

MEASUREMENT NEWS



#10 - MARCH, 1985

Editor: Pete Riegel - 3354 Kirkham Rd - Columbus, OH 43221

Measurement News (MN) is distributed to all members of the Road Running Technical Committee of TAC, all regional certifiers, and all final signatories. Also some miscellaneous others.

MN is supposed to serve the RRTC as a way for us to talk with one another, so that we all get some idea of what's going on. It also serves to provide guidance from the RRTC Vice-Chairmen to the regional certifiers and final signatories.

All opinions and grievances are solicited. They will be aired here. All will have a chance to discuss what we are doing. Write if you've got an opinion on something, or a new measurement technique you'd like to share.

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THE NEW CERTIFIED COURSE BOOK

Isn't it a beauty! Ken and Jennifer deserve applause for the best course book ever. Organization by state, unique codes, and instant identification of the measurer and certifier add a lot of fun to the reading. It took an enormous amount of work by K & J, something we seem to take for granted. I'm proud to have helped with my certifications and measurements, and I hope the rest of you share the same pride in what we have created.

EFFECT OF TIRE PRESSURE ON CALIBRATION

Bob Baumel and Tom Knight both did some experiments in which they varied the pressure in their tires and then rode their cal course. They found what we suspected was true:

- 1) Rear tire pressure has no measureable effect on calibration constant.
- 2) Front tire pressure has a significant effect.

Bottom line: If you get a flat on the rear tire, fix it and go on measuring. If you get a flat on the front, everything measured since the previous calibration must be junked. Also, don't mess with tire pressure between calibrations. Leave those tires alone!

FAT MN

I went out of my mind and sent several people a draft of a validation article (appears later). I asked them for one-page photo-ready replies if they had any. What I got was as fat as what I sent. So there's a lot of reading in this MN, more than many may like. Food for thought, though, and it would be nice to get our validation act (for roads and tracks) together. If you have any responses to what you read, send it in.

NO MORE FAT MN'S

In future, I'll keep my sermons to one page, and limit responses to the same. Or try.

NEW, IMPROVED CERTIFICATION FORM

Sally Nicoll whipped up the beautiful cert form you'll find as the last page of this MN. Use snopake to eliminate what you don't like, and use it if you wish. Thanks. Sally!

READER RESPONSE

Bob Thurston writes "Do we have any protocol for measuring courses in other areas? I would have thought we'd go through another certifier if it's in their area. Maybe that's too bureaucratic. But at least the regional certifier ought to get a copy in order to include the course in files, lists, etc."

Wayne Nicoll has some feelings on this too:

Some food for thought regarding the measurement or review activities of one Regional in the area of responsibility of another Regional. As long as we allow Regionals or Final Signatories to function in another's area we can expect some problems. Here are some examples. For two months in a row, Ted Corbitt has certified a course in Georgia and I knew absolutely nothing about it until the courses appeared in NRDC News. Both courses are located in Atlanta, measured by persons unknown to me and probably calibrated on an early Atlanta Track Club Calibration Course on Ponce DeLeon that is curvy, hilly, and that I have "de-certified". (Neither course is documented with a map). The other day I received a request from the president of the Charleston Running Club to measure a course and train some measurers for them. I determined that A.C. Linnerud was handling the paperwork for several measurements down there. It took a phone call to A.C. to find out which courses to measure and which not to measure down there. In the process, A.C. and I agreed to provide certificates to one another on any course we might measure or approve in each other's area.

It is a matter of communication and courtesy to each other. Here are some suggestions:

The review and certification of a course by a final signatory not in the direct chain of application approval should be discouraged. I realize there will always be justifiable exceptions, however, I see no reason why Bob Letson should be certifying courses in Connecticut as he stated he was at convention. If we retain the current policy I feel that, at a minimum, the approving signatory should send a copy of the certificate with map to the regional in whose area the course exists. In fact, to discourage intra-regional approvals, we could require the completed application accompany the certificate so that a person is able to retain complete files on his own region.

If a measurer travels into another state and measures a course in that area, he should submit the course application through the regional in whose area he measured, not carry it home and send it through his own regional in another state. I have that potential situation with a North Carolina measurer coming into South Carolina, then going home and submitting to A.C.

When I went into Florida, I kept Basil Honikman informed. He was invited to the validation rides. I measured several courses, signed off on them and sent him copies for his files. I sent the certificates and completed applications back to the sponsors to keep them informed and to give them examples of how to submit applications for the future.

Response: Good idea. Some of us, for various reasons, find ourselves measuring or certifying outside our assigned areas. Let's not even try to preserve our areas as private kingdoms. Instead, if you measure or certify in somebody's area, have the elementary courtesy to send the regional guy a certificate when you're done.

Thurston also writes "I like the distinction you make between course layout and measurement. Course layout should be safely long, and on that basis I can agree with using longer constant. But I still say we should give our best estimate of course length. This should not be left to validation rides. I believe as measurers (1) we're interested in a close estimate of distance (2) we need the information - for comparisons, analyses, evaluating our methods, etc. (enough soapbox) What I mean is, use larger constant to lay out course, but use average or interpolated constant for stating its length."

Response: Another good idea. There is a space on the cert form for "stated length of course". Usually we just put in nominal distance plus 0.1 percent. Those who feel as Bob does can enter their best estimate of the actual course length in this space. I intend to do so on the courses I measure, although I won't do it on courses I check for other people, since I lack their intuition about the ride.

FROM WAYNE NICOLL:

[EVEN EDM'S MAKE MISTAKES!]

Now for my Jones versus TopCon story. Sunday we went to Greenville, SC to measure the Women On The Run series 5 mile to be held there on April 13th. It seems that Gabrielle Andersen-Scheiss, the wandering Swiss Olympic Marathoner, indicated that she would run the race only if the course was certified. We were contacted to come to the rescue. One of their volunteers to assist turned out to be a runner and a registered land surveyor. He had brought along his TOPCON DM-41. He showed me how to hold the prism pole and we went to work to lay a calibration course. Since the selected half-mile had some undulation he shot it in three segments, then we went back and mounted the Jones Counters on the other two bikes. We rode the cal course, computed the counts, and I came up 20-30 counts short of what I would have anticipated. This plagued me but by then it was past noon and though it was a nice day, I was worried about having enough daylight remaining to measure the course so I decided to proceed with the measurement. We went to the park, measured the course and returned to the cal course. I checked my bike tires, fearing that I might have pumped the front tire excessively hard, possibly giving a false reading. The tire checked out okay. Next we took two measuring wheels and wheeled the course - mine averaged 2628 feet and the other 2633 feet. You should have seen the look on the surveyor's face. I then did a quick & dirty steel taping. It came up 2630'2 1/2" in length. There was only one stone left unturned. I asked to see his math for the three shots with the EDM, and sure enough, there was a 10' math error. We added the 10 feet, rushed back to the race course and changed all the markings before it grew dark. It was a good trip though. I made several believers in a track club that has been traditionally resistant to course certification and I have a motivated and experienced person who is going to be measuring in the future. The Greenville TC has been used as a model club for organization and programs by the RRCA in its handbook. I was glad to impress them in an area they had neglected.

During this experience I gained some real appreciation for a 200ft nylon coated steel tape on a reel (the city had given one to the GTC). It was so easy to work with that I came home and changed my order for a 100' tape to a 200' one. I also asked for 10ths of feet rather than inches.

"CERTIFIED COURSE" LIES

It is time for a concerted effort by all of us to put a stop to improper claims of accurate measurement. Locally I confront the race director gently with his "certified" statement. Usually I end up providing him with the guidance and assist his measurer, or get asked to come measure it for them, once they understand. Either way, everybody wins when we add another certified course. The problem races are the big ones. The bigger the race, the less concern the race director seems to have for his course measurement (there are of course some outstanding exceptions). Often the big races delegate measurement to a novice volunteer who does not get the job done. If mega-race directors would give consideration to replacing one of their elite invited runners with an "elite" measurer, their problems over the course would go away.

I recommend:

- 1) Increased activity by regionals to encourage race directors to correct their course measurement status.
- 2) Assistance by us to ARRA, RRCA, and the running publications to provide clear, concise, guidance to runners on why certification is important and how to determine if a course is TAC Certified.
- 3) Consideration by TAC to "trade mark" or register the use of the term "TAC Certified Course".
- 4) Consideration by TAC of withholding Sanctions for certain events pending completion of TAC Certification.
- 5) Elimination of the process and term known as "Certification Pending"

COURSES DELAYED?

Al Phillips wondered if our insistence in FS's sending their courses to me and Paul wouldn't cause certification delays. After all, weren't FS's created to eliminate delay?

Good point. When a cert is sent back to a FS, it is because the map is deficient in some way. We do not check the measurements of FS's. This checking and request for correction does not delay the certification of the course itself. What it does delay is the acceptance of the course by NRDC. To date, several courses have been returned to FS's because the maps lacked critical elements, such as locations of start, finish or turnaround. The FS's have been cooperative in fixing these, by and large, and now the overwhelming majority of courses are coming in with adequate maps.

WHO SHOULD GET MEASUREMENT NEWS?

It has been suggested that I add certain measurers to the MN mailing list because they are smart folks, good measurers, and would benefit from it. I have already got a few people outside the RRTC on the list. I do not intend to add more at this time, because the work of putting it out is already more than I like and I don't want to add to it. I could charge for subscriptions, but I would like to avoid any more hassle. Besides, although it looks like MN will come out about every two months, I don't wish to commit to any particular number of issues. So if you have a friend who would like a subscription, make a copy of yours and send it to him or her, with my blessing.

Back Issues. There are now 9 back issues, and every once in a while I get a request for them. I used to honor these requests, but the xeroxing is time-consuming. No more. If you want the collection of back issues, send \$15 and I'll send them to you.

WHO WILL WATCH THE WATCHERS?

David Reik wrote, and expressed the view that it would be desirable if Pete Riegel's courses were checked by Paul Christensen, and vice versa. This would extend, I assume, to all Final Signatories - each would send his courses to another FS for checking.

Response: Good idea in theory, since it would reduce mistakes. In practice, I'm agin' it, because it makes more work. FS's are appointed after they have demonstrated an ability to measure and check other folks' work. They aren't perfect - nobody is - but the work involved in trying to be a FS and handle one's own territory is enough without adding the extra burden of checking even more courses, the overwhelming majority of which will be found to be error-free.

I may be wrong. Opinions solicited.

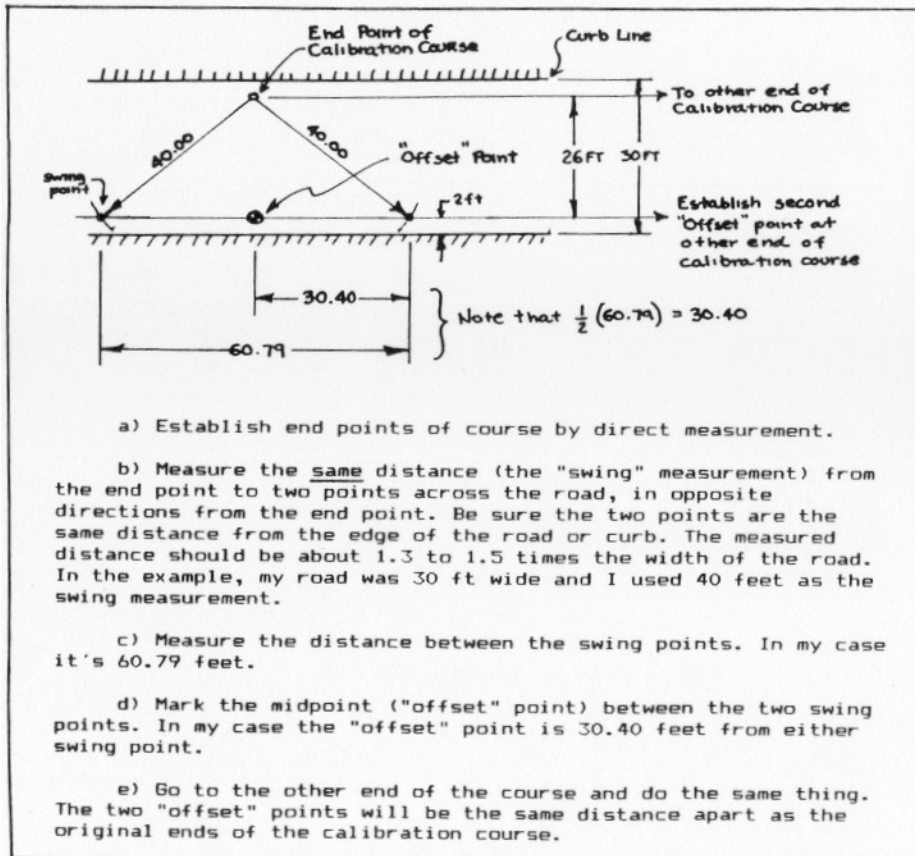
PARALLEL CALIBRATION COURSES

It's legal to ride on the right. Unfortunately, many calibration courses are located on one side of a road, so half the calibration rides must go in the wrong direction. This makes drivers mad and can cause anxiety to the rider.

Parallel calibration courses can make life easier. If there's a set of marks on each side of the road, then all the riding can be done legally. Here are some options to produce parallel courses:

1) If you're using an EDM, just move across the road and take another shot. Since this is quickly done it's no big hassle.

2) If you're using a tape, you can do what's called a swing offset by surveyors. If done with care it's accurate, and can be done using only a tape. It is an accepted surveying procedure. See the diagram below to see how it's done:



CONES ARE A PAIN! I SENT THIS TO SOMEONE WHO ASKED ABOUT WHAT TO DO. *Pete*

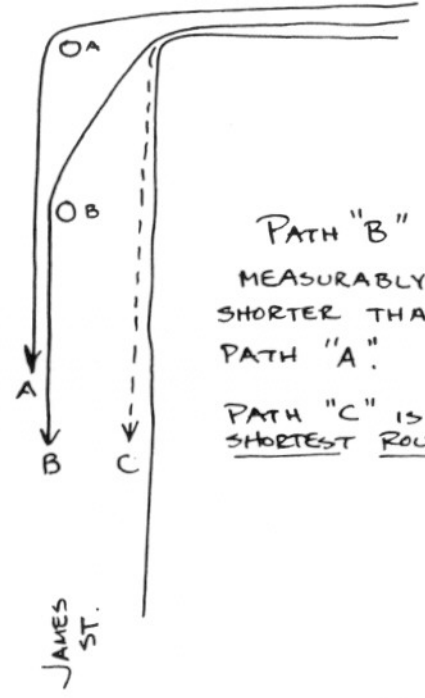


JONES ST

cone "A" - ON CENTERLINE OF JAMES ST, EVEN WITH S EDGE OF JONES ST

cone "B" - ON CENTERLINE OF JAMES ST, 30 FT S OF S EDGE OF JONES ST.

↑
SAMPLES OF CONE LOCATIONS.
NOTE EXACT LOCATIONS.



PATH "B" IS MEASURABLY SHORTER THAN PATH "A".

PATH "C" IS SHORTEST ROUTE

RUNNERS ARE TOLD "KEEP RIGHT ON JAMES ST".

IF CONES ARE NOT SPECIFIED, EXACT MEASURED ROUTE IS IMPOSSIBLE TO VERIFY.

BEST SOLUTION: MEASURE PATH "C", TELL RUNNERS TO KEEP RIGHT AS YOU WISH. IF THEY DON'T, THEIR COURSE IS STILL NOT SHORT.

FROM PETE RIEGEL

EFFECT OF ERRORS IN VALIDATION MEASUREMENTS

Last August Bob Letson polled the RRTC membership in an effort to help clarify some TAC rules. One question is still with us, and it's a thorn in the side of several of us. It can be expressed as an example:

We know that Salazar's "WR" course was short by a load, and there was no question of shortness. Although he ran a beautiful race, Tom Knight's measurement showed that his course was short of the allowable distance by 65 meters. This is not even close. There is no question in this case. But what if it had been otherwise? What if the "shortness" had come out to only 1 or 2 meters? Would this have been sufficiently convincing to justify the negation of a fine run?

If the measurement had come out 1 meter short, and the record was disallowed, the press and the public would have a field day with it. TAC would come out looking like a real stinker, and it would be widely perceived that our validation procedures were strict to the point of unfairness. I believe this is a bad thing.

Unfortunately, the method we presently use for validating courses provides proof of neither shortness nor longness. A validation measurement (for a 10k) of 9999 is not really different than one that comes out 10001. Yet one course is considered "short" while the other is not.

I believe that our validation algorithm should be asked to provide either a proof of shortness (9995 or less) or a proof of longness (10005 or more). The present method proves neither longness nor shortness when the measurement falls within the 10 meter error band, which we all know does exist.

This situation has been aggravated by a recent track measurement that came out to 400.02 by one interpretation and 399.994 by another interpretation of the same data. If the track is considered "short" the results of a 48 hour run are invalidated. In addition, it is possible that the track, at a major university, may not be valid for track meets until construction is undertaken to lengthen it.

Given the nature of measurement, is it reasonable to ask everybody who owns a track that might measure out to 399.96 to lengthen his track? It's expensive. In addition, I don't believe that this approach is consistent with past practice. Has anyone ever heard of a track being rebuilt because it was found to be a few centimeters short? I have not, but I am certain that measurements of all the tracks would find a good percentage of them to be "short" by a small amount.

If I should go to the track at Ohio State University and measure it, what if I should find that it had an average measured length of 399.98 meters? If I report this to Ken, does this mean that the track must be rebuilt before the Jesse Owens Classic track meet can be held? The original surveyor's report, which I've not seen, would say that the track had a length of 400 meters. Have I

proved this claim wrong with my measurement? No. I have, however, established that the track was measured "with reasonable accuracy".

I own two 100 ft steel tapes. I checked them against another that had been checked by the National Bureau of standards and found that both were actually about 100.01 feet long, thus barely falling within U.S. Government specifications for tape accuracy. Now, if I went out and measured a track with either of these tapes, and did everything perfectly (temperature, tension, alignment), I would get a measurement of 399.96 meters for a 400 meter track. Should the track be flunked? Most people do not know exactly how long their tapes are - they don't have an opportunity to check them against a standard.

The argument in favor of some negative allowance on track measurements is inescapable. And, if roads are to receive the same justice, an allowance there is also seemly.

I have checked ten tracks for which I was able to obtain measurement information (after construction). I found that most measure oversize, but only by a centimeter or two. Now, if one of us should go to one of these tracks, and measure it, there is a very good chance that our mean measurement may show a small amount of shortness. Should this invalidate the track?

Proposed Solution. I believe that we should have one way to do things for both tracks and roads, as follows:

1) The Surveyor's report should be considered as an accurate statement of track length until proven otherwise.

2) The certification document should be considered as an accurate statement of road course length until proven otherwise.

The effect of the above is that a track measurement of 399.92 or so would shoot down the track. A 10k road measurement of 9995 or less would shoot down the road course. Both measurements are convincingly short, and are likely to be accepted without protest by a disappointed race director or record claimant.

What is the effect on the quality of records? Very small. To deny that there is any effect would be stupid. But is it not equally stupid to accept a 10001 road 10k and reject a 9999, when neither measurement proves anything about whether the course is indeed short?

It is true that a road validation of 9999 proves that the original measurement, which was supposed to lay the course out at 10010, was inept. But is it the purpose of validation to punish poor measurement, or is it an attempt to determine whether a course is reasonably accurate?

The effect of the above proposal on track records is zero. The tracks of today are no different from those of the past - they are the same tracks. Why should we strive to make rules that will force a goodly number of them to be found unsuitable? It makes no sense at all.

I am concerned with the credibility and the excellence of the certification program. I believe that a certification document should mean something. It should have some value. I believe that decertifying a course on the basis of an inconclusive measurement is a perversion of the measurement process.

When we certify a course we have told the measurer, the race director, the runners and the public that we consider the course to be reasonably accurate. I believe that any further burden of proof of shortness should lie on us, not on the race director or record claimant.

I didn't intend to sermonize, but I feel strongly about this. I believe that shooting down a 9999 meter 10k will be perceived by the running public as greatly unreasonable. If I had done my best job on a validation ride, and come up with that 9999, it would shame me to tell the race director that the system I'm a part of would consider that measurement proof enough to shoot down the course.

I think the rules should be written to account for our imperfection, and that this should be done before a fine run is shot down by a meter, because sure as God made little green apples it is going to happen.

How can we find a point of view on this subject that will be reasonably acceptable to everybody? Let's look at the past:

In the past, track records were accepted if the timing was correct and the original surveyor's report said that the track was either 400 meters or 440 yards. I never heard of anybody going out and actually checking tracks after the fact, in an effort to "certify" them. Most WR's were set in college meets or big-time track meets, and nobody worried that the track might be 3 cm short, or if they did they kept quiet about it.

In recent years efforts have been made to "certify" tracks. A measurer, perhaps just the race director and a friend, measures the track and sends the data to somebody who does the math to figure out how long the running path is. Because most tracks are very close to nominal distance, some of these measurements are showing tracks to be "short" by a few cm. Yet these are the same tracks that in former years were considered to be good enough for record purposes. The tracks have not changed - the interpretation of their measurements has.

The original surveyor's report for a track will say that it is the right size. These reports have been accepted by IAAF and AAU, now TAC, for decades. Are we to now say that we have a "better" way? Are we to believe that the track records of the past are in some way suspect, and that it is now necessary to disqualify tracks because of tiny shortness? Is it wise to impose construction costs on high schools and universities because somebody later measured their track and got a measurement of 399.98? Or to downgrade a 440 yard track to a 400 m track? Does anybody seriously doubt that those tracks were measured "with reasonable accuracy"?

Now, for roads, the situation should be similar. The certificate should serve the same function as a Surveyor's report on a track. Remeasurement showing small shortness only confirms that the road course is "reasonably accurate". We in RRTC have already said that the course is OK. Must we make the road courses pass two trials? Why should we certify courses at all if the certification document is to carry no weight?

My thinking goes like this:

- 1) The philosophy for road courses and tracks should be as similar as possible.
- 2) A validation measurement should provide reasonable assurance (or "proof") of something - either that the course is (a) longer or (b) shorter than the nominal distance.
- 3) If we opt for (a), proof of longness, then most tracks will be found not to have been proven oversize, and they will have to be modified with a curb reconstruction before they can be acceptable for record purposes. This is, I believe, a poor idea.
- 4) Therefore we should opt for (b), proof of shortness. This means that expert remeasurement must show a convincing amount of shortness before the course can be declared unsuitable.
- 5) If road courses are to be philosophically similar to tracks, I believe that some allowable shortness (as little as possible, but as much as it takes) is mandatory.

Exercise for the Reader. Have you measured a track? If you have any first-hand track info, send it to me. Include:

- 1) Name of track and location
- 2) Measured length
- 3) No of measurements
- 4) Values of measurements (or high & low)

I will add them to the measurements I already have and we will see how long tracks really are. Results will appear in MN.

FROM WAYNE NICOLL (B. LETSON HAD TAPE-SLIPPING-
UNDER-THE-RAIL PROBLEMS TOO!)

My University of Georgia track measurement was unproductive but educational. We arrived a little late and not fresh to do a good job. The track had old cracked cement curbing on the straightaways and partially curbed on one end except at the steeplechase entry and exit which they close by aluminum rails. On the other end the curve was totally made up of 20 foot sections of aluminum removable rails. The rails did not fit tight to the track surface and did not always align with the alignment marks placed on the track. When you put tension on the tape in the curve the tape slid under the rails. Also the concrete curb was low and had a shallow slope from too many layers of artificial goop on the track surface. When we pulled the tape there was a tendency for the tape to ride up the slope. After one unhappy trip around the track with Sally holding and me pulling the tension device, we did a rough calculation showing the track to be a 400 meter and short, but I am convinced that if the rails are placed correctly and I can measure accurately, that it'll be okay. I'm going back better equipped next time so I can use both approaches to measurement. I need cut off broomstick poles and nails. The poles with a nail in the top will be my centerline guides and I think by putting long thin finish nails up against the rails and curbs I can keep the tape on a proper line. Any ideas are welcome. If I can get two good measurements and it is still short I can recommend a slight outward displacement of the rails on one end and later remeasure.

FROM PAUL CHRISTENSEN - 2-20-85

Fete,

I enjoyed your letter regarding "Validation measurements". I generally agree with your position. As you can see by the enclosed Valley River 10K info, I purposely showed all the possible distances that the course could be, and then noted the most possible distance. Also noted was that range fell into the acceptable zone.

For the sake of argument, I'd like to throw out a couple of ideas. 1. Change the safety factor from .1% to .15%. I can hear 'em howling already. For a time I've been thinking that the .1% was not enough, especially when a course will be validated by a highly experienced rider. Quite often an experienced rider can "shorten" the course by more than .1%. Also, this would give more assurances that more courses that are already certified would validate out at "at least" the stated distance. 2. As it stands now, the validation measurement is the measurement used as the official distance. This completely disregards the other two or more measurements submitted by the original measurers. Maybe there could be some way of averaging the original measurements with the validation ride to determine the "most probable" distance a course is. For example, say the two original measurements on a 10K course end up being 10007 and 10010. Some hotshot validator comes along and measures the course at 9997. As it stands now the course is short. If we equally weigh the average of the two original rides with the validation ride we come up with a "most probable" distance of 10001.75. Just barely tolerable, but affecting the same result as PR's 9995-10000 proof of shortness/longness range.

I feel we have to make some kind of adjustment also. Otherwise Fete, you will be right. A lot of courses will validate in the 9995 to 10000 range. And I agree, that's not enough to determine shortness.

Also enclosed is a copy of a race flyer from last November where a local race director was encouraged (by me) to use the certification code. I like the way it looks. Several runners commented favorable on using the code number. I think this would be better than trying to get a trademark or similar mark to use. This way, all course certification code numbers being different, a race director couldn't or wouldn't use certified if he didn't have an official number.

Most races around here print their race flyers at least 8 weeks before their race. Quite often in Portland, the final course isn't approved by the city powers until the week of the race. Many of the race directors have every intention of certifying their courses. Some provision should be made so that they can say something intelligent in their race flyer as to the the certification status of the race course. People around here are now saying, "course will be certified by race day" or something similar. This still isn't what the runners want to see. And it's still left kind of vague.

Since only one person in any given area is assigning final codes, what would be wrong with assigning temporary numbers, or assigning the final code early and letting them use it with an asterisk or something. If we define the asterisk as meaning "the race director has contacted the official TAC/RRTC code assignor and has signed a "statement of intent" that course will be measured, marked and paperwork submitted prior to race day" then a OR-85006-FC* would mean something different than OR-85006-FC. All other references to certification status would then be designated as incorrect. Then, if the race director fails to make good the runners would have him/her by the horns.

FROM WAYNE MCOLL

I have been thinking about Paul's letter of 2/20/85. I have had the same uneasiness over the disparity between the measurements of an experienced rider and a novice. Are we trying to tighten the screws too tight? Are we becoming unreasonable with our tire skimming tactics? Most runners do not get the opportunity to run the shortest possible route on a race course. I think riding "mercilessly" is maybe a little unfair, especially every time you get inside the 8" from edge or 12" from curb. That riding skill should be saved for measuring the original course, but not applied to validations. Applying that philosophy, I rode the Stroh's 8K in Gainesville, FL unfairly (so did the original measurer accompanying me) but rode the Citrus Bowl Half-Marathon fairly. I do not want to lower the standard to allow less than the standard distance to be acceptable. I am absolutely convinced that elite races should not be measured by novices and that any race director, who can afford to have his course checked by an experienced measurer, should do so. I suggest to novice measurers to add a little extra distance. I always try to tip the scales in my favor on my measurements with a little extra if possible.

Dear Paul,

FROM BOB BAUMEL

Your suggestion to increase the safety factor from 0.1% to 0.15% ignores the fact that we already have not one but THREE different short-course-preventive offsets in the certification process, namely:

1. The 0.1% Short Course Prevention Factor.
2. Use of the measurement that makes the course come out longer.
3. The Larger Constant.

Offset number 3 (larger constant) is not universally accepted by all certifiers, but it does typically have about the same effect as adding an extra 0.05% to the safety factor while using the Average Constant. The Larger Constant also provides an additional element of justice: it makes you use a bigger safety factor in cases of poorer data quality (as evidenced by the spread between premeasurement and postmeasurement calibrations). In terms of the "Knight Diagram", the effect of the larger constant is to shift most of the error bar to the RIGHT of the intended distance (such as 10010 meters) instead of keeping the error bar CENTERED on that intended distance (more on that later). It would certainly be simpler to just enforce the larger constant principle (which is already part of the new TAC measurement book) than to try increasing the size of the short course prevention factor!

Your hypothetical example, in which the two original measurements for a 10 km course were 10007 m and 10010 m, ignores offset number 2. In particular, if the first measurement attempted to lay out the course at 10010 m, but the second measurement found the course so laid out to be only 10007 m, then the course would need to be lengthened by 3 m before it could be certified (so that the MINIMUM length as measured was at least 10010 m). The two original measurements, expressed for the final course as actually certified, would then be 10013 m and 10010 m.

Your proposed re-interpretation of validation measurements (based on averaging the validation ride with the average of the original rides) would allow even more tolerance for short courses than Riegel is willing to allow. In the hypothetical example presented above, the original certification measurements averaged out to 10011.5 m. According to your proposal, this course would pass a validation test unless the validation ride came out below 9988.5 m. In fact, as long as the course has been certified in accordance with the rules (using offsets 1 and 2), your proposal would always allow AT LEAST as much tolerance as the 0.1% shortness standard in effect last year!

CERTIFICATION OF TRACKS

by Ken Young

First, let's recognize that certification of tracks (and road courses) by the Road Running Technical Committee is done to assist other committees of TAC do their jobs. For example, the Standards Committee sets qualifying times for runners to enter national championships and Olympic Trials. Times need to be achieved on tracks measured according to the same set of standards, otherwise the qualifying times would be meaningless.

Another of the committees served by the RRTC is the Records Committee. In fact, the workings of these two committees is so closely linked, that it has been suggested that the RRTC be a sub-committee of the Records Committee. It is important that the needs of the Records Committee be met by the RRTC when certifying tracks. As a member of both committees, one of my functions is to keep the two committees working together.

What are the needs of the Records Committee? The charge to the Records Committee is to "investigate every performance submitted for record approval and recommend approval or rejection to the appropriate Standing Sports Committee." How then does the Records Committee investigate a record claim?

First, the burden of proof lies with the record claimant! Consider the Rosemont (IL) Turkey Trot 10K of 1982 and Benoit's claim to a mixed race 10K record. The record claim was rejected because the race officials were unable to prove beyond reasonable doubt that the disputed turn-around point was actually where they claimed it was. A record will NOT be accepted simply because one cannot prove that the claim is invalid.

A record is a statement that the named athlete did cover the stated distance in the stated time. It is NOT a statement that the athlete covered approximately the stated distance within measurement error. The burden of proof lies with the record claimant, i.e., it must be demonstrated beyond reasonable doubt that the athlete did cover at least the stated distance. Hence, an acceptable track is one that can be shown to be at least the stated distance. Bob Hersh and I feel this view is the prevalent view of the Records Committee.

One might expect that very specific standards have been specified for laying out and measuring tracks. After all, track racing has been around for more than 100 years. If the track that Roger Bannister ran his first sub-4 minute mile on were even one inch short, the mark would have been thrown out! Would it have been? Was it remeasured? What if two measurements were taken and only one showed the track short? What if two more measurements were taken and both showed it to be acceptable? What if.....?

The TAC rule book does not provide satisfactory answers but rather muddles the issues. Unfortunately, we cannot turn to the IAAF Technical Committee for guidelines. Bob Hersh assures me that the concepts of measurement error and statistical proof are NOT topics of discussion by the IAAF. At the same time, we have real (to us, anyway) problems that need to be resolved. We are asked to certify tracks and to recognize track records based on those certifications.

Suppose the RRTC were to decide to certify tracks provided they are not demonstrably short. The Records Committee would then need to review the certifications in case of a record claim on that track, to insure that record-keeping requirements would be met. This would lead to the unpleasant situation where marks on a TAC-certified track might not be acceptable for TAC records. Let's not get to that stage.

Another point that has been discussed by the Records Committee is the question of acceptable track lengths. The general feeling of the committee is that tracks are EITHER 400 meters OR 440 yards. Odd track lengths are not acceptable. Tracks should be certified as 400 meter tracks or 440 yard tracks (ignoring for the present, indoor tracks). Again, the TAC and IAAF rule books are less than lucid on this point.

What would happen if we rejected tracks for certification unless the measurements demonstrated the track to be AT LEAST the stated distance? Are tracks constructed with a "safety factor" built-in? Or, would we be throwing out the majority of existing tracks? Sadly, the latter is more likely to be true. Let's simply assume that most tracks are constructed with the intent of coming as close to 400 meters (or 440 yards) as possible. Let's also note that a curb-length measurement is not available until AFTER the track is constructed and, in all likelihood, is rarely, if ever, performed.

From this, one may conclude that the majority of tracks are NOT provably AT LEAST the stated distance. The only bright spot is that tracks constructed to be 440 yard tracks are probably provably at least 400 meters in length.

A number of solutions come to mind. Some of the really radical solutions have been left out of the list, e.g., quit keeping records. Two of the more reasonable solutions are:

- (1) to require all tracks not provably 400 meters to add a "pimple" such that the track would be provably 400 meters, or
- (2) to redefine the manner in which the track length is determined.

Solution #1 is not as unreasonable as it may appear. Curbless tracks are required to install a temporary curb before any marks can be considered for records. If the temporary curb consists of bricks, for example, the adjustments are minor (compared to the job of laying out the bricks!). Even snap-in curbs could be modified without a considerable outlay of time and/or money.

Solution #2 recognizes that the definition of "track length" is somewhat arbitrary. TAC Rule 62 is almost humorous, stating that "All distances run or walked shall be measured by a steel tape upon a line 30 centimeters (12 inches) outward from the inner edge of the track." Obviously, one cannot apply the proper tension to a steel-tape around a curve, keeping the tape 30 cm from the curb, without employing extraordinary methods. The rule also implies that 30 cm equals 12 inches when, in fact, 12 inches equals 30.48 cm. A track "measured" 12 inches from the curb would be 3.0 cm "longer" than the same track measured 30 cm from the curb!

Clearly, the choice of 30 cm or 12 inches is somewhat arbitrary and the values stated were probably chosen as "round numbers" rather than a precise, statistically or physically determined, average or "shortest possible" running path. One could as easily justify the choice of say 31 cm rather than 30 cm.

Such a "redefinition" of "track length" can solve our problem very simply. It effectively "adds" 6.28 cm to the "length" of a track determined 30 cm from the curb (or 3.26 cm to a "length" determined 12 inches from the curb). In effect, this becomes a "built-in safety factor." Newly constructed tracks should STILL be constructed to "measure" 400 meters when measured 30 cm from the curb BUT, for our purposes, the "true length" is that determined 31 cm from the curb.

Rather than rewrite the TAC and IAAF rule books to state 31 cm as the proper distance from the curb to determine a track length, let us define the acceptable curb length measurements (ACLM) for 400 meter and 440 yard tracks so that they are consistent with our choice of 31 cm with a "short course prevention factor" (SCPF) built-in AND define track certification procedures that incorporate these ACLMs. Only the certification procedures would be incorporating into the rule book, replacing TAC Rule 62.2 and completely eliminating the confusing reference to measurements made 30 cm (12 inches) from the curb.

The raw curb length measurements (RCLM) would be 398.0522 meters for a "400 meter" track and 400.3882 meters for a "440 yard" track. I suggest a SCPF of 2 cm as being roughly one standard deviation in the measurement variability. Thus, if three measurements all yielded values greater than the RCLM + 2 cm, one could state with some degree of confidence that the track is at least the stated distance, as determined 31 cm out from the track-side curb face. Thus, the ACLMs would be 398.0722 meters for a "400 meter" track and 400.4002 meters for a "440 yard" track.

The suggested measurement procedure for track certification is as follows. Make two curb length measurements. Term the measurement yielding the smaller value "A" and that yielding the larger value as "B." Term the acceptable curb length measurement "L." Both A and B must be greater than L. If not, the track is not certifiable. If B minus A is less than A minus L, the track is certifiable. Otherwise, a third measurement (C) must be taken. If C is greater than L, the track is certifiable. If C is less than or equal to L, the track is not certifiable. (It is assumed that temperature corrections have been applied and proper methods employed.)

The programmers among you will see the flow chart mentality at work here. This "algorithm" is not designed to be statistically rigorous. It is intended to separate certifiable from non-certifiable tracks, clearly and simply. It also incorporates a tougher standard for "poor" measurements viz. "good" measurements in that two measurements that agree closely can lie closer to the ACLM than can two measurements that vary more widely. Nothing is perfect and this algorithm glosses over a couple gray areas. Fortunately we can easily do something about these gray areas.

Suppose that a certification is issued for a given track. Suppose also that another individual, for whatever reason, decides to remeasure that particular track. Suppose further than one of the second series of measurements produces a single measurement value less than (or equal to) the acceptable curb length measurement L. After all, the more measurements you make, the more likely you are to produce such a measurement. Should the original certification be revoked? Let's agree to the simple expedient of accepting ONLY the original certification UNLESS the track has been altered in such a manner to affect its curb length OR there is reason to doubt the original set of measurements. This would mean that a certification based on measurements KNOWN to have been made properly, is IRREVOCABLE!

Now suppose that the original measurer is less than honest. Imagine that you have run 160 miles in 24 hours on a 400 meter track but didn't bother getting the track measured for certification until after your race. You take two measurements and find one of the two is one millimeter short of 400 meters. You and your measuring buddy agree that throwing out a performance of such magnitude for one rotten millimeter is ridiculous and that you'd much rather throw out that measurement. You take a third measurement and find that by ignoring the short one, you have a certifiable track.

Given a SCPF of 2 cm that represents one standard deviation of the population of measurements and a track that is truly less than 400 meters (31 cm out from the curb), less than one-sixth of the measurements would be expected to yield acceptable values, i.e., greater than the ACLM. In order to obtain two acceptable values, an average of 12 measurements would be required. Even then, the two could still fail the B-A vs A-L comparison, requiring a third measurement. If a measurer is capable of throwing out the majority of measurements, he/she is just as likely to fudge the data. In either case, our only check against such submissions is the same, remeasurement or validation in the case of records.

Suppose that the measurer really is honest and tells the certifier that one of the measurements is slightly short. What advice do we give? In all likelihood, if one measurement is reported as short (of three), and no apparent reason (error in temperature correction, etc.) is evident, suggest the measurer take a fourth measurement and certify if the fourth measurement is at least the ACLM.

The basic idea is that if we can get three good measurements that yield values greater than the ACLM, the track is very likely to be OK. By redefining the track length to be taken 31 cm out from the curb, we should greatly reduce the likelihood of throwing out "good" tracks and, if we do throw out a track, it is quite likely short as defined 30 cm out from the curb.

In the case of the certification of the Southern Methodist University track in Dallas TX that was instrumental in raising this issue, the three curb length measurements were 398.12997, 398.07907, and 398.11717 meters. Applying the algorithm, $A = 398.07907$, $B = 398.12997$, and $L = 398.0722$ meters. Both A and B are greater than L but $B - A = 5.090$ cm and $A - L = 0.687$ cm, requiring a third measurement. This measurement ($C = 398.11717$ meters) was greater than L, hence the track would be certifiable. Note that this track "squeaks" by according to this algorithm. The average measurement as determined 30 cm from the curb was 399.994 meters, suggesting that the track was constructed to be as close to 400 meters as possible. Looking at the data, one might suspect the second measurement and, in the event A was less than L, suggest a fourth measurement.

I submit this algorithm meets the requirements of the Records Committee, does not require any track reconstruction or alteration in the present method of constructing tracks, and is not likely to throw out any properly constructed track designed to be "close to" 400 meters. It is also simply stated, easy to apply, unambiguous, and provides definitive answers (most of the time).

MEASURED TRACKS

| Name | Location | Measured Length | No. of Measurements | Maximum Difference |
|---------------------|------------------|-----------------|---------------------|--------------------|
| N Scott HS | Eldridge, IA | 1320.11 ft | 2 | 0 (EDM) |
| F Lewis HS | Flushing, NY | 1319.30 ft | 4 | 0.52 ft |
| 32nd St Naval Sta | San Diego, CA | 1319.775 ft | 2 | 0.01 ft |
| Carlsbad HS | Carlsbad, CA | 1320.53 ft | 2 | 0.02 ft |
| Beaver HS | Beaver, PA | 1320.15 ft | 2 | 0.08 ft |
| MCRD | San Diego, CA | 400.17 m | 2 | 7 cm |
| Morrison Bell (SMU) | Dallas, TX | 400.01 m | 3 | 8 cm |
| SMCC | Santa Monica, CA | 400.01 m | 2 | 1 cm |
| Olympic Coliseum | Los Angeles, CA | 400.02 m | 2 | 2.6 cm |
| Tullahoma HS | Tullahoma, TN | 400.005 m | 2 | 3 cm |

The measurement data for the above tracks are only a small sample to which Pete Riegel has present access. The estimated error band on the above measurements may be considered to be about 10 to 15 cm for the taped measurements, and 3 to 5 cm for the EDM.

February 21, 1985

VALIDITY STANDARDS FOR RUNNING COURSES

by Bob Baumel
March 3, 1985

I. INTRODUCTION

Although we've come a long way in arriving at standard, effective course measurement algorithms, certain issues remain unresolved, most notably the question of when a running course (either road or track) should be considered valid for record purposes. Opinions on this subject vary widely. Some say that records shouldn't be accepted unless the course can be "proven" to be at least the advertised distance. Others claim that once a course has been certified, only a proof of SHORTNESS can invalidate the record.

Of these two positions, the first is unfortunately totally impractical; a requirement for meaningful proof that the true distance is at least the advertised distance would result in far too many disqualifications. The second position has the defect that it won't satisfy those people who have doubts about the validity of records. And it may provide too much room for manipulation by powerful groups with vested interests in the acceptance of particular records.

Historically, many of the recent changes in road course standards came from the track. The 30-cm-from-curb principle is an obvious example. Track rules state that the track should be no shorter than advertised (e.g., IAAF Rule 161.1), although in practice, this may not always have been enforced as rigidly as some would like to believe. In any case, the "not short" concept has re-defined the meaning of "certification" for road courses. Now, this process has come full circle, as a recent controversy concerning a track in Dallas TX has highlighted the need to arrive at more or less uniform standards for both roads and track.

II. DOES THE 1985 ROAD VALIDATION STANDARD PROVIDE 95% CONFIDENCE?

In Jan 84, Ken Young expressed the laudable goal of having 95% confidence that the actual course length is at least the advertised length. This leads to the question: Does the present "No Shortness Tolerance" standard for Validation remeasurements actually achieve that goal?

The answer is obviously "NO" if the course only just barely passes the validation test, and if we have no evidence other than the validation measurement itself. But Ken Young maintains that a successful validation result, considered together with the original certification measurements, provides high confidence that the true course length is not short.

I have recently derived the mathematical result that the answer REMAINS "NO" even when the original certification measurements are taken into account. I'll probably write this up in more detail in the future, but the basic reasoning is as follows:

With regard to the original certification measurements, there are two possibilities:

- 1) The original certification measurements are considered so reliable that we ALREADY have the desired 95% confidence, with no need to perform a "validation" measurement (for example, Olympic Marathon course). OR ELSE:
- 2) The original certification measurements are not considered to provide 95% confidence. In this case, it can be shown that if the course JUST BARELY

passes a validation test, then even after that "validation," we'd STILL have less than 95% confidence that the true distance is at least the advertised race distance.

III. HOW MUCH ASSURANCE DOES THE 1985 VALIDATION STANDARD ACTUALLY PROVIDE?

As indicated above, the present validation standard does not fulfill Ken's original goal of providing 95% confidence. But if a course passes a validation test, then we can legitimately make the following two statements:

- 1) We have at least 50% confidence that the true length is at least the advertised distance. And:
- 2) If the course actually is short, then we have very high confidence that IT'S NOT SHORT BY VERY MUCH.

Thus, even the present tough validation standard does not "prove beyond reasonable doubt" that the course is not short. But a successful validation does establish that the course has been measured with "reasonable accuracy."

IV. SHOULD THE PRESENT VALIDATION STANDARD BE RELAXED?

Given that present standards do not result in "proof" that the course isn't short, should we take the opposite approach of requiring actual proof of shortness before we disqualify? (This could take the form of an "allowance for error in the validation measurement" as I suggested in June 84).

Quite possibly, our standards should be relaxed a bit by just interpreting the rules with a little more flexibility and generosity (more on that later). But any actual rule change incorporating an officially sanctioned "error allowance" would probably be a mistake. In particular:

- 1) It could be perceived negatively by the public. Consider, for example, the lead article in the Feb 85 Road Race Management (on the Salazar affair) which generally applauded the development of rigorous standards for road courses, and concluded: "But the silver lining of this situation is that the day of accurate and verifiable course measurement has arrived. This is a tremendous asset to elite athletes, middle of the packers, sponsors, and the followers of our sport." It would not be wise to be seen as retreating from that goal of "accurate and verifiable course measurement."
- 2) Ken's "No Shortness Tolerance" standard has considerable intuitive appeal, whether or not it has a firm scientific basis. Ken put it well in a letter dated 3 Jul 84: "The simple truth is that if the validation measurement is at least the advertised course length, people will be satisfied. If it is not, you aren't going to convince them otherwise with statistics, simple or fancy."
- 3) The present Validation standard is probably WORKABLE, in the sense that: If a measurer has a reasonable understanding of the SPR, and uses all three short-course-preventive offsets in the system (i.e., Short Course Prevention Factor, Larger Constant, and measurement giving the longer course), then the resulting course really ought to be capable of withstanding a validation.
- 4) If we officially relax the validation standard, pressures will inevitably mount to REMOVE some or all of the offsets just mentioned in (3). That, in turn, would result in more courses that are actually short!

I shall resume the consideration of road validation procedures after first pausing to consider track certification.

V. PROPOSED STANDARD FOR TRACK CERTIFICATION

Ken Young claims that track measurements should establish, beyond reasonable doubt, that the track is not short. But is it reasonable to ask track certification to accomplish something that even our present tough certification and validation standards for road courses cannot do? I think the following two requirements would constitute a reasonable track standard, providing about the same level of confidence (see section III above) as our present road course procedures:

- 1) The AVERAGE measured length should not be less than the nominal track length. It is not necessary for every individual measurement to exceed the advertised distance.
- 2) All measurements should be reasonably close to each other. The simplest expedient here is to cite IAAF Rule 145.2, which states that two measurements of a 400 m track should not differ by more than 13 centimeters.

VI. THE SMU TRACK CONTROVERSY

This disputed track, in Dallas TX, clearly satisfied the 2nd criterion of my proposed track standard (section V above). By any interpretation of the data, all three measurements fell within a range of 6.5 cm -- just half the spread allowed by IAAF 145.2.

The average measured length of this track was either:

399.994 m or 399.996 m at 30 cm from the curb, or
400.024 m or 400.026 m at 12 inches from the curb.

(The 2 mm uncertainty derives from a dispute concerning the actual value of one of the three measurements).

Our decision as to whether the average measurement is officially above or below 400 m depends on two main factors, in my opinion:

A major source of error in any steel tape measurement involves the temperature correction. The calculated distance, in this case, was based on a stated "air temperature" of 72°F. Now, if the actual TAPE temperature had been 75°F or higher, then the calculated distance would unambiguously exceed 400 m. The weather conditions were not stated in this case. But if further research should reveal that the weather was sunny, and that the 72°F reading was from a SHADED thermometer, then the track would certainly have to be considered acceptable.

Then there's the 30 cm vs. 1 foot controversy. Ken Young says that proper distance from the curb is 30 cm on 400 m tracks, and 12 inches on 440 yd tracks (which permits 10,000 m races to actually be 75 cm shorter on 440 yd tracks than on 400 m tracks!). I find NO support for Ken's position in either the TAC or IAAF rulebook. TAC Rule 62.2 says to measure "upon a line 30 centimeters (12 inches) outward from the inner edge," which seems to regard 30 cm and 12 inches as functional equivalents for this purpose. IAAF Rule 161.2 says to measure "0.30m outward from the inner border," which doesn't mention the 12-inch figure at all! But note that only two decimal places are given. If IAAF really wanted to draw a distinction from 12 inches (= 0.3048 m), they could have specified another digit (e.g., "0.300 m" or "300 mm"). In fact, it seems that the IAAF rule was carefully worded so as to avoid disqualifying tracks measured at 12 inches!

I certainly DON'T LIKE this fuzziness in the rules. I think the rule should be tightened to require ALL tracks to be measured at 30 cm (11.81 inches) from the curb (but obviously, any such change could apply only to new tracks). The rules for existing tracks permit measurement at EITHER 30 cm or 12 inches. Thus the SMU track is clearly acceptable.

VII. INTERPRETING ROAD COURSE VALIDATIONS: WHAT IF IT'S JUST marginally SHORT?

Sooner or later, a Validation will find a course "short" by an amount that is not at all convincing (for example, a few meters in a marathon). And the Validator will feel really rotten if the course has to be disqualified on that basis. How do we deal with this?

One possibility is to try decreasing the chance of this happening, by gathering more data in a validation than you'd have in a routine measurement. For example, when Paul Christensen validated the Women's Olympic Trials marathon course, he did extra calibration rides at three intermediate points on the course. And the distance calculated using all his calibration data was about 4.5 m higher than the distance calculated the usual way using only the premeasurement and postmeasurement calibrations. Note that the calculation using ALL the cal data would probably have to be considered MORE ACCURATE than the calculation ignoring the intermediate calibrations. Note also that temperature data could probably be used the same way.

Of course, such manipulation will not always be possible, and there will still eventually be cases where the validation comes out "short", although by an amount considerably less than the probable error of the measurement. We should have a tacit understanding that, in such cases, the Validation Chairman will not get everybody mad by unilaterally ruling against the course and refusing to submit the mark to the Records Committee. Let the Records Committee decide in these close cases! TAC Rule 185.3 says, "Performances made after January 1, 1985 will not be accepted if the remeasurement shows that the actual course distance was shorter than the stated distance." Note that it could be legitimately argued, for example, that a remeasurement of 9998 m does not "show that the actual course distance was shorter than the stated distance."

Thus, there is room for generosity in interpreting the present rules. In practice, we can maintain a certain UNWRITTEN "allowance for error in the validation measurement." But it would be a mistake to officially write such an allowance into the rules. That's because our regular role as certifiers (i.e., convincing measurers to lay out their courses long enough in the first place) is significantly easier if those measurers can be led to believe that there is no mercy in the validation process!

SIGNIFICANCE

Our certification/validation/AEVM problem might vanish merely by defining significance, and expressing our results to no greater precision than actually exists.

Textbooks say that a value such as "123.456", if the least significant unit is 1/10, should be expressed as "123.5". The 1/100 and 1/1000 values ("5" and "6") must be omitted from the expression because these values are "insignificant". The result should be rounded to the nearest significant unit value: "123.456" is closer to "123.5" than it is to "123.4"; therefore, "123.456" should be expressed as "123.5". A more precise way to communicate the significance of the value "123.456", where the least significant unit is 1/10, is to express it as a range, as "[123.406 to 123.506]" which means that the actual value is somewhere inside this range.

If this is applied to bicycle measurements that are accurate to + or - 1/2000, where the least significant unit is 1/1000, the measurements should be expressed to the nearest 1/10%. For example, a bicycle measurement in the range [9,995m to 10,005m] should be expressed as "100.0% of 10Km". If we wish to be precise, we can express the result as a range. For example, a bicycle measurement of "9,996m" that is accurate to + or - 1/2000 can be expressed as the range "[9,991m to 10,001m]" within which the actual value resides. In this example we cannot know with certainty if the course is longer or shorter than 10,000 meters.

If this is applied to steel tape measurements that are accurate to + or - 1/5,000, where the least significant unit is 1/2500, the measurements should be expressed to the nearest 4/100%. For example, a steel tape measurement in the range [399.92m to 400.08m] should be expressed as "100.00% of 400m". If we wish to be precise, we can express the result as a range. For example, a steel tape measurement of "9,998.5m" that is accurate to + or - 1/5000 can be expressed as the range "[9,996.5m to 10,000.5m]" within which the actual value resides. In this example we cannot know with certainty if the course is longer or shorter than 10,000.0 meters.

If this is applied to electronic distance meter (EDM) measurements that are accurate to + or - 1/50,000, where the least significant unit is 1/25,000, the measurements should be expressed to the nearest 4/1000%. For example, an EDM measurement in the range [999.98m to 1000.02m] should be expressed as "100.000% of 1000m". If we wish to be precise, the result can be expressed as a range. For example, an EDM measurement of "999.985m" that is accurate to + or - 1/50,000 can be expressed as the range "[999.965m to 10,000.005m]" within which the actual value resides. In this example we cannot know with certainty if the course is longer or shorter than 10,000.000 meters.

Because IAC Rule 133 requires courses to be "reasonably accurate", we should accept a course whose expressed length is the target length. A "10,000m" course should be certified if it has an expressed length of "10,000m". Because "10,000m" is equal to "[9995m to 10,005m]" for bicycle measurements, a 10 Km course should be rejected only if the bicycle measurement is less than 9995 meters. Because "400m" is equal to "[399.92m to 400.08m]" for steel tape measurements, a 400m track should be rejected only if the steel tape measurement is less than 399.92 meters. Because "10,000m" is equal to "[9999.8m to 10,000.2m]" for EDM measurements, a 10 Km course should be rejected only if the EDM measurement is less than 9999.8 meters. To do otherwise would be unreasonable, because of the limits of significance for these various methods of measuring.

All measurements can be grouped into three categories: SHORT, ACCURATE, and LONG. ACCURATE courses are those that can be expressed as the target distance (e.g., "10,000m", which is equal to "[9995m to 10,005m]" for bicycle measurements). SHORT or LONG courses cannot be expressed as the target distance (i.e., do not fall within the measurement range for the target distance). Consequently, we can classify courses as "SHORT", "ACCURATE", or "LONG". "SHORT" courses can be disqualified for records purposes. "ACCURATE" and "LONG" courses can be accepted for records purposes. And all of this categorization can occur without bending any rules.

Bob Letson
8 March '85

SHORT/ACCURATE/LONG

We should be legal by following the rules: legality requires us to follow TAC Rule 133 which specifies that a course is certified only if it is found to be "reasonably accurate". We should be useful: "accurate" courses are more useful than "oversized" or "undersized" courses for determining pace and performance. We should honor records for "accurate" or "oversized" courses.

"Reasonable accuracy" exists if the target length lies within the region of doubt of the measurements. The regions of doubt for various measuring methods are:

1/2000 for expert bicycle measurements
1/5000 for careful steel tape measurements
1/25000 for electronic measurements

For example, a 10,000 meters course is "reasonably accurate" if the measured length is within the following ranges:

9995-10005 meters for bicycle measurements
9998-10002 meters for steel tape measurements
9999.6-10000.4 meters for electronic measurements

Because "validation" is considered the "final word" for determining the acceptability of a course, the above definition of "reasonably accurate" should apply to validation measurements.

When a fixed course already exists (i.e., a track with a curb), or when a prior event is to be validated, the measurements should be classified as "validation measurements".

When a course is created, a "short course prevention factor" is appropriate to insure that the newly-created course will pass a validation remeasurement.

Robert A. Letson

Robert A. Letson 2/12/85

*"When a cornered vessel no longer has any corner
should it be called a cornered vessel? Should it?"*

Confucius, Analects, 6:23

(Name must correspond to actuality)

When an accurate course is lengthened so that it becomes decisively oversized, should it be called an accurate course?

When an accurate course is rejected because it is not decisively oversized, should we say that our purpose is to be reasonably accurate?

When a track has a measured length of 442 yards, should it be called a 440 yard track? Should it?

CHECKING

The way things work, all the certifiers and final signatories send their certs to me and Paul, and we send them on (if OK) to NRDC. The bad ones we send back to the sender. Inevitably some courses are bound to fall through the cracks, either through failure of the mails, or through simple human mistakes.

The only way to know whether a course is in NRDC's computer is for someone to read NRDC news and check to see whether the courses are really there. Who does it?

The person who assigned the course number is responsible for checking to see that his courses reached NRDC. Paul and I do not have the time to check all the courses we send in. We will, of course, check the courses from the regions we directly serve, but no others. So if you want those courses to be sure to get into the annual course book, better check monthly.

QUALITY CONTROL

NRDC is accepting no courses that do not come direct from me and Paul. We are doing this so that we can be sure that our quality control is uniform across the nation. Several final signatories have been sending certificates without maps. All the certs with inadequate maps have been returned to the sender, and will not be accepted by NRDC as certified until a map is provided. Things are improving as everybody gets used to the new ways. If NRDC has a map with each course, record-keeping at the certifier level becomes less critical, since the entire needed course info will be on file at NRDC.

So, if you sent in a course and don't find it in NRDC News, ask yourself "Was this course returned to me for rework?" If it wasn't, then something may be wrong, and a letter to me or Paul may be in order.

MIRACLE MILE

Bob Thurston was wondering what to do about measuring a straightaway mile, slightly downhill (PR!), that will be used for one of those "downtown mile" courses. We talked about it some, and I advised him to go ahead and bike-measure it, adding 5.3 feet just like all road courses. Of course, since it's only a mile it might be faster to steel-tape it twice, depending on the location of the calibration course. It could even be a calibration course. The road course could have a finish line 5 ft beyond the end of the cal course. Since the downhill point-to-point mile isn't recognized as record-quality by anybody, we could just lay it out without the extra 0.1 percent, I suppose, but I think we might as well strive for uniformity in course layout. Any opinions on this?



Road Running Technical Committee
TAC/RRCA



Certificate

Name of the course _____ Advertised distance _____

Location: (state) _____ (city) _____ (park) _____

Type of course: [loop (no.), pt/pt, out/back, key hole] _____

Type of surface: paved _____% dirt _____% gravel _____% grass _____%

Type of course: road race cross country calibration track

Type of terrain: flat rolling hilly total climb _____(optional)

Straight line distance between the start and finish _____

Altitude: (meters/feet above sea level) Start _____ Highest _____ Lowest _____ Finish _____

Measured by: (name, address, & phone) _____

Measuring Methods: bicycle walking wheel steel tape electronic meter (EDM)

Number of measurements of the entire course: _____ Date(s) when course was measured: _____

Race date (if applicable) _____ Date when course paperwork, sent for evaluation, was postmarked: _____

Stated distance of the course (including .1% safety factor) _____

Difference between longest and shortest measurements _____ Certification Code: _____

Be It Officially Noted That

Based on our examination of data provided by the above-named measurer, the course described above and in the map attached is hereby certified to fulfill national standards for accurate measurement. A copy of this certificate should accompany race results sent to the National Running Data Center, P.O. Box 42888, Tucson AZ 85733. If **any** changes are made to the course, this certification is void until the change is measured and data submitted for recertification.

Validation of Course — In the event a National Open Record is set on this course, or at the discretion of TAC, a validation remeasurement may be required, to be performed by a member of the Road Running Technical Committee. Such a remeasurement must show the course to be **at least** the advertised race distance in order for the record to be accepted and certification to remain in effect.

AS NATIONALLY CERTIFIED BY:

Wayne B. Nicoll — Member: TAC/RRCA National Certification Committee
3535 Gleneagles Drive, Augusta, Georgia 30907

Date: _____
As Authorized by Ted Corbitt,
National Chairman