k 04674
Finish 32926

Somehow the second half comes out about 15m short on the 2nd ride. I went over and rode the course again yesterday w/ Carol Kane, and we both came up with a similar result. So I buy the fact that the 2nd half is short - I just can't figure out how I messed up, since on the first ride it checks out. I don't think my riding was that bad, and both halves of the course are equally curvy. If you see anything obvious, let me know, but don't spend too much effort on it; as I'm going to add the distance to bring it to 5k - I just am curious so I can avoid making the same mistake in the future.

Best

Jim

Readers - I already sent my opinion to Jim. What is yours?

14-Sep-99

VALIDATIONS

Validations Pending

Pass/ Fail	Date of Event	Date of Validation	Course Name	Course ID	Measurer	Validator	Type	Advertised Distance	Nominal Distance	Measured Distance	Percent Difference
	6-Apr-97		Fifty Plus 8KM	CA97026RS	Carpenter	Young	LDR	8000 m	8000 m		
	27-Nov-97		Run to Feed the Hungry	CA95037CW	Moore	Young	LDR	10,0000 m	10,000 m		
	25-Oct-97		Tulsa Run	OK94041BB	LaFarlette	Baumel	LDR	15,000 m	15,000 m		
	5-Apr-98		Wins Racewalk	CA98013RS	Scott	Young	RW	25,000 m	1250 m		
	20-Mar-99		Bull Run 2K	VA97042RT	Thurston		RW	2,000 m	2,000 m		
	22-Oct-97		Juniper Valley Park	NY94003DB	Brannen		LDR	100 mi	1.1982 mi		
	18-Jan-97		Jed Smith Ultra	CA97004KY	Young	Young	LDR	50,000 m			
	14-Sep-97		Nat. HeritageCorridor	IL96052JW	Hinde	Wight	LDR	25,000 m	25,000 m		
	'17May98		Mayfest	CA98022RS	Scardera		RW	15,000 m	1703.26 m		
	14-Nov-98		Helen Klein 50Km	CA98041RS	Scott		LDR	50,000 m	50,000 m		
	23-May-98		Benchmark Blast 30Km	CA98002RL	Letson	Scardera	LDR	30,000 m			
	14-Nov-98		Mission Bay 25Km	CA96005RL	Letson	Scardera	LDR	25,000 m	25,000 m		
	15-Nov-98		Clarksburg Country Run 30Km	CA87015CW	Wisser		LDR	30,000 M	30,000 m		
	20-Feb-99		Outback Distance Classic 12 Km	FL99007DL	Ward	Loeffler	LDR	12,000 m	12,000 m		
	20-Mar-99		Shamrock Sportsfest 8 km	VA99009RT	Corzatt		LDR	8,000 m	8,000 m		
	17-May-98		Inland Empire 15K	CA98022RS	Scardera	Loeffler	RW	15,000 m	1703+ m		
	26-Jun-99		USATF 20K RW	OR99008LB	Zemper	Barrett	RW	20,000 m	1000 m		

Validations Completed

Fail	27-Nov-97	6-Jun-99	Hyatt Turkey Trot	NC97062PH	White	Hronjak	LDR	8,000 m	8,000 m	7995.5 m	-0.055
Superced	28-Mar-98		Bull Run 2K	VA97042RT	Thurston		RW	2,000 m	2,000 m	record sprcded	

TIDBITS FROM MNFORUM

Subj: MNF99-09-25A
Date: 9/25/99 11:18:51 PM Eastern Daylight Time
From: MNForum
BCC: Riegelpete

MNF #0384 25Sep99A

PRE-RACE VALIDATION - For discussion

I measured the LaSalle Banks Chicago marathon, submitted the application and received the USATF course certificate.

The race director wanted the course pre-validated because there is prize money and bonus money involved.

The course was measured by the validator and found to be 17.3 meters longer than the marathon distance of 42,195 meters.

The validator recommended that the course be lengthened by 24.9 meters so that it included the short course prevention factor, SCPF, in accordance with RRTC guidelines.

The question I have is this: If a record were to be set on a course and it was post-race validated and found to be at least as long or longer than the advertised distance, would the record stand? The answer, I am told, is that it would stand.

Why then must the course be lengthened to include the SCPF when it is pre-race validated?

In the case of the 1999 Chicago marathon we did lengthen the course per the validator's recommendation. So it is now 42.2 meters longer than the marathon distance.

Why so much longer?

#2 question. What is the purpose of including the SCPF? In the case of the Chicago Marathon I can assure you that in the past the runners (at least the lead men and women) did run the course as measured. I have riden in a side car of a motorcycle along with the lead men. I position myself at turns or other critical points so that I am able to observe the lead pack and more. I know that the lead runners do run longer that the "shortest possible route". Often they are on the wrong side of the street. Their special water table is set in the center of the street when the shortest route is on the side of the street. There are parked cars on some streets during the measurement. There are parked cars there during the race and sometimes the crowds of people force the runners to follow a longer path.

I'd like some viewpoints from other measurers and course experts. I just can not understand why the 1999 Chicago Marathon must be 42 meters longer that the marathon distance.

Chuck Hinde
NDFAN50@AOL.COM

PRE-RACE VALIDATION

Chuck Hinde raised complex questions in his recent inquiry. This is an attempt to answer them.

His first question was "If a record were to be set on a course and it was post-race validated and found to be at least as long or longer than the advertised distance, would the record stand?" The answer is, as he thought, yes. There is another side of this coin, however. If the course was to be shown short, the record would not stand. This would be a source of embarrasssment to the race and to the measurer, and disappointment to the runner. He goes on the ask "Why then must the course be lengthened to include the SCPF when it is pre-race validated?"

In all marathons associated with AIMS and IAAF, the course is checked beforehand by an expert, and the full SCPF is added, regardless of what the original measurement may have shown. The expert watches the race and verifies that the correct route was run. This has been standard procedure for years. In the US, because we have many races, we do not have the manpower to do this for every race, so we use post-race validations in cases where fast times are run. Over 90 percent of the time, the course passes validation.

Some race directors do not wish to take this chance, and opt for a pre-race validation. In this case, the validation measurement is compared to the original measurement. In the case of Chicago, Hinde measured the course and got it certified at 42195 m + 42.2 m = 42237.2 m. Jay Wight, the validator, obtained a measurement of 42204.6 meters, which is less than a 10 meter SCPF, and recommended that 32.6 meters be added to the course to bring it to the "standard" length.

This procedure is entirely consistent with our measurement process. We have two measurements - 42237.2 and 42204.6. Agreement between the two is

0.00077, acceptable. What do we do? We use the shorter measurement, which was Jay's, and add 32.6 meters. That is what was done.

Note that this was not mandatory. The race was not forced to endure a pre-race validation. It was their choice to opt for certainty of record-acceptance, and with that choice came the obligation to abide by the result. Any race should be aware that a pre-race validation carries with it a likelihood that distance will have to be added, simply because the validator is generally more experienced than the original measurer.

Experience has shown that a marathon course with only a 9.6 meter cushion is on shaky ground. It would be possible for a post-race validation to show it short. Addition of distance to bring the course to the full SCPF does not put Chicago at any disadvantage, as all marathon courses are supposed to use the full SCPF. Any race that used less would have an advantage over the others.

Hinde goes on to question the purpose of the SCPF, pointing out that he has watched the race and seen the runners diverted from the SPR by parked cars, water tables, crowds, and their own preferences for the path they choose to run.

In a long-distance track race it is also unusual for a runner to run the entire race on the SPR. Often they will be forced into a longer path by runner traffic, but no credit is given for this. Why should it be in road races?

The purpose of the SCPF was defined many years ago. It is put into the course layout procedure to assure that the course will not later be found short when validated. This procedure works.

I think Chuck may have been lulled into belief that a single value can define the length of the course. This is not so. We never know the exact length of a course. Two or more measurers never agree in their measured lengths. Where they do agree, if things are done according to the standard method, is that the course is not short of its intended distance.

Pete Riegel
riegelpete@aol.com

Subj: MNF99-09-27A
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From: MNForum
BCC: Riegelpete

MNF #0386 27Sep99A

PRE-RACE VALIDATION - A NON U.S. VIEW.

Wow, Chuck's question will ferment some heated and lengthy discussion. It is a fundamental issue and there are some inconsistencies around world-wide. In the US I think it is simple, you follow the RRTC rule book and the established procedures. Full stop. Doubtless, Chuck will shortly be told the procedures which apply. It is a system that works well because it is well defined. And that is very important.

The easy one first:

Q2: The SCPF is not designed to cope with runners taking short cuts on corners. Short cuts should be covered by the race organiser by means of barriers, active marshaling, and potentially disqualifications (the latter not used enough on persistent offenders down in the field in my view). The SCPF covers only measurement errors, which include any slight deviations from the perfect SPR by the measurer. It is the course legally available to runners which counts. A runner may choose to take a line longer than the SPR. That is his judgment and right. In my view taking a longer line at some parts of the course should not justify any cutting elsewhere. So it is just bad course organisation if the (optional) visits to drinks stations entails extra distance.

Q1. Ignoring the established rules, this raises interesting issues. In my view we are indeed trying to achieve a length of a 42,195 m plus 42 m, and all marathons should ideally be adjusted as closely as possible to that distance. In fact, if both Chuck and the pre-validator had measured absolutely perfectly the pre-validator (without the scpf) should have found the course was long by 42m. They would then agree that the course was exactly 'right' and nothing would then need to be done! The pre-validator found it sufficiently short of 42,195 +42 m that he thought it was prudent to add some more. If he had found it 20 m short of 42,195 m, it would still have passed the standard for a post race validation, but it would then be almost certainly short of the target 42,195 +42 m, and could possibly have been short of 42,195 m, although this would not be definitely proven. In this case as a prevalidator I would have little hesitation in regarding my measurement as definitive and adding to the course 20 m plus the 42 m SCPF. I would do this because the two measurements were so far apart someone must have made a mistake, using the shorter measurement is a safe procedure in such situations, but may produce a long course if the mistake was mine.

In the Chicago case, after the pre-validation there were 3 pieces of information about the course length. Chuck's 2 rides, of which he presumably selected the shortest, and the one ride by the validator. If there were no issues of 'mistakes' (e.g. riding the wrong route round parked cars) then I think these 3 measurements should be appropriately averaged to decide on any adjustment. It would be up to the pre-validator to use his wide experience. If I had no reason to give lower weight to Chuck's longer result, then I would consider an averaging process such adding together a quarter of each of Chuck's two measurements and the half the pre-validation measurement (with the SCPF included in the calculation). I weight in this way since I think a measurement by another measurer (different day, different tyre, possibly different roughness of the calibration course) is more valuable than a repeat measurement by the same measurer (only different time).

In practice as I interpret Chuck's account, it appears that the pre-validator gave 100% weight to his own single measurement and discounted completely the information provided by Chuck's two measurements. I would certainly want to know why. In fact I would even be interested in examining the pre-validator's data. What were his temperature swings? If he used the average cal const, was that implied average temperature truly representative of the ride? Did he use a different tyre to Chuck e.g. solid vs pneumatic, etc etc.? I don't want my asking these questions to be seen as undermining the work of the pre-validator. I am just making the point that all measurements provide useful information which must be evaluated, and provided our procedures allow it they should all be taken in to account. In summary it should be the pre-validator's call to make a decision based on an evaluation of all the measurement information. With the same measurements done as a post validation, although any best performance would stand, I think it should still be the post-validator's call regarding any adjustments required in future years to make the race conform as closely as possible with the IAAF's "recommended" norm of 42,195 + 42 m (IAAF Rule 165.3 note 2).

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MNF #0385 27Sep99

PRE-RACE VALIDATION

When measuring anything there is an error possible in the apparatus you use. The equipment we use, steel tape for a calibration course, a Jones counter, and how accurately we ride also has an error. We believe that the error approaches 0.1%. In order to make the course at least the distance advertised and knowing that the distance could be over or under by 0.1% we add on this extra distance which we call the scpf (short course prevention factor). To each 1000 m we add 1 m. Therefore a 10000 m course is 10010 m +/- 10 m. Similarly a marathon adds 42.195 m so that it will be at least the distance of the 42.195 km it claims to be.

Removing this extra distance means the course could, in theory be found to be under the length of a marathon by up to 42.195 m and of course any pending records would not stand. By adding the difference between the distance actually calculated and what is necessary for the scpf you guarantee that the record will be accepted. Having this done as a prevalidation any records can immediately be accepted rather than having to wait until a measurement validation takes place.

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From: MNForum
BCC: Riegelpete

MNF #0387 28Sep99

PRE-RACE VALDATION

My understanding is that a marathon (or any other race) is be be at least the stated distance and not the distance plus 42 m (+0.1%). If we had an absolute method of measuring a course we would not have to add the 0.1% SCPF. Since the method that is used is not perfect, 0.1% is added during the course layout/measurement process to ensure that the race is at least the stated distance. This makes up for any wobbling, non tangent, air loss etc errors.

If the measurer is experienced and has reliable equipment and perhaps a stable temperature day the true distance is likely to be the stated distance plus the full 0.1% SCPF. However due to a variety of reasons the course is most likely to be less than "stated plus 0.1%" but hopefully more than the "stated" distance. The US data seems to be showing that the 0.1% SCPF has been very effective in limiting the number of courses that are latter found to be short of the stated distance.

It seems to me that once a course is validated, the validation should last the lifetime of the course. If the validation shows the course to be at least the stated distance there should be no need to add some more SCPF. Why add distance to something that has already passed the test. Do we really want the runners to be running 0.1% too long or do we want them to be running at least the stated distance. Adding distance to a course that passes a validation suggests that the validation process needs to be improved. Perhaps a validation should consist of 2 rides, or perhaps a ride by two separate people, or perhaps a single measurement by an approved measurer with an "approved" tire.

A pre validation should be the same as a post validation - a process that confirms the course is at least the stated distance. I don't think there needs to be a a distiction between the two.

The common argument for adding distance after a sucessful validation is usually that the validation itself is not 100% accurate and a subsequent "validation" could find that the course is short. Why would you want to validate a course that is already validated? The validation process should be such that once it is done the results are accepted as correct. If that is not the case then perhaps the validation process/requirements should be revisited.

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From: MNForum
BCC: Riegelpete

MNF #0388 29Sep99

Pre-race validation

Dave Yaeger does not believe that extra distance should be added to a course that passes validation. What would he say if the course is validated to be one meter over the 42,195 meters? Since there is error in any measurement, it would seem prudent to bring the course to the stated distance plus the SCPF. As we all know, a course is not a set, unchangeable entity. What if the cones are slightly misplaced the next time the race is run? The 0.1% helps ensure a record run is not thrown out.

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Hey Jim, that's not a bad idea! At least it will get the blood flowing.

Seriously, I still believe that the double standard in validations should be eliminated. This is one of those rare instances where I disagree with the Czar. I fail to understand his reasoning, which seems to boil down to "it works".

Yes it works ... however, if a course passes a post-race validation EVEN IF SHORT, how is our craft served by adding distance to a course in a pre-race validation just to bring it up to 1.001? Unless, of course, there is some reason to doubt the results of the validator.

If "works" means that courses pass validation, a pre-race validation that shows the course to be at least the advertised distance, therefore, it passes validation! Why add more distance? Perhaps this is my fault and I just can't express my thoughts adequately ... it wouldn't be the first ... or last time.

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From: MNForum
BCC: Riegelpete

MNF #0394 19Oct99

1999 CHICAGO MARATHON COURSE

I'll jump in here for Chuck. The Chicago Marathon course is new- at least the first thirteen miles of it, but not substantially different from the last two years' courses. The course seems to change every year because of construction and because race director Carey Pinkowski keeps finding more creative ways to improve the course subject to the restrictions the City of Chicago places on the event

For example, the course can't go past Wrigley Field. I'm sure this is due to the annual possibility of a conflict with the World Series.

The new course is IL-99043-JW. I performed the pre-race validation measurement on 22 August and the results of that measurement have been the subject of considerable debate on this forum since early September. Chuck has since adjusted the course in accordance with my recommendations so the course as run this Sunday will be the full marathon distance plus SCPF.

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Someone to count on

Ken Young does running by the numbers

By Doug Thurston
Bee Staff Writer

"What was your time? How many miles did you run this week? What's your personal record? What pace is that? Is that a record?"

Runners are known for obsession with numbers. It's how we keep track of training. It's how we compare performances.

Even among the most numeral-oriented runners, however, Ken Young stands out.

The former Folsom resident, who moved to the tiny Humboldt County town of Petrolia in 1997, keeps running records. Thousands of them. His Web site (www.mattoleriver.com) and e-mail newsletter, The Analytical Distance Runner, focus on results of races 3,000-meters and longer around the world.

Young, 57, maintains more than 160,000 performances from men running under five minutes per mile over 10K, for women under 5:35. He also tracks world bests for all distances over three kilometers (1.86 miles). He also maintains race histories and tracks prize money for major national and international races.

He uses his immense database of elite performances to handicap top races. Each week, he sends out predictions of major events around the world, listing odds, probabilities and predicted times. It's more information than one would find for thoroughbred horse racing. He's found that his computer program correctly predicts the top athletes' placings and ballpark times about two-thirds of the time.

Young publishes his data on 15,000 new performances annually in weekly e-mails to about 40 running journalists and fans. His Web site is neatly organized to allow quick perusal of the lists, records or race histories.

He estimates he spends an average of 30-40 hours a week crunching the numbers. He receives little income from subscribers: Most get the information for free. His annual expenses run about $600.

Young started keeping track of running results in the early 1970s. At the time, Runner's World magazine would publish a yearly list of American men who ran the marathon in less than three hours (women's marathon times were not officially recognized back then). Young, whose marathon personal record of 2:25:41 was set in the 1974 Boston Marathon, thought it would be nice to have lists for other distances. The editors of the magazine invited him to keep track of distances shorter and longer than a marathon, and his record-keeping began.

"I have a penchant for collecting data," Young said in a classic understatement. "I also like to organize things."

When he began compiling times at other distances, Young quickly found wide variance in the accuracy of courses. Standardized course measurement was in its infancy and only the

RUNNING By Doug Thurston

New York Road Runners Club kept track of courses measured correctly. Young soon organized a state-by-state course-certification list. This gave national-caliber runners a means to compare their performances with other runners around the country on record-quality courses.

Young, a computer programmer since 1965, added and expanded his database as running boomed through the 1980s. As course-measurement techniques became more refined, he helped sort out times run on record-quality courses, usually loop or out-and-back routes, and aided times, such as marathons run down a mountain or pushed by strong tailwinds.

In 1985, Young developed a competitive ranking system, a point-exchange system whereby runners exchange points with other runners in a race on the basis of their relative finish and their point level going into the race. This concept is familiar to tennis and golf fans, but was new to running.

In 1987, Young turned over bulging course files and official record-keeping duties to other USA Track & Field committees and concentrated on elite-level performances.

Last year, Young developed a race time bias that charts how fast one course is compared to another. The California International Marathon, for example, is known as a fast course for its elevation drop from Folsom to Sacramento. Young charts this course as 21 seconds faster for men and women then an average marathon course. The Berlin Marathon leads the list with an average positive difference of 45 seconds. Race courses with more hills, such as the Big Sur Marathon along the Carmel coast, rate slower than average.

"It's fun; I enjoy doing it," Young said of his statistical bent. "I get a surge of adrenaline when I get results from a major race. There are always little surprises. I hope I can keep doing this for another 10 or 15 years."

Young, who retired from teaching seven years ago, has all the numbers on his own running. He ran a marathon in 3:02:48 at 50 and holds the current U.S. 50-kilometer 55-59 age-group record. He has also run at least three kilometers a day for 10,652 consecutive days, one of the longest running streaks in the country.

Young ran his 100,000th mile last May – of course he was keeping track.

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Trio takes measure of course

By BOB GREENEY
Hour Staff Writer

Hour photo/[illegible]

Carol Kane, Karen Gerweck and Jim Gerweck, left to right, course calibrators for U.S. Olympic marathon trials courses, demonstrate the tools of their trade.

NORWALK — Carol Kane of Weston and the Gerwecks of Norwalk, Karen and her husband Jim, have long been fixtures in the Fairfield County running community.

Whether it is organizing and directing races, competing in marathons, going out on training runs with other runners, writing about running for publications or Internet sites, designing T-shirts and selling them at races and high school track meets, whatever, they are constantly there and at the forefront.

So it was fitting that when a dozen people were needed to calibrate the United States Olympic Marathon Trials courses last month to make sure they are official, three of those people happened to be this trio.

Karen Gerweck and Kane rode their bicycles and did their duty down in Columbia, S.C., and Karen's husband Jim was pedaling away on the steep hills of Pittsburgh to help assure that the men's course is official.

The calibration of a race course is done by riding a bicycle with a Jones Counter attached to it to measure distances in increments. Then the riders compile and compare their respective measurements to come to a determination that a marathon course is at least the minimum of 26.2 miles.

Olympic Marathon Trials organizers had six women calibrate the women's course and six men calibrate the men's course.

"They want women to validate the women's course, as it should be," Kane said. "We just worked so well together. It flowed so wonderfully. It was very professional, and yet there was a feeling that we were all in this together.

"It was just a real pleasurable, wonderful experience. I just can't say enough about it. It was just one of the best experiences of my life."

"It was an awesome experience," Karen Gerweck agreed. "I roomed with Carol and that was real fun because she's such a funny person. Just being with the people downtown who were real friends, who wanted to help us out. It was great. It was the best time."

Karen's husband Jim had the most expertise of the area trio in course calibrating prior to this summer, but he's now much more well-versed because of this experience.

"It was good because the guys down there (in Pittsburgh) were all real expert measurers," Jim Gerweck

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From *The Sunday Hour*
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Trio takes measure of course

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said. "Some of them had done three Olympics courses or three Olympics Trials courses. Some of them did the Atlanta Olympics marathon course.

"These guys were the top guys in the game, so it was good to be able to ride with them and pick up technical tips, whatever."

Jim Gerweck has had significant experience measuring race courses. He organizes, designs and calibrates the courses for the Boston Buildup series of races and others, and he has helped John Bysiewicz measure the prestigious Fairfield Half Marathon that has undergone course recent changes.

Being the runner-holic he is, Gerweck was snooping around on a running-related Internet site and noticed the Road Running Technical Council from USA Track and Field was looking for calibrators to help measure its two Olympic Trials marathon courses.

"Jim saw it and he said, 'You ought to go and do that,' " his wife Karen related. "I told him, 'I don't know anything about it,' and he said, 'I'll teach you.' So I thought it would be fun, and Carol said she wanted to do it too.

"Jim trained Carol and I over the summer on how to measure and how to calibrate. I felt pretty comfortable going in. It was really easier than I thought it would be."

Course calibration is basic and repetitious.

The Jones Counter is a mechanical device that goes on the bicycle wheel and measures counts per revolution.

Calibration mathematics begins with the calibrators riding their bikes over a 300-meter stretch four consecutive times to determination how many counts there are on a particular bike for those 300 meters. Further extrapolation is employed to determine counts per mile or per kilometer with the Jones Counter, and then it's a matter of mere math with multiplication and division to come up with figures.

Six bike riders are used to ensure the most consistency in measurements. The riders pick their own line on the course, pretty much staying together. They stop every five kilometers (3.1 miles) and report their Jones Counter readings to someone in the car ahead of them to compile the pertinent information.

"It was a wonderful morning. It was hot, but nobody seemed to mind," said Kane, who has become one of the top women's marathoners in the country in her 50-55 age division. "I did some real intensive training. I was constantly on my bike for three weeks. I was constantly going on a course with my Jones Counter on my bike to make sure it was working. I went over every aspect of (calibrating). I took 60 pages off the Internet off of a book on measuring.

"I worked for a month and a half making sure I was up to snuff in the company of all these people," Kane said. "And Karen and I did pretty well in the measuring. We were right up there with (the other calibrators). There was not a huge deviation from the figures. They have all these formulas to make sure we're accurate and in agreement. There's a margin of error and we were well within that margin of error."

"I just got the reports back and the courses checked out, so the marathoners will be running at least the minimum distances," said Jim Gerweck.

Kane and Karen Gerweck happened to find a race on the day after their calibration ride and they each were awarded trophies for finishing high in their respective divisions.

"As Karen and I came up to get our trophies, they announced us as validaters of the Olympic course, and everyone went wild. There was like a gasp from the crowd," Kane said. "The whole weekend was such a great experience. I just can't say enough about it."

Karen Gerweck and Kane will soon take another trip together to run in the Philadelphia Marathon. It will be especially fun for Kane because she'll get to visit her daughter Emily, picked by *The Hour* as it's All-Area MVP twice in cross country (1995 and '96) and once in outdoor track and field (1997). Emily is now at the University of Pennsylvania.

Kane, a member of the Hi-Tek racing team and now an assistant coach for the Wilton High cross country programs, ran it last year in 3 hours, 53 minutes and 53 seconds.

"It's funny, that time ending with those two 53s, because I was 53 at the time," said Kane. "The qualifying time for Boston was four hours and my number was 400. To me, that was so strange."

Kane did not plan on running in Boston. "But everyone said: If you qualify for Boston, you have to do Boston, because it's so much fun," she said.

So Kane went and did it this past spring and had a 3:30:18 that placed her eighth out of about 200 women in her age group.

Hour photo/ERIK TRAUTMANN
Karen Gerweck of Norwalk, left, and Carol Kane of Weston recently helped calibrate the course for the U.S. Olympic women's marathon trials course. They are also runners and will compete in the upcoming Philadelphia Marathon.

After Kane and Karen Gerweck finish with their Philadelphia Marathon, the next marathon they'll go to they will be involved as fans.

When Kane and the Gerwecks were at their respective sites to help calibrate the courses, it was a challenging mission that became fun because of the way they were taken care of.

They were all invited back for the US Olympic Marathon Trials and they'll all be returning for them.

"The organizations bent over backwards to take care of us," Jim Gerweck said. "I'm looking forward to going back there in May."

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