

Measurement News



May 2002
Issue #113



Coal mine safety equipment may be used in the measurement of road race conditions. This is a safety lamp used to detect combustible gas and low oxygen. See article within.

MEASUREMENT NEWS

#113 – MAY 2002

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Subscription cost:

MN is sent free to RRTC officers and certifiers, and AIMS/IAAF measurers. Others may obtain MN by sending \$20 (for a one year subscription - six issues) to Pete Riegel.

Course lists for individual states may be obtained via email, free. Contact Pete Riegel at: Riegelpete@aol.com

Deadlines

Material intended to be included in the July 2002 issue must be in the Editor's hands by **June 24**. Next issue will be mailed in early July.

ONLINE MEASUREMENT FORUM

All it takes to become a subscriber is access to email. Simply send to MNForum@aol.com with "Subscribe MNF" in the subject heading box, and you will be added to the list. Postings on any subject related to measurement are also welcome at the same address.

ROAD RUNNING TECHNICAL COUNCIL

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Vice-Chairman (West).....	Tom McBrayer
Registrar of Courses.....	Karen Wickiser
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Athlete Representatives.....	Carol McLatchie, Dan Dillon
National Officer Liaison.....	Bill Roe
Regional Certifiers.....	See list in this issue.

Visit the RRTC website at:

<http://www.rrtc.net>

A complete list of certified courses may be downloaded from this site.

A complete USATF measurement book can be downloaded from this site.

ABOUT MEASUREMENT NEWS

Measurement News (MN) is the newsletter of the Road Running Technical Council (RRTC) of USA Track & Field (USATF). MN is our way to talk to one another, so that we all know what's going on.

MN is also sent to many foreign measurers associated with AIMS and IAAF, who are also invited to participate in the dialogue.

MN is published bimonthly beginning in January (six issues per year).

If you wish to reproduce or report on anything in MN, go ahead, but an attribution would be appreciated.

MN wants to make road course measurement as good as it can be. All opinions and grievances are solicited. No cows are sacred. If you have a new measurement technique, or if you think things should be done differently, send in your contribution to MN. Your opinion will be given space. Nothing changes until somebody tries!

Electronic copy or clean typed material is most welcome, but send what you can.

MEASUREMENT NEWS

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Chairman's Clatter - From Mike Wickiser

Maps, maps, and course maps. USATF Webmaster, Keith Lively, recently contacted me about certified course maps. Keith has offered to dedicate time and server space to digitize and post maps for all certified courses going back 10 years. He intends to produce a searchable calendar and database of certified courses and their maps.

As you can expect a project of this magnitude and complexity is going to take some time to accomplish, but with the national office's commitment to the project, it appears there will be a complete and searchable database of certified course maps available to the public. As I understand it, the maps will be available for viewing and printing with a high quality of reproduction. It will be possible to print a course map that rivals the original.

Bob Baumel has provided Keith with his views and suggestions to help with some of the server compatibility glitches. The entire 2001 and 2002 certificate files have been sent to Indianapolis. As of this writing Keith has scanned and digitized over 700 maps and expects to return the certificates within a week or so. To get a glimpse of how these maps will look try going to www.usatf.org/test/maps/. This site shows a few maps and served as a trial. Some of the final work is yet to be worked out but each map will be identified by its certificate ID number.

Maps have often been the hard part of measurement for me. Getting a satisfactory map that clearly indicated the race course and looked reasonably good has always been the difficult part of course measurement for me. I have never been able to produce a map as good looking as a Bob Letson but always tried to get the course detailed adequately. With maps going online it will be possible to view the course for any certified race.

I have not forgotten the RRIC search engine. Since the work for this item is primarily a volunteer effort, it appears completion and implementation is in the future. Once completed, it should be possible to search out courses by state or distance and then view the course map.

Well, that's about it for this month. I have to get going and remark a course for a race director who needs to move his start line about 150 feet.

A handwritten signature in black ink that reads "Mike Wickiser". The signature is written in a cursive style with a small arrow pointing to the right at the end.

YEAR 2001 MEASUREMENT ACTIVITY

This summary is based on the course list as it existed on March 1, 2001. It was assumed that all of the year 2001 courses had been received, and indeed few have been received since then. Here is how we did last year:

Most active certifier: Tom McBrayer – 136 (104 in 2000)
Most active measurer: Chuck Hinde, with 62 (37 in 2000)
Most active state: Texas, with 159 courses certified (110 in 2000)
Measurers active in 2000: 298 (272 in 2000)
State with most active measurers: Texas, with 25 (19 in 2000)
Courses certified in 2001: 1242 (1101 in 2000)
New measurers in 2001: 59 (51 in 2000)

STATUS OF CERTIFIED COURSES AS OF MARCH 1, 2002

Active courses (including renewed courses)	10127
Courses renewed after 10 year expiration	249
Total courses	21175

LENGTHS OF COURSES CERTIFIED IN 2001

Length	Number	Percent
5 km	641	51.6
10 km	148	11.9
Mar	71	5.7
Cal	70	5.6
Hmar	60	4.8
8 km	48	3.9
5 mi	34	2.7
1 mi	33	2.7
15 km	23	1.9
4 mi	18	1.4
10 mi	12	1.0
2 mi	11	0.9
Other	73	5.9

2001 CERTIFICATION STATISTICS

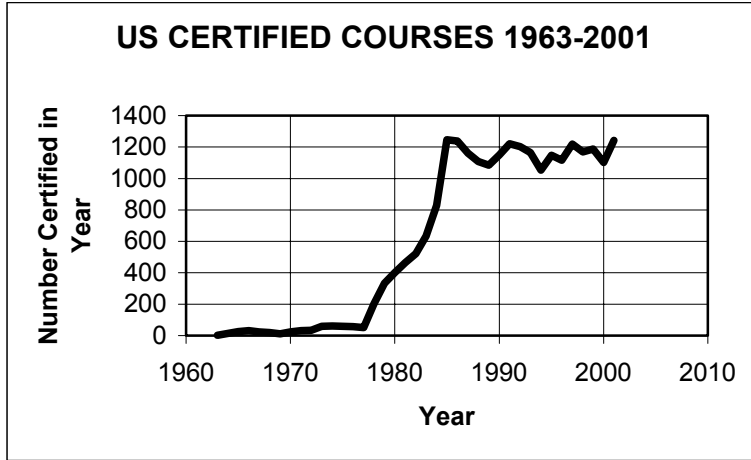
Courses Certified In State in 2001	Measurers Active In State in 2001	Per Measurer	Courses Certified by Certifiers in 2001	Measurers with 10 or More
TX 159	TX 25	6.4	ETM 136	Hinde 62
CA 102	NY 20	3.0	JW 116	Scardera 45
IL 100	FL 16	3.1	RS 74	Ashby 38
NC 73	OH 15	4.2	PH 73	Hess 36
OH 63	CA 13	7.8	AM 57	Ferguson 29
NY 60	GA 12	2.3	PR 57	Thurston 28
FL 50	IL 12	8.3	BG 52	White 27
SC 38	NC 11	6.6	DL 51	Knight 26
NJ 37	SC 10	3.8	GAN 46	Lafarlette 26
OK 37	CO 9	2.4	RH 44	Hronjak 23
PA 37	CT 9	2.6	RN 43	McBrayer 23
TN 36	MO 9	3.4	RT 42	Nelson 21
MI 34	VA 9	2.9	BS 38	Hubbard 20
MA 33	KS 8	2.5	BB 37	Recker 19
AL 32	PA 8	4.6	SH 34	Vaitones 19
MO 31	TN 8	4.5	WB 33	Rhodes 18
GA 27	WI 8	2.4	JF 31	Wickiser 17
VA 26	AL 7	4.6	WN 31	Sissala 16
CT 23	MD 6	3.0	TK 28	Wight 16
CO 22	ME 6	1.3	JD 27	Belleville 15
MN 21	IN 5	1.2	WC 27	Clines 15
KS 20	MA 5	6.6	DR 23	Dewey 13
WI 19	NH 5	3.0	JS 23	Zeigler 13
MD 18	OK 5	7.4	DP 22	Courtney 12
NH 15	WV 5	1.4	RR 21	Grandits 12
DC 13	KY 4	2.0	MW 20	Morgan 12
WA 11	MI 4	8.5	MR 13	Fitzpatrick 11
IA 10	NJ 4	9.3	MF 10	Joline 11
RI 10	VT 4	2.0	DS 9	Riegel 11
NM 9	AK 3	1.3	KU 6	Knoedel 10
KY 8	AR 3	1.7	DLP 5	McGuire 10
ME 8	MN 3	7.0	BC 3	Melanson 10
VT 8	NM 3	3.0	JG 3	Polansky 10
WV 7	WA 3	3.7	DB 2	Prytherch 10
DE 6	DC 2	6.5	LB 2	Smith 10
IN 6	IA 2	5.0	DK 1	
AR 5	ID 2	1.0	DL 1	Total 694
AK 4	MS 2	1.5	FW 1	
AZ 4	NV 2	1.0		
NE 4	OR 2	1.0	Total 1242	
MS 3	WY 2	1.0		
HI 2	AZ 1	4.0		
ID 2	DE 1	6.0		
LA 2	HI 1	2.0		
NV 2	LA 1	2.0		
OR 2	ND 1	1.0		
WY 2	NE 1	4.0		
ND 1	RI 1	10.0		
MT 0	MT 0			
SD 0	SD 0			
UT 0	UT 0			
Total 1242	Total 298			

This column contains surnames only. Note that several measurers may share the same surname.

This data was taken from the course list as it existed on March 1, 2002.

US CERTIFIED COURSES BY YEAR

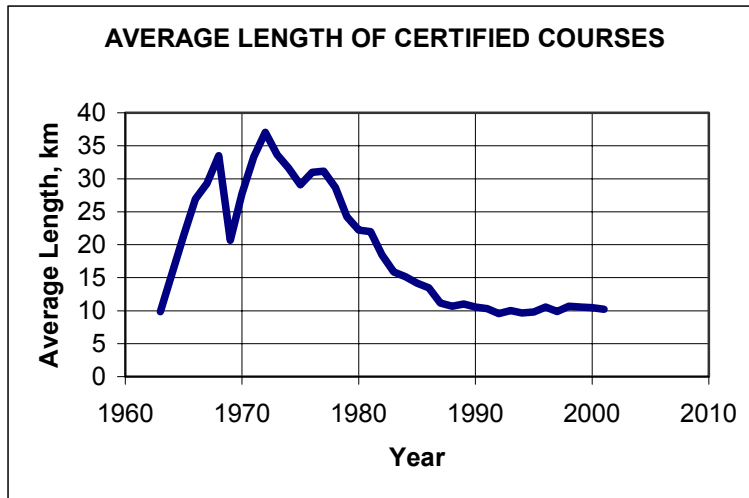
Year	Courses
1963	2
1965	25
1966	31
1967	24
1968	20
1969	12
1970	23
1971	31
1972	34
1973	60
1974	62
1975	59
1976	58
1977	52
1978	202
1979	334
1980	400
1981	464
1982	521
1983	633
1984	829
1985	1245
1986	1238
1987	1161
1988	1108
1989	1085
1990	1149
1991	1220
1992	1203
1993	1165
1994	1053
1995	1148
1996	1115
1997	1219
1998	1168
1999	1187
2000	1101
2001	1242



Year	Avg km
1963	9.9
1965	21.4
1966	26.9
1967	29.3
1968	33.5
1969	20.7
1970	27.7
1971	33.3
1972	37.0
1973	33.6
1974	31.6
1975	29.1
1976	31.0
1977	31.2
1978	28.6
1979	24.2
1980	22.2
1981	22.0
1982	18.4
1983	15.9
1984	15.2
1985	14.2
1986	13.5
1987	11.1
1988	10.7
1989	11.0
1990	10.5
1991	10.3
1992	9.5
1993	10.0
1994	9.6
1995	9.8
1996	10.5
1997	9.9
1998	10.7
1999	10.5
2000	10.5
2001	10.2

In these graphs, the data was taken from the historical list generated by Malcolm Heyworth, and combined with data from the modern list. Malcolm's data was used from 1963-1983, while 1984-2000 used the modern list

All courses certified before 1982-1984 which did not contain the 1.001 short course prevention factor were decertified, and the currently-used listing was begun.



PERFORMANCE OF USATF MEASURERS SINCE 1982

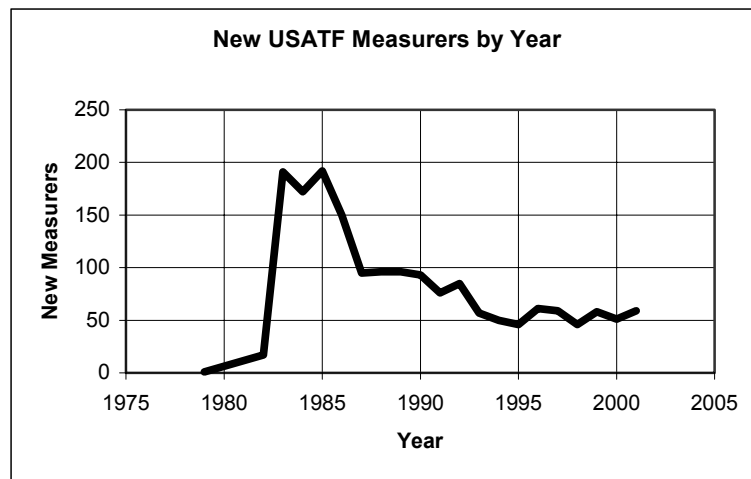
Based on the USATF certified course list as it existed on March 1, 2002

Top Measurers Since 1982	
Measurer	Courses
Lafarlette	677
Scardera	562
Nicoll	547
Linnerud	537
Thurston	446
Hinde	426
White	419
Brannen	404
McBrayer	372
Courtney	318
Hubbard	299
Recker	289
Beach	279
Riegel	268
Knoedel	261
Smith	230
Nelson	226
Knight	223
Witkowski	219
Sissala	207
Wight	198
Newman	182
Dewey	176
Connolly	152
Standish	152
Wisser	152
Ensz	149
Ashby	144
Hickey	143
Hronjak	134
Belleville	131
Berglund	129
Ferguson	129
Letson	129
Melanson	126
Lucas	120
Hess	119
Wickiser	112
Polansky	109
LeBlanc	107
Grass	106
Katz	106
GuidoBros	105
Pierce	105
Rhodes	100

Courses Measured by Other Measurers	
Courses Measured	Number of Measurers
50 to 99	34
20 to 49	94
10 to 19	134
5 to 9	202
2 to 4	568
1 only	673

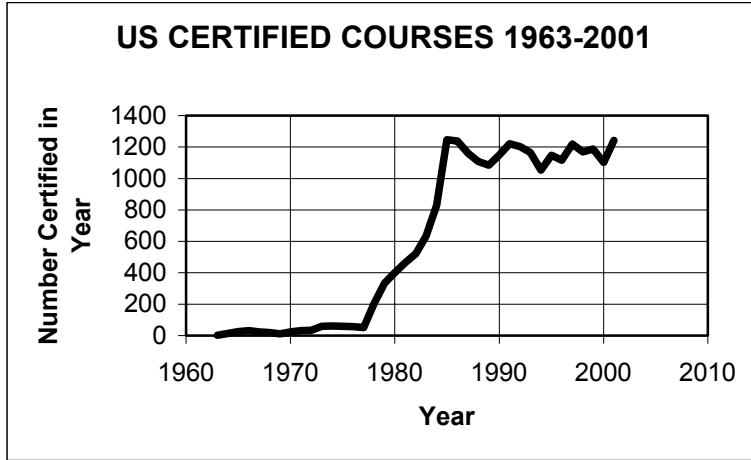
Note: These listings are based on sorted surnames only, thus some inaccuracy exists.

New Measurers by Year	
Year	New Measurers
1979	1
1982	17
1983	191
1984	172
1985	192
1986	150
1987	95
1988	96
1989	96
1990	93
1991	76
1992	85
1993	57
1994	50
1995	46
1996	61
1997	59
1998	46
1999	58
2000	51
2001	59



US CERTIFIED COURSES BY YEAR

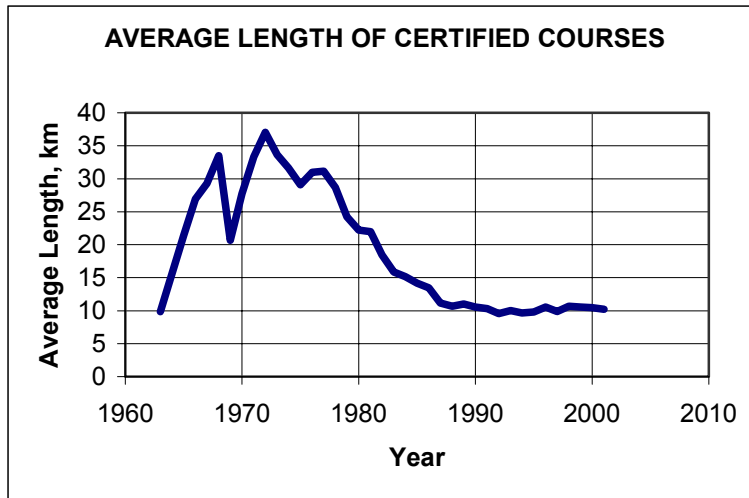
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1992	1203
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1970	27.7
1971	33.3
1972	37.0
1973	33.6
1974	31.6
1975	29.1
1976	31.0
1977	31.2
1978	28.6
1979	24.2
1980	22.2
1981	22.0
1982	18.4
1983	15.9
1984	15.2
1985	14.2
1986	13.5
1987	11.1
1988	10.7
1989	11.0
1990	10.5
1991	10.3
1992	9.5
1993	10.0
1994	9.6
1995	9.8
1996	10.5
1997	9.9
1998	10.7
1999	10.5
2000	10.5
2001	10.2

In these graphs, the data was taken from the historical list generated by Malcolm Heyworth, and combined with data from the modern list. Malcolm's data was used from 1963-1983, while 1984-2000 used the modern list

All courses certified before 1982-1984 which did not contain the 1.001 short course prevention factor were decertified, and the currently-used listing was begun.



NUMBER OF CERTIFIED COURSES BY CERTIFIER AND YEAR

This data was taken from the course list as it existed on March 1, 2002

Only those certifiers active in 2001 are shown in this listing.

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total	
AM								28	31	50	35	45	41	40	35	54	36	71	52	57	575	
BB		35	72	81	73	66	60	55	52	74	79	49	56	60	35	52	39	33	34	37	1042	
BC							1	1	3	2	2	4	1	3	3	2	4	6	1	3	36	
BG				14	38	22	31	31	28	36	38	37	50	48	49	33	71	61	50	52	689	
BS					19	43	34	31	51	27	43	27	36	32	41	27	26	30	34	38	539	
DB					6	50	71	38	39	45	43	41	39	31	26	43	3	3	2	2	482	
DK		1	10	7	2	3		2					21		21	19	7	3	1	1	98	
DL						23	18	16	41	77	68	51	53	66	53	72	53	66	51	51	759	
DL																			13	1	14	
DLP							4	8	12	4	5	9	10	5	3	9	13	17	11	5	115	
DP							10	23	27	35	36	29	29	14	10	11	12	20	19	22	297	
DR		1	10	15	20	19	19	29	17	19	19	21	20	18	17	42	24	26	32	23	391	
DS													2	1	3	3	2	2	9	9	31	
ETM				10	26	36	65	71	87	71	87	103	101	112	131	115	143	140	104	136	1538	
FW						2	4	5	6	9	9	1	7	2	1	5	10	1	6	1	69	
GAN											15	31	24	25	16	42	48	42	48	46	337	
JD					6	11	6	26	25	28	21	16	13	17	20	28	25	19	22	27	310	
JF																			14	31	45	
JG																				3	3	
JS								5	14	6	19	15	19	34	22	26	30	28	27	23	268	
JW							41	50	67	65	72	69	70	82	79	64	80	66	85	116	1006	
KU								1	5	15	11	14	7	4	7	8	8	15	17	6	118	
LB								3	13	15	12	9	11	8	14	13	6	15	16	14	2	151
MF								11	7	10	7	8	6	8	10	8	6	9	4	10	104	
MR					1	19	20	25	18	16	17	18	15	16	19	7	11	19	16	13	250	
MW							10	21	23	15	7	18	16	25	19	19	21	29	21	20	264	
PH															42	65	41	47	72	73	340	
PR	1	66	110	154	143	97	85	58	66	62	112	75	51	52	62	52	59	53	45	57	1460	
RH									4	14	10	33	22	27	25	25	48	23	24	44	299	
RN											5	36	18	22	21	39	38	36	36	43	294	
RR		2	9	27	46	34	12	18	25	16	14	7	14	18	20	32	26	17	18	21	376	
RS		2	24	48	51	55	76	68	52	83	61	43	38	60	43	61	52	74	54	74	1019	
RT		9	41	66	55	61	51	23	22	31	22	30	23	42	39	34	39	28	39	42	697	
SH					22	36	31	19	33	17	25	39	32	58	37	33	20	31	37	34	504	
TK		11	33	32	43	37	29	8	7	19	11	13	9	15	11	20	18	16	13	28	373	
WB														12	39	41	27	31	16	33	199	
WC											4	27	21	15	25	18	17	22	25	27	201	
WN		4	32	125	124	112	106	117	138	148	139	93	81	75	67	36	49	41	31	31	1549	

NUMBER OF CERTIFIED COURSES BY STATE AND YEAR

This data was taken from the course list as it existed on March 1, 2002

	1979	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
AK		1			1	4	4	5	6	9	9	1	7	2	1	5	10	3	6	4	78	
AL		2	14	8	17	12	11	5	26	27	39	25	28	17	20	24	37	31	25	27	32	427
AR			4	5	9	4	4	8	8	13	4	5	9	10	5	3	10	13	17	11	5	147
AZ			13	14	23	20	20	7	10	10	16	9	6	3	8	12	9	6	15		4	205
CA	1	4	68	103	146	129	94	133	129	88	139	103	87	81	112	76	103	75	95	68	102	1936
CO			29	17	15	30	14	20	23	26	35	36	29	29	14	10	11	12	20	19	22	411
CT			1	10	17	23	19	21	31	20	20	19	21	22	20	18	43	24	27	33	23	412
DC			3	23	25	17	9	11	4	9	7	6	16	11	19	17	11	21	21	10	13	253
DE				12	25	18	18	13	13	23	23	18	10	11	4	11	11	8	8	3	6	235
FL			17	21	60	52	71	70	63	72	84	74	56	59	75	54	75	54	67	65	50	1139
GA			7	20	50	41	28	32	29	30	35	37	30	24	15	31	18	17	22	25	27	518
HI			7	6	9	9	10	6	1	3		5		3	3		9	5			2	78
IA		1	7	5	12	4	16	5	21	11	14	8	11	10	11	13	13	8	13	10	10	203
ID			1	1	4		1		1	1	2			1	2				1	2	2	19
IL			6	17	11	48	53	45	50	68	70	75	72	69	82	79	64	83	67	78	100	1137
IN			11	23	36	21	17	8	8	15	10	4	16	16	16	12	25	21	23	15	6	303
KS			7	6	12	32	14	21	20	24	23	29	30	33	23	40	24	49	40	29	20	476
KY			1	9	19	13	7	16	6	15	7	12	7	1	4	4	11	6	3	9	8	158
LA			2	2	11	2		1	5	5	2	6	6	4	8	9	4	7	11	10	2	97
MA		2	4	4	17	29	22	17	34	36	36	26	37	17	21	19	33	35	30	27	33	479
MD			4	8	16	17	28	14	7	17	5	17	14	19	21	19	20	19	14	26	18	303
ME			4	3	26	15	6	9	12	11	17	26	17	16	11	7	9	12	7	7	8	223
MI			21	27	37	22	36	31	19	33	17	25	40	37	58	37	33	24	31	37	34	599
MN			5	11	27	46	32	12	18	25	15	14	7	14	17	20	33	26	17	18	21	378
MO			13	14	10	6	8	10	11	4	14	9	7	17	25	9	9	23	20	19	31	259
MS			1	3	18	6		2	7	2	1	3	5	1		6	1	5		1	3	65
MT			1	8	5	8	1	4	1	1	3	7	10		3			2				54
NC		1	16	41	88	70	72	56	52	61	57	58	34	25	27	42	64	44	48	71	73	1000
ND			1	3		2	1			1	2									2	1	13
NE			4	22	20	25	17	3	5		6	7	7	1	1	5	3	3	9	9	4	151
NH			11	11	21	17	16	9	11	12	12	21	34	13	26	28	15	33	25	22	15	352
NJ		2	15	13	20	38	46	51	33	35	39	50	62	56	48	36	67	41	35	44	37	768
NM			1		3	3	5	3	11	11	15	4	4	4	4	4	8	2	4	9	9	104
NV				6	4	5		4	1	4	2	2	4	1	3	3	2	4	7	1	2	55
NY		3	28	60	57	48	44	41	45	41	65	43	62	76	52	70	79	44	76	56	60	1050
OH		1	43	51	46	52	56	64	64	62	60	91	69	52	53	55	32	48	53	38	63	1053
OK			34	69	72	65	51	54	50	51	74	78	47	56	60	34	50	39	34	34	37	989
OR			23	32	32	14	11	11	9	12	13	8	11	8	12	13	6	14	14	14	2	259
PA		1	23	24	28	29	38	57	50	48	34	26	50	26	32	44	41	28	33	18	37	667
RI			2	1	4	5	1	2	9	1	5	4	10	6	5	5	10	5	9	9	10	103
SC				15	32	41	52	37	35	51	25	36	22	29	29	42	27	23	29	34	38	597
SD			1	6	6	2			4	1	1	1	2			1	2	1	1			29
TN			3	10	13	10	16	19	9	14	26	23	18	15	21	14	15	38	17	18	36	335
TX			10	22	37	97	105	94	71	83	70	85	101	98	105	124	111	136	129	110	159	1747
UT				3	6	6	14	11	6	15	4	10	10	6	7		8	3	13			122
VA		1	12	17	21	23	26	24	19	14	26	15	17	12	31	24	24	26	24	27	26	409
VT				1	5	3	5	1	4	3	7	8	4	5	1	4	8	1	6	2	8	76
WA		1	25	37	53	34	18	20	28	20	14	18	18	15	17	19	7	15	20	16	11	406
WI			7		13	22	20	17	4	14	12	5	6	16	11	15	14	21		8	19	224
WV			8	4	7	2	4	3	3		4	3	1	1	4	2	5	3	4	4	7	69
WY				1				2													2	5
Total	1	20	518	829	1245	1238	1161	1108	1085	1149	1220	1203	1165	1053	1148	1115	1219	1168	1187	1101	1242	21175

MEASURING WIND DURING THE RACE

By Pete Riegel

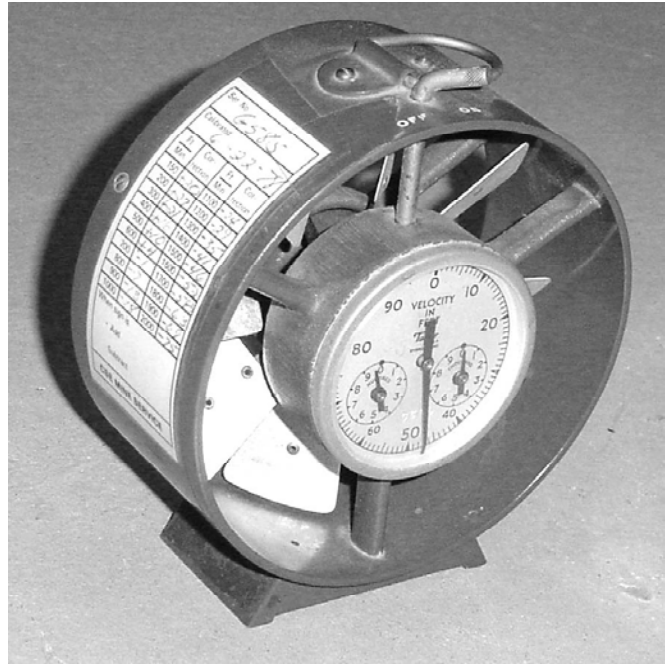
When USATF's Rule 185.5 was adopted, the "standard" course (drop less than 1 m/km, separation less than 30 percent) was made completely eligible for road records, assuming timing and validation check of length was OK. A sidebar to this rule allows races to qualify if their separation exceeds 30 percent, if evidence satisfactory to RRTC is presented to the effect that no wind aid was present. The course still has to have drop less than 1 m/km, but this allows certain high-profile races (NYC Marathon, Crescent City 10 km) to qualify if wind checks out OK.

This presents RRTC with a problem, as nobody has yet come up with a wind-gauging procedure that is beyond reasonable criticism. The best we have been able to do, to date, has been to install balloons at points along the course, or use available banners, and photograph them as the lead car goes by. This technique has been used successfully several times by Wayne Nicoll, at Crescent City. The idea is that anybody, looking at the photos, can see which way the wind is blowing.

Still, we seem to lack something more credible. Something quantifiable, such as the output of a track & field gauge.

While working in a coal mine in the late 1970's I came into possession of an integrating anemometer. It is used by mine foremen to check that ventilation is maintained at the proper level. This is important in coal mining, as fan-driven airflow must be maintained in order to keep methane gas well below its explosive limit. In a coal mine, one can always feel a breeze as the ventilation moves through the workings. Fireproof canvas barriers are used to block off shortcuts and assure that the exhaust fans will successfully maintain the desired air flow in all parts of the mine. In event of an emergency, a rule of thumb is to walk away from the wind, as that will lead you out to the main exhaust fan air shaft.

The instrument is calibrated in "feet." If the air is still, and you walk at 60 feet per minute, the gauge will read "60" at the end of one minute. If you are standing still, and the breeze is moving at 60 feet per minute, the gauge will similarly read "60." The foreman stands holding the instrument perpendicular to the axis of the tunnel, and starts a watch. He moves the instrument in a prescribed pattern, being sure to cover the center and edges of the tunnel. When the watch is stopped, the reading is taken, and it is noted whether ventilation



This is an integrating anemometer of the type described.



The anemometer in use

meets prescribed conditions. If it does not, corrective action is taken.

The anemometer was obtained in 1978, and since then digital technology seems to have supplanted the mechanical devices. I have been unable to find any current manufacturers of mechanical anemometers of this type. Perhaps readers can supply this information.

APPLICATIONS TO WIND MEASUREMENT DURING A RACE

The instrument can be mounted on the handlebars of a bicycle. If properly calibrated, it can record the “feet” covered during the race by the bicycle. If there is no wind, the “feet” recorded by the instrument will be equal to the race distance. If a headwind is present, the reading will be higher, as more air will pass through the gauge. If a tailwind is present, the reading will be lower. This information can perhaps be used in determining whether a certain event had wind aid during the race.

I am hoping, later this year when weather improves, to do some experiments to assess just how well this technique can work. I will now outline the things that I think are important. If anybody has any suggestions, I would appreciate any input I can get.

Calibration – The instrument must be calibrated. I have in mind using an out-back configuration for this, along the same course “out” as “back.” The Jones/Oerth counter will record the actual distance traveled. If a headwind is present during “out” it will be a tailwind “back” and the effects should cancel out. As wind is rarely constant, the calibration may require fine-tuning, and I have not worked out a certain way to do it. Perhaps repeated efforts will produce similar results, increasing confidence. Time will tell.

During the Race – The bike stand poised ahead of the runners. The Jones/Oerth counter reading has been recorded. Just before the start, the cyclist toggles the meter, and begins riding the course. When he or she is in proximity of the finish line, he/she again toggles the meter, stopping it. The bike is stopped and the JO counter reading is taken. At this point all the information needed to assess wind has been taken, and the rest is arithmetic.

It may be desirable to perform a post-calibration of the instrument.

Obstacles – The main obstacle to this experiment will be to secure the instrument to the handlebars in a fairly shockproof way. The instrument is a precision clockwork thing, and not designed to be shaken as things are when mounted to handlebars. For all I know, it may take it with no problems, but I must work something out.

My instrument records to a reading of 10,000 feet, or about 2 miles or 3 km. The operator must be able to note the number of times the instrument “rolls over.”

General Application – Even if this experiment should be successful, it will not avail if the price of the instrument is too high to allow its application. I understand that these meters currently go for about \$400 each, which is not excessive in a coal-mine-safety environment, but which may be a bit high for general application in road racing.

I’m looking forward to learning more about this instrument and its possibilities. Any help is welcome.



Measuring compression in support cribbing



Subsidence causes supports to yield

MAP OF THE MONTH

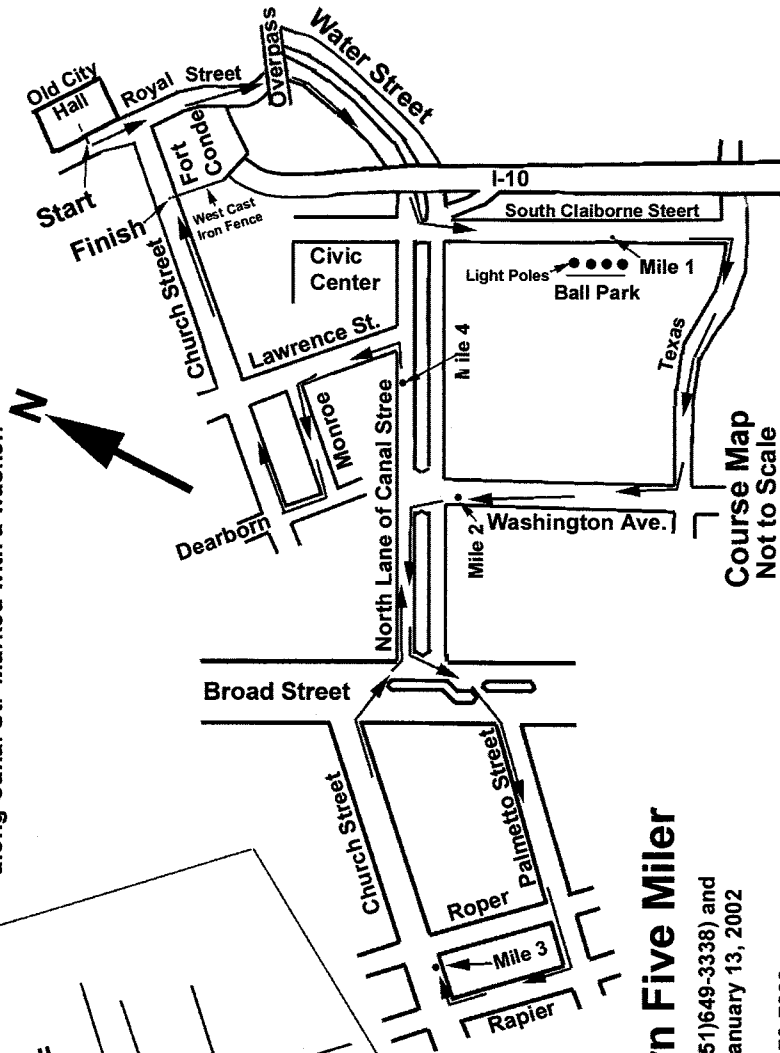
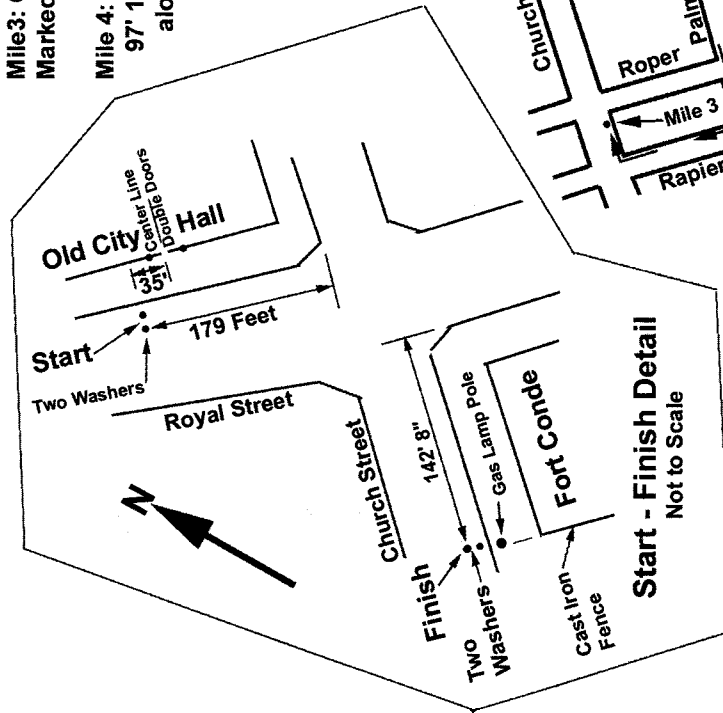
Mile 1: On S. Claiborne, 15' 3" south of the third light pole (from the north) for the ball field. Marked with a washer on the right side of the road.

Mile 2: On S. Washington just before Canal St. 50' south of the SW curb of Canal St. Marked with a washer.

Mile 3: On Church St., between Roper and Rapier. 92' west of Roper. Marked with a washer on the south side of the street.

Mile 4: On the north lane of Canal Street, just west of Lawrence, 97' 11" west of the west curb of the entrance to the along Canal St. Marked with a washer.

AL 02001 JD



Red Cross Town Five Miler

Measured by Leon Mattics (Semmes, AL (251)649-3338) and John Olive (Mobile, AL (251)342-6740) on January 13, 2002
Calibrated on AL 97009 RH
Race Contact is the Port City Pacers (251)473-7223.

MORE THAN TWO MEASUREMENTS

A Thread from MNForum

Jim Gerweck inquired about how to treat multiple measurements of a course, or a course that has been measured in bits and pieces, some more than two times.

This question has never been answered to everybody's satisfaction. Each time a procedure is proposed, someone comes up with a hypothetical set of data that will confound the method.

I ran into this for the first time when analyzing the measurement data for the 1984 Olympic Marathon course. At this time Ken Young advocated using the median measurement when more than two existed, or the lower of the central two. Also at that time, four precalcs were required, but only two postcalcs. To complicate things further, there were six enroute calibration courses, each of which was ridden only once by the 13 riders.

Bob Letson, working with John Brennan, invited a number of people to come and measure. Allan Steinfeld was in charge of data-taking. Of the 13 measurers, Letson, Bob Baumel and I dug in and began to analyze the data. The process turned into a six-months long (maybe more - I don't clearly recollect) marathon of argument. It was not a useless exercise, as Baumel came up with SOSS during this period, and Letson and I also added some fillips of our own.

All the argument covered a range of less than about 20 metres, as I recall. No matter what we did, that was the possible range of the final adjustment.

Finally, when we were exhausted, Letson produced a report, a very nice one. The final adjustment, as best I can tell, was made by him, and I have no clear idea exactly what rationale was used, as I was sick and tired of the argument. But I was satisfied that the course was OK. Ted Corbitt signed off on the report.

For the 1988 Olympic Marathon, the Koreans used our report and copied the methodology faithfully, right down to using 13 riders.

1992 is a mystery to me. Josep Sole measured it but I never saw any measurement data.

1996 in Atlanta has been well-reported. As time was short between measurement and event, there was little time for extended argument. Each measurer prepared a report which was included in the final report. As I was in charge, I made the decision about the final adjustment. The final length was based on average constant and median overall measured length. While others suggested other methods, nobody offered actual objections to my choice.

Sydney was less complicated, in one sense, as fewer

measurers were there, but flat tires and other complications made the measurement more complicated than would have been a standard start-to-finish parade. Hugh Jones, being the boss, made the decision of how much final adjustment to make. His work has been reported in MN, September 2000, Issue #103.

In short, there is no set-in-stone procedure for multiple measurements. It is up to the person in charge. If the race is important, it helps if the data are available for others to see. In all of the races cited, the exact final length may be argued. But all will agree that the courses are not shorter than the nominal distance.

Pete Riegel
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MEASUREMENT OF THE 1984 LOS ANGELES OLYMPIC MARATHON COURSE

A little background on the measurement of the 1984 Olympic Marathon course may be helpful. The week before the measurements, I used a Hewlett Packard IR distance measurement system to lay out six calibration segments along the course. These were marked at each end with bronze monument plugs anchored in three-inch holes by epoxy. The segments varied in length, I think, from 300m to as much as 800m. The measurement crew mostly arrived on a Friday, coming from as far away as New York. We spent Saturday driving over the route to get a consensus on the exact path to be ridden during the measurements to be taken the following day. I pointed out the calibration sections along the course. We also painted in a number of intermediate points, which were to be recorded the following day.

Sunday was cold (for LA) and drizzly. We used a calibration course near the start at Santa Monica Community College for the pre-measurement calibration. I don't recall the details, but at some point, the calibration course was found several inches off. That may have occurred before Sunday or we discovered it on Sunday. In any event, the calibration course was remeasured to everyone's satisfaction.

We had one or two Los Angeles Police cars escorting us. I drove a van carrying Steinfeld and a couple of other people. We would drive ahead to the next reference point or beginning (or end) of a calibration section and record the readings for each measurer. All data were recorded in either one or two lab notebooks, not on various pieces of loose paper as someone remembered a year or so back in one of the MNForum messages. Every measurer rode the same route except in the Marina Del Rey area. There, I planned to make the gross distance adjustment. At the start on the track at Santa Monica City College, we could only adjust maybe

300m plus or minus. We essentially had no leeway at the finish. Fortunately, in the Marina area we had the option of doubling back by making a U-turn at one of three different breaks in a wide street with a broad median. Thus, we had three or four riders do each U-turn.

The measurement ride took about six hours, during which time the skies cleared and the temperature rose by about 20 deg F. We did the post-measurement calibration on a course near the finish. To no one's surprise, calibration constants had decreased substantially during the ride. I wasn't involved in the data analysis, but I do remember that it took about six months. I don't remember who argued what, but I argued for two things. First, that the calibration should be varied along the ride based on the six calibration sections, because the tires were heating up as the temperature increased. Two, that it was overly conservative to include a short course prevention factor of 42 meters when we had so much carefully collected data. Finally, Baumel, Letson and Riegel did agree to an SCPF of 25m.

Perhaps a year or so after the Olympics someone sent me a report written by some academics at a technical university in England. They had obtained a copy of the final report on the 1984 Olympic course and after analyzing the data on some small (must have been very small, because it took eight hours!) computer, they concluded that the course was 25 m long with some confidence level which I can't recall. I'm sure I still have the report somewhere and I think it was Letson who sent it to me.

Ed. note: The report was *Measuring Marathon Courses: An Application of Statistical Calibration Theory* by Richard L. Smith and Mark Corbett. Reprinted from *The Journal of the Royal Statistical Society, Series C (Applied Statistics)*, Volume 36, No. 3, 1987 (pp.283-295).

In closing, I believe that the 1984 Los Angeles Olympic Marathon course remains the most accurately measured Olympic course and probably the most rapidly measured as well. The use of multiple calibration sections along the route played an important role in the process. Has this procedure been utilized in subsequent measurements of important courses?

John Brennand
brennand@alum.mit.edu

MULTIPLE CALIBRATIONS

John Brennand's confidence in the accuracy of the Los Angeles Olympic course, through use of multiple calibrations, neglects consideration of the variation of calibration constant with surface texture. I ran the race (twice - I did the pre-Olympic event in Feb 1984, too), and remember both the very smooth tarmac of the road down the Santa Monica seafront and the ridged concrete of the Marina del Rey freeway section. These surfaces would have yielded very different constants, exaggerating or offsetting the variations due to change in temperature - and a 20F

temperature change is considerable. As I remember from some illustration of the ride, the surface was wet for some part of the measurement.

The on-course calibrations during the measurement ride were presumably done only once, in the racing direction. They may or may not have added up to being roughly equal in either direction. In measurement of the London Marathon I have possibilities to recalibrate at 8 miles and 18 miles with calibration courses adjacent to the course. I have not found reason to use the intermediate calibration courses yet. Serviceable calibrations at start and finish, combined with an unbroken ride of around 3 hours and a minimal change of temperature afford as much confidence as more elaborate exercises in recalibration on surfaces which may not be typical of the overall race surface (even if they are on the course itself).

Without attempting to disentangle the various sources of error, measurement of the course on different days, under different conditions, may give a better indication of course accuracy than different riders on the same day. I understand that this is still what may be called 'precision' rather than accuracy, but perhaps this kind of 'precision' can be interpreted as an 'indication' of accuracy.

Hugh Jones
aimssec@aol.com

Wind, temperature, rain and surface are all significant sources of error in our method. Unless we have specific controls for each of these there is little chance that we can eliminate them, or even reduce them much.

REFLECTIONS

The delay caused by splitting up to measure all the options in the Marina del Rey section allowed the measurement to take more time than it should have, and calibration constants to change. It would have been better to pick the most probable route, measure it, recalibrate, and only then go on to check the various adjustment options.

But how were we to know? This was new to all of us. As things stood, it was still magnificently well-organized in its time - better than any group measurement to its date. The LA measurement represents one of the shoulders we stood upon to refine what we do now. We have learned a lot since then, thanks to this first exercise in multiple measurements.

Pete Riegel

USATF/RRTC CERTIFIED COURSE LIST
New Entries - March - April, 2002
Closing Date April 22, 2002

DISTANCE	COURSE ID	ST	LOCATION	COURSE NAME/RACE	m/km DROP	pct SEP	MEASURER	REPLACES
5 km	AL 02002	JD A	Fairview	Purple & Gold 5K Run	0.0	2	R Melanson	
5 km	AL 02003	JD A	Tuscaloosa	Int'l City Fest & Weindorf 5k	0.0	0	R Melanson	
10 km	AL 02002	RH A	Montgomery	Road Rage 10k	-0.2	5	B Harrison	
5 km	AR 02002	DLP A	Russellville	Saint Mary's Expo 5k	0.0	2	D Potter	
5 km	AR 02003	DLP A	Little Rock	Mount Saint Mary's Academy 5k	0.0	0	J Curry	
10 km	AR 02004	DLP A	Little Rock	Capital City Classic	0.0	3	J Curry	AR 98005 DLP
42.195 km	AZ 02001	ETM A	Grand Canyon	Grand Canyon Int'l Marathon	0.0	0	T LaBlonde	
42.195 km	AZ 02002	ETM A	Gold Canyon	Lost Dutchman's Marathon	4.3	48	T LaBlonde	
42.195 km	AZ 02003	ETM A	Sierra Vista	Thunder Mountain Marathon	0.8	23	L Woods	
Cal	AZ 02004	ETM A	Phoenix	Dee-Rand 16th ST. 804.68m	0.0	100	R Strachan	
10 km	CA 02009	RS A	Newport Beach	Spirit Run 10km Course B	0.3	1	R Scardera	
5 km	CA 02010	RS A	Newport Beach	Spirit Run 5km Course B	0.8	3	R Scardera	
5 km	CA 02012	RS A	Fresno	Susan B. Komen 5km	0.6	10	R Scardera	CA 99018 RS
5 km	CA 02013	RS A	Woodland Hills	Run for Education 5km	0.0	0	R Scardera	
10 km	CA 02014	RS A	Woodland Hills	Run for Education 10km	0.0	0	R Scardera	
5 km	CA 02015	RS A	Torrance	Shamrock & Roll 5km	0.0	0	R Scardera	
10 km	CA 02016	RS A	Torrance	Shamrock & Roll 10km	0.0	0	R Scardera	
8 km	CA 02017	RS A	Stanford	Fifty Plus 8km At Stanford	0.8	2	D Carpenter	CA 01003 TK
4 mi	CA 02018	RS A	San Diego	Original Over the Bay Bridge 20	0.2	27	G Rahill	CA 01036 RS
4 mi	CT 02001	DR A	Fairfield	St. Patricks Day Classic	0.0	4	Guido bros.	
5 km	CT 02002	DR A	Plymouth	Terryville Rotary Club 5k	-0.6	11	W Graustein	
5 km	CT 02003	DR A	Watertown	Watertown 5k Road Race	0.6	1	W Graustein	
5 km	CT 02004	DR A	Farmington	South Park 5k	0.0	0	M Dumonski	
10 km	DC 02001	JS A	Washington	Lawyers Have Heart 10k	0.0	0	J Sissala	
Cal	FL 01052	DL A	St. Petersburg	Pinellas Trail 1320 ft. Calibrator	0.0	100	C Lauber	
Cal	FL 02001	DL A	Daytona Beach	Daytona Speedway 1000 ft. Cal.	0.0	100	J Boyle	
5 km	FL 02002	DL A	Daytona Beach	Daytona Speedway 5k	0.0	9	J Boyle	
5 km	FL 02003	DL A	Ocala	5k Run for Education	0.2	1	G Miller	
5 km	FL 02004	DL A	Sunrise	MOS Corporate 5k Run	0.0	3	G Witkowski	
Cal	FL 02006	DL A	Ft. Lauderdale	Fiesta Way 2640 ft. Calibration	0.0	100	J Musters	
Cal	FL 02009	DL A	Naples	Trail Blvd. 1000 ft. Calibration	0.0	100	F Fidler	
5 mi	FL 02010	DL A	Ft. Lauderdale	Riverwalk 5 Mile	0.0	5	J Musters	
5 km	FL 02011	DL A	Ft. Lauderdale	Riverwalk 5k	0.0	7	J Musters	
5 km	FL 02012	DL A	Ft. Lauderdale	Fleet Feet 5k Run	0.0	3	G Witkowski	
10 km	GA 02002	WC A	Roswell	Homestretch Challenge	0.6	2	M Murphy	
5 km	IL 02001	JW A	Chicago	Wacky Snacky	0.0	2	C Hinde	IL 01006 JW
10 km	IL 02002	JW A	Winnetka	Winnetka Distance Run 10k	0.0	1	C Hinde	IL 91055 JW
16.6667 km	IL 02003	JW A	Chicago	Chicago North Lakefront 50k	0.0	0	C Hinde	IL 01011 JW
8 km	IL 02004	JW A	Chicago	Shamrock Shuffle	0.0	5	C Hinde	IL 01115 JW
5 km	IL 02005	JW A	Elmhurst	Joe Newton 5k	0.0	1	C Hinde	
5 km	IL 02006	JW A	Winnetka	Winnetka Distance Run 5k	0.0	2	C Hinde	IL 91054 JW
5 km	KS 02003	BG A	Lawrence	Raintree Run	0.4	1	S Riley	KS 00006 BG
21.0975 km	KS 02004	BG A	Lawrence	Raintree Run	0.1	0	S Riley	KS 98006 BG
10 mi	KY 02007	PR A	Louisville	Papa Johns 10 Miler	0.0	5	J Kaiser	KY 01020 PR
10 km	LA 02001	JF A	Alexandria	Red River Run 10k	0.0	3	S Gehring	LA 99001 ETM
5 km	LA 02002	JF A	Vivian	Red Bud Festival 5k	0.0	3	S Gehring	

DISTANCE	COURSE ID	ST	LOCATION	COURSE NAME/RACE	m/km DROP	pct SEP	MEASURER	REPLACES
42.195 km	MI 02001	SH A	Northville	Martian	0.0	1	S Hubbard	
21.0975 km	MI 02002	SH A	Northville	Martian	0.0	1	S Hubbard	
5 km	MN 02000	RR A	Long Lake	Long Lake	0.0	8	R Recker	
Cal	MO 02005	BG A	Columbia	Cosmo Park 375 meter	0.0	100	W Armbrust	
1 km	MO 02006	BG A	Columbia	Cosmo Park	0.0	0	W Armbrust	
5 km	MS 02001	RH A	Jackson	Race for the Cure	0.0	4	R Eades	MS 00001 RH
5 km	MS 02002	RH A	Jackson	Watermelon Classic 5k	-0.2	7	R Eades	
5 km	NC 02003	PH A	Wilson	Wilson Road Race	0.0	2	P Hronjak	NC 00015 PH
5 km	NC 02004	PH A	Chapel Hill	UNC Sports Club Development	0.0	0	D Forbis	
21.0975 km	NC 02005	PH A	Charlotte	Corporate Cup Half Marathon	0.2	1	T Rhodes	
5 km	NC 02006	PH A	Charlotte	Corporate Cup 5k	0.4	6	T Rhodes	
5 km	NC 02007	PH A	New Bern	Run For Merci	-0.2	6	P Hronjak	NC 95003 WN
5 km	NC 02008	PH A	Raleigh	Great Raleigh Road Race 5k	-1.5	4	P Hronjak	
10 km	NC 02009	PH A	Raleigh	Great Raleigh Road Race 10k	0.0	0	P Hronjak	
21.0975 km	NC 02010	PH A	Charlotte	South End Race Fest	-0.1	0	D White	
5 km	NC 02011	PH A	Clayton	Family Fun Run	0.0	3	P Hronjak	
6 km	NH 02001	WN A	Nashua	SNHMC 6k For Kids	0.0	0	J Belanger	
5 km	NJ 02003	GAN A	Gloucester	St. Pats Running of the Green 5	0.0	1	G Newman	
5 km	NJ 02004	GAN A	Livingston	Livingston 5k	0.0	2	P Hess	
5 km	NJ 02005	GAN A	Bayonne	Bayonne 5k	0.0	7	P Hess	
5 km	NJ 02006	GAN A	Bloomfield	Brookdale Park 5k	0.6	2	P Hess	
5 mi	NY 02001	AM A	Rochester	Johnny's Runnin' of the Green	-0.4	3	B Kehoe	
5 km	NY 02002	AM A	Port Jervis	Delaware River Run	0.0	8	B Cavanagh	
21.0975 km	NY 02003	AM A	Brooklyn	Brooklyn Half Marathon	-1.2	46	P Hess	NY 00002 AM
4 mi	NY 02005	AM A	New York	NYRRRC 4 Mile, Marathon Finish	0.5	16	P Hess	
10 mi	NY 02006	AM A	New York	NYRRRC 99th St. 10 Mile	0.0	0	P Hess	
5 mi	NY 02007	AM A	Brooklyn	Prospect Park 5 Mile	0.9	2	P Hess	
42.195 km	OH 02001	MW A	Cleveland	2002 CVS Cleveland Marathon	0.0	1	M Wickiser	OH 01024 PR
10 km	OH 02002	MW A	Cleveland	2002 CVS Cleveland 10k	0.0	4	M Wickiser	OH 01025 PR
5 km	OH 02005	PR A	Columbus	Race for the Cure	0.6	5	P Riegel	OH 01022 PR
8 km	OK 02001	BB A	Oklahoma City	Life Strides on the East Side	0.3	1	J Smith	
42.195 km	OK 02002	BB A	Oklahoma City	OKC Memorial Marathon 2002	0.0	1	G LaFarlette	
5 km	OK 02003	BB A	Perkins	Pistol Pete Run	0.0	1	G LaFarlette	
50 km	PA 02002	WB A	Pittsburgh	GNC 50km - 2002	0.0	0	M Courtney	
5 km	RI 02001	RN A	Newport Beach	Frosty 5k	0.0	1	R Nelson	RI 01001 RN
5 km	SC 02006	BS A	Greenville	Greenville News Downtown Rur	-2.6	3	J Roberts	
5 km	SC 02007	BS A	Folly Beach	Save The Light 5k	2.4	3	M Desrosiers	
21.0975 km	SC 02008	BS A	Folly Beach	Save The Light Half Marathon	0.0	1	M Desrosiers	
10 km	SC 02009	BS A	Columbia	Extra Mile 10k	0.9	3	E Prytherch	SC 01033 BS
5 mi	SC 02010	BS A	Columbia	Providence Heart and Sole 5 Mi	1.8	67	E Prytherch	
30 km	TN 02001	RH A	Kingston	Whitestone 30K	0.0	0	A Morgan	
5 km	TN 02002	RH A	Nashville	Tom King 5k	5.5	3	J Zeigler	TN 01002 RH
21.0975 km	TN 02003	RH A	Nashville	Tom King Half Marathon	0.1	1	J Zeigler	TN 01003 RH
10 km	TX 02001	ETM A	Laredo	Laredo 10k Classic	0.0	4	C Mericle	
5 km	TX 02009	ETM A	Bellaire	Bellaire Trolley Run 2002	0.0	9	E McBrayer	TX 01021 ETM
10 km	TX 02010	ETM A	Fort Worth	Cowtown 10k	0.8	4	M Polansky	
5 mi	TX 02011	ETM A	Houston	Houston Derby Dash 5 Miler II	0.0	0	R Barnhill	TX 01004 ETM
5 mi	TX 02012	ETM A	Dallas	Border Uptown Run Trolley Wal	0.0	1	C Clines	TX 01005 ETM
5 km	TX 02013	ETM A	Highland Park	Tracy Wills 5k Classic 2002	0.0	1	C Clines	

DISTANCE	COURSE ID	ST	LOCATION	COURSE NAME/RACE	m/km DROP	pct SEP	MEASURER	REPLACES	
5 km	TX 02014	ETM	A	San Antonio	Race for the Cure San Antonio	0.0	2	R Soler	TX 00031 ETM
Cal	TX 02015	ETM	A	San Antonio	Speedway 300 meters	0.0	100	R Soler	
5 km	TX 02016	ETM	A	Fort Worth	Kathryn A. Stevenson 5k	0.0	0	M Polansky	
5 km	TX 02017	ETM	A	Houston	Run With The Bulls	0.0	3	E McBrayer	
5 km	TX 02018	ETM	A	Lake Jackson	Brazosport College 5k	0.0	4	D Beatty	
5 km	TX 02019	ETM	A	Houston	Houston Senior Olympics	0.0	5	E McBrayer	
10 km	TX 02020	ETM	A	Houston	Houston Senior Olympics	0.0	10	E McBrayer	
5 km	TX 02021	ETM	A	Uvalde	SWTJC 5k	0.0	1	C Mericle	
10 km	TX 02022	ETM	A	Uvalde	SWTJC 10k	0.0	0	C Mericle	
5 km	TX 02023	ETM	A	Houston	Space Race 5k	0.0	5	R Barnhill	
10 km	TX 02024	ETM	A	Houston	Space Race 10k	0.0	6	R Barnhill	
5 km	TX 02025	ETM	A	Dallas	Minyard Buddy Run	0.0	3	C Clines	TX 98042 ETM
1 mi	TX 02026	ETM	A	Dallas	Minyard Buddy Run	0.0	10	C Clines	TX 01031 ETM
5 km	TX 02027	ETM	A	Fort Worth	Run to Joe's	0.0	0	C Clines	TX 00038 ETM
5 km	TX 02028	ETM	A	Fort Worth	Fort Worth Zoo Run	0.2	6	C Clines	TX 01022 ETM
5 km	TX 02030	ETM	A	Houston	Therapy For The Sole	-4.6	1	E McBrayer	
3.5 mi	TX 02031	ETM	A	Dallas	Corporate Challenge 2002	0.0	1	A Beach	
5 km	TX 02032	ETM	A	Plano	Plano Komen 2002	-0.2	28	A Beach	
5 km	TX 02034	ETM	A	Houston	Sprint for Life	0.0	4	E McBrayer	TX 99030 ETM
5 km	TX 02001	JF	A	Austin	Run for the Roses	0.0	0	J Ferguson	
5 km	TX 02002	JF	A	Round Rock	Shoes for Austin 5k	0.0	0	J Ferguson	
10 km	TX 02003	JF	A	Austin	Go for the Gold	0.0	0	J Ferguson	
5 km	VA 02001	JS	A	Reston	Plaza America 5k	0.0	4	J Sissala	
10 mi	VA 02002	JS	A	Alexandria	George Washington pkwy 10 Mi	2.1	70	J Sissala	VA 01001 JS
5 km	VA 02003	JS	A	Alexandria	George Washington pkwy 5K	-0.3	68	J Sissala	

Renewed

Cal	GA 86017	WN	A02	Atlanta	Columns Drive Calibration 2640	0.0	100	W Nicoll	
5 km	GA 90010	WN	A02	Glenville	Glenville Onion Run	0.0	1	D Hagemes	
5 km	NC 89051	ACL	A02	Raleigh	YMCA Halloween Run	0.0	6	A Linnerud	
10 km	OK 89049	BB	A02	Norman	Brookhaven 10 km	0.0	1	J Kiser	
5 km	OK 91015	BB	A02	Kingfisher	People's National Bank 5 km	0.3	3	G Lafarlette	
10 km	OK 91016	BB	A02	Kingfisher	People's National Bank 10km	0.2	2	G Lafarlette	
5 km	OK 91041	BB	A02	Tulsa	Mohawk 5000 - 91	0.0	5	G Lafarlette	
5 km	OK 91062	BB	A02	Tulsa	Mapco Run '91	0.0	4	G Lafarlette	
2 mi	SC 85017	WN	A02	Aiken	Aiken Triple Crown & Whiskey	0.0	1	S Nicoll	

Copies of these certificates available from:

(Send course name & ID number and \$2.00)

Each certificate includes a course map.

Karen Wickiser - Course Registrar
 2939 Vincent Road
 Silver Lake, OH 44224-2916
 Phone 330-929-1605
 FAX 509-351-5383
 Mikewickiser@neo.rr.com

A complete listing of USATF Certified courses is available at - www.RRTC.Net

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VeloTrend BikeBrain is a new class of bicycle computer that incorporates graphical displays, route directions, dynamic logging and smart features such as automatic wheel size calibration into a multi-use, hand-held and handlebar mounted computer. It is designed for use with Palm and Handspring Visor personal organizers.

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<http://Bikebrain.com/>

From Marcel Lamontagne

PUBLICATIONS AVAILABLE FROM RRTC

Printed Course Lists - You can obtain a list of certified courses for any state. Send \$2.00 for any state list. You will receive a list that is current as of the last published Measurement News. If you wish the courses to be sorted in a special way, let us know. Otherwise it will be sorted by distance as the list appears in MN. You can obtain other specially-sorted lists - for instance, you might want to have all the 5k's in IL, IN, and MO. It can be done. Just say what you want. If you are online, lists can be sent that way. Contact Mike Wickiser at MikeWickiser@neo.rr.com

Attention RRTC certifiers: Your lists are free. Any time you want one let us know. You can mark up any mistakes and we will correct it and send you a new copy.

Web Page Access to Course Lists: The complete list can be downloaded from the RRTC website at <http://rrtc.net/download/> Also, try the certified course Search Engine at the USA-LDR website <http://www.usaldr.org/>

Individual Certificates - These may be obtained by sending the course number and \$2.00 per course desired. **SEND THE COMPLETE ID, INCLUDING PREFIX AND SUFFIX LETTERS, Thus: CA 92057 RS.** Send course name, length and location as well. If you are thinking of hiring a measurer, this is an excellent way to see the sort of work you can expect. In addition, you may wish to check out a course you intend to run. Bring the map to the course and see if the race director got it right!

Above material may be obtained from: Mike Wickiser - 2939 Vincent Rd. - Silver Lake, OH 44224-2906

Measurement Calculation Computer Program by Bob Baumel, version 1.2 for Macintosh or IBM PC. This software can be downloaded for free from the RRTC website at <http://www.rrtc.net/download/> or Bob will distribute it by email attachment (send requests to webmaster@rrtc.net) or on floppy disks (send blank, formatted diskette and stamped return mailer to Bob at: 129 Warwick Road, Ponca City OK 74601-7424). Be sure to specify Mac or PC version.

Electronic Certificate Templates (available to Certifiers only), now in an Adobe Acrobat format which isn't tied to any word processor. Requires Acrobat or Acrobat Reader 4.0 or greater (Current Acrobat Reader may be downloaded for free from www.adobe.com). The template allows you to fill in certificates on the computer and print them. Available in both FS and non-FS version. Distributed by Bob Baumel by email or diskette [same addresses as for Measurement software]. Bob can customize the template with certifier's personal info at the bottom (name, address, phone, etc.) so you can avoid re-typing it every time (Be sure to specify exact ID text desired when requesting a template).

Online course measurement book, edited by Bob Baumel. It's a revision of the one you can buy from USATF, but the basic procedures have not changed. Available at: <http://www.rrtc.net>

Course Measurement Procedures - the Bible of course measurement. Complete instructions for measuring courses for USATF certification. The same procedures are now used for IAAF and AIMS courses. \$9.00 postpaid. Available from: USATF - Book Order Dept. - PO Box 120 Indianapolis, IN 46206

Course Measurement Video - a concise 17 minute introduction to course measurement, intended as a supplement to *Course Measurement Procedures*. See how it's done! Version 2 sells for \$10 but there are still a few copies of the original version available for

\$7.50. Send to: Tom McBrayer - 4021 Montrose - Houston, TX 77006-4956.

OTHER PUBLICATIONS AND EQUIPMENT

Road Race Management is a monthly newsletter providing race organizing ideas and news for race directors. \$97 per year from: Road Race Management - 4904 Glen Cove Pkwy - Bethesda, MD 20816 Phone: 301-320-6865 Fax: 301-320-9164

Jones/Oerth Counters - Write to: Paul Oerth - 2455 Union St - Apt 412 - San Francisco, CA 94123. Phone: 415-346-4165 Fax 415 346 0621. Email: Poerth@aol.com. US Price is \$70 for the 5 digit model, \$80 for the 6 digit model, postpaid. Foreign price is \$75/\$85 plus postage. Foreign orders shipped by airmail. Visa, MasterCard, American Express cards accepted. **Note: Payment in advance is required.**

RunScore - The flagship of IBM-style finish line programs. For information contact: Alan Jones - 3717 Wildwood Dr - Endwell, NY 13760. Or check it out on the internet at: www.runscore.com

Apple Raceberry JaM - Race management software for Macintosh and Windows. Check it out on the Internet at <http://www.raceberryjam.com> or call Jack Moran at (952) 920-0558.

TOPOGRAPHIC MAPS

USA topographic maps are available from:

U. S. Geological Survey 303-202-4200
USGS Map Sales
PO Box 25286, Bldg 810
Denver Federal Center
Denver, CO 80225

Delivery will be made in approximately 4 weeks. Ask for latest price.

Maps can be located and ordered online at: <http://www.usgs.gov>

Maps can be obtained in just a few days from:

Map Express - PO Box 280445 - Lakewood, CO 80228-0445

1-800-MAP-00EX (1-800-627-0039)

Maps can be located and ordered online at:
<http://www.mapexp.com>

Topo Maps on CD-ROM - 3-D TopoQuads includes authentic USGS 7.5-minute quadrangle maps, assembled into one seamless database. See an interactive online demo at <http://www.delorme.com>
Also - check out Street Atlas USA from the above - it's a seamless street map of the whole USA at a decent price.

USGS TOPOGRAPHIC MAPS ONLINE - FREE

Maps.Com has a section where you can click on to all USGS maps, free. This can be very handy for obtaining accurate elevation information.

Check out: <http://www.maps.com>



ROAD RUNNING TECHNICAL COUNCIL

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Phone/fax: 330-929-1605 email: MikeWickiser@neo.rr.com

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April 25, 2002