



Management of preparation of highly qualified decathletes based on the development of a competitive activity model

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Abstract

Objective of the study was to develop a methodology for managing the training of highly qualified decathletes based on creating a model of competitive activity in decathlon.

Methods and structure of the study. The scientific work includes an analysis of documentary materials, a method of mathematical statistics, and a pedagogical experiment.

Results and conclusions. Based on the analysis of indicators of competitive activity in certain types of decathlon of the world's leading all-around athletes using regression analysis, a model of competitive activity in track and field decathlon was formed. The model of competitive activity allows: to compare the results of an athlete in certain types with the average statistical indicators for a given result in the decathlon, to analyze the results of a decathlete in certain types, to identify lagging and dominant types of decathlon for a given athlete, to plan results in certain types of decathlon for the next macrocycle of training and on this based on programming the training process for the upcoming annual cycle.

Keywords: *all-round track and field athletes, decathlon, competitive activity, modeling, management of the training process.*

Introduction. Target planning for the training of qualified athletes at the first stage should be based on the planning of indicators of the competitive activity of athletes [4], and for track and field decathletes - indicators in certain types of all-around for the result in the decathlon planned for the next macrocycle [3, 6]. This is where planning of the annual cycle begins - the planned competitive result in all-around requires the coach and athlete to have a thoughtful and reasonable forecast of results in certain types of all-around for the next sports season [2].

To objectively assess an athlete's strong and weak all-around types, it is necessary to create an average statistical model of results in individual types of decathlon for a certain competitive result in the decathlon [1, 5].

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Methods and structure of the study. The scientific work includes an analysis of documentary materials, a method of mathematical statistics, and a pedagogical experiment.

Results of the study and discussion. At the first stage of the research carried out by employees of a comprehensive scientific group, the task was set to develop, based on a statistical analysis of the competitive results of highly qualified decathletes in certain types of the program, an average model of competitive activity in men's all-around in the range of results of 7700-8700 points. This problem was solved through statistical analysis of the results in certain types of decathlon of the world's strongest all-around athletes based on the results of the world champion-



ships. To analyze the dynamics of competitive results in individual types of decathlon, the 10 best results in the decathlon at each of the 17 past World Athletics Championships (1983-2019) were selected. The sample included only the results of athletes who competed in all 10 types of the all-around program.

The regression analysis of the performance indicators of athletes in certain types of decathlon made it possible to determine the regression equations on the basis of which model indicators in individual types of decathlon were calculated for a certain competitive result in the decathlon in the range of results of 7700-8700 points (Table 1).

Model performance indicators in certain types of decathlon, when compared with an athlete's individual indicators, allow:

- compare the athlete's results in individual events with the average statistical indicators for a given result in the decathlon;
- analyze the results of a decathlete in individual events, highlight the lagging and dominant types of decathlon for a given athlete;
- outline the strategy and tactics of preparing an athlete for the upcoming macrocycle, highlighting the types that should be given more attention and time in preparation;
- plan results in individual types of decathlon for the next macrocycle of training and, on this basis, program the training process for the upcoming annual cycle for all components of training (special physical and technical training of the athlete, volume, intensity and distribution of training means at the stages of the annual cycle).

Below, using specific examples of highly qualified athletes, leading decathletes of the country, winners of the 2022 National Championship, an analysis of the

individual correlation of results in certain types of decathlon is shown, the lagging and strong disciplines of each athlete are highlighted (Fig. 1-3). The circle in the diagram corresponds to the average statistical indicators for the athlete's results shown in the decathlon. The indicators inside the circle are below the model indicators (conditionally lagging types of the athlete), the indicators outside the circle are higher than the model indicators for a given result (conditionally strong types of the athlete).

At the first stage, the performance indicators of decathletes in individual all-around events were compared with models for a given competitive result in order to determine the athlete's lagging and strong all-around types.

Honored Master of Sports Sh-ev I. The strength of the athlete's special preparedness is the relatively uniform development of individual types of decathlon. The athlete is strong in almost all types of all-around,

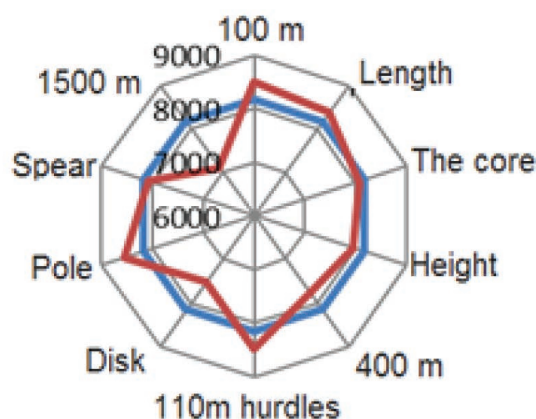


Figure 1. Indicators of competitive activity of HMS Sh-ev I. in certain types of all-around relative to the average statistical model for a result of 8165 points. in the decathlon

Table 1. Model characteristics of competitive activity of all-around athletes in certain types of decathlon

Decathlon event	All-around points					
	7700	7900	8100	8300	8500	8700
100 m, s	11,20	11,12	11,03	10,95	10,87	10,79
Length, m	7,20	7,28	7,36	7,44	7,52	7,60
Core, m	14,05	14,32	14,60	14,86	15,13	15,40
Height, m	1,92	1,95	1,98	2,01	2,03	2,06
400 m, s	50,30	49,85	49,35	48,85	48,35	47,90
hurdles 110 m, s	15,00	14,82	14,64	14,46	14,28	14,10
Disk, m	44,50	44,90	45,30	45,70	46,10	46,50
Pole, m	4,40	4,54	4,68	4,82	4,96	5,10
Spear, m	58,80	60,10	61,40	62,70	64,00	65,30
1500 m, s	277,0	276,0	275,0	274,0	273,0	272,0

which provides him with many years of leadership in this discipline in our country, confidently entering the elite of the world decathlon for ten years. The most powerful types of decathlon for this athlete include those that are based on speed-strength qualities and technical readiness, namely, 100 m run, long jump, hurdles and pole vault. There is some lag behind the model in the development of general and speed endurance, as indicated by the results in both the 1500 m run and the 400 m run (Fig. 1).

Masters of Sports of International Class M-ko A. 8077 points. An athlete with a pronounced emphasis on the first six types of all-around, the basis for success in which is the athlete's excellent speed qualities (above the model results in the 100 and 400 m running), as well as parallel specialization in hurdles, where the athlete is also among the elite of Russian athletes this distance. The long jump is largely determined by speed qualities; the athlete's performance here is also higher than that of the model. However, the last types (except for the pole vault) and, above all, long throwing are relatively weak types of the athlete due to technical errors. The results in these events are below the model characteristics, and the 1500-meter run is added to them, which indicates an insufficient level of development of aerobic and anaerobic endurance (Fig. 2).

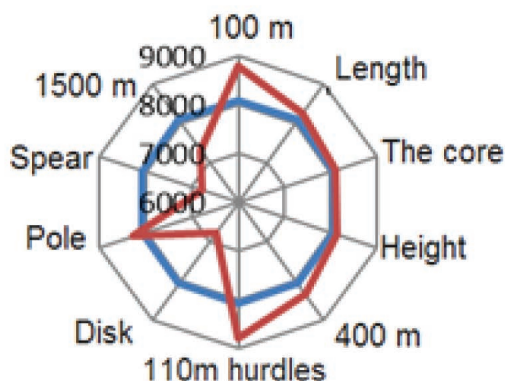


Figure 2. Indicators of competitive activity of MSIC M-ko A. in certain types of all-around relative to the average statistical model for a result of 8077 points. in the decathlon

Master of Sports K-ov A. 7829 points. The athlete's relatively lagging types of decathlon are long throws, here the young athlete has a significant growth reserve, as well as 1500 m running, which indicates an insufficient level of general and special endurance. An athlete with a pronounced emphasis on the types of

the first day of the decathlon, the basis for success in which is a high level of development of speed and speed-strength abilities, which is manifested in all-around jumping events and sprint running (Fig. 3).

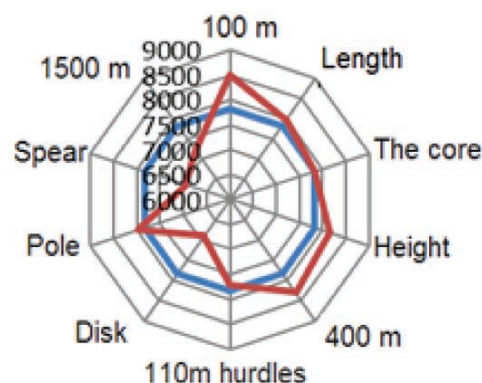


Figure 3. Indicators of competitive activity of MS K-va A. in certain types of all-around relative to the average statistical model for a result of 7829 points. in the decathlon

At the second stage, after analyzing the indicators of competitive activity in certain types of all-around, the correlation of results in the types, identifying the lagging types that limit performance in the decathlon, as well as the dominant types of the athlete, the strategy and tactics of preparation for the next annual cycle are determined. Based on the comparative analysis, conclusions are drawn and individual recommendations are developed for each multi-athlete to improve the training process for the next stage of preparation. The preparation management process goes through the following stages:

1. Analysis of the correlation of results in individual all-around disciplines relative to the model - identifying lagging and strong events.
2. Analysis of indicators of competitive activity in certain types using video analysis (in running events - timing of running along sections of the distance, in technical events - the number of successful attempts, stability of results in attempts, inaccessibility to the bar in long jumps). Analysis of the strengths and lagging aspects of competitive activity.
3. Using video analysis and photodiode timing, an analysis of kinematic characteristics in technical all-around events is carried out (phase composition of a competitive exercise, spatial, temporal, spatio-temporal indicators of the technical readiness of all-around athletes in individual phases of jumping and throwing).



4. Identification of technical errors in technical events, lagging aspects of athletes' special physical preparedness that limit performance in all-around disciplines. Formation of strategy and tactics for step-by-step work to improve all-around disciplines.

5. Adjustment of preparation, planning of the training process for the next stage of preparation (distribution of training means, their volume and intensity).

Conclusions. Based on the analysis of indicators of competitive activity in certain types of decathlon of the world's leading athletes, a model of competitive activity of qualified male all-around athletes has been formed. The model of competitive activity allows:

- compare the athlete's results in individual events with the average statistical indicators for a given result in the decathlon;

- analyze the results of a decathlete in individual events, highlight the lagging and dominant types of decathlon for a given athlete;

- plan results in individual types of decathlon for the next macrocycle of training and, on this basis, program the training process for the upcoming annual cycle.

An analysis of the competitive activity in certain types of decathlon of the leading all-around medalists of the 2022 Russian Championship in Athletics All-Around is presented. Lagging and strong types of athletes are identified, limiting factors that hinder the growth of decathletes' skills are identified, and promising areas of training are identified.

References

1. Kudu F.O. Legkoatleticheskiye mnogoborya. Moscow: Fizkultura i sport publ., 1981. 143 p.
2. Ogandzhanov A.L., Valiullin R.A. Innovatsionnaya metodika kontrolya v mnogoborye na primere pryzhka v dlinu. Aktualnyye problemy i sovremennyye tendentsii sportivnoy podgotovki v tsiklicheskiykh vidakh sporta v Rossii i mire. Proceedings national scientific-practical conference with international participation. Kazan, 2021. pp. 44-49.
3. Ogandzhanov A.L., Valiullin R.A., Latypov I.K. Metodiki kontrolya tekhnicheskoy podgotovlenosti v pryzhkovykh vidakh desyatiborya. Olimpiyskiy sport i sport dlya vsekh. Proceedings International Scientific Congress. Kazan, 2021. pp. 61-63.
4. Platonov V. N. Dvigatelnyye kachestva i fizicheskaya podgotovka sportsmenov. Moscow: Sport publ., 2019. 656 p.
5. Plotnikov V.M. Upravleniye trenirovochnym protsessom desyatibortsev na etape nachalnoy spetsializatsii s ispolzovaniyem sistemnogo podkhoda. PhD diss. Omsk, 2003. 145 p.
6. Frank Zarnowski Bazovoye rukovodstvo po desyatiboryu. USA, 2001. pp. 7-21.