

Measurement News



March

1997

Issue #82



Tadeusz Dziekonski of Poland has been a frequent contributor to *Measurement News* since attending an IAAF/AIMS seminar held in Warsaw in 1989. Since then he has measured marathon courses in Austria, Hungary, Lithuania, Poland, Slovakia and the former Soviet Union. Here he stands at the “center of Europe” after measuring the *Maratonas Europos Centras* in Vilnius, Lithuania.

MEASUREMENT NEWS

#82 - March 1997

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USATF BUDGET CUTS

USATF, due to a shortfall in income this year, has cut Committee budgets by about 1/3. RRTC has also been cut. While this will have little effect on our day-to-day activities, we will have to trim our sails to the wind. The following are some of the things which will likely be done to reduce costs:

- *Measurement News* will be limited to 40 pages, to save postage and printing costs. Some text will be reduced in size, and greater editorial scrutiny will be used. IAAF/AIMS funding will be sought to cover the cost of printing and mailing foreign subscriptions. Several people currently receiving free subscriptions will be dropped from the subscription list. **Certifiers will continue to receive MN free. Subscription price to others will be raised to \$20 annually** to better reflect the real cost of printing and mailing.
- Validations will be reduced by 1/3.
- Convention expenses for RRTC officers may be reduced or eliminated, depending on the state of our finances as the Convention approaches.
- No special projects, such as measurement seminars, will be done this year. The single exception to this will be Tom McBrayer's session at the RRCA Convention. He will be teaching there. This commitment was made last year. Eastern Vice Chairman Mike Wickiser has pointed out that if our present leanness continues, we may have trouble with Olympic Trials prevalidation measurements, which have been useful in training measurers as well as assuring the accuracy of the courses. We will have to wait and see.
- Reimbursement to RRTC officers for ongoing office expenses will continue. No change here.

FREE MN SUBSCRIPTIONS MAY END

This does not apply to certifiers and RRTC officers. You will continue to receive MN free. It does apply to others who have asked to be put on the MN distribution.

Beginning with the next issue, those who will need to start paying for MN will see a stamped "Measurement News - Last Issue Unless You Renew." If you don't subscribe, you won't get MN any more. I am still working out the details.

Subj: Measurement Techniques
Date: 97-02-07 17:00:44 EST
From: Wgrass@vines.etn.com (Bill Grass)
To: Riegelpete@aol.com

Pete,

I get to start the year off with an interesting one. See attached. This letter is only a draft but I believe in it. I acknowledged the receipt but there is no big rush on this as there is still over three feet of snow on the course.

The course is on an old railroad right-of-way with a few 35 degree turns. It was measured with an EDM on the straight portions and a 100 foot chain on the curves by a Registered Land Surveyor.

I was wondering if this was food for thought in Measurement News?

Regards,

Bill (Bill's letter follows)

Dear (Measurer)

I have received your request to certify a 10K race course in (town). There are several problems but I think they all can be worked out.

The Measurement Kit with the Jones counter, video tape and Measurement Booklet that you had, described in detail the process and all the information I need to complete your request. This was not finished so I will ask again for the general information on the race such as the location of the start, finish, race name, race contact, phone numbers etc. I have enclosed a copy of the course data sheets for you to fill in.

Another deviation from our procedure was the method of measurement. Your course was measured by a Registered Land Surveyor following the standards of his profession. The Road Running Technical Council of USA Track and Field has developed, over a period of many years, a proven method of measuring the distances of race courses. This was devised to cover the uniqueness of our needs which are different from land surveyors.

Considerations for records are not allowed until the course has been measured a second time and shown to be "at least" the stated distance. Two very good measurements by our method could still be several feet different with a course as long as yours (32,808.4 feet). To prevent a course for falling short on the re-measurement, and to accommodate the different skill levels of the measurers using our method, a short course prevention (SPR) factor of 0.1% is added. I have not doubt of the accuracy of the measurement made by your Registered Land Surveyor with EDM equipment is superior to our technique but am concerned with a possible re-measurement that would be made by an experienced person using our technique.

Our procedure also requires that we follow the shortest possible route the runner could take which would cut all the tangents. The original measurement of the course used the centerline of the railroad right-of-way.

I am willing to accept the following compromise that falls between the two procedures. The starting line is to be moved back, away from the finish, by 0.1% of the course length or 10 meters. The fact that the center line was used rather than the shortest possible route will be ignored. This is justified by the facts the radii of the turns are larger (2000 ft) and the path width is narrow (8 feet). This effectively removes the SPR from the turns. Based on the maps provided I believe that there would still be 75% of the SPR remaining. This should be sufficient for an experienced measurer should a check be required.

Bill Grass
Road Running Technical Council
USA Track and Field

Dear Bill, (Pete's reply)

I think you pretty well hit the bullseye on your response to the measurer who surveyed the 10k with EDM and steel tape. As you said, the narrowness of the path and the large radii do make the SPR almost identical to the centerline measure. Adding 10 meters should do the job.

Ideally everybody will do things according to our method. When they do not, I hesitate to make people redo work if it seems well done. Bike measurement, while fairly quick and easy, is not the only technique that's accurate. By giving a break (within the limits of decent accuracy) the first time around we encourage people to improve and do it better next time. If we are too hardnosed with new people they won't come back.

In short, you did what I'd have done.

Best regards, Pete

FROM
HUGH
JONES

15 January 1997

Dear Pete,

MN is a great publication, and I enjoyed the January issue tremendously. My experience of the AIMS Newsletter over the last few months makes me aware of how difficult it is to generate such appeal. Your loose editorial format contributes to it - and I'm glad to see that David Reik is now corresponding courteously with Wayne.

He had some useful things to say about sticking to procedure, but it's not as if we've got our fingers on the nuclear button. As far as I can see, a lot of the procedure we follow now has been invented by people who are still in the game - people who are aware of shortcomings and who are still on the lookout for improving their 'historic' procedure.

On your Convention highlight, pacing, there's a 'historic' side to this: when I read of your contest last year I meant to write to you about it. This is how the British Empire mapped the Himalayan region. According to Peter Hopkirk in *The Great Game* (OUP, Oxford, 1991):

"The idea of using native explorers to carry out clandestine surveys of the lawless regions beyond India's frontiers had arisen as a result of the Viceroy's strict ban on British officers venturing there. Because of this the Survey of India, which had the task of providing the government with maps of the entire sub-continent and surrounding regions, found itself greatly hampered when it came to mapping northern Afghanistan, Turkestan and Tibet. Then a young officer working for the Survey, Captain Thomas Montgomerie of the Royal Engineers, hit upon a solution. Why not, he asked his superiors, send native explorers trained in secret surveying techniques into these forbidden regions? They were far less likely to be detected than a European, however good the latter's disguise. If they were unfortunate enough to be discovered moreover, it would be less politically embarrassing to the authorities than if a British officer was caught red-handed making maps in these sensitive and dangerous parts.

"Surprisingly perhaps, in view of the British and Indian governments' determination not to become entangled in Central Asia, Montgomerie's bold plan was approved, and over the next few years a number of Indian explorers, including Nain Singh and Kishen Singh, were dispatched in great secrecy across the frontier. All of them were hillmen, carefully chosen for their exceptional intelligence and resourcefulness. The word 'pundit', which suggests a man of certain learning, became the generic name by which they were referred to. Because discovery, or even suspicion, would have spelt instant death, their existence and activities had to be kept as secret as possible. Even within the Survey of India they were known merely by a number or cryptonym. They were trained personally by Montgomerie at Dehra Dun, the Survey's headquarters in the Himalayan foothills.

"Montgomerie trained his men through exhaustive practice to take a pace of known length - 33" in the case of Nain Singh - which would remain constant whether they walked uphill, downhill or on the level. Next he taught them ways of keeping a precise but discreet count of the number of such paces taken during a day's march. This enabled them to measure immense distances with remarkable accuracy and without arousing suspicion. Often they travelled as Buddhist pilgrims, many of whom regularly crossed the passes to visit the holy sites of the ancient Silk Road. Every Buddhist carried a rosary of 108 beads on which to count his prayers, and also a small wood and metal prayer-wheel which he spun as he walked. Both of these Montgomerie turned to his advantage. From the rosary he removed eight beads, not enough to be noticed, but leaving a mathematically convenient 100. At every hundredth pace

the Pundit would automatically slip one bead. Each complete circuit of the rosary therefore represented 10,000 paces - five miles in the case of Nain Singh.

"The total for the day's march, together with any other discreet observations, had to be logged somewhere safe from prying eyes. It was here that the prayer-wheel, with its copper cylinder, proved invaluable. For concealed in this, in place of the usual handwritten scroll of prayers, was a roll of blank paper. This served as a log-book, which could easily be got at by releasing a secret catch and removing the top of the cylinder. Some of these prayer-wheels are still preserved in the Indian State Archives. Then there was the problem of a compass, for the Pundit was required to take regular bearings as he journeyed. Montgomerie concealed this in the lid of the prayer-wheel. Thermometers, which were needed for calculating altitudes, were hidden in the tops of pilgrims' staves. Mercury, essential for setting an artificial horizon when taking sextant readings, was hidden in sealed cowrie shells and poured out into a pilgrim's begging bowl when required. Concealed pockets were added to the Pundit's clothing and false bottoms, in which sextants could be hidden, were built into the chests which most native travellers carried. All this work was done in the Survey of India's workshops at Dehra Dun under Montgomerie's supervision.

"The Pundits were also thoroughly trained in the art of disguise and in the use of cover stories. In the lawless lands beyond the frontier their safety would depend on just how convincingly they could play the part of holy man, pilgrim or Himalayan trader. Their disguise and cover had to stand the test of months of travelling, often in the closest intimacy with genuine pilgrims and traders. Some were away for years. One became the first Asiatic to be awarded the Royal Geographical Society's gold medal, having contributed 'a greater amount of positive knowledge to the map of Asia than any other individual of our time'. At least two never returned, while a third was sold into slavery, although he eventually escaped. In all, their clandestine journeys were to provide a wealth of geographical intelligence over twenty years which Montgomerie and his fellow cartographers at Dehra Dun used to fill in many of the no-go areas on the British maps of Central Asia."

In *Trespassers on the Roof of the World*, Hopkirk describes some such journeys, the following of Nain Singh. He started in the company of his cousin Mani, but they then went separate ways to reduce the chances of discovery.

"They calibrated their instruments in the small town of Bareilly, whose location was known exactly to the Survey authorities, and crossed successfully into Nepal. Nain Singh managed to attach himself to a Ladakhi caravan approaching from the west and bound for Lhasa. At one stage, however, the Ladakhi traders transferred their goods to coracles and shipped these and themselves some 85 miles down the River Tsangpo [Brahmaputra] to Shigatse, Tibet's second town. But Nain Singh, of course, had to continue the journey on foot (on what pretext is not known) so that there would be no gap in the secret route survey he had been conducting ever since leaving Bareilly - without any of his fellow travellers suspecting for a moment what he was really up to with his rosary, muttered prayers and spinning prayer-wheel.

"[In January 1866] Exactly one year after leaving Dehra Dun, Nain Singh reached Lhasa having counted every single pace of the way as well as taking innumerable clandestine compass bearings and other observations. He spent three months in the Holy City and took 20 separate observations, both solar and stellar, enabling him to establish its exact latitude (the pundits were not trained in the far more difficult skills required for calculating longitude)

Nain Singh's observations showed Lhasa at 29.39' degrees. Today's atlases put it at 29.41'. Altitude calculations showed the Tibetan capital at 11,700'. Today it is generally given as 12,000', the discrepancy possibly due to the readings being taken at different spots.

"In April 1866 Nain Singh learned that the Ladakhi caravan he had accompanied to Lhasa was ready to return home. The 500-mile march took over two months and followed the ancient Jong-lam trade route that stretched across Tibet from east to west, the most elevated highway in the world at 15,000'. Once again, Nain Singh paced every step of the way and took the necessary secret observations for his route survey, finally descending into British India after an absence of one and a half years.

"Montgomerie assimilated all his mileages, bearings, altitudes and latitudes into a map: 'The Pundit I think deserves all praise, his work has stood every test capitally...' Lhasa's longitude was calculated from the route survey, to within a quarter of a degree. Nain Singh's route survey, in which he had walked 1200 miles and counted 2,500,000 individual paces had disproved the notion that existing maps of Tibet might be correct in some respects."

"Montgomerie's full official report of the clandestine trip was sent to the Royal Geographical Society, and the Pundits' secrets were revealed to all and sundry in their *Journal*, including bogus prayer-wheels, doctored rosaries and concealed sextants. This elementary but massive breach of security is hard to understand, as it put both the Pundits' lives and future operations. The *Journal*, was only distributed to fellows of the Society, although these did include Russian explorers. But as long as it continued to publish such accounts and maps, St Petersburg remained happy. The Chinese would have had every reason to intervene, but their London Legation did not know of the *Journal*. It would only have needed one busybody to alert them, and simple checks at Tibetan border posts would have imperilled the entire enterprise.

"Just what drove men like Nain Singh and Kishen Singh [who undertook a five-million pace journey to Chinese Turkestan lasting four and a half years] to face such hardships and extreme dangers for their imperial masters has never been satisfactorily explained. Perhaps it was the inspirational leadership of Montgomerie, who took such a pride in their individual achievements, and who looked upon them as his sons. Or possibly it was the knowledge that they belonged to an elite, for each was aware that he had been hand-picked for this great task. Or maybe Montgomerie had managed to imbue them with his own patriotic determination to fill in the blanks on the Great Game map before the Russians did. Sadly, little is known of these men as individuals, for none of them left memoirs of any kind. However, it is in Kipling's masterpiece *Kim*, whose characters so clearly come from the shadowy world of Captain Montgomerie, that they have their just memorial."

Other journeys and other pundits' stories are recounted by Hopkirk in the book, but what I've selectively transcribed above indicates some interesting points in common with our own less heroic methods of measurement. Calibration, counters (the rosary 'rotates' with roughly the same frequency as a Jones counter), a chain of continuous measurements, temperature effects on measurement, a course map and Montgomerie sahib, the big white chief, as certifier.

Sounds as if these guys would have been able to teach some present-day Alaskans a thing or two, if Ric Wilson's entertaining letter is anything to go by.

Best wishes,

High Five. 7

LAURA GRIFFIN MEMORIAL

5 km · CHARLESTON, SC

MAP OF
THE
MONTH



START - EAST SIDE OF ST PHILIP STREET
BETWEEN GEORGE ST & LIBERTY ALLEY.
2'6" S OF STORM DRAIN IN FRONT OF
EDUCATION CENTER. 0'7" N OF S EDGE OF
STORM DRAIN IN FRONT OF PARKING
GARAGE. HEADING SOUTHWARD.

MILE 1 - NORTH SIDE OF S. BATTERY,
BETWEEN MEETING & KING STS @
DRIVEWAY OF # 26 - EVEN WITH WEST-
MOST PORCH COLUMN.

MILE 2 - NORTH SIDE OF MURREN BLVD
BETWEEN ASHLEY & USCG STATION -
IN FRONT OF DOOR @ # 96, 5'4" EAST
OF STORM DRAIN

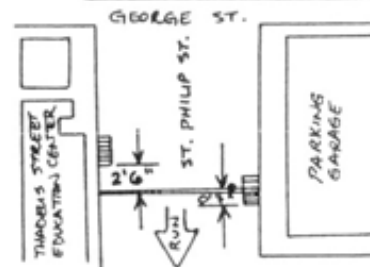
MILE 3 - NORTH SIDE OF MONTAGU
BETWEEN PITT & COMING STREETS -
IN FRONT OF # 6 (Laura's House),
8'10" EAST OF STORM DRAIN.

FINISH - SOUTH SIDE OF GEORGE ST
BETWEEN COMING & GLEBE STREETS -
IN FRONT OF # 72 (even with 2nd column
from East), 1'2" WEST OF MANHOLE &
5'10" WEST OF W SIDE OF STORM DRAIN.

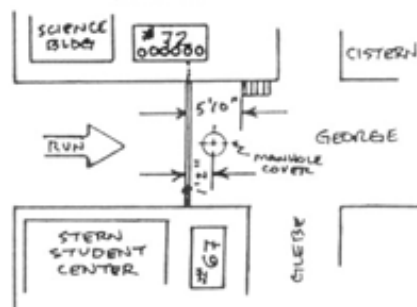
MEASURED BY

RANDALL J. BROWN, (803) 723-2596
CHARLESTON, SC

START DETAIL



FINISH DETAIL



RACE DIRECTOR

JILL ROBINS
COLLEGE OF CHARLESTON
66 GEORGE STREET
CHARLESTON, SC
(803) 953-5744

CALIBRATION

SULLIVAN ISLAND, SC
95000BS

Subj: The Course List
Date: 97-02-27 13:07:43 EST
From: JayWight2
To: Riegelpete

A couple of questions:

1. What do we send out to the race contact on a course that is being renewed for an additional 10 years?
2. What do we do with courses that are "temporarily" changed? In a lot of cases, construction requires that a course be changed for one year and then the original course is used again. The certification form asks if an existing course will be replaced, and it will, but there's no reason that the old course can't be run again.
3. Would the course list benefit from a purge of courses that we know, for physical reasons, simply cannot be run again? We have quite a few of those- especially in the Chicago area.

Hope everything is running smoothly. Thanks.

Dear Jay,

I send nothing to race contacts regarding renewal. After ten years it's almost certainly a different person. I am not sure that expirations are even a good idea. We will honor records set on expired courses, as long as the course has not changed. Expiration was a tool I saw as potentially useful to keep the list size manageable, but certifiers, who are the major requestors of lists, want complete data. So I find myself wondering whether expiration really does anything other than create extra work for people.

There is no reason to "replace" a course if there is any likelihood that the old course may be used again.

Purging is generally done by either:

- 1) Course is replaced by a newer course
- 2) Certifier tells us the course is inactive.

In both cases the course receives a "D" in the Code column. Feel free to issue a bunch of D's if so moved.

Best regards,

Pete

FROM AIMS
NEWSLETTER

A NERVE-WRACKING RIDE

I know of no country where course measurement is taken more seriously than Japan *writes Andy Galloway*. The Japanese are extremely vigilant about the five-year re-measurement. As many courses were measured by John Disley, Ted Paulin or myself four or five years ago, many are coming up for re-measurement.

Everything for successful course measurement was ready when we visited the start and finish of the Osaka International Ladies' Marathon at the new Osaka athletic stadium on the Saturday morning. The calibration course was on a road outside the stadium park: newly sealed, straight and level. The entire length of the inside lane was protected by cones, with policemen or officials positioned every 50 metres. We steel-taped a 500m calibration course, adjusted for temperature, and marked both ends with nails and tape. We calibrated the excellent bicycles provided and in the afternoon measured both from the finish to the 40km point and the start to a point 3.2km distant, on the main road leading from the stadium. This pre-measurement of start and finish was necessary because we were to measure the balance of the course on marathon day, working just three to four minutes ahead of the lead runners. This is usual in Japan. It is the only time when the roads are clear, all cones are in place, and a really accurate ride can be made. The measurement is for the following year, as it is too late to make any adjustments should the course be short or long.

It is nerve-wracking to look back and see the lead runners. But with expected efficiency tape was run out every 5km and we were able to stop, take a reading and later verify these points and the halfway mark. Our measurement started from 3.2km and finished at the 40km point. We re-calibrated the bicycles on the morning of the race and after the measurement.

I would recommend all marathons carry out their re-measurement on race day. It guarantees a trouble-free ride with no traffic worries whatsoever. The Japanese example of ensuring that all courses are check-measured every five years (or sooner if there is any change in the course) should be followed by all AIMS members. Then no-one can doubt the accuracy of AIMS courses.

THE MILLENNIUM MARATHON

P. O. Box 10-106
Hamilton
NEW ZEALAND

Tel: 64-7-849.1782
Fax: 64-7-849.1789

13 January 1997

Pete Riegel
3354 Kirkham Road
Columbus
Ohio 43221-1368
UNITED STATES OF AMERICA.

Dear Pete,

Many thanks for keeping me on your mail list for Measurement News, which I always appreciate receiving. I've certainly found life somewhat quiet since giving up as Secretary and Treasurer for AIMS and thus the heading on this paper. Just for something to do!!! I'm organising the above event, the first marathon of the new millennium for 6 a.m. 1st January 2000..

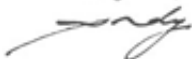
Already, from one small article in 'Distance Running' and the members of T.O.U.R.S, the response has been tremendous with requests for entry forms and accommodation as follows; 250-USA, 250-Sweden, 150-Germany, 80-Belgium, 75 Portugal, 150 France, 20 Egypt and I know that groups are forming in England, Italy, Ireland, Brazil, Argentina, Denmark, Norway and I haven't even advertised yet. I think maybe 'I have a tiger by the tail' with this project.

I am keeping my hand in on the measurement side of things and head off next week to re-certify Osaka Women's Marathon and then in March go back to Japan to re-certify Nagoya.

One thing that really does concern me is the complete lack of action on measurement in many countries, including my own - New Zealand. I wonder just how many races, including national championships, are run on courses of incorrect distance? Time and again I have approached Athletics New Zealand on the matter, requesting that they insist that all road courses and especially championship courses are measured to the approved AIMS/IAAF method, but my pleas fall on deaf ears and nothing is done. I am sure the same applies to very many of the countries which are members of the IAAF. Maybe you Area Representatives can put pressure on the IAAF Road Running and Cross Country Committee to ensure that they take some action in those countries where measurement often is completed by some person in a motor car - or maybe on an elephant or camel !!! I still recall the re-measurement of a course in Korea, being done by some locals holding a hand-held surveyor wheel out the window of a car travelling at 30 to 40 miles per hour.

Keep up the good work, Hope we'll meet again before too long.

Regards,



Subj: Steel Tape, the .08% solution
Date: 97-01-16 23:12:17 EST
From: ZGerweck
To: Riegelpete

Dear Pete,

I received a steel tape from MF Athletic, our track supplier, the other day, and I'm wondering if it's accurate enough for calibration work.

It's distributed by Gill Sport Equipment, there is no brand name except "Long Steel Tape" on the case. It's made in Taiwan, 50m long, 13mm/.5 in wide. There is no force marking on the blade. Can I/should I use this for laying out calibration courses? I also checked out a Stanley contractor grade 100 ft steel tape at the local Home Depot. This also had no force marking on the blade.

Second question: On the course measurement Data Sheet, your two measurements are required to be within .08% of each other. But if you are using the SOSS (as generated by Bob B's computer program) is this still required. It would seem that you should still perform such a check to make sure one of your rides wasn't way out of whack. Also, if you use SOSS, should you use THAT figure to determine your final course length, and make appropriate adjustments? Punching in the figures for some past courses I measured, I found that SOSS gave me an even shorter distance than the shorter of two rides. Thanks for your advice.

Jim Gerweck

Dear Jim,

Your tape is almost certainly good enough for course layout. Don't worry about it. If you are curious you can do a side-by-side comparison with another tape. There will be a difference but it will probably be small. Of course, you will not know whether your tape is in error or the other one. But it is reassuring to see agreement.

We had a seminar in Phoenix in 1994, and did a side-by-side comparison of around 20 tapes from the US and abroad, brought by the individual measurers as their personal tapes. We got excellent agreement. My Brazilian tape was not in the group, as I had not acquired it at that time.

The 1 cm error in my Brazilian tape was equivalent to 1/3 the SCPF, and use of that tape on layouts would have produced courses that were 1.0013 times nominal. It could have gone the other way, and reduced the SCPF to 1.0007.

There is no way to tell for sure except by a comparison with a known standard, but I would not worry about it.

Agreement within 0.0008 is dead easy unless you have a horrendous calibration change. That can affect agreement. You will find with experience that you will not have trouble getting that sort of agreement.

SOSS is a good checking tool, but you are not required to use it. Still, if you use it to check, and see that you have a lot of compensating errors, it's probably a good idea to adjust the course in accordance with SOSS. SOSS will ALWAYS give a longer course after adjustment than does either of the overall rides, unless all the shorter splits are obtained on the same ride.

As for force to use on a tape, ten pounds tension is standard for most steel tapes of 100 feet or less. The standard for longer tapes is 20 pounds. In practice tension has little effect compared to temperature. As long as you get the tape good and tight by feel you will get a decent measurement. It's best to use a scale until you get a feel for how tight things should be.

Best regards,

Pete

Profile of a Measurer : Mike Sandford

Mike Sandford has started a measurement newsletter called *Certified Accurate*. It is sent to South of England Athletic Association Course Measurers. It has many similarities to MN, containing maps, course lists, articles and correspondence. Mike included this profile of himself in the first issue.



My bicycle is an old ladies tourer. The absence of a crossbar makes carrying the bike to the measurement mark with the front wheel locked easier. Both front and back wheels are fitted with a Jones counter. I am collecting data on the performance of the back wheel as a measuring instrument. A board is mounted across the handle bars which carries my note book, and the display of a digital thermometer. The sensor of the thermometer is taped close to the front wheel at the top of the fork. The front wheel is held by nuts which can be tightened by hand levers which facilitates wheel changing.

I started running in races in 1982 at the age of 40. Prior to that I had run very slowly about once a week for 13 years. In that year I helped found the Abingdon Amblers, the name says a lot about our original attitude to running. However, today we sport track and junior activities. I am one of the three founders still in the club.

My interest in course length arose from my interest in my times. I was too slow to be interested in competition, so for many years sought to shave seconds off this or that PB, and I experienced some doubtful courses. In fact my four best marathon times lie between 3h 16m 4s and 3h 16m 45s a range of only 0.3%. So the 0.1% accuracy of course measurement was something that I felt was useful to me.

In October 1991, I attended a seminar for new measurers at the Cophall Stadium in London organised by Roger Gibbons, Mac Speake and Mike Tomlins. I picked up a fair load of measurements in Oxfordshire as Keith Morgan was at that time winding down. I have measured 40 certificates to date.

In 1995 I enquired about training courses for upgrading to grade 1 measurer, and Roger told me that there was nothing specifically new to learn it was sufficient to have the experience of measuring about 20 courses, and to have a course selected at random checked by himself or another grade 1 measurer. He invited me to help at a training seminar for new measurers being fronted by Mac Speake near Ipswich in October 1995. While the new measurers attended their lectures I was sent out to provide a preliminary measurement of the three trial courses to be used that weekend.

I have been applying my experimental skills to study various aspects of course measurement. Roger was interested in my work on the sensitivity of solid tyres to road surfaces and told me of *Measurement News (MN)* which is published by Pete Riegel in USA. I subscribed, and subsequently had my work on solid tyres and various measurement errors published in MN.

I find less time for training and coaching now, since I am also road race permit secretary for Oxfordshire and in the winter I do the results programme for the Oxfordshire Cross-Country League.

Contributions to CA are sought from all measurers. Both manuscripts and computer files are acceptable.

Subj: Weird track measurement request
Date: 97-02-14 00:40:12 EST
From: djbrunr@village.ios.com (Dan Brannen)
To: riegelpete@aol.com

Pete,

Here's an uncommon question: Jorge Andonie in Mexico is putting on a 2,000km track race in March. He is using an IAAF-certificated 400m track, but he is restricted by the proprietors to lane 7 and wants to know the "certified" distance. He's going to measure it, but there must be a formula to tell what it is. Would you know?

Best,

-Dan Brannen
djbrunr@village.ios.com

Dear Dan,

Here is the formula. We assume that the track has an IAAF certificate as a 400 m curbed track. If this is not the case let me know.

At several points on the curves of the track (say 4 places on each curve, equally spaced) measure from the curb face to the inside edge of lane 7. The inside is the side toward the runner.

Average the measured distances. Let the average distance be X centimeters.

The distance to be added to the basic 400 meters is D.

$$D = 2 \times \text{Pi} \times (X - 10) \text{ centimeters}$$

Convert this to meters and add to 400 to get the lap length of lane 7.

Example: if the average offset is 7.38 m = 738 cm, as is ballpark for lane 7, then the added length is $2 \times 3.1416 \times (738) = 4574.2 \text{ cm} = 45.74 \text{ m}$. The lap length thus becomes $400 + 45.74 = 445.74 \text{ meters}$.

The reason for subtracting 10 cm from the offset is that the curb lane's length lies 30 cm from the curb, while in all the rest of the lanes, which are uncurbed, the length lies 20 cm from the line.

If the organizers intend to cone the lane 7 inner line, thus making a substitute curb, then the 10 cm should not be subtracted, and the added length becomes $2 \times 3.1416 \times 738 = 4637.0 \text{ cm} = 46.37 \text{ m}$. The lane 7 lap length, with cones on the inner line, is then 446.37 m.

Best regards,

Pete

Subj: Lane 7 Measurement Details
Date: 97-02-27 10:27:54 EST
From: djbrunn@village.ios.com (Dan Brannen)
To: riegelpete@aol.com

OK, Pete, here's what I got from Jorge Andonie (all measurements in inches):

Curve 1: Five measurements: 294.5, 295.5, 295.5, 294.5, 295.5

Curve 2: Five measurements: 294.25, 294.75, 295.125, 294.5, 295.5

Please let me know the final result for lane 7.

Thanks again for all your help.

Dan Brannen

Subj: Re: Lane 7 Measurement Details
Date: 02/27/97
To: djbrunn@village.ios.com

Dear Dan,

Below you will see how I calculated a length of 447.07 meters for the track. In the calculation I have assumed:

- 1) The track is certified at 400 m
- 2) The measurements taken were from the outside of the curb to the outside of the inner line of lane 7.
- 3) Coning of the lane 7 inner line will be in place.

If you wish a letter from me attesting to the above, granting a sort of "IAAF Certification" I will need a copy of the track certificate and a formal statement that the measurements were taken as in (2) and (3) above.

If this message alone will do, great. If I were race director I would use 447 meters as the official length, as I don't think the SCPF belongs in track measurements.

Best regards,

Pete (calculation follows)

inches	feet	meters	cm
294.5	24.54167	7.4803	748.03
295.5	24.62500	7.5057	750.57
295.5	24.62500	7.5057	750.57
294.5	24.54167	7.4803	748.03
295.5	24.62500	7.5057	750.57
294.25	24.52083	7.4740	747.40
294.75	24.56250	7.4867	748.67
295.125	24.59375	7.4962	749.62
294.5	24.54167	7.4803	748.03
295.5	24.62500	7.5057	750.57
294.9625	24.5802	7.4920	749.20 averages

$D = 2 \times \text{Pi} \times (749.20) \text{ centimeters}$

increase in circumference: 4707.36 cm
 47.07 meters

Track length = 447.07 meters



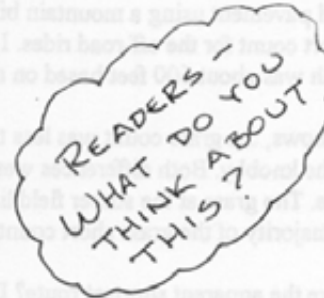
ROAD RUNNING TECHNICAL COUNCIL

John DeHaye
Regional Certifier
824 Annlau Avenue
Huntsville, AL 35802

(205) 881-9326

February 26, 1997

Pete Riegel
3354 Kirkham Road
Columbus, OH 43221-1368



Dear Pete,

The revised Alabama course list that you sent me last month looks fine but I have some more changes. Most are from the Birmingham area where Rick Melanson does much of the measuring. He provided a list of courses to delete, see enclosure, where most were dropped because the supporting the races were discontinued. Rick says that Vulcan Marathon used the "D" course, AL87010JD, for last year's race, but I don't think we should make any status changes until this year's race plans are firm.

I have also enclosed a form for renewal of the expired Monte Sano 15 km course in Huntsville. Some of the original landmarks have disappeared for this one, but fortunately, the measurer provided enough redundancy to locate all pertinent points. Two additional expired Huntsville course, AL85001WN and AL86006WN, remain active, but will be remeasured because of construction changes.

Another subject.

I was glad to see that the RRTC will no longer certify cross-country courses. Like others, I believe definition of the shortest route is a real problem with no good solution. Bicycle calibration and course measurement also presents a challenge. How do you calibrate for a course that is a mixture of grass, dirt hard pack, rocky sections, sandy areas etc? I don't know. But cross country races remain popular and the numbers of trail races and trail runners are growing. The need for accurately measured off-road courses is obvious and I believe that we should keep the subject active so that some of the outstanding questions can be answered.

Some of my questions and observations follow.

Should we use a paved calibration course with a correction factor? Without a correction factor? Must we use an off-road calibration course?

I've had an interesting calibration and measurement experience on Huntsville's 3-mile cross country course which may shed some light. The course is approximately 75% dirt trails with most of the remaining 25% in grass. This course was measured in 1986. The first measurement used a 200' steel tape routed along the "beaten path" by a team of six to eight. It gave a length of 2.96686 miles. As a rough check against missing tape sections, I made two calibration rides and a single measurement ride with a thin tire road bike. This check gave 2.96287 miles. The difference of .00398 miles or 21 feet showed that we didn't miss a tape length. It also showed an agreement of .00134, not good enough for a road course but maybe an indicator of a correction factor for a bike measurement.

More recently, construction has altered the course and we are confronted with route changes and a remeasurement. In preliminary work, I have used a road calibration with no correction. But, the use of off-

road calibration for this course is a thought, since it is near an old airport runway with adjacent grass soccer fields. The edge lines for the fields are all in line and make a convenient way to ride a straight line. I ran a simple experiment to directly compare off-road and road calibrations and to assess our good agreement from the 1986 measurements. I first marked a convenient length on the pavement and made a few triangulation measurements to find the adjacent end points on the soccer lines. I then rode two sets of four rides each on both grass and pavement using a mountain bike equipped with knobby tires, hoping that the tires would reduce the short count for the off-road rides. I also completed a single set of four rides with my street bike. The trial length was about 600 feet based on recent calibrations.

As the table shows, the grass count was less than the pavement count and the street tire had a slightly larger change than the knobby. Both differences were much larger than the 1986 cross country measurements would indicate. The grass at the soccer field lines is much rougher than most of the cross country course, and I suspect the majority of the grass short count comes from this. Do you have suggestions here?

Do we measure the apparent shortest route? Do we measure the "beaten path" for trails? Do we measure something else?

I measure the "beaten path" for most off-road courses because it gives an accurate assessment of the preferred route. It may change slightly over time, but I suspect the effect on course length is insignificant. It will give the runner a distance that he or she actually runs. Of course, an open field cross country course is a different challenge and requires a measurement of the shortest route.

Sincerely,



BICYCLE CALIBRATION EXPERIMENT				MOUNTAIN BIKE w KNOBBY TIRES	
Ride 1 - Pavement		Ride 2 - Grass			
	Counts		Counts	Change (P-G)/P	02/18/97
RIDE #1	1827.0	RIDE #1	1817.0	0.005473	11:27
RIDE #2	1827.0	RIDE #2	1820.0	0.003831	60deg
RIDE #3	1828.0	RIDE #3	1819.0	0.004923	
RIDE #4	1827.0	RIDE #4	1819.5	0.004105	
TOTAL	7309.0	TOTAL	7275.5		
AVERAGE	1827.250	AVERAGE	1818.875	0.004583	
Ride 3 - Pavement		Ride 4 - Grass			
	Counts		Counts	Change (P-G)/P	
RIDE #1	1827.0	RIDE #1	1818.5	0.004652	11:52
RIDE #2	1826.0	RIDE #2	1819.5	0.003560	62deg
RIDE #3	1828.0	RIDE #3	1818.5	0.005197	
RIDE #4	1827.0	RIDE #4	1819.0	0.004379	
TOTAL	7308.0	TOTAL	7275.5		
AVERAGE	1827.000	AVERAGE	1818.875	0.004447	
BICYCLE CALIBRATION EXPERIMENT				ROAD BIKE	
Ride 1 - Pavement		Ride 2 - Grass			
	Counts		Counts	Change (P-G)/P	02/18/97
RIDE #1	1709.0	RIDE #1	1700.0	0.005266	12:20
RIDE #2	1709.0	RIDE #2	1701.0	0.004681	62deg
RIDE #3	1709.0	RIDE #3	1700.0	0.005266	
RIDE #4	1709.0	RIDE #4	1700.0	0.005266	
TOTAL	6836.0	TOTAL	6801.0		
AVERAGE	1709.000	AVERAGE	1700.250	0.005120	

E-MAIL ADDRESSES

This list will continue as a result of several requests. New addresses, and address changes will be posted as received.

Bob Baumel	Bobbau@pcok.com
Andy Beach	Abeach@ti.com
Tom Benjamin	Benjtr@aol.com
Dan Brannen	Djbrunr@village.ios.com
Bill Callanan	Bcallan369@aol.com
Bernie Conway (CAN)	Measurer@ican.net
Woody Cornwell	cornwej@basf.com
Dave Cundy (AUS)	Dave.cundy@atonat.ausgovtax.telememo.au
Jose Rodolfo Eichler (BRA)	Jose.rodolfo@cbpo.com.br
Tom Ferguson	Ktjsudad@lava.net
Michael Franke	Mfranke@worldnet.att.net
Zean Gassmann	Zeansusan@aol.com
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Paul Hronjak	Hronjak@aol.com
Alan Jones	AlanLJones@aol.com
Hugh Jones	Aimssec@aol.com
David Katz	Katz@flirt.com
Tom Knight	Tdk@stanford.edu
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Tom & Mary Anne McBrayer	104613.56@compuserve.com
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Amy Morss	Amorss@koko.mv.com
Gene Newman	Brunner@aol.com
Pete Riegel	Riegelpete@aol.com
Ron Scardera	RRScar@aol.com
Michael Sandford	M.sandford@rl.ac.uk
Brian Smith	Bnewbatt@aol.com
Jay Wight	Jaywight2@aol.com

See Bob Baumel's homepage at <http://www.pcok.com/~bobbau/>
Bob's page contains a lot of good information, with links to other sites.

See David Katz's homepage at <http://www.flirt.com>
David, in addition to being our most senior active measurer, puts on numerous events each year. His homepage contains something no other site has yet included - course maps.

Check out the Runner's World Race Time Calculator at
<http://www.runnersworld.com/misc/timecalc.html>

Subj: More on calibration ride variation
Date: 97-02-03 10:16:05 EST
From: KCYX
To: Riegelpete

Pete

As you may recall, I have been bothered by the variations I've noted in Anonymous Measurer's calibration rides. We did another course today and used a 500 meter calibration course that we laid out yesterday. The course is an "ideal" calibration course, straight, a nice white guideline that is easy to ride, no cross traffic, and a recently paved surface. Anonymous rides for the pre-cal were 5974, 5971, 5976, and 5974 counts. For the post-cal, he had 5970, 5970, 5973, and 6000. Yes, you read that last value correctly.

Before the last ride, I checked Anonymous' first three rides and asked him what he was doing differently. He noted that he had "stood up" longer starting his previous ride (#3). I then asked him to "stand up" for all of ride #4. That resulted in the 6000 count ride. We estimated the distance he had "stood up" on ride #3 as 30 meters. This would account for a 2 count variation over the 500 meter calibration course, fairly close to what we observe.

Anonymous has a mountain bike with street tires. There are shock absorbers on the front wheels. We noted his seat is about 10 cm further back from the front axle than my standard road bike. When Anonymous "stands up" he puts a lot more weight on the front handle bars. I tried to do a ride in this fashion and was unable to control the front wheel sufficiently to get a reasonable ride.

Obviously this is potentially a significant source of error. Do you have any comments or know of anybody else that might have had a similar experience? Could the shock absorbers significantly change the weight distribution viz. bikes without shock absorbers? Perhaps the rider can't control the front wheel well enough to get a good ride in this position. Is the position of the rider this critical for all types of bikes or is this exceptional?

We assume that the measurer rides both the calibration course and the race course subject to the same source of error. If the measurer "stands up" more during the calibration rides than during the rides on the course, then this would produce a long course. On today's measurement, Anonymous' ride produced a course 7 meters longer than my rides (over 5 km). Since our two rides differed so much, I took a third ride that agreed with my first ride within 0.2 meters. Anonymous noted that he sat back on the seat for most of his ride on the course. Under the assumption that he stood up for about 140 meters of the 500 meter calibration rides and a negligible amount on the course measurement, one could account for the 7 meters discrepancy.

Any ideas?

Ken

Subj: Re: More on calibration ride variation
Date: 02/05/97
To: KCYX
CC: m.sandford@rl.ac.uk

Dear Ken,

Unless you object I will put your letter about Anonymous Measurer's bike in Measurement News, with Measurer's name edited out. It's not that you said anything terrible about him but I'm now a bit gun-shy about that sort of stuff. The rider's name is irrelevant in any case - it's the bike and technique which concern us.

I can see two main factors at work - weight transfer and inability to control the bike. Weight transfer

is certain, while control, at least in Anonymous' case, is uncertain. Although you had a tough time controlling the wheel on an unfamiliar bike, he might have been OK. The condition is aggravated by fat tires, as weight change on a fat, low-pressure tire produces a greater effect than it does on a skinny, high-pressure tire.

With a "normal" bike the rider's weight is carried well forward of the rear wheel, and posture shifts don't change the weight distribution significantly. In the case of Anonymous' bike, the front wheel could have been very lightly loaded under normal riding because his seat was almost over the rear wheel. I have a mental picture of those kids' high-rise bikes on which they easily do wheelies which are impossible on a regular bike.

I once had a small folding bike that I used for a few measurements before concluding that it was unsuitable. I took it to Pittsburgh to do a validation of The Great Race years ago. While riding uphill and pumping hard, the front wheel came off the ground twice. Fortunately I had another measurer along who got better data. That bike had all the worst characteristics, easy to see in hindsight. The seat was near the rear wheel, the tires were fat, and the wheel diameter was small - a 20 inch wheel.

In our measurement system we assume that the measurer measures as he calibrates. This is not always true, but we hope that in most cases it is close enough. That last ride of Measurer's would be one that I would normally discard as a "wobble" given no other explanation.

A couple of years ago Jean-Francois Delasalle did an experiment in which he loaded the bike with extra weight to see the effect it would have on calibration. More weight led to more counts for a given distance.

I'll put this in MN and we'll see what others have to say. I'm also forwarding your message and this one to Mike Sandford, who is working on calibration variation.

Best regards,

Pete

Subj: Re: More on calibration ride variation
Date: 97-02-05 09:19:14 EST
From: KCYX
To: Riegelpete

Pete

Fine to include this experience in MN. Note that I was riding my own bicycle that I have had for many years but I generally don't stand up to ride it. Sitting, I have very good control (0.5 count range on both pre and post measurement calibration sets of four rides each). I asked Measurer about his control while standing and he claims to have been able to follow the white guideline (bike line boundary) we used to guide the layout of the calibration course. The variation seems to be entirely due to weight distribution changes. His bike does have much wider tires than mine but they are not the knobby mountain bike tires.

Weight can be distributed on the seat, the pedals, or by leaning on the handle bars. If the seat is above the pedals, simply standing viz sitting shouldn't make much difference. On rough stretches, I do stand up and coast, mostly to keep from bruising my poorly padded posterior. It is standing up and peddling without putting weight on the front handle bars that I lose control so I don't do that. Measurer's bike is designed to allow weight to be placed on the handle bars while pedaling and he is accustomed to doing that.

I'll be interested to read others' comments. Meanwhile, I think I've convinced Measurer there is a problem and he is planning to use a "street" bike now.

Ken

PUZZLES OF THE MONTH

Subj: Puzzles for Measurement News
Date: 97-02-20 20:32:51 EST
From: measurer@ican.net (Bernard Conway)
To: riegelpete@aol.com

Pete,

Here are some puzzles for Measurement News if you want to use them. They were prepared for the Math Department at the school where I teach Science, Chemistry and Physics. I have adapted them for runners or measurers where possible. I have answered them all myself but have not checked the answers to all of them.

1. The race director of a marathon had seventy two runners including himself/herself at the All You Can Eat Pasta Feed the night before the marathon. After the meal he/she paid the bill but when he/she returned home he/she could not remember the total cost. The cost was \$_67.9_ for the 72 dinners. What was the cost for each dinner?
2. Pete, one of the guests at the pasta feed was overheard telling his friend Wayne that he has a son with three children. The ages of these three children have a product of 72 and have a sum equal to the number of people at the head table. Wayne checked the number of people at the head table and said "You've given me insufficient information". Pete thought a moment and said "You are right. My son's eldest child loves liver and onions better than steak". How old are Pete's son's children?
3. A race of one lap was run around a regular octagon (all sides equal and all angles equal). If the length of each side was 1 km, calculate:
 - a) the length of the race.
 - b) the area of the octagon.
 - c) the length of the longest straight line distance across the octagon.
4. A total of 64 squares each 1 metre per side are to be placed in a much larger square. Eight of these squares are painted black and the rest white. The squares which are painted black must be positioned so that no two of these black squares are in a line horizontally, vertically, or diagonally. Draw a diagram to show where the black and white squares must be positioned assuming one of the black squares must be placed in the first vertical row second from the bottom.

Do you want the answers now or later? Have a puzzling good time. I did.

Bernie

P.S. By the way I now have my passport. I remember Richard Boone in an old TV weekly program playing a gunman called Palladin whose motto was "Have gun will travel.". I guess mine can now be "Have passport will travel."

Elevation Data Obtained During Measurement of The Truth Great Race

Early in February I was asked to measure a half-marathon course. It was point-to-point, starting in Goshen, Indiana and going to Elkhart, about 10 km north. I had no topographical maps of the area, nor did the race director.

I decided to use my altimeter to obtain relative elevation between start and finish. Altimeters measure atmospheric pressure, and calculate elevation from that. They are sensitive to changes in the weather. Knowing this, I thought that if I could get a reading at one end, and quickly drive to the other end before the atmospheric pressure changed much, I could get reasonable values for the difference in elevation.

Several years ago I calibrated the altimeter in a 10 story office building, and obtained differences in elevation in good agreement with the height of the building.

From the previous certificate of the course I saw that the elevation of the finish was noted at 750 feet. I arbitrarily used 750 feet as the finish elevation. The listed start elevation was not useful, as it was in a different place.

		Observed Elevation	
Date	Time	Feet	Location
Feb 1	12:06	530	start Drove to finish, forgot to record elevation
Feb 1	14:19	530	start
Feb 1	14:52	490	finish
Feb 1	18:02	450	finish
Feb 1	18:31	510	start
Feb 2	05:53	430	start
Feb 2	06:15	410	finish

Question - If we assume that 750 feet is the correct elevation of the finish, what elevation should have I assigned to the start? Comments?