# Measurement News

November 1998 Issue #92

Measuring at Allen Correctional Institution, Lima, Ohio. Measurer Ray Thompson calibrates the wheel as Corrections Officer Kenneth Reynolds looks on. Note the white spots on the inside of the wheel rim, marking spokes for greater accuracy in reading the distance. Story inside.

# SUM OF SHORTEST SPLITS VS WHOLE-COURSE MEASUREMENT

The standard way to obtain the length of a course is to measure the course twice, choose the smaller of the two measurements as "official," and make final adjustments accordingly. Another method is sometimes used, called "sum of shortest splits" or SOSS. SOSS can be used when data is such as to give no confidence in the standard method.

Example using a 4 km course:

| Point | First Measure | Second Measure |
|---|---|---|
| Start | | |
| 1 km | 998 | 1002 |
| 2 km | 1002 | 998 |
| 3 km | 998 | 1002 |
| 4 km | 1002 | 998 |
| Total | 4000 | 4000 |
| SOSS | 3992 | |

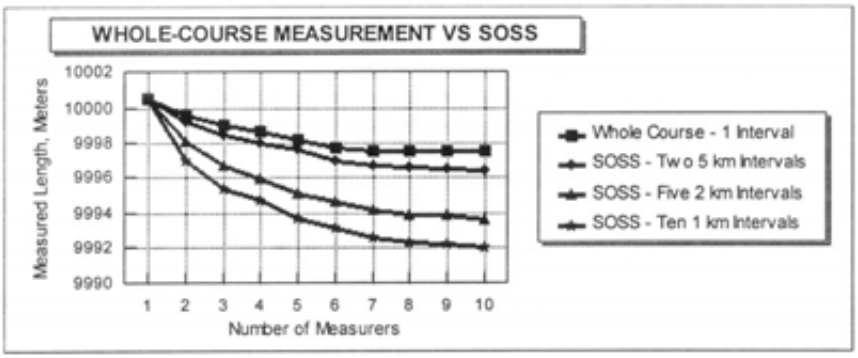
In the example, we have perfect agreement in overall length. However, it is obvious that with a bit more care in riding, accuracy would be improved. The course would certainly be at risk during a validation. In this case, use of SOSS by the certifier would serve as an alternative to a remeasurement.

**Multiple Measurements**

Certain courses have been measured with large numbers of measurers, with many intermediate splits obtained. The Olympic marathon courses are good examples. While obtaining the data is straightforward, the proper method of analysis is not always clear. With many measurers and many intervals, the use of SOSS may produce a course that will wind up longer than it should.

**A Simple Analysis**

A good spreadsheet program can generate examples that shed perspective on SOSS. I have worked up one such program. It assumes that we measured a 10 km course, and took data at every kilometer. We had ten riders. Each rider, on each interval, obtained a measurement between 999 and 1001 meters. These data come from using computer-generated random numbers.




In the above, data was generated for ten measurers getting data for ten intervals, resulting in a 10x10 matrix. This matrix was generated ten times. As a result, the graph shows the average of whole-course vs SOSS averaged over ten trials.

It must be pointed out that each time the "recalculation" button is hit, a completely new graph results. The above graph, however, is typical of those obtained. Results of a single trial of a single 10x10 matrix are more scattered.

In reading the above graph, we see that in this trial, if we take the whole-course measurements of 3 riders, the lowest will be 9999.1 meters. If we use SOSS over 5 km increments, SOSS becomes 9998.5. If we Use SOSS over 2 km intervals, SOSS becomes 9996.7. And, using all ten intervals SOSS becomes 9995.4.

**What does It Mean ?**

No fixed meaning can be applied to the above, as we never have measurers so easily gauged. Also, because of chance, each result is slightly different. Still, certain conclusions must follow:

- The more whole course measurements, the lower will be the lowest measurement.
- Use of SOSS further lengthens the final course. The more intervals used, the lower the final measurement.

Anyone wishing to play with the program may obtain it from Pete Riegel. I have it in Lotus 1-2-3 and Excel.

**COMMENTARY ON SOSS ARTICLE**
**from Mike Sandford:**

Dear Pete

I am glad you have written this article and hope you will publish it. It is a neat demonstration of what I labelled my myth number three, see *Certified Accurate Mar 98* page 16. **(Ed. Note: See below)**

If you took enough repeat measurements you could always find an exceptionally small result for each split. If you take the view that you cant measure with a smaller result than the true length then SOSS would be a correct procedure to use. An example of this is that if you are preoccupied to the exclusion of all else by the fact that deviations from the straight lines of the Shortest Possible Route increase the measurement result, then SOSS is a sensible procedure.

However, there are many things which can make a single bike measurement give a result smaller than the accurate result (such as measured by an accurate steel tape). In fact I believe that once measurers are reasonably experienced, and perhaps have been coached about riding the SPR, then they usually know when they have chosen a bad line and added on extra distance. Basically if an experienced person is happy with his route - no parked cars on corners, no setting up the wrong way for a corner - then I believe the SPR errors are small and may in fact be either positive or negative depending how the rider judges 30 cms from the kerb on bends. There are many other errors in measurement and in general one error source may be positive on some occasions and negative on others. So for experienced riders I strongly believe SOSS gives a falsely low result. I agree with you that there may be some role for SOSS under the circumstances when data is such as to give no confidence in standard methods. This I interpret to mean comparatively large unexplained discrepancies of size approaching/exceeding the SCPF in magnitude.

My dream would be to see the measurement community accept the use of average values. Perhaps weighted averages in some circumstances such as a big group ride, when it may be possible identify some riders with unusually poor (variable) riding performance or unsuitable tyres.

Best Regards Mike

**From *Certified Accurate, No. 3, Mar 1998*:**

**3) The SUM of the SHORTEST SPLITS myth:**

This procedure is not encountered in routine measurement, because we usually only make one measurement of the splits. However, in group rides one often has two or more measurements. The argument that the shortest measurement is safest leads some measurers to add together all the shortest splits to derive the shortest possible total course length. Strictly, it is true that any calculation that makes the result smaller increases the safety, However, it is an unnecessary increase in safety. The SCPF is supposed to provide an adequate margin of safety for a single measurement. There is a very low probability that the sum of the shortest measurement of each split would be closer to the true distance than the sum of the average measurement of each split. Instead we should let the SCPF take the strain and just be happy that we are improving our accuracy by averaging several measurements.

If I continue further I enter a dangerous zone where I challenge the procedures adopted internafionally. In fact I had better stop calling these myths and rename them RULES OFTHUMB. This correctly acknowledges that for ordinary purposes they are fairly reasonable rules, simple to apply, so we don't want to abandon them without workable alternatives.

Mike Sandford

Association of International Marathons and Road Races
AIMS
sponsored by asics

In September, 1998 MN, Mike Sandford presented an article *Variation of Calibration Constant with Surface Texture, Part 3: Modelling of the Deformation Pneumatic Tyres on Different Surfaces.*

This letter is commentary on that article. Further commentary on both the article and this commentary is invited.

*Leonard F. Luchner*
*Vice President*
*BAA Boston Marathon*

Oct. 15,1998

Mr. Peter Riegel
Measurement News

Dear Pete,

The recent article by Mr.M.C.W. Sandford is very interesting as far as it goes and it should be extended with further comment on the place of the bicycle.

The bicycle is powered by a centrifugal force, created by the rider rotating the pedals.The generated torque ((foot-lbs.) is in turn transmitted to the rear wheel through a system of gears and chain drive.It is a dynamic system creating a balance by which the rider advances in a horizontal direction. In a static condition, there are no forces.The front wheel indepedently rotates from the forward motion created by the rear wheel drive.There is no transfer of active energy from the rear wheel to the front wheel. The weight of the rider and frame are fully absorbed by the wheel's tires.

Upon application of rider force,the wheels,supporting both frame and rider,may be compressed over the tire surface in contact with the road. The degree of compression varies with either a pneumatic or solid type tire. In motion, the compressed surface , is constant, yet varies millimeter by millimeter along the wheel circumference,thus maintaining a constant reduced wheel radius.There is no transfer of force from horizontal to vertical. Furthermore,there is no"slippage". The form of movement is no different than that of the standard automobile with four wheels and rear axle drive. Acceptance of slippage would involve forward movement without wheel rotation, creating a false reading of total distance traveled. The dynamics of bicycle energy does not support any such theory.

Other features for comment relate to "wobble" at slow speed,sometimes required. One way of overcoming this is the addition of smaller support wheels mounted on the rear wheel support.

Tires,either pneumatic or solid, should not be subject to compression from the weight of the rider. Racing tires do not have this problem.

Gear teeth manufacture,within the counter, should be examined to improve its tolerance and eliminate the"slack" at stop and start.

Electronic measurement should be continuously investigated. Current units have an accuracy of thousandths of a meter. As opposed to the counter , the electronic unit is a computer with controlled movement. The needs for calibration are simplified and accurate to a millimeter.Temperature is no longer a factor. Athletic performance ,today,on a comparative basis requires as accurate a basis as current technology allows.

Sincerely,

*13328 Touchstone Ct., Palm Beach Gardens, FL 33418 Tel: 407-694-1721 Fax: 407-694-3094*

# MEASURING IN PRISON

Two years ago Norm Green, minister and accomplished distance runner, inquired whether I would be willing to measure a course at a prison in Lima, Ohio. I said yes, and a few weeks later Norm sent a letter to the Warden, with copy to me. I followed up with a fax, but never received an answer.

Early this September, I received a call from the Warden of the Allen Correctional Institution, a medium-security prison. We set a date the following week for the measurement . It seems an older (65), long-term inmate is a pretty good distance runner and wanted to attempt a noteworthy run. They wanted everything nice and official, and a certified course was in order. I was informed that Runner's World might be doing a story.

I asked Ray Thompson, a longtime friend, to some along and hold the other end of the tape when I laid down a calibration course. I thought he might be as curious about the experience as I was. The Warden had told me that the route in question would be a kidney-shaped road within the facility, and that it had a length of about 1/3 mile. Because of the shortness of the loop, and the potential problem of getting a bicycle into the prison, I elected to use a calibrated measuring wheel to do the job.

Ray and I drove through rural Ohio to Lima, and found the entrance to the prison. The prison itself is not visible from the road, just a sign indicating it. The road wound through a parklike expanse with many trees - very attractive. Soon we reached the prison and saw a double chain-link fence festooned with razor wire. We parked and entered the small reception building, pausing at each locked door to be buzzed in by the security people.

We explained our mission, had our possessions examined, signed in, walked through a metal detector, and were met by a supervisor who walked us into the facility where we were introduced to Bill Yetman, the recreation director. He explained that there were actually two circuits to be measured. The first, on the "Kidney Road," would be used by the inmate runner. Although this road is not generally available for running, it would be made available for him on the day.

The other circuit, the "recreation path," is located behind the Recreation Building and surrounds some basketball courts and a grassy area. This path is available for running by the general inmate population.

I looked for a reasonable location for a calibration course. Adjacent to the Recreation Building was a straight piece of asphalt pavement that was used as a 100 yard sprint venue. As the path is only six feet wide, only two men at a time could compete simultaneously. Since this is the longest straight path we saw within the facility, Ray and I laid out 300 feet, and went on to 100 meters. Start, 100 yards, and 100 meters were marked with nails and paint.

As Ray is a measurement novice, I suggested that he watch me and do the same as I did. I calibrated the wheel, and measured the length of the recreational path. Then I gave Ray the wheel and he did the same. I then measured the "Kidney Road" circuit and again Ray did the same. I recalibrated, then Ray, and we went to the office to figure out what we had.

I had just about completed my calculations when Ray inquired "Did you use that 1.001 thing you were telling me about?" I had not. I'd gotten so wrapped up in calculation of actual feet vs indicated feet that I completely forgot the SCPF. Thanks, Ray.

After determining the lengths of the two circuits, I calculated what was needed to make some even distances, and we went back out to do the adjustments. On the "Kidney Road" circuit we laid out a start, and finish lines for 1500, 5000 and 10,000 meters. It was felt that the inmate runner would wish to compete at standard distances. We did not meet the inmate runner himself.

The "Kidney Road" path measured out to 1818 feet (554 m) and the recreation path to 1103 feet (336 m).

On the recreation path I laid out a start, and finish lines for 1, 2, and 3 miles, as the general inmate population universally thinks in miles. I also prepared a laps-vs-distance chart for up to 100 laps. This may seem extreme, but we met one inmate who said he ran a daily 48 laps there, believing it to be 10 miles.

The inmates were extremely curious about what we were doing, and I had the impression that we were an unusual diversion for them. We told them what it was all about. Throughout our activity we were accompanied by Corrections Officer Kenneth Reynolds, and we chatted as we worked. Prisoners were running, walking, talking, and exercising. Some looked remarkably fit. Reynolds explained that those inmates who were exercising were generally little trouble, as they had something to focus on besides their prison jobs. He mentioned that the Devil found work for idle hands.

After laying down the various splits, and nailing them, I made a sketch map of the area. I requested a site map, but because of security was not given one. No objections were made, however, to my sketching.

Work done, Ray and I checked out and drove back to Columbus.

Pete

## ACCURATE USE OF A MEASURING WHEEL

Our standard method of course measurement uses a bicycle with a Jones/Oerth counter. While not prohibited, use of measuring wheels by course measurers has been discouraged. The reasons for this almost all center around misuse of the measuring wheel, and not from any question as to its basic accuracy when used properly. After all, the front wheel of a bicycle is simply a different form of measuring wheel.


This is a Rolatape Model 400 measuring wheel. It measures 4 feet per revolution. Note that it has 20 spokes.


This is a Rolatape Model 415 measuring wheel. It measures 4 feet per revolution. Note the printed scale on the periphery of the metal rim.

Many people who want to use a measuring wheel do not understand the use of the calibrated bicycle. They can readily understand the measuring wheel's simple digital readout, and assume it to be accurate. Also, some of these people do not have a concept of the Shortest Possible Route (SPR). These people will not get accurate measurements.

Many people use only the digital counter.They will reset to zero at the start, and ignore the angular position of the wheel. And at the finish, the counter is all they read.

Most measuring wheel have multiple striker pegs located around the periphery, at intervals corresponding to the units measured. Each time a striker peg hits the counter trigger, a new interval is recorded. The counters can be reset to zero.

A properly calibrated and operated measuring wheel, following the proper route, ought to be accurate. Because we do not have comparative data, it is difficult to assess how measuring wheel data compares with that obtained by use of a calibrated bicycle.

There are three operations which, if performed properly, should lead to accuracy.

1) Measure along the proper line (i.e. SPR). I will not discuss this further. It is obvious.

2) Operate the wheel properly, at walking pace. A measuring wheel is designed to operate on a relatively smooth surface at a walking pace. If numerous pebbles and debris are present, the wheel will hop about and mismeasure, because its "tire" is typically a very thin band of rubber, incapable of shock absorption. A bicycle, on the other hand, has a tire that can better accomodate itself to surface roughness.

3) Calibrate the wheel. Measuring wheels have striker pegs which trip a counter each foot or meter. Unlike the Jones/Oerth counter, the readout is not continuous. However, wheel manufacturers have provided a means to obtain more accurate data.

**COMPARATIVE CALIBRATIONS OF A MEASURING WHEEL**

These readings were obtained on a 100 meter (328.08 feet) calibration course at Allen Correctional Institution, Lima, OH.

| Ray Thompson | Pete Riegel |
|---|---|
| 328.1 | 327.65 |
| 328.1 | 327.8 |
| 328.1 | 327.8 |
| 328.05 | 327.9 |
| Average: | |
| 328.0875 | 327.7875 |
| True/Indicated (including 1.001): | |
| 0.998978 | 0.999892 |

For example, if Ray got a reading of 172.35 feet, the true length, including SCPF would be 172.17 feet. For Pete to get the same true length, he would have a reading of 172.2 feet.

Note that wheel accuracy is not the same for all operators. This is why calibration is necessary.

The two photos show two examples of Rolatape measuring wheels. One has spokes, and one has a solid disk.

**Spoked Wheel**
This wheel has four striker pegs and 20 spokes, and measures in feet. This means that each spoke represents 2/10 foot. Counting spokes can easily lead to measurement precision to 1/10 foot. This can be error-prone. To avoid error, I found which spoke was on the ground just after the striker had registered a count. I painted a zero ("0") next to this spoke. On the next four spokes I painted 2, 4, 6, 8. Then I began over until I had each spoke numbered.

Now, when I measure, I do the following:

1) Rotate the wheel until the counter is tripped.
2) Set the "zero" spoke on the mark.
3) Reset the counter to zero

At the end of the measurement I record the elapsed count, and also the spoke number which is in ground contact. It is quite simple to interpolate at least to 1/10 foot.

If I finish with 283 feet and 2 ½ (between spoke "4" and "6") spokes, I have an indicated distance of 283.50 feet.

**Solid Disk Wheel**
This wheel is similar to the spoked wheel, except that these wheels commonly have a printed scale on the side of the disk. They can be used as above.

Pete

Notebook

# It's Work for Courses to Measure Up

By JIM HAGE
Special to The Washington Post

Road construction around the Jefferson Memorial has created minor inconveniences for tourists, major headaches for race directors, and a little overtime from some of running's most invisible supporters to ensure that the races are as long as advertised.

The roadwork has necessitated course changes—and recertification—of all of the city's biggest races, including last week's MS Half Marathon, the Army Ten-Miler Oct. 11, and the Marine Corps Marathon Oct. 25. Most of the work in D.C., including measurement of the course and paperwork, has fallen to a fourth-grade teacher at D.C.'s Lafayette Elementary School and running enthusiast. "I've been hopping lately," said Bob Thurston, 54, one of two U.S. Track and Field course certifiers in this area.

Certification entails two measurements of the course on a calibrated bicycle, with relevant information regarding start and finish lines, plus mile marks, carefully encrypted on an 8½-by-11-inch map.

"The process has a certain rigor to it," said fellow cartographer John Sissala, who recertified this year's Cherry Blossom 10 Mile. "Bob is one of the most meticulous course measurers in the country."

Despite the most carefully measured route and exacting course instructions, race directors and course marshals often fail to follow the precepts of the certified map, thus frustrating the purpose of entire process. Just as no marathoner wants to run 26.3 miles, they do not want their times rendered meaningless by a short course, either.

At last year's Marine Corps Marathon, Thurston observed the race in progress, to see, in effect, how things went where the soles meet the road.

"One of the Marines misdirected the runners at the 14th mile," Thurston said. "I pointed out that the course actually went another way. He said, 'Oh, no, sir, it doesn't.' "

"I jumped on my bike, measured how much had been cut, and then added it on near the Pentagon at the end of the race," Thurston said. He finished splicing the extra 80 meters to the course just as the lead runners approached.

"Really, it's a fairly simple procedure to certify a course," Thurston said. "Anyone can do it. You just need to be careful, and follow directions."

And be willing to ride a bike through city streets in the middle of the night, so that hot pavement doesn't affect the bike's calibration, tangents can be properly cut, and the chance of getting run down by a car is slightly reduced.

Only a handful of individuals measure courses in the metropolitan area. Thurston trained Sissala in 1982; together, they now approve all course maps submitted in the District, Maryland, and Virginia. Maps are assigned a certification number and filed with the USATF certification coordinator in Columbus, Ohio. Sissala estimated that he and Thurston had recertified 70 courses this year, many more than usual.

Certified courses are measured to be long by one-tenth of one percent; for a 10K course, that amounts to only 10 meters, or typically less than two seconds. In the event of a world best performance, the course is remeasured before the record is considered legitimate and must be at least as long as it was proclaimed to be.

"I've had four world bests on my courses," Sissala said. "You're always a little nervous when it's being remeasured." Each time, Thurston's review confirmed the accuracy of the original map.

"Measuring courses suits of lot of the things I like to do," Thurston said. "Sometimes it's a bit of a challenge to reduce a marathon course to one piece of paper, but it's a good feeling to illustrate something for a practical purpose."

BY CRAIG HERNDON—THE WASHINGTON POST

**School teacher Bob Thurston, 54, measures race courses with his bicycle, often in middle of the night.**

# LETTERS TO THE EDITOR

## He Just Keeps Going and Going

Jim Hage's story about Bob Thurston's race-course measuring in the Washington area [Sports, Sept. 26] was a nice tribute. Enough cannot be said about Bob Thurston's contribution to the sport of running. I don't know how many courses he has measured, but I believe it must number more than 1,000. Even with a lot of experience, it takes at least eight to 12 hours of work to get a five-mile or 10-kilometer course certified, including the measuring and all the related paperwork. Add it up: Bob Thurston has to have put in several man-years of effort to meet all these certification requirements.

I first met Bob Thurston in 1963 while working on the Fenwick Cherry Blossom race. He was the area official for the Athletic Congress certification. I still have a letter that I sent to him forwarding all the documentation necessary for certification. There were nine documents—not atypical for a national level race.

Incidentally, champion runner Greg Meyer set a 10-mile world-best time during the 1983 race (46:13) after falling down at the turn around (the record has since been broken). The Athletic Congress sent a certification expert down from New York to verify my measurement. My 10-mile measurement was only six feet off from his. Accordingly, Bob Thurston approved the certification. Greg Meyer's record stood for more than 10 years.

ARTHUR E. HASS
Reston

To: MN
Fr: R.Letson, 2870 Amulet St., San Diego, CA 92123-3137
Da: 1998 Sept 20
Re: achieving accurate measurements via automobile

Although automobile measuring has been discouraged for decades, automobiles are often used for design. I did this recently for a 6100 meters length of dangerous highway and was surprised to obtain three car measurements that agreed within 1.5 meters. Further study with a 3992 meters loop and a traffic circle suggest that car measurments, if performed carefully, can obtain accuracy sufficient for certification.

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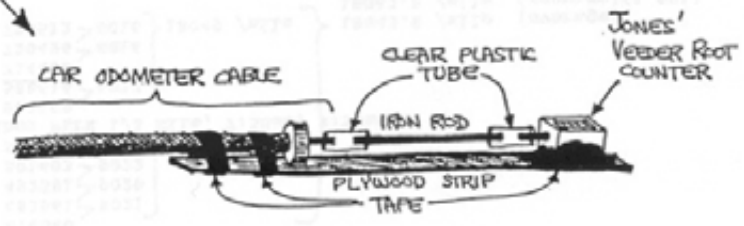
## MEASURING METHODS

BC - BikeCounter
AC - AutoCounter
ABC - Auto,BikeCounter

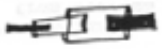
### BikeCounter (BC) Method
A bicycle with Jones counter is peddled on a baseline immediately before and after peddling the racecourse.

### AutoCounter (AC) Method
An automobile with Jones counter is driven on a baseline immediately before and after driving the racecourse. Adjustments are calculated for the offset between the odometer's wheel and the curb at turns.

### Auto,BikeCounter (ABC) Method
An automobile (with no Jones counter) creates a baseline "4.000" odometer miles long, and drives this baseline immediately before and after driving the racecourse. Then the baseline is accurately measured via BC method. Adjustments are calculated for the offset between the odometer's wheel and the curb at turns. THE "ABC" method is not as precise as the AC method.




IF THE PLASTIC TUBE IS TOO SMALL, FIT A LARGER TUBE OVER IT.



ELIMINATE ALL SOURCES OF RESISTANCE/FRICTION TO MOVING PARTS. CONNECTIONS MUST BE SECURE TO PREVENT SLIPS.

## ADJUSTMENTS *for AC or ABC methods*

AC and ABC methods may experience differences between the SPR and the path taken by the odometer's wheel on turns. Adjustment for each turn:

a. Measure the DEGREES of turn (from an accurate map).
b. Record if a shoulder was not measured,
   and measure the shoulder width (SW).
c. Record the number of lanes (LANES) not measured,
   and measure the lane width (LW).
d. Measure the car width: CW = distance between center of tires.
e. Determine which car wheel feeds the odometer
   (The following text assumes that the LEFT wheel drives the odometer,
   and LEFT TURNS require no corrections.)
e. Compute TOTAL DEGREES:
   TOTAL_DEGREES_FOR_CW_R_TURNS = sum of DEGREES for all right turns.
   TOTAL_DEGREES_FOR_SHOULDER = sum of DEGREES for all turns
   with unmeasured shoulders.
   TOTAL_DEGREES_FOR_LANES = sum of (DEGREE)(LANES) for all turns
f. Compute ADJUSTMENTS:
   ADJUSTMENT_FOR_CW_R_TURNS =
   (CW)(TOTAL_DEGREES_FOR_CW_R_TURNS/360)*2*PI.
   ADJUSTMENT_FOR_SHOULDER =
   (SW)(TOTAL_DEGREES_FOR_SHOULDER/360)*2*PI.
   ADJUSTMENT_FOR_LANES =
   (LW)(TOTAL_DEGREES_FOR_LANES/360)*2*PI.
   TOTAL_ADJUSTMENT = ADJUSTMENT_FOR_CW
   + ADJUSTMENT_FOR_SHOULDER
   + ADJUSTMENT_FOR_LANES.

## TEST RESULTS

AC IS BETTER THAN ABC: AC produced 8000 digits/mile, while ABC produced the equivalent of 800 digits/mile (10 digits/mile, viewed to within 1/20 of one digit, with a 4-mile-baseline).

AC SPEED LIMIT: The Jones counter can be damaged if it is driven faster than 500 RPM, or 5000 counts per minute, or 37 mph in my car. 70mph traffic on Hwy163 prevented lane changes or driving into the shoulder on turns, thereby necessitating adjustments for undriven lanes/shoulders.

CONSTANT SPEED: AC had 8184/mile at 20mph, and 8180/mile at 40mph. Driving at a constant speed reduces variation.

CONSTANT TEMPERATURE: AC had 8176/mile at noon, and 8184/mile at 7am. Measuring/calibrating before sunrise reduces variation.

CAR WIDTH: Because my car's left wheel fed the odometer, adjustments for car-width (between left/right wheels) were made for right turns.

AC IS ACCURATE: AC measurements: 3991.7m, 3990.3m, 3990.9m, 3991.5m
BC measurements: 3992.2m, 3992.8m

## FUTURE STUDY

Motorcycles may have advantages over bicycles (weight, stability, wheel width, speed) for measurement of road race courses. Future study of motorcycles might lead to improvements in accuracy and efficiency.

CAR MEASUREMENT OF HIGHWAY 163 (TOO DANGEROUS TO BIKE)

**D A T A :  ABC Method, "4.000" odometer miles, Hwy163**

```
R.Letson, 9-15-98 4am-9am
    Friars (B):  from Stadium turnout (N.side) to "4.000" miles
    Hwy163 (U):  from X-walk at Friars to "4.000" miles ("1244" 10th St)
Mission Bay Mile, 6am
    474540
    483561 > 9021
    492581 > 9020
    501603 > 9022
    510625 > 9022 > 18042.5 /mile
 Balboa Park 1/3 Mile, 7:30am, 8:50am
    582599
    588616 > 6017
    714480
    720496 > 6016
    726512 > 6016 > 18049 /mile  > 18045.8 /mile  (average)
                                   18063.8 /mile  (average)(1.001)
                                   11.2243 /meter (average)(1.001)

 Indirect measurement of Hwy163 via
 measurement of Friars:  (BC method)
    331500 Stadium parking turnout
    400194 +"4.000" odometer miles
     68694    [6119 meters]  3.802 miles  <--ride1, unadjusted
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**D A T A :  AC Method, Hwy163**

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9-17-98 noon (warm/sunny), Mission Bay Mile, VW van w/JonesCounter
    16364
    12276 > 4088    20 mph  <--These rides were too slow to be used
    08188 > 4088    20 mph     for the Hwy163 measurements
    04181                      which were made at 40 mph.
    00091 > 4088    20 mph
    98796.5
    94708.5 > 4088  20 mph
    90620 > 4088.5  20 mph
    86606
    82517.5 > 4088.5  20 mph
9-18-98 6am, Mission Bay Mile, R.Letson, '71 VW van w/counter
    22268.5
    14088 > 8180.5  40 mph
    10066
    05974 > 4092    20 mph  <--too slow for Hwy163 measurement
9-18-98 7am, Mission Bay Mile, R.Letson, '71 VW van w/counter
    11597
    01418 > 8179    40 mph
   103256
    95076 > 8180    40 mph
    93775.5                  8179.4 /mile
    85597 > 8178.5  40 mph   8179.9 /mile (40mph average)
    85463.5                  8188.1 /mile (*1.001)
    77283.5 > 8180  40 mph   5.0879  /meter(*1.001)
9-18-98 5am, Hwy163 southbound, from XWALK at Friars to "1244" 10th
    82841
    51626 > 31215   [6135.2 meters] (3.8122 miles)  <--ride2, unadjusted
   108614
    77403 > 31211   [6134.4 meters] (3.8117 miles)  <--ride3, unadjusted
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CAR MGMT. of Hwy163 (continued)

ADJUSTMENTS: ABC/AC methods for Hwy163

LaneWidth LW = 14 feet = 4.27 meters
ShoulderWidth SW = 4 feet = 1.22 meters
CarWidth CW = 55 inches = 1.40 meters

| | | .....SHOULDER..... | | | .....LANES..... | | | |
|---|---|---|---|---|---|---|---|---|
| DEGREES | TURN | ride1 | ride2 | ride3 | ride1 | ride2 | ride3 | |
| 115 | R | noS | noS | noS | 0 | 0 | 0 | |
| 55 | L | noS | S | noS | 0 | 1 | 1 | |
| 33 | R | S | S | S | 0 | 3 | 3 | |
| 36 | L | S | S | S | 0 | 1 | 1 | |
| 64 | R | S | S | S | 0 | 0 | 0 | |
| 27 | L | S | S | S | 1 | 1 | 1 | |
| 12 | R | S | S | S | 0 | 0 | 0 | |
| 12 | L | S | S | S | 1 | 1 | 1 | |
| 7 | R | S | S | S | 0 | 0 | 0 | |
| 24 | L | S | S | S | 1 | 1 | 1 | |
| 50 | R | S | S | S | 0 | 0 | 0 | |
| 38 | L | S | S | S | 1 | 1 | 1 | |
| 26 | R | S | S | S | 0 | 0 | 0 | |
| 13 | L | noS | noS | noS | 0 | 0 | 0 | |
| 512 | | 329 | 384 | 329 | 101 | 291 | 291 | degrees |
| | | 7.0 | 8.2 | 7.0 | 7.5 | 21.7 | 21.7 | meters |
| | | ADJUSTMENT_FOR_SHOULDER | | | ADJUSTMENT_FOR_LANES | | | |

TOTAL_DEGREES_FOR_CW_R_TURNS = 307 degrees
ADJUSTMENT_FOR_CW_R_TURNS = 7.5 meters

TOTAL_ADJUSTMENT 22.1 37.4 36.2 meters

SPR for Hwy163 6097.9 | 6098.8 | 6099.2 meters

ABC method

AC method

# CAR & BIKE MEASUREMENTS

of a 3992 meters loop, and a traffic circle

For comparison, car and bike measurements were made of two loops: a large meandering 3992 meters loop, and a small 78 meters traffic circle.

The 3992 meters Fiesta Island Bicycle loop is a recently paved, one-way-only, 5 meters wide road, with continuous painted lines on both sides (double-yellow on left, and white on right). Rather than ride to the edge of pavement as would be done for a race course, this test used the lines as delimiters, with rides 20 centimeters from the lines.

The 78 meters traffic circle was measured to reveal any bias between left and right turns.

All calibrations and measurements were performed on September 24, 1998:

### ... CAR ...

MB Mile, noon

```
 72722
 68633  4089
 64546  4087
 64381
 60293  4088
 56206  4087   8175.5 /mile
```

MB Mile, 3pm

```
 24235.5
 20147   4088.5
 16057.5 4089.5
 15852
  7674    8178 /mile
          8177 /mile avg.
       5.0808 /meter
```

### ... BIKE ...

MB Mile, noon

```
 854180
 863197  9017
 872213  9016
 881228  9015
 890241  9013   18030.5 /mile
```

Aero880y, 3:40pm

```
 984650
 993667  9017
1002682  9015
1011697  9015
1020712  9015  18031    /mile
                18030.8 /mile avg.
              11.2038 /meter
```

3992m-loop, 1pm — AC method uncorrected

```
 165471
 145156 20315  3998.4 meters
 124848 20308  3997.0 meters
 104537 20311  3997.6 meters
  84223 20314  3998.2 meters
```

3992m-loop, 1:30pm — BC method

```
 890640
 935368  44728  3992.2 m
 980102  44734  3992.8 m
                3992.5 m average
                  2.48 miles
```

78m Traffic Circle, 2pm

```
 57637
 57237   400 left-turn
 56568
 56168   400 left-turn
        78.7 meters
 55108
 54662   446 right-turn
 54216   446 right-turn
        87.8 meters
```

78m Traffic Circle, 2pm

```
 980700
 981574  874
 982451  877
 983326  875   875.3 avg
               78.1 meters
```

TRAFFIC CIRCLE ANALYSIS:

difference between left & right turn: 1.44 m = 56.7 inches
(approximate distance between center of left & right tires)

difference between center of left/right tires: 55.0 inches
1.40 m

left-turn error: 0.60 meters = 0.10 meters radius
3.8 inches

right-turn error: 9.65 meters = 1.54 meters radius
60.5 inches

CONCLUSIONS:

1. My car's odometer is fed from the left-front-tire.

2. The extra 0.10 meters radius for left-turns is probably due to the rear tire scraping the curb, preventing the front tire from getting closer than 40 centimeters to the curb. Because turns on the 3992m loop have large radii and no curbs, and the left front tire was driven 20cm from the line, left-turn corrections are unnecessary for car measurements of the 3992m loop.

3992m-LOOP CORRECTION for RIGHT TURNS:

| DEGREES | TURN | | |
|---|---|---|---|
| 198 | left | total LEFT turns : | 610 degrees |
| 42 | right | total RIGHT turns : | 250 degrees |
| 90 | left | | |
| 101 | right | total LEFT turn correction: | 1.0 m |
| 232 | left | total RIGHT turn correction: | 6.7 m |
| 22 | right | | |
| 90 | left | | |
| 85 | right | | |

CAR MEASUREMENTS
corrected for RIGHT turns:

| AC method | difference from bike | |
|---|---|---|
| | 60.5" | 55.0" |
| 3991.7 m | -0.8 m | -0.2 m |
| 3990.3 m | -2.2 m | -1.6 m |
| 3990.9 m | -1.6 m | -1.0 m |
| 3991.5 m | -1.0 m | -0.4 m |

CONCLUSIONS:

1. The LEFT wheel on my car is the measuring wheel.

2. Corrections on my car need to be applied for RIGHT turns.

3. Distance between center of left/right tires may be used for the right turn correction.

4. This test produced car measurements (AC method) that were precise accurate, and sufficiently biased for certification.

To: MN
Fr: Robert Letson, 2970 Amulet St., San Diego, CA 92123-3137
Da: 10-5-98
Re: Achieving accuracy with a motorcycle

A dangerous stretch of highway - with 70mph traffic, blind turns, and no shoulders for some turns - is being planned for a future race. Flashing lights from police cars cannot be seen around some blind turns. Risk of collision may be less if measuring is performed at higher speeds. Towards this end, automobiles and motorcycles are being studied as candidates for accurate measuring on dangerous highways.

Automobile measurement study, reported earlier, suggests that accuracy and precision within 1/2000 is achievable if compensation is made for right turns (for car odometers driven by a left wheel).

Motorcycle measurement study suggests that accuracy and precision within 1/1000 is achievable. Two tests were performed:

Test A: Motorcycle measurement with Veeder Root counter, producing 22870/mile, with a speed limit of 13 mph.

Test B: Reversed Jones-Oerth counter, designed to allow motorcycle measurements faster than 30 mph, was tested via automobile.

---

M O T O R C Y C L E  M E A S U R E M E N T  10-4-98
driver: Holly Hearn, 4385 34th St., San Diego, CA 92104
recorder: Robert Letson, 2870 Amulet St., San Diego, CA 92123-3137

Mission Bay Mile (measured by EDM, accurate to one inch)

| | begin | end | /mile | difference from average | | |
|---|---|---|---|---|---|---|
| 9am | 79263 | 56406 | 22857 | -24 | -1.7 meters | |
| | 55697 | 32809 | 22888 | 7 | 0.5 meters | |
| | 32503 | 09612 | 22891 | 10 | 0.7 meters | 22881 /mile average |
| | 07716 | 84829 | 22887 | 6 | 0.4 meters | 14.217 /m |
| noon | 70419 | 47560 | 22859 | -9 | -0.6 meters | |
| | 47165 | 24292 | 22873 | 5 | 0.4 meters | |
| | 24111 | 01247 | 22864 | -4 | -0.3 meters | 22868 /mile average |
| | 01107 | 78231 | 22876 | 8 | 0.6 meters | 14.210 /m |
| | | | | | | 14.213 /m overall avg. |

Fiesta Island 3992m loop

| | begin | end | /loop | overall avg. | diff. from bike (3992.5m) | |
|---|---|---|---|---|---|---|
| 11am | 84826 | 28059 | 56767 | 3993.9 m | 1.4m | 0.04% |
| | 128059 | 71305 | 56754 | 3993.0 m | 0.5m | 0.01% |

difference between motorcycle measurements: 0.9m 0.02%

---

M O T O R C Y C L E  A N A L Y S I S

1. The spread in baseline rides is 0.15% and 0.07%. If the first baseline ride is ignored, spread for pre is 0.02%.

2. The spread in the two motorcycle measurements is 0.02%.

3. The difference between bicycle and motorcycle measurements is 0.04%.

4. Motorcycles ride the SPR directly.

5. The speed limit for the motorcycle measurement (5000cpm or 13mph) is too slow for safety. To increase speed, a Jones-Oerth counter was reconfigured and tested (following page).

# REVERSED JONES-OERTH COUNTER 10-5-98

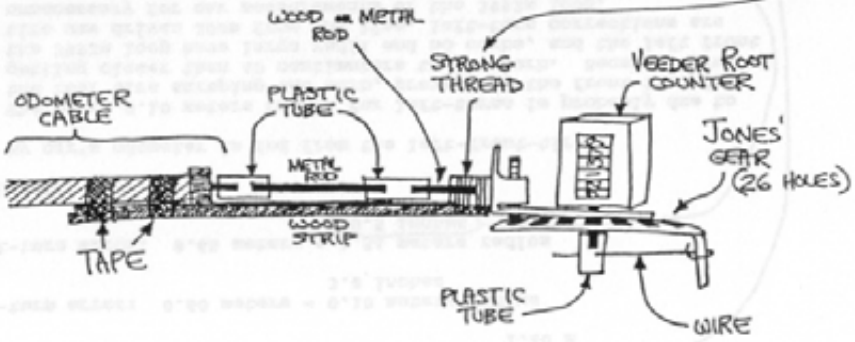
To increase the motorcycle measuring speed, a Jones-Oerth counter was reconfigured to reduce the speed of the counter. Two reconfigured counters were built and tested by mounting them on an automobile odometer, and driving on the Mission Bay Mile:

Mission Bay Mile, 10-5-98, 3pm, 75°F, sunny
Reversed Jones-Oerth counter mounted on '71 VW Van odometer cable.
Because these gears seemed to be sticky, I moved them back and forth to obtain the most probable number before reading the counter.

| CTR-1 | | | CTR-2 | |
|---|---|---|---|---|
| 184303 | | | 78436 | |
| 187764 | 3461 | 35mph | 81895 | 3459 |
| 187862 | | | 81978 | |
| 191321 | 3459 | 40mph | 85438 | 3460 |
| 191871 | | | 85987.5 | |
| 195330 | 3459 | 45mph | 89446 | 3458.5 |
| 195416 | | | 89506 | |
| 198874 | 3458 | 50mph | 92965.5 | 3459.5 |
| 199191 | | | | |
| 202553 | | | | |
| 202557 | | | | |

... counter fell apart when Jones' gear is attached to wood strip

A stronger binding was made with carpet thread (not yet tested). Assuming the ratio between automobile and motorcycle counts/mile is the same as previous tests (i.e., 22875/8180 = 1.7965), the Reversed Jones-Oerth counter will have a motorcycle measuring speed limit of 36 mph.



**MNF #0158 17Sept98**

**RECORD COUNTER LONGEVITY?**

I have been using my original Jones Counter since 1980. The first "Certification Letter" I have from Ted Corbitt is dated 10-April-80.

Of course, the counter has not gotten the heavy use of many others: but it hasn't missed a beat. I own a new, 6-digit counter and I probably should change over to it just to be on the safe side. I'd hate to lose a measurement because of counter failure.

Does anyone know if there is warning before failure or if they just break and quit?

Paul Hronjak hronjak@mindspring.com

**MNF #0159 18Sept98**

**JONES COUNTER LIFESPANS**

Regarding Paul Hronjak's question about failure modes of the Jones Counter...

I had the opposite problem. My very first Jones Counter failed after only three weeks of use. It apparently was a bearing failure. What I first noticed was increasing resistance as the mechanism rotated. Gradually, there was enough resistance that the nylon gear teeth began to wear considerably, and then the counter began to "slip" from spoke-to-spoke. By then, of course, it was useless for measurements, and as we were in the middle of a course measurement for an upcoming race, we sent off for a replacement counter with overnight delivery. Of course, to Hawaii there is no such thing as "overnight" delivery. Even 2nd Day Delivery takes 3 or even 4 days.

The second Jones Counter has been flawless and reliable since then, but like Paul's it has not seen a lot of use. I do take care now to inspect the nylon gear teeth for wear and to rotate the mechanism by hand to check the resistance. If I see either symptom, I will immediately send for a replacement.

cbeck@hei.com

My counter was made in 1973 and it still works. I guess it is serial number 0 as I sent serial number 1 to Ted Corbitt on Oct. 1 of that year.

Clain had a few come back for repair but I can't remember what was wrong with them.

Alan Jones

**MNF #0160 20Sept98**

**COUNTER FAILURES**

Here is a collection from my own experience of 7 years of measuring and two years as SEAA measurement secretary (in US terms = Certifier). Since I have 70 measurers in my area, I suppose this amounts to some 150 measurer.years of experience. Quite a small sample of the overall world scene, but as you will see below some interesting points arise.

A) Seized bearing

After very approximately 200 miles use my second Jones Counter failed when the ring gear which carries the lug which engages the wheel became very stiff and the three spot welds, which hold together the slot acting as the bearing, sheared. Lesson learnt: be more generous with the lubrication especially if you are going to ride in wet weather on dirty roads. Incidentally my first counter I mounted on my son's bike which he promptly he had stolen just after I had measured my first course.

B) Slipping of counter shaft in plastic cog

When became custodian of the SEAA's stock of counters. I mounted one on my son's replacement mountain bike. After a less than 100 miles I noticed it slipped intermittently. It could be just be got to work by tightening the wires. The shaft on the counter seemed to only just be long enough to engage in the square hole in the plastic cog, and this hole was very slightly rounded. I decided it was not sufficiently reliable, so retired this almost new counter.

C) Slipping of counter shaft in plastic cog

Bob Cathmoir recently had to have a replacement for a counter which he had used for about 5 years. He wrote:

"The metal shaft has been quite crudely filed square and this inserted into a square hollow through the centre of the plastic cog shaft. Those two are held together by the wire bindings. In mine, it was the metal shaft that had slipped and rounded off the plastic aperture. I have several thoughts about why this happened:

1. Just bad original fit, slowly working loose. 2. Alignment is purely about those wire bindings holding the two together and the prominent threaded barrel being kept hard against the counter box. Any loosening of those bindings might be fatal. 3. Thirdly, and probably my favourite, a sideways knock of the counter would loosen those bindings and cause misalignment.

I think the occasional check to make sure those bindings are tight might be wise. As we know it's not a common problem, so probably the best advice is if it isn't broken don't fix it. In other words leave well alone.

I repaired the broken one by grinding about an 1/8th. of an inch off the threaded barrel to allow the square end of the shaft to go further into the plastic shaft, beyond the damage. I am a better photographic lecturer than I am engineer, so it will be kept strictly for emergencies." ---- Bob Cathmoir

D) Slipping of counter shaft in plastic cog

Yesterday an event occurred which finally convinced me of the importance of writing this contribution to MNF. While I was out measuring at 6.30 am, my wife had an emergency call from Roger Strickland who had just discovered his counter was intermittently slipping. He had diagnosed the problem and found the socket was so badly worn that he could not get a reliable fit. He came over to pick up a replacement and left me the old one. It looks as if I could fix it by following Bob Cathmoir's method of grinding down the metal threaded barrel. With this event it became clear to me that there is a seriously worrying failure mode with the old Jones style counters which are the type almost exclusively in use throughout the UK. If this slipping is intermittent and goes unnoticed it will lead to problems.

The occurrence of three counters with slipping of the shaft in the cog, all from SEAA measurers provided with counters in the last 7 years could indicate a batch problem with the manufacture. I believe Roger Gibbons may know of a large batch that was purchased by the SEAA possibly from the NYRRC.

It would help to track down batch problems if counters had serial

numbers.

E) Possible counter failure or other unknown serious measurement problem

A little while ago I had a very unfortunate retirement of one of the accredited SEAA measurers. He had laid out a 5 mile course which was challenged by the organising club, who attempted to prove their point by measuring with a surveyor's wheel showing that one mile interval was long by 300m. Before a remeasurement was done I assessed the situation as follows:

"Had a real testing one tonight. A measurer calls to say that the 5 miler I certified for him is being queried by the race director as too long. Seems a club member has ridden it with a bike and a Cats Eye and decided mile 2 to 3 is long. The club member has then checked it with a surveyor's wheel, reporting all miles OK except 2 to 3 which is 300m long!!!! Cant speak direct to the wheeler but everybody is in awe of his figuring since he works with computers (wow!).

Checked the measurer's report again. Everything spot on. Measurer says he had 4 rides all coming out with cms of one another. I dont know why he checks so much (lack of confidence? justified?) Anyway 300m is a gross mistake by someone.

Possibilities are: 1. wheeler screwed up 2. measurer's counter stopped working for 300m (possible but then the overall course would be out on that ride, which it was not) 3. Measurer rode a different route to the wheeler. Seems impossible to believe on a fairly simple course when both sides are adamant that the map correctly shows the course. The measurer was shown the course by the race director for his first ride.

A single counter misreading at a split would make two of the mile intervals wrong, which does not seem to be the case.

The race is on 1 July. In jest because of the short time I suggested the race director to get the runners to record their mile splits and then average them to see if the mile is out. More seriously I gave out some names of measurers who might be able to carry out a check. I do worry about wasting measurers' time. I think I am about 99.99% sure that the wheeler did not follow the same route that the measurer followed. Perhaps I will get a useful pedagogical tale out of it.

Watch this space."

What then transpired in the few days before the race was the original measurer, checked the second mile and found it to be 300m long. A grade one measurer confirmed an error had been made and laid out the whole course again with altered start and finish. As far as I could interpret the situation it seemed that the whole course had indeed been long by about 300m. Since the original measurer had measured several times I wonder whether he had had problems with a repeatedly slipping counter. Unfortunately he resigned and I felt it would be inappropriate behaviour to pester him for every detail of what he did on 'the four rides which came out to within cms'

Moral: If you have something that just does not work out, please preserve your field notes with the greatest possible care and share them and a detailed commentary on your procedure with your certifier. It is always possible that between you and your certifier the cause may be pinned down. In this instance I have my suspicions that a slipping Jones Counter could have contributed to the measurer's problem. I shall now write to the retired measurer asking if I can borrow his Jones Counter for strip down and inspection.

F) Jones-Oerth model, failure of glue joint

When I had the bearing failure described at A) above I purchased my new counter from Paul Oerth. After some years the counter unit became loose and eventually dropped off during a measurement. I tried to glue it back together but after this failure happened a couple of times I wired it on in a similar fashion to the old Jones Counter. It has been 100% reliable ever since in very heavy use, with very thorough repeat measurement checking being done to look for measurement errors of any type.

Conclusion

I shall be checking my email irregularly for the next 24 days as I shall be visiting Sydney and Melbourne and spots in between. However, when I come back I shall be interested to see if anyone else has had similar failures. If you have a failed counter the best thing would be to send it back to the manufacturer. This may be inappropriate where the manufacturer has ceased production. I believe that only Paul Oerth is in production at present, and any failed counters made by Paul should obviously be 'offered' back to Paul for investigation. Depending on Paul's interest in the older counters made by others I would be interested to receive any failed counters with their history. I would examine these and produce a report.

Mike Sandford m.sandford@lineone.net

I bought my first Jones counter sometime prior to March 25, 1982, which is the date of my first course measurement. This Jones counter is still in use but I have an extra in case of problems or to put on another bike so two riders can ride over a course instead of me riding the course twice. The last time I used both Jones counters was on August 23, 1998 when I measured The Around the Bay 30 km in Hamilton, Ontario, Canada. This is the oldest road race in at least North America, even older than Boston. The first running of this race was in 1894. This race course goes along some quite busy roads and it was a pleasure to have another measurer, Mike Zajczenko, riding on his bike and the race director, Bob Ranalli running interference in his car. I wouldn't hesitate to ask Mike to help me measure another long course but he indicated that once was enough. The temperature was near 35 C or higher that day and the sun had made its presence known. The pop and fruit that Bob had available on the route were very much appreciated but not as appreciated as the beers at the end of the measurement.

Bernie Conway measurer@ican.net

When counters begin to stick or to be hard to turn by hand it is a sign they are about to fail. Two things are usually the cause of that problem: misalignment between the sprocket gear and the counter, and water seeping into the counter.

In producing the new model Jones/Oerth Counter we have virtually eliminated both problems; however of the more than 1500 units we have sent out 6 have had the counter part of the finished product fail and were replaced. When we first began the project seven years ago the biggest problem we had was cementing the two parts together. The body of the counter is made from the Dupont plastic, 'Delrin', which is an excellent material for casting and machining; but very difficult to bond to anything else including other Delrin. Dupont finally solved that problem with a special epoxy cement they produced just for bonding Delrin to Delrin. As it turned out, however the epoxy alone was not sufficient to solve the bonding problem completely as early failures were to prove. We finally got around that problem by applying hot glue to the outside as a final operation. But that too is a difficult application problem requiring a very steady hand which, fortunately, my son, Karl, has.

We had other problems to overcome. The counter itself comes with a round shaft which we must grind square. That is an art which my Karl achieved; but not easily as the heat of grinding can destroy the internal parts of the counter. We tried to spray water on the shaft during the grinding operation, but if even a small amount of water reaches the inside of the counter that too destroys it. As you can imagine the early going was a very expensive learning process. We still occasionally ruin some counters, but rarely.

I sent the first Jones/Oerth Counter to Alan Jones who was the original genius behind the invention.

I didn't intend this to turn into an essay. That's Malcolm's domain, and Mike Sandford's too. They are much better prepared for such linguistic efforts than I could ever hope to be.

Cheers,

Paul Oerth Poerth@aol.com

Paul,

Your warning on water seeping into the mechanism and ruining leads me to the following question:

Since many of us measure in the rain (sometimes inadvertantly), if the counter gets wet, how should it be dried. Also, is there some type of lubrication (WD40, lithium grease, silicon, etc) that you recommend applying to the counter to prolong its life.

Jim Gerweck Zgerweck@aol.com

**MNF #0161 21Sept98**

**COUNTER FAILURES**

This may not be totally accurate. It is based on my recollections.

About a decade ago I ordered a counter from New York Road Runners Club (NYRRC), which at the time was the source of counters. When I received the counter it looked superficially OK, but then I noticed that the counter was not coaxial with the gear drive socket. The two parts were obviously not aligned properly.

On these counters, a Veeder-root counter was mounted to a Stewart-Warner mechanical odometer gear drive. Because the threaded portion of the gear drive was too long to permit the counter shaft to reach the square drive hole in the plastic gear, it was necessary to cut off the threaded portion to the proper length, to allow the counter shaft to adequate engage the drive hole. It was also necessary to grind the counter shaft to a square cross-section, so it would fit nicely into the square hole in the gear.

My counter was not coaxial because the threaded portion had been cut off at an angle, and the mounting face contacted by the counter was not perpendicular to the axis of the gear. I removed the wires holding the counter together, and looked at the counter shaft. It was very crudely ground to a sort of quadrilateral shape, not at all a square.

The whole thing was a totally botched job, and after I made some inquiries I found that counter work was being done as a sort of social-welfare activity. Indigent people were being paid by NYRRC to grind or file the counter shafts, cut off the threads on the drive gears to the proper length, and assemble the counters. Some of these people were obviously not doing the job properly, and faulty units were being shipped.

As I valued having a good counter above the welfare of those who made it, I was unhappy.

I also learned that NYRRC's stock of Stewart-Warner drive gears was nearly exhausted and no longer being manufactured. I was concerned that our principal tool might become unavailable.

While shopping at K-Mart, I saw a mechanical bicycle speedometer-odometer. It had a drive gear similar to the Stewart-Warner. I contacted the distributor and found that the gear was available as a part. Not wishing to go into the counter business, I made some inquiries, and found that Paul Oerth was interested. Paul contacted NYRRC and they had no objections to his manufacture of the counters. I put him in contact with the gear distributor, and I sent him the gear I had got from K-Mart. Paul and I discussed various ways to marry the counters to the drive units. Finally, Paul worked up a prototype, and it appeared as the cover photo on the September 1991 (#49) Measurement News.

The major problem, which has been partially overcome by glue, is that it is difficult to bond the plastic counter to the plastic sleeve. They seem to resist bonding. The bonding problem has been partially solved by the use of hot glue, but it is still not totally fixed. This remains the only problem of the Jones/Oerth counter that has not yet been completely resolved. I have never heard of any sloppiness in the machining.

Some people have made themselves feel more secure by adding their own wires to the JO counter, to assure that the counter stays where it belongs. While this works, it is sloppy.

I am sure that Paul Oerth would be delighted to hear of a fix for the bonding problem.

In my opinion, the present JO counter is the best counter made so far. It has got rid of the wires on the original Jones model, and has eliminated the quality-control problems of the NYRRC model.

Pete Riegel riegelpete@aol.com

**MNF #0162 21Sept98A**

**Jones Counters**

I am using the same JC which I was given by the RRC 10 years ago, and it stays on my cycle all the time. I am tempted to say that it has always worked well, but who knows whether it has ocasionally slipped ? Here is another good reason for making 2 runs every time. Mike, as I recall Mike Tomlins - then BAF Measurement secretary - placed an order for all British regions. He may have made this via PR or direct to NYRC. Certainly they arrived in seperate batches because I had to drive 12 miles to pay import duty before they were released! It was the only new batch that came into my hands and included those I distributed to Bob C and Roger S. I passed the rest to you.

Roger G
zeando@globalnet.co.uk

**MNF #0163 22Sept98**

**COUNTER FAILURE**

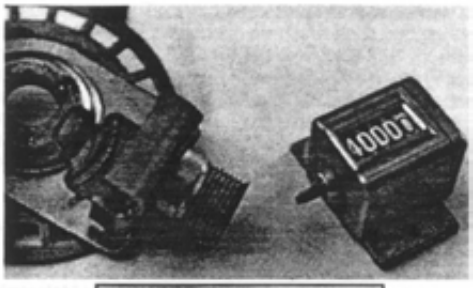
This is another forbidden subject, though again I didn't introduce it to MNF (offhand I recall only one other such topic, which was right up my alley, not that the "expert" opinion was muted one iota there either, so I may not await an "invitation"). MikeS was aware of the delicacy of this area. Others "out there" have been too, but as they didn't respond to my requests for calibration data, if only to say they hadn't kept any, I

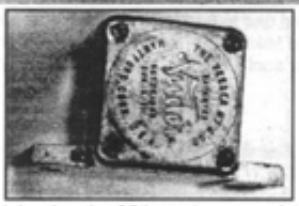
presume they will continue forever lurking. This was prior to the advent of MNF, and it's their prerogative of course, and I suspect Mike, too, will have to learn to live with that unfortunate reality. If you read his "D)" in particular (though really his whole documentation), it says it all, but I think he missed one case.

The possibility of Intermittent Counter Failure arose, again from a probe of the Atlanta data. I was summarily told that it just doesn't happen, and agreed: without calibration data my theory remained just pure speculation. In other cases I concluded my imagination had run away with me, but continued a rational discussion with Mike. He didn't think it happened either, so that put three of us in agreement. He then proceeded out to his garage to get a bike for a measurement, when lo ... . I don't think they'll mind my quoting this bit, slightly edited.

Subj: Pete's Visit and a resonse to Rambles Date: 97-04-10 17:47:48 EDT Missing Counts: Both Pete and I are wrong: counters can miss counts, although they do it by missing single counts which add up. I don't think they miss say just the 100-digit change. I discovered this when I got my son's mountain bike out to accompany Pete. The Counter had become dislodged. When I pushed the square shaft on the counter into the socket in the gear set, it failed to engage fully and I got intermittent counts as I pushed the bike backwards and forwards. This is the first time I have ever observed such a phenomenon. I could not believe, I thought there was a good solid fit. But Pete said these early NYRRC counters were produced to poor specifications and often the mating parts were not square leading to a motion on this drive that could lead to failure. I guess that can fully account for xx's slow loss of counts, and I must accept the possibility of this occurring before the actual run unnoticed by xx. This does not quite gel with Pete's dogmatic statement to you that counters never fail intermittently. I don't condemn Pete for his statement, on balance he is right about most things. I am going to look CLOSELY at the counter when I get some time.

Malcolm Heyworth
Jheyworth@aol.com



We are celebrating the 25th anniversary of the Jones Counter. The first one was mailed to Ted Corbitt on October 1, 1973.

This photo shows the earlier prototype device with which Alan Jones measured a course in 1971. The top part of the photo shows the gear and the counter. Note that they are not attached. The device hadn't progressed to that level of sophistication. The counter was wired to the bicycle fork and its shaft slid into the gear. The bottom photo shows the end of the metal counter on which is written: The Veeder M.F.G. Co., Patented, Veeder, Oct. 22, 1896, Aug. 15, 1911. Hartford, Conn. U.S.A.

Ted Corbitt (right), considered the father of the US measurement community, is greeted by Tom McBrayer at the RRCA annual convention in Peoria, IL in June. Ted is also a past president of RRCA and one of the early distance runners. He logged 199 marathons and ultra races.

09/23/98

FROM: TED CORBITT

TO: PETE RIEGEL, CHAIRMAN ROAD RUNNING TECHNICAL COUNCIL

I WAS SURPRISED AT SEEING DON ALLISON'S PAGE: "TED CORBITT: A TRUE RUNNING PIONEER," IN THE SEPTEMBER 1998 MEASUREMENT NEWS.

I FOUND IT INTERESTING, BUT I WANT TO CORRECT A TYPO ERROR AND ONE MISTAKE, AND TO COMMENT ON A FEW ELEMENTS IN THE ARTICLE.

MY FIRST MARATHON WAS INDEED AT BOSTON IN 1951, BUT THE TIME WAS 2:48:42 (NOT THE "TYPO" 2:58:42). I RAN THE BOSTON MARATHON 21 TIMES, PLUS ONCE UNOFFICIALLY, OVER A 24 YEAR PERIOD, WITH TIMES BETWEEN 2:53:31 AND 2:28:06.

MY SHORTEST ROUTE TO WORK WAS 11.6 MILES. WHEN I DID RUN 30 MILES TO WORK, I RAN TO A 440y TRACK, DID 17 MILES, THEN RAN ON TO WORK. MOST OF MY 30 MILERS ON WORK DAYS WERE DONE AFTER WORK. I NEVER RAN 30 MILES EACH WAY, BUT I DID LOG A TOTAL OF 50 MILES TWICE ON WORK DAYS AND RAN 40 MILES THE FOLLOWING DAYS. THIS HAPPENED ONE SUMMER WHEN I RAN 40 MILES MONDAY THROUGH FRIDAY, BUT RESTED ON THE WEEKENDS, USING THE TIME TO CATCH UP WITH COURSE MEASUREMENT BUSINESS, WRITING UP TO 30 OR MORE LETTERS ON THE WEEKEND.

THE ROAD RUNNERS CLUB OF AMERICA (RRCA) GOT UNDERWAY IN 1958, WITH OLYMPIC ('48, '52) STEEPLECHASER H.BROWNING ROSS AS PRESIDENT. ROSS HAD IMPORTED THE RRC PROGRAM FROM ENGLAND. THIS GAVE US A VEHICLE WHEREBY WE HAD A REASON AND NEED TO INITIATE A COURSE MEASUREMENT PROGRAM. WE DID OUR FIRST MEASUREMENT IN NEW YORK IN 1960. I WAS THE THIRD PRESIDENT OF THE RRCA. I WAS PROBABLY MORE VISIBLE THAN MY TWO PREDECESSORS, BECAUSE I PUT OUT A QUARTERLY NEWSLETTER, SPECIAL BULLETINS, AND TWO PAMPHLETS (ONE ON NUTRITION; AND ONE ON WEIGHT TRAINING, WRITTEN BY OLYMPIC MARATHONER NICK COSTES), AND I WROTE LETTERS ENCOURAGING THE NEW ROAD RUNNERS CLUBS TO WORK AT SURVIVING.

I WAS SUCCEEDED AS RRCA PREXY BY MY NEW YORK PIONEER CLUB TEAMMATE JOHN STERNER. IN 1964 WE GOT INVOLVED IN SETTING UP THE NATIONAL COURSE MEASUREMENT MOVEMENT. STERNER SERVED AS CHAIRMAN OF THE RRCA STANDARDS COMMITTEE FOR ABOUT TWO YEARS AND I HELPED HIM, AND I SERVED AS CHAIRMAN OF THE AAU (TAC) STANDARDS COMMITTEE FOR ABOUT 18 YEARS.

AS FOR THE HIGH TRAINING MILEAGES, MUCH OF THAT WAS EXPERIMENTAL EXPLORATIONS. NOT MUCH HAD BEEN WRITTEN ON TRAINING IN THOSE DAYS. OVER A SIX YEAR PERIOD, I LEARNED THAT IT WAS POSSIBLE TO WORK FULL TIME AND TO PROGRESSIVELY WORK UP TO RUNNING 200 MILES A WEEK FOR MONTHS AT A TIME (WITH THE HELP OF AN UNDERSTANDING, FLEXIBLE WIFE); AND THAT IT IS IMPOSSIBLE TO RUN TOO MUCH, IF YOU SUCCEED IN ESCAPING INJURY. BUT TO CASH IN ON EXTENSIVE TRAINING LOADS, YOU MUST BREAK OFF THIS TRAINING EARLY ENOUGH TO GIVE YOUR BODY TIME TO REPAIR ITSELF AND TO LEAVE YOU FEELING FRESH AND IMPATIENT TO RACE. OTHERWISE, YOU END UP WITH LOTS OF ENDURANCE BUT UNABLE TO RACE AT THE NEEDED SPEED WHEN YOU NEED IT. THAT CONCLUSION SEEMS OBVIOUS, BUT IF YOU ARE ADDICTED TO RUNNING, THEN SHUTTING DOWN THE TRAINING SUFFICIENTLY TO PREPARE TO RACE AT YOUR BEST, MAY BE EASIER SAID THAN DONE.

Ted Corbitt

## Jones/Oerth Counter Sales by Country and Year

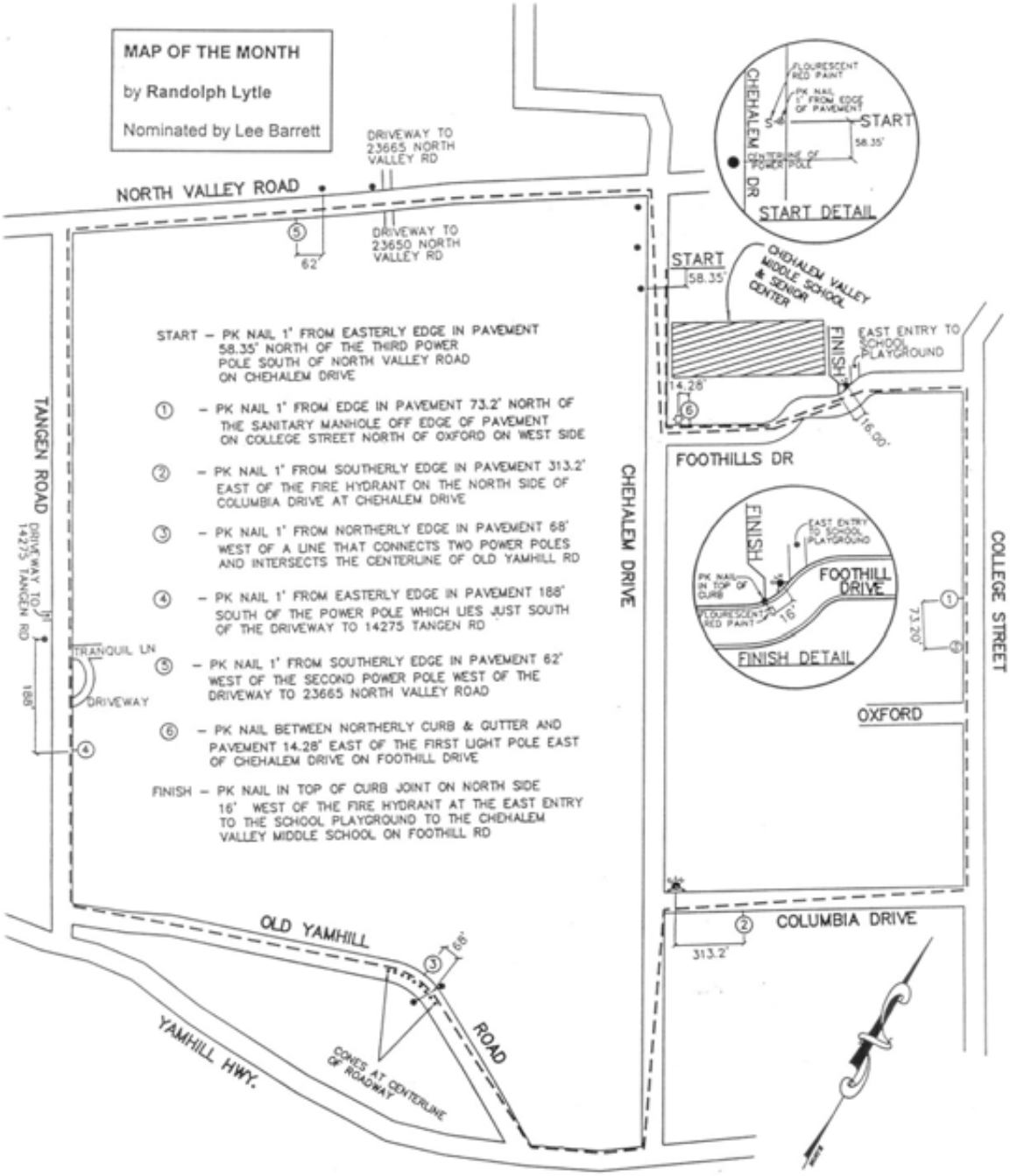
| Country | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Total |
|---|---|---|---|---|---|---|---|---|
| United States | 87 | 38 | 44 | 55 | 66 | 65 | 52 | 407 |
| France | 4 | 61 | 0 | 50 | 18 | 18 | 14 | 165 |
| Australia | 31 | 1 | 12 | 2 | 0 | 1 | 3 | 50 |
| Germany | 4 | 2 | 20 | 0 | 0 | 10 | 12 | 48 |
| Spain | 20 | 16 | 0 | 0 | 7 | 7 | 6 | 56 |
| Ireland | 1 | 12 | 10 | 4 | 0 | 8 | 0 | 35 |
| New Zealand | 17 | 2 | 0 | 16 | 0 | 0 | 0 | 35 |
| Singapore | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| Great Britain | 8 | 21 | 2 | 0 | 1 | 0 | 0 | 32 |
| Japan | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 27 |
| Netherlands | 4 | 0 | 3 | 18 | 2 | 0 | 0 | 27 |
| Finland | 1 | 10 | 0 | 5 | 0 | 0 | 0 | 16 |
| Kenya | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 15 |
| South Africa | 10 | 0 | 0 | 2 | 0 | 0 | 0 | 12 |
| Puerto Rico | 10 | 0 | 0 | 1 | 0 | 0 | 0 | 11 |
| Canada | 7 | 2 | 1 | 0 | 0 | 0 | 0 | 10 |
| Hong Kong | 2 | 0 | 0 | 0 | 0 | 6 | 0 | 8 |
| Norway | 0 | 2 | 0 | 6 | 0 | 0 | 0 | 8 |
| Scotland | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| Czech Republic | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Denmark | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 6 |
| Macau | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 |
| Italy | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Mexico | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| South Korea | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Argentina | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Cyprus | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Fiji | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Greece | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Iceland | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| India | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Jamaica | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| New Caledonia | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Sweden | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Pete Riegel | 38 | 31 | 62 | 10 | 25 | 3 | 13 | 182 |
| Totals | 295 | 215 | 189 | 179 | 119 | 118 | 101 | 1216 |

Pete Riegel has bought 182 counters and presently has 20 on hand.
The 162 were distributed approximately as follows:

| | |
|---|---|
| Great Britain | 60 |
| USA | 34 |
| France | 30 |
| Mexico | 15 |
| Colombia | 12 |
| Brazil | 12 |
| Indonesia | 10 |
| Malaysia | 5 |
| Venezuela | 2 |
| Japan | 2 |

Total sales to
September 20, 1998: 1216
Five digit: 572
Six digit: 644

The above information was provided by Paul Oerth, manufacturer of the Jones/Oerth Counter




# CHEHALEM VALLEY 10K, NEWBERG OREGON
# COURSE MAP - OR98013-LB

DATE: 9/1/98

4202 E. Fowler Avenue # 30322
Tampa, FL 33620-3032
September 8, 1998

USATF/RRTC Course Registrar
Joan Riegel
3354 Kirkham Road
Columbus, OH 43221-1368
Phone: (614) 451-5617
Fax: (614) 451-5610
email: riegelpete@aol.com

Enclosed is a money order in the amount of $2.00 for a copy of the official certificate with course map for the Vicksburg Run Thru History 10-K run located in Vicksburg, Mississippi. Listed below is the course ID and information necessary to process this request. As a veteran of every one of these races, I am attempting to establish a web site for this race before the 20th anniversary run on March 4, 1999, and I have two questions listed below, related to certification.

1) Since this 10-K course certification is expired, does it need to be re-certified for records to be judged official?

2) A 5-K race walk follows a portion of the 10-K run race course and ends at the same finish line. Does this separate 5-K race walk need a separate certificate, or can it use the previously issued 10-K certificate?

| DISTANCE | COURSE ID | ST | LOCATION | COURSE NAME/RACE | DROP | SEP | MEASURER |
|---|---|---|---|---|---|---|---|
| 10km | MS 85004 C | X | Vicksburg | Run thru History | 2 | loops | J Mitchell |

Thanks for your assistance.

Sincerely,

Gary Sessums

# USA TRACK & FIELD

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

614-451-5617 (phone)
614-451-5610 (fax)
E-mail: Riegelpete@aol.com

Gary Sessums
4202 E. Fowler Avenue #30322
Tampa, FL 33620-3032

September 10, 1998

Dear Mr. Sessums,

Enclosed is a copy of the certificate for the Vicksburg Run Thru History, MS 85004 CJ.

In answer to your questions:

1) A course does not need to be renewed for records to count. It may be renewed if the course is unchanged since it was measured, and all reference points necessary to locate start and finish can be found.

In the case of this course, my examination of the map reveals that the exact finish location has not been documented. The measurer, Joe Mitchell, did not include this on his course map, and it slipped by Carl Jeansonne, the Certifier, and me. This means, unfortunately, that **the course cannot be considered for record purposes.** It must be remeasured. Historical paintmarks are unreliable. The course has been deleted from the active list.

2) Even if the finish line was documented, the 5 km walk could not be considered as certified, since no starting point for 5 km is documented.

It is remotely possible that Carl or Joe may possess sufficient documentation to establish the finish line, but a long time has elapsed.

Since this is an unhappy answer to your problem, I'm returning your money order.

Best regards, Pete 26