

NEW HAMMER SPECIFICATION

Introduction

A group of Hungarian researchers was commissioned by the IAAF in 2000 to study the effect of increasing the hammer weight and/or shortening the hammer wire.

This paper was originally written in 2001 before the landing sector angle was reduced in 2001 and a new hammer cage design adopted in 2003.

As a result of the Hungarian studies (the full text is available in electronic form) the table of equivalent world records that might be achieved with different weights and hammer wire lengths is shown in the Table below.

RESULTS OF TESTS UNDERTAKEN BY HUNGARIAN RESEARCHERS

Comparable World Record m	Hammer Weight Kg	Hammer Length mm
40-45	13.00	900
	12.00	700
45-50	10.00	700
	12.00	900
50-55	8.00	600
	11.00	800
55-60	9.00	800
	7.26	700
	10.00	1000
60-65	9.00	1000
	7.26	800
65-70	9.00	1100
	7.26	900

Determination of Appropriate New Weight and Hammer Wire Length for Open Men

Firstly it must be decided what is a realistic new record level that would be acceptable in terms of safety. I consider that approximately 60 metres would ensure that no "wild" hammer could reach the main straight or an inside horizontal jump facility. Left handed throwers would still be a problem as their "wild" throws would still land on the back straight with the 2002-2003 type cage.

If this desired new maximum distance thrown was accepted then the choice would seem to be between a 9kg hammer with a 90cm wire and 10kg hammer with a 100cm hammer length. The shorter wire in each case would reduce the danger zone angle marginally

However, the effect of hammer wire is to increase the maximum possible vertical angle of hammer release thereby increasing the possibility of a hammer being thrown over the top of the cage.

The longer hammer wire with heavier hammer might be the better option, as it would also allow the throwers to have more control over the hammer.

The argument against changing the hammer specification is that it would change the nature of the event and make it less spectacular.

Determination of Appropriate Hammer Specifications for other Divisions

The 2001 World Records and in the case of Youths an indication of current capabilities is given in the table below. It should be noted that the Junior Men World Record is made with a 7.26kg hammer and the 2001 Congress agreed to reduce this weight to 6kg so that the new record for this event could easily be well over 80 metres.

2001 WORLD HAMMER RECORDS

Division	Men	Women
Open	86.74	76.07
Junior	78.33	71.16
Youth	80.11 (2001 Championship)	64.92 (Season Best)

For safety reasons unless a new safer hammer cage design is adopted we should aim to have all the new records with new implements below 60 metres. For consistency the hammer wire used should be the same as that used with the Open Men's Hammer. Assuming that we decide to use 10kg hammer with a 100cm then the same reduced wire length would affect the distances thrown with the present weight implements. The maximum distance thrown is approximately proportional to the radius the centre of the hammer is from the centre of mass of the thrower. Note that the radius to the centre of mass I used was determined by adding 40cm to the maximum hammer length specified. Using those facts the approximate New World records are determined in table 1 below.

Table 1 Hammer Maximum Lengths as shown for 100cm Open Hammer Length

	Men		Women	
Division	Specification	New Record	Specification	New Record
Open	10kg x 100cm	60.0	4kg x 97cm	65.0
Junior	7.26kg x 99cm	67.0	4kg x 97cm	61.0
Youth	5kg x 98cm	69.0	4kg x 97cm	56.0

The approximate new records for 90cm Open Maximum Hammer Length equivalents are shown in Table 2 below.

Table 2 Hammer Maximum Lengths as shown for 90cm Open Hammer Length

	Men		Women	
Division	Specification	New Record	Specification	New Record
Open	9kg x 90cm	60.0	4kg x 87cm	61.0
Junior	7.26kg x 89cm	63.0	4kg x 87cm	57.0
Youth	5kg x 88cm	64.0	4kg x 87cm	52.0

This would seem to indicate that the shorter length of hammer would be sufficient to bring the performance of other divisions down sufficiently so as not to have to increase the weight of the other division hammers. However, the Junior Men would have to throw the 7.26kg hammer again.

Conclusion

The Hungarian study recommendation was that once the IAAF decides on the distance that it wishes to achieve then additional investigation be undertaken with the selected implements using elite athletes from different countries.

Recommendation

This study might be revisited once there is experience with the new hammer cage design adopted at the 2003 Congress.

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