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To: Mr. Yutaka Nishida (FAX 81 985 31 1152)
From: Rex J. Harvey
Date: 2Sep93

Subject: 1993 WAVA Age Factors for Multi-Event Scoring

Nishida San,

I hope that your preparations for the WAVA World Championships are progressing well. Please forgive our Committee for being so long in finalizing these 1993 WAVA Age Factors. The long, hard, updating process is now done. Thank you for your patience.

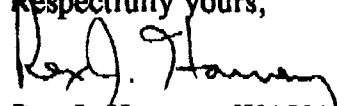
Although it could be done by hand, I assume that you will be doing the multi-event scoring on a computer (or computers) and that you have already created your scoring program using the 1989 WAVA Age Factors. It will only be necessary to replace the 1989 Age Factors with these new 1993 Factors which are attached. Also attached is a short explanation of Multi-Event scoring for Veteran's.

I would suggest that you run several test cases through your system to assure yourself that the scoring program is working correctly. I can supply you with test cases (past Decathlon and Heptathlon results) if you would like and I would be most happy to help you check out your system by examining the output from your scoring program. I have written several of these scoring programs for various computers and have made most of the common errors.

Please feel free to use me as a resource for anything concerned with the Multi-Events. I have considerable experience as I have completed more Decathlons than anyone else in history. I have been an age group winner in both of the previous WAVA Decathlon/Heptathlon Championships in Eugene and Turku and have been the US champion for the past ten years. I will be glad to help in any way that I can. write, call, or FAX anytime.

I am also a member of the WAVA Council as the President of the North and Central American, and Caribbean Region of WAVA (NCCWAVA). I will be arriving in Miyazaki on Monday 4Oct and on Tuesday 5Oct, the Council will meet and be sent out to various areas to do a last minute examination of preparations. I pleasantly anticipate the assignment of examining your preparations for the Multi-Events. This would include the Decathlon, Heptathlon, and the Weight Pentathlon. Anything that we can do ahead of that day will be good as the time will be extremely short then to make any changes. I fully expect your preparations to be excellent, but there are always things that a person with a different point of view can see.

Respectfully yours,



Rex J. Harvey, WAVA Multi-Event Sub-Committee Chair
160 Chatham Way, Mayfield Heights, Ohio 44124, USA
Home (216) 446-0559 FAX (same)

INFO - BILL TAYLOR
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1993 WAVA Decathlon Age Factors (Day 1)											
AGE	100M	LJ	SP (16#)	SP (6K)	SP (5K)	SP (4K)	HJ	400M			
M40-44	.9474	1.1474	1.1320				1.1188	.9388			
M45-49	.9206	1.2231	1.2055				1.1799	.9064			
M50-54	.8931	1.3016		1.1700			1.2438	.8733			
M55-59	.8645	1.3845		1.3080			1.3121	.8391			
M60-64	.8343	1.4738			1.3380		1.3868	.8033			
M65-69	.8019	1.5719			1.4910		1.4703	.7653			
M70-74	.7666	1.6816				1.4950	1.5654	.7244			
M75-79	.7276	1.8061				1.6880	1.6753	.6798			
M80-84	.6840	1.9518				1.9110	1.8064	.6303			
M85-89	.6347	2.1315				2.1740	1.9715	.5739			
M90-94	.5782	2.3708				2.5295	2.1962	.5070			
M95-99	.5122	2.7209				3.0400	2.5317	.4228			
M100-104	.4328	3.2842				3.7680	3.0804	.3081			
1993 WAVA Decathlon Age Factors (Day 2)											
AGE	HUR (110/991)	HUR (100/914)	HUR (100/840)	HUR (80/762)	DT (2.0K)	DT (1.5K)	DT (1.0K)	PV	JT (800G)	JT (600G)	1500
M40-44	.9350				1.1200			1.1530	1.1760		.9415
M45-49	.8900				1.1950			1.2383	1.2940		.9077
M50-54		.9570				1.1190		1.3264	1.4320		.8732
M55-59		.9080				1.2250		1.4189	1.5900		.8376
M60-64			.8989				1.1390	1.5178		1.5450	.8004
M65-69			.8339				1.2450	1.6255		1.6590	.7610
M70-74				.9880			1.4035	1.7448		1.8830	.7187
M75-79				.9130			1.6145	1.8789		2.2170	.6727
M80-84				.8380			1.8780	2.0342		2.6610	.6218
M85-89				.7555			2.2140	2.2235		3.3250	.5640
M90-94				.6605			2.7275	2.4724		4.0440	.4957
M95-99				.5530			3.5435	2.8321		5.2130	.4101
M100-104				.4330			4.7870	3.4050		6.8670	.2940

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1993 WAVA Heptathlon Age Factors (Day 1)

AGE	HUR (100/33)	HUR (80/30/8)	HUR (80/30/7)	HJ	SP (4K)	SP (3K)	200M
W35-39	.9350			1.0780	1.1470		.9716
W40-44		1.1150		1.1568	1.2820		.9393
W45-49		1.0690		1.2372	1.4420		.9066
W50-54			1.0670	1.3204		1.3230	.8732
W55-59			.9835	1.4080		1.4180	.8387
W60-64			.9000	1.5020		1.5755	.8026
W65-69			.8165	1.6048		1.7955	.7643
W70-74			.7330	1.7192		2.0780	.7231
W75-79			.6495	1.8484		2.4230	.6782
W80-84			.5660	1.9988		2.8315	.6286
W85-89			.4795	2.1832		3.3305	.5729
W90-94			.3880	2.4272		4.0270	.5089
W95-99			.2915	2.7820		5.0460	.4328
W100-104			.1900	3.3500		6.5125	.3376

1993 WAVA Heptathlon Age Factors (Day2)

AGE	LJ	JT (600G)	JT (400G)	800M
W35-39	1.0856	1.1376		.9693
W40-44	1.1720	1.3266		.9329
W45-49	1.2600	1.6006		.8961
W50-54	1.3508		1.6032	.8586
W55-59	1.4460		1.7092	.8200
W60-64	1.5476		1.9052	.7798
W65-69	1.6580		2.1912	.7374
W70-74	1.7800		2.5672	.6921
W75-79	1.9168		3.0332	.6431
W80-84	2.0748		3.5906	.5892
W85-89	2.2668		4.2776	.5284
W90-94	2.5184		5.2346	.4571
W95-99	2.8808		6.6241	.3685
W100-104	3.4564		8.6086	.2494

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 WAVA MULTI-EVENT SUB-COMMITTEE CHAIR

SCORING OF AGE-GRADED MULTI-EVENT COMPETITIONS:

The scoring of Age-Graded Multi-Event competitions is quick and easy. It is exactly the same as scoring Open Multi-Event competitions with the addition of a single initial step of multiplying the performance by the appropriate Age Factor. Here are a few examples that will illustrate the entire process.

Multi-Event competitions are held in the normal five year age groups as established by WAVA. That is: age 40 through 44, age 45 through 49, and so on. Age is determined by the competitor's actual age on the first day of the competition. Scoring in each of these age groups is done using the WAVA Age Factor for the initial age of that Age Group. For example, the M40 Age Factor is used for all men from age 40 through age 44. Sometimes, for curiosity sake, single age factoring is done using the single year age factors, but this is not the official method of scoring. Note that Age Standards have nothing to do with Multi-Event scoring, only the Age Factors.

Please note that all Age Grading uses only the Automatic Timing sections of the IAAF Scoring book. For each running event, there is a small table for the direct scoring of hand timed events. It is a simple offset of the main table. 0.24 seconds is added to the 100 Meter, 110 Meter Hurdles and 200 Meters. 0.14 seconds is added to the 400 Meter. Ignore this hand timed sections of the 1985 Scoring Book as they are not used in Veteran's Multi-Event scoring.

Here is an example of the proper scoring of a running event that has been fully automatically timed as defined by IAAF Handbook. See the next paragraph for the scoring of hand timed results. In the M50-55 Decathlon, a 53 year old competitor runs a 13.12 second performance in the 100 Meter event. The first step in scoring is to multiply the performance of 13.12 by the M50 Age Factor for the 100 Meter which is 0.8931. This results in the theoretical open class performance: $13.12 \times 0.8931 = 11.717472$. This theoretical performance needs to be rounded up to the nearest one-hundredth of a second. The result of this rounding is 11.72 seconds (the general rule is that you never give an advantage to a competitor by rounding or by table lookup). This theoretical performance is now looked up in the current scoring book which, at this time, is the 1985 IAAF Scoring Tables for Men's and Women's Combined Events Competitions (Note: don't forget that the scoring book contains both fully automatic scoring tables and hand scoring tables, the hand scoring table is much smaller than the automatic table and is clearly labeled "This Table is to be Used Exclusively for Hand Times", do not use the hand tables). When 11.72 is looked up in the tables you find that it is awarded 707 points. You are done. It's as simple as that.

If the fully automatic timing breaks down or if the meet is hand timed, then this is the proper procedure. For example, a 40 year old Woman runs a 18.3 second hand time for the 80 meter hurdles. The 18.3 is arrived at by using all of the rules of the IAAF Handbook- middle of three times, rounded up to the higher tenth of a second, etc. Next, the differential between hand times and fully automatic times must be added. Here are the times to be added:

50 through 300 Meters	add 0.24 seconds
400 Meters	add 0.14 seconds
all above 400 Meters	add 0.0 (nothing)

In this case, 0.24 is added to the 18.3 to arrive at 18.54 seconds. This is fully automatic equivalent time and from here on, the scoring procedure is exactly the same as for fully automatic times. From the WAVA Age Grading Tables, the W40 Age Factor for the hurdles is 1.1150 (note that the factor is more than one because the factor automatically accounts for the fact that 40 year old Women only run 80 meters instead of 100 like the 1985 Scoring Tables are set up for). 1.1150 times 18.54 gives 20.6721 which is rounded up to 20.68 seconds. This, when looked up in the 1985 Scoring Tables (note that the women's section is different from the men's) you find that not every performance is in the Tables. Remember that the rule is to never give artificial advantage to the competitor. So, in this case, it is correct to award the next slower time that is in the Tables which is 20.69 which is awarded 248 points.

The scoring of Jumping and Throwing events is even easier because there is no problem with hand times and fully automatic times. The actual measurements should be taken in meters only. Feet and inches, for certain countries, are to be converted later from the official meter measurements. About the only rule to keep in mind is that the Discus and Javelin are to be measured to the shorter even centimeter. So, even if the throwing officials make a mistake, and turn in results in odd centimeters, the scorer should reduce them to the lowest even centimeter and score with that figure. For example, if 30.33 meters was turned in as a discus result for a 72 year old man on the official results sheets, only 30.32 should be used for scoring. The 30.32 is multiplied by the proper age factor of 1.4035 to get 42.55412. Like all other throws and jumps, this is mathematically rounded down to 42.55. Note that this theoretical performance can be an odd centimeter and it makes no difference because the scoring tables only have entries for even centimeters. 42.55 is looked up in the scoring table to be worth 716 points as it does not quite reach the 42.56 required for 717 points. All jumps and throws other than the two long throws are to be measured and reported to the shorter centimeter whether odd or even.

Here is a scoring example for a Jump. A 79 year man jumped 3.01 meters. The proper Age factor is the M75 Long Jump Age Factor or 1.8061. 1.8061 times 3.01 is 5.436361 meters. This is rounded down to 5.43 meters (not to the nearest centimeter, but to the lesser in this case because rounding up would give an artificial aid to the performer). All jumps and throws are rounded down or truncated to centimeters depending on how you look at it. The Age Factors Automatically take into account the reducing implement weights for older age groups. But one does have to be careful to look up the Age Factor in, not only the proper age group, but also in the proper implement column as specified in the WAVA Handbook.

Other than adding up the event scores, that is all there is to scoring Veteran Age Graded Multi-Event competitions.

Please note that the IAAF Handbook (to which WAVA defers when its own Handbook does not contain a specific rule) requires that the scores be announced, separate for each event and as a cumulative total, to all competitors after the completion of each event. Also, it is required that, in the last event of a Combined Events Competition, the heats should be arranged so that one group contains the leading competitors after the penultimate event. In other words, all the leaders must be together in the same heat, which is traditionally the last heat, so that they have a chance to compete head-to-head for the title.

Rex J. Harvey, WAVA Multi-Event Sub-Committee Chair

1985 IAAF Scoring Tables for Men's and Women's Combined Events Competitions

Please note that the 1985 IAAF scoring tables were generated from the following equations. These equations can easily be put in a computer to do multi-event scoring. Japan will not need to manually score if they can program this in. The score equals the constant A times the quantity of the Age Graded performance minus the constant B raised to the constant C power.

For the Running Events:

$$\text{Score} = A * (B - \text{Age Graded Performance}) ^ C$$

For the Throwing and Jumping Events:

$$\text{Score} = A * (\text{Age Graded Performance} - B) ^ C$$

Scoring Hint: The long throws; Discus and Javelin must be rounded down to the shorter, even, centimeter before using the formula or else it will occasionally mis-score by one point. For example: if an age graded throw is 43.77 Meters, it must be rounded down to 43.76 Meters in order to score correctly using the formula.

Men's Constants:

Event	A	B	C	Performances in:
100 Meter	25.4347	18	1.81	Seconds
Long Jump	.14354	220	1.4	Centimeters
Shot Put	51.39	1.5	1.05	Meters
High Jump	.8465	75	1.42	Centimeters
400 Meter	1.53775	82	1.81	Seconds
Hurdles	5.74352	28.5	1.92	Seconds
Discus	12.91	4	1.1	Meters
Pole Vault	.2797	100	1.35	Centimeters
Javelin	10.14	7	1.08	Meters
1500 Meter	.03768	480	1.85	Seconds

Women's Constants:

Event	A	B	C	Performances in:
Hurdles	9.23076	26.7	1.835	Seconds
High Jump	1.84523	75	1.348	Centimeters
Shot Put	56.0211	1.5	1.05	Meters
200 Meter	4.99087	42.5	1.81	Seconds
Long Jump	.188807	210	1.41	Centimeters
Javelin	15.9803	3.8	1.04	Meters
800 Meter	.11193	254	1.88	Seconds

Running Example:**Age Graded Performance of 11.27 Seconds in 100 meters**

$$\begin{aligned}
 \text{Score} &= 25.4347 * (18 - 11.27)^{1.81} \\
 &= 25.4347 * (6.73)^{1.81} \\
 &= 25.4347 * 31.528787 \\
 &= 801.92525 \\
 &= 801 \text{ points} \quad (\text{Always round down})
 \end{aligned}$$

Throwing and Jumping Example:**Age Graded Performance of 11.27 Meters in Shot Put**

$$\begin{aligned}
 \text{Score} &= 51.39 * (11.27 - 1.5)^{1.05} \\
 &= 51.39 * (9.77)^{1.05} \\
 &= 51.39 * 10.949374 \\
 &= 562.68833 \\
 &= 562 \text{ points} \quad (\text{Always round down})
 \end{aligned}$$

Rex J. Harvey
WAVA Multi-Event Sub-Committee Chair

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M100-104	.4328	3.2842				3.7680	3.0804	.3081			
1993 WAVA Decathlon Age Factors (Day 2)											
AGE	HUR (110/.991)	HUR (100/.914)	HUR (100/.840)	HUR (80/.762)	DT (2.0K)	DT (1.5K)	DT (1.0K)	PV	JT (800G)	JT (600G)	1500
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M50-54		.9570				1.1190		1.3264	1.4320		.8732
M55-59		.9080				1.2250		1.4189	1.5900		.8376
M60-64			.8989				1.1390	1.5178		1.5450	.8004
M65-69			.8339				1.2450	1.6255		1.6590	.7610
M70-74				.9880			1.4035	1.7448		1.8830	.7187
M75-79				.9130			1.6145	1.8789		2.2170	.6727
M80-84				.8380			1.8780	2.0342		2.6610	.6218
M85-89				.7555			2.2140	2.2235		3.3250	.5640
M90-94				.6605			2.7275	2.4724		4.0440	.4957
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 WAVA MULTI-EVENT SUB-COMMITTEE CHAIR

1993 WAVA Heptathlon Age Factors (Day 1)

AGE	HUR (100/33)	HUR (80/30/6)	HUR (60/30/7)	HJ	SP (4K)	SP (3K)	200M
W35-39	.9350			1.0780	1.1470		.9716
W40-44		1.1150		1.1588	1.2820		.9393
W45-49		1.0690		1.2372	1.4420		.9086
W50-54			1.0670	1.3204		1.3230	.8732
W55-59			.9835	1.4080		1.4180	.8387
W60-64			.9000	1.5020		1.5755	.8026
W65-69			.8165	1.6048		1.7955	.7643
W70-74			.7330	1.7192		2.0780	.7231
W75-79			.6495	1.8484		2.4230	.6782
W80-84			.5660	1.9988		2.8315	.6286
W85-89			.4795	2.1832		3.3305	.5729
W90-94			.3880	2.4272		4.0270	.5089
W95-99			.2915	2.7820		5.0460	.4328
W100-104			.1900	3.3500		6.5125	.3376

1993 WAVA Heptathlon Age Factors (Day2)

AGE	LJ	JT (600G)	JT (400G)	800M
W35-39	1.0656	1.1376		.9693
W40-44	1.1720	1.3266		.9329
W45-49	1.2800	1.6006		.8961
W50-54	1.3508		1.6032	.8586
W55-59	1.4460		1.7092	.8200
W60-64	1.5476		1.9052	.7798
W65-69	1.6580		2.1912	.7374
W70-74	1.7800		2.5872	.6921
W75-79	1.9168		3.0332	.6431
W80-84	2.0748		3.5906	.5892
W85-89	2.2668		4.2776	.5284
W90-94	2.5184		5.2346	.4571
W95-99	2.8808		6.6241	.3685
W100-104	3.4584		8.6086	.2494

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