

## REAL AND HYPOTHETICAL MAXIMUM POTENTIAL SCALE RANGES OF MOST SUCCESSFUL WORLD DECATHLONS

Marija Bilić<sup>1</sup> and Nusret Smajlović<sup>2</sup>

<sup>1</sup> Faculty of social sciences dr.M.Brkić, Hercegovina University, Mostar, Bosnia & Herzegovina

<sup>2</sup> Faculty of sport and physical education, University of Sarajevo, Bosnia & Herzegovina

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### Abstract

The paper presents the objectifying of criteria for evaluating the overall and individual achievements of the most successful decathlons in a world, as well as the type of structure the relationship between decathlon disciplines in relation to the achievements of the most successful athletes specialists. Obtained significant differences in performance levels and profile structure decathlon athletes and specialists, it has been ascertained that it is not appropriate to carry out structuring the relationship between discipline decathlon based on an assumed "ideal structure specialists" to permit a fuller expression of multidiscipline potential. However, based on established substantial uniformity of minimal results and maximum potential and approximate range of maximum uniformity of decathlon potential, obtained by natural objectified measuring scale allows reliable comparative assessment of the relationship between decathlon disciplines.

**Key words:** decathlons, disciplines relation, structuring, perspective assessment

### Introduction

About the character of the decathlon today still existed expert discussions with the aim of refining the peculiarities of the discipline as well as the question of whether and to what extent the current system of scoring results in the decathlon supports the ancient and the contemporary demand for the manifestation of the general and athletic versatility. Authors Smajlović (2000) and Bilić (2013) suggest that decathlon despite its benefits, by its current structure discipline does not fully meet the requirements necessary for expression multi-discipline maximum potential.

These requirements relate to the proportional representation of disciplines by branches of athletics, heterogeneity requires technical complexity within the group discipline, their optimal order and discipline appropriate representation for maximum expression of basic motor qualities. On the other hand, it was established a predestined development of multidiscipline potential with the application of the current points system due to differences in the direction and size of the evaluation of disciplines (Wester, 2006; Bilić, 2013), which encourages routing decathlon towards profitable disciplines. The level and the interrelationship between the results of specialists in each decathlon discipline IS result of the latest achievements in understanding and preparing athletes specialist where it is the result of a specific manifestation of the maximum potential in an one athletic discipline.

The questions that we have tried to answer in this study is whether such an interrelation between the level of discipline can be established in the decathlon and whether, and to what extent the structures differ? That is, can it be done structuring the relationship between decathlon disciplines based on an assumed "ideal structure athletes

specialists" to permit an objective assessment of prospects and resources complete manifestation multidiscipline potential of decathlons? In order to objectify criteria for assessing the achievements of the decathlons, and the type of structure the relationship between decathlon disciplines in relation to the achievements of athletes specialists, have been shaped real and hypothetical scale ranges with maximum potential based on the results of World Records specialists and the best results achieved within decathlon competition.

### Methods

Insight into the level and structure of the maximum potential of decathlon and athletes specialists was enabled by the result achievements comparative analysis through a hypothetical modeling: the minimum and maximum decathlon potential, maximum potential of athletes specialists, the maximum potential of world champion in the decathlon at the realization of a personal record and the best single achievement in disciplines decathlon during of his career.

For this purpose, it was made the Z5 scale, based on the results of the 100 most successful world decathlons of all the time, taken from the official statistical yearbook of the International Association of Athletics Federations (IAAF) - All time list in 2012, and 10 athletes specialists, world record holder in the decathlon disciplines contained in the rest of the season 2012, which is the highest (100%) level within Z5 scale.

For the purpose of considering the individual decathlon potential, it was presented the result of two recorders Roman Šebrle (2001) and the current recorder Ashton Eaton (2012), whose achievements exceeded the high limit of 9000 points.

**Results and discussion**

By a comparative analysis of the decathlon maximum potential structure and potential of world records athletes specialists it was determined that the decathlon achievements level does not reach in any discipline results of World Records specialists. The closest level was reached in the disciplines of running the 110m hurdles (96.4%), pole vault and running 100m (93.8%) and the biggest deficit is in the throwing events (Table 1).

Specificity of profile interrelationship decathlon discipline modeled based on the maximum decathlon potential s reflected in much more consistent levels of individual achievement in relation to the maximum potential of world records specialists, with little apparent lower level of achievement in the disciplines of long jump and shot put.

The qualities of the profile structure maximum results specialists have significantly higher levels of achievement in the throwing disciplines in relation to racing and jumping, while discipline running 110m hurdles has expressed a lower level compared to other levels of a results (Figure 1). On the basis of specific significant differences in the interconnection of maximum results achievements of decathlons and specialists, it can be stated that it is not appropriate to carry out structuring of decathlon potential according to maximum achievements of specialists and that it can not represent the "ideal structure of decathlon disciplines" as that has been assumed in this paper. Such interrelation disciplines levels in the current conditions can not be established in the decathlon as a result of a specific synergetic manifestation of various motor skills within an one athletic discipline, and that is largely predetermined by the current system of scoring.

Table 1. Values of max. potential of world best decathlons of all times and athletes specialists world record holders

	100	400	1500	PRE	VIS	MOT	DAL	KUG	DISK	KOP	U-BOD
MaxSP	9,58	43,18	206	12,87	245	614	895	23,12	74,08	98,48	12545
MaxDP	10,21	45,68	238,7	13,35	227	576	823	19,17	55,87	79,80	10506
Raz.%	93,8	94,5	86,3	96,4	92,7	93,8	91,9	82,9	75,4	81,0	83,6

MaxDP – max. Decathlons potential.; MaxSP – max. potential of specialists Razl. % - percent of difference; of max. Results in decathlon events and in relation to specialists records

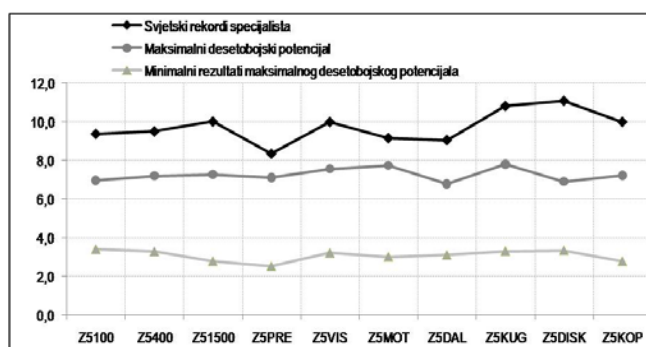


Figure 1. The scale and structure of maximum potential

Table 2. Decathlon potential of world record holder

		100	400	1500	PRE	VIS	MOT	DAL	KUG	DISK	KOP	U-BOD
Roman Šebrle	OR	10,64	47,79	261,98	13,92	212	480	811	15,33	47,92	70,16	9026
	MaxP	10,64	47,76	261,98	13,87	215	510	811	16,47	48,75	71,18	9257
Ashton Eaton	OR	10,21	46,70	254,48	13,70	205	530	823	14,20	42,81	58,87	9039
	MaxP	10,21	45,68	254,48	13,35	211	530	823	14,78	47,36	61,96	9368

OR – personal record; MaxP – max. potential in absolute results

Table 3. Decathlon potential of world record holders and percent of achievement of personal maximal potentials in order with maximal decathlon potential and specialists potential

		100	400	1500	PRE	VIS	MOT	DAL	KUG	DISK	KOP	U-BOD
Šebrle	OR	96,0	95,6	91,1	95,9	93,4	83,3	98,5	80,0	85,8	87,9	85,9
	MaxDP%	MaxP	96,0	95,6	91,1	96,3	94,7	88,5	98,5	85,9	87,3	89,2
Šebrle	(OR)	90,0	90,4	78,6	92,5	86,5	78,2	90,6	66,3	64,7	71,2	71,9
	PSR%	(MaxP)	90,0	90,4	78,6	92,8	87,8	83,1	90,6	71,2	65,8	72,3
Eaton	(OR)	100	97,8	93,8	97,4	90,3	92,0	100	74,1	76,6	73,8	86,0
	MaxDP%	(MaxP)	100	100	93,8	100	92,9	92,0	100	77,1	84,8	77,6
Eaton	(OR)	93,8	92,5	80,9	93,8	83,7	86,3	91,9	61,4	57,8	59,8	72,1
	PSR%	(MaxP)	93,8	94,5	80,9	96,4	86,1	86,3	91,9	63,9	63,9	62,9

MaxDP% (OR) – percent of personal record achievement in relation to max. decathlon potential  
 MaxDP% (MaxP) – percent of personal max. potential in relation to max. decathlon potential  
 PSR% (OR) – percent of personal record achievement in world record potential  
 PSR% (MaxP) – percent of max. personal achievement in relation to world record potential

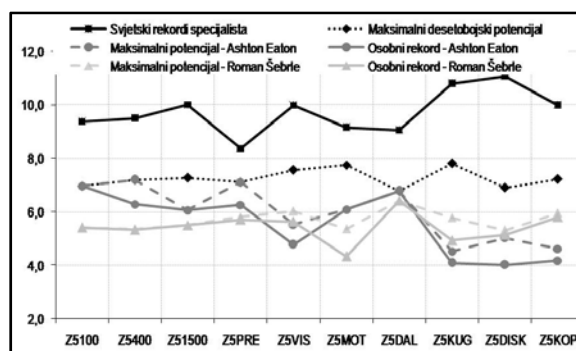


Figure 2. Hypothetic multidiscipline potentials and profiles of individual max. potential

On the contrary, based on established substantial uniformity lower Z5 scale of minimum performance and approximate uniformity range of decathlon disciplines (maximum decathlon potential value), derived natural objectified measuring scale that allows reliable comparative assessment of the relationship between decathlon disciplines (Figure 1). Comparative analysis of the structure of the maximum individual potential of two world record holders Romana Šebrlea and Ashton Eaton provides an insight into the real type and level of structure at achieving a personal record, while maximum potential reached individually by events during the successful performances of his career, will offer insight into the hypothetical, the maximum possible level of the same structure desetobojca. This also may determine the extent to which the reserves or changing the structure of the relationship between decathlon disciplines in achieving a personal record in relation to maximum decathlon personal potential. Then comparing them with decathlon maximum potential structures of all time and potential world records specialists, sought to expand the space perception in order to determine the prospects for further growth and structuring discipline in individual development decathlon (Figure 2). By comparative analysis of individual-level and structure of the maximum potential to achieve personal (world) record, it was established the common characteristics of Eaton Šebrlea and that is reflected in the range of approximately uniform in the running events and throws compared to jumping, with that in Šebrlea more pronounced in racing (Z5: 5.4 to 5.7) and for Eaton in throwing events (Z5: 4.0-4.2) (Figure 2).

Noticeably higher disproportionality of comparable size is present in both recorders in jumping disciplines (R.Š.Z5: 4.3 to 6.4; AEZ5: 4.8 to 6.8), which is also achieved the highest level of results and the discipline long jump (R.Š.Z5: 6.4; AEZ5: 6.8) and then in the running section of the 100m and 110m hurdles. The specificity of the difference of their profile is reflected in the interconnection by branches discipline. Looking at the entire structure, it is evident that Šebrle has considerably more uniform levels of individual achievement, nevertheless that it is a realistic achievements (Z5: 4.0 to 5.7), or hypothetical modeled maximum potential (Z5: 5.3 to 6.4) in compared to Eaton (Z5: 4.8 to 7.0; Z5: 4.5 to 7.2), which is lagging far behind in the throwing disciplines.

So it can be concluded that Eaton belongs to a typical sprint-jumping profile decathlon Šebrle a versatile type with dominant jumping qualities. This suggests that the result efficiency in the decathlon can not be achieved through consistent discipline structure. Both recorders are to achieve personal (world) record at the same time achieve their individual personal records in two events and repeated in one (Šebrle) and two (Ashton). It highlights the difficulties in reaching the maximum personal potential within a competition illustrating polistrukturality as immanent to decathlon. In a hypothetical modeled maximum decathlon potential of these recorders it was found that there would be no significant changes in the structure of the relationship between the discipline and the structure to achieve a personal record. The most significant changes in Šebrlea can be observed in the pole vault and shot put and in Eaton in the discus throw, running 400m and 110m hurdles.

It says that their achievements in these disciplines in reality a rather higher level but they achieved it in other performances of their careers with a different structure of the relationship between disciplines, thus pointing to the problems related to the preparation and directing of discipline structure. By a comparative analysis of the maximum potential of the observed world recorder with maximum decathlon potential and potential of athletes specialists it was determined that the Šebrle, with its overall score of the award at achieving a personal record, achieved 85.9% of the maximum decathlon potential and 71.9% of the potential world record specialists (Table 3). Disciplines that are closest to the rank of world specialists in running 110m hurdles (92.5%) and long jump (90.6%), while the laggard in the shot put (66.3%).

The current record holder Eaton is to achieve a personal record also exceeded the personal and total decathlon potential in running 100m and long jump at the same time reiterated its best results in the 1500m and pole vault. In relation to the potential world record specialists, nearest realization has in running 100m and 110m hurdles (93.8%), and the largest deficit in the discus throw (57.8%). The total score is almost pointing at achieving personal records achieved 86% of the maximum decathlon potential and 72.1% of potential of records specialists.

## Conclusion

The results of this research show that we cannot fully accept the fundamental desetobojska legality based on the principle of versatility, that is, the assumption that the highest result efficiency achieved through consistent discipline structure, as evidenced by previous researchers (Etcheverry, 1995; Van Damme et al., 2002; Stemmler and Baumler, 2005). The resulting natural objectified measuring scale minimum and maximum potential in the decathlon, contribute to a more reliable evaluation of the relationship between decathlon disciplines.

Information on the structure and level of the relationship between the maximum achievements of world record holder in the decathlon are important for understanding the real achievement of the versatile decathlon profile according to the degree of uniformity of the level of individual achievements in relation to levels of maximum decathlon potential. In this way, it is possible to make an optimal choice of individual disciplines that should emphasize to determine the effective time and time achieving the next level of individual achievements. This is also the way to assess the efficiency of previously conducted orientation process and preparation.

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## REALNI I HIPOTETSKI RASPONI SKALA MAKSIMALNIH POTENCIJALA NAJUSPJEŠNIJIH DESETOBOJACA SVIJETA

### Sažetak

U ovom radu izvršeno je objektiviziranje kriterija za ocjenu ukupnih i individualnih dostignuća najuspješnijih desetbojaca svijeta, kao i tipa strukture međuodnosa disciplina desetboja u odnosu na dostignuća najuspješnijih atletičara specijalista. Dobivenim značajnim razlikama u ostvarenim nivoima i profilu struktura desetbojaca i atletičara specijalista, utvrđeno je da nije prikladno vršiti strukturiranje međuodnosa disciplina desetboja na osnovu pretpostavljene "idealne strukture specijalista" koja bi omogućavala potpunije ispoljavanje višebojskog potencijala. Međutim, na osnovu utvrđene značajne ujednačenosti minimalnih rezultata maksimalnog potencijala i približne ujednačenosti raspona maksimalnog desetbojskog potencijala, dobivena je prirodnije objektivizirana mjerna skala koja omogućava pouzdaniju usporednu ocjenu međuodnosa desetbojskih disciplina.

**Ključne riječi:** desetbojci, međuodnos disciplina, strukturiranje, ocjena perspektivnosti

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Correspondence to:

Assist.Prof.Marija Bilić, PhD.

Faculty of Social sciences dr.M.Brkić

University Hercegovina

88266 Međugorje, Kraljice Mira 3A,

Bijakovići, Bosnia & Herzegovina

Phone: +387 (36) 32 78 08

E-mail: maria.bilic@yahoo.com