

THE WORLD OF TRACK-AND-FIELD ATHLETICS

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Summary

Different aspects of history, development and the present state of one of the primary kinds of modern sport - track and field athletics are considered. Specificity, origin and rules of competitions of different groups in separate disciplines, included into a modern track and field athletics complex, organizational structure and a competitive calendar of world track and field athletics are represented. Results of the largest international track and field athletics competitions - the Olympic Games, World and European Championships and Cups - are analyzed. Records of the world, Europe and Russia in main categories of track and field athletics are mentioned, and information, concerning individual achievements of leading athletes of the world from different generations is given.

1. Introduction

While football is the worldwide recognized “King of Sport”, undoubtedly, track and field athletics is the “Queen of Sport” and it is not an exaggeration. Track and field athletics sport is a complex of simple, most natural movements of a human - walking and running, jumping and throwing - which, in their turn, to some extent are elements (sometimes basic elements) of techniques of the majority of modern kinds of sport. And jogging is habitual and useful to all people - from weightlifters to chess players. “How to raise endurance, to develop a respiratory system without running” - says the great volleyball player and the best sportswoman of Russia of 2010 Ekaterina Gamova.

What were the first kinds of sport in the ancient Olympic Games? Throughout thirteen ancient Olympic Games “one stade” running was the only kind of sport. Later on “diaulos” (double running) and after that “dolihodrome” (endurance race, its distance has been gradually increased from 8 to 24 stades) have appeared. The program of

competitions of Ancient Greeks included long jumps, discus and javelin throwing and even “lampaderioumas” - a relay race, participants of which handed off a burning torch. So, many track and field athletics disciplines have an age of more than three thousand years.

But after all in modern track and field athletics there are also such technically difficult kinds, as, for example, pole vault, triple jump or hurdle race, which, at first sight, can seem a little stylized, artificial. However, all these kinds have the same folk origin. Prototypes of the modern pole vault are jumping over ditches, fences and other obstacles with use of the Cossack’s lance or simply long sticks, multiple jumping was known already in Ancient Greece, and hurdle race has roots in common jumps over obstacles at jogging.

The purpose of this chapter is to familiarize the reader with the great and fascinating world of track and field athletics, to acquaint him/her with its history, specificity and diversity of disciplines, included into it, with a calendar, rules and results of the largest track and field athletics competitions - the Olympic Games, World and European Championships and Cups, with records and the most titled athletes.

2. “Faster! Higher! Further! ”

This is the motto of modern track and field athletics, by two of three words coinciding with the motto of the Olympic Games. The whole complex of track and field athletics disciplines (more than hundred disciplines) can be divided into some groups. The first of them consists of 47 men’s and women’s kinds, included into the program of the largest international competitions - the Olympic Games, World and European Championships and Cups: running (100, 200, 400, 800, 1500, 5000 and 10 000 m), marathon race (42 km 195 m), hurdling 110 m (100 m for women) and 400 m, steeplechase (3000 m), relay race 4×100 and 4×400 m, racewalking 20 km and 50 km (men only), high jump, pole vault, long jump, triple jump, shot put, discus, hammer, javelin throwing and multisport – decathlon for men and heptathlon for women. Marathon race and racewalking, unlike other kinds, are mostly held outside of a stadium.

The second group comprises kinds, which are not included into the program of official international competitions, but in which records of different level are registered, including world records: run 1000 m, 1 mile (1609 m), 2000, 3000, 20 000, 25 000 and 30 000 m, 1 hour run, relay race 4x200, 4x800 and 4x1500 m, racewalking on a stadium path 10 000 m (women), 20 000 (men and women), 30 000 and 50 000 m (men), decathlon (women).

The third group are kinds included into the program of indoor competitions, in which world records are also registered: run 50, 60, 200, 400, 800, 1000, 1500 m, 1 mile, 3000 and 5000 m, hurdling 50 and 60 m, relay race 4x200, 4x400 and 4x800 m, racewalking 3000 m (women) and 5000 m (men), high jump, pole vault, long jump and triple jump, shot put and multisport - heptathlon for men and pentathlon for women.

One more group consists of road running and road racewalking: run 10, 15, 20 km, half-marathon (21 km 97.5 m), 25, 30, 50 and 100 km and marathon distance relay race. In these kinds and also in marathon race and racewalking 20 and 50 km world records are registered. These competitions are held completely on a road or with start and finish at a stadium, distance can be closed or unclosed (from one point to another). In closed loop racewalking length of one loop should be not shorter than 2 km and not longer than 2.5 km.

In track and field athletics there is also other division of kinds into groups, proceeding from their specificity, essence, rules of competitions: run (short, average, long and super-long distances), hurdling and relay race, steeplechase, cross-country and mountain running, racewalking, jumps, throwing and multisport.

2.1. Running

2.1.1. Sprint

The basic, classical distances from programs of the largest competitions are 100, 200 and 400 m (outdoors), and also 50 and 60 m (indoor). Results in sprint (in contrast to longer distance running) are registered only by a completely automated system of timing (photo- or video- finish) with accuracy down to 0.01 second.

At start, sprinters use special equipment (starting blocks), which must have rigid design and some spikes for rigid fixation on a lane. Two flat or slightly concave plates are fastened to a rigid frame of a starting block and can be displaced along the frame forward-backward. Starting blocks are connected with a special unit, registering false start. The start-referee and his/her assistant, responsible for return of runners, are supplied with special ear-phones, allowing them to hear the alarm signal from false start controlling units.

In straight distance running, all sportspersons start from the same line with width of 5 cm, for the 200 m, 300 m and 400 m, which involve curves, runners are staggered for the start (so that all runners are equidistant from finish). In all kinds of sprint sportspersons from start to finish must remain within their separate lanes with width of 1.22 m.

Start in sprint is carried out as follows. According to the command “On your marks!” sportspersons stand on their starting blocks. They lean on the ground by arms and on plates of starting blocks by legs, at the same time one knee touches a lane. When a Start-referee with assistants sees that all runners are ready (staying motionlessly on starting blocks), the Starter commands “Set!”. Sportspersons raise a basin and raise the knee from the lane, transferring mass of the body onto arms. A Starter, having convinced that runners have again motionlessly fixed their starting positions, fires a starting gun (or signals otherwise) and, thus, officially starts a race. Movement of one or several sportspersons prior to a starting signal is considered as false start. False start is also the situation when starting reaction of one or several sprinters, fixed by special equipment, does not exceed 0.1 sec.

According to the rules, active since January 1, 2003, in one heat only one false start without disqualification of a corresponding runner was allowed. Those sportspersons, who made the second false start, were disqualified in this heat and were informed about it by red cards. Thus, the first false start threatened by disqualification to all participants of this heat, irrespective of a person, responsible for false start. Disqualification was started from the second consecutive false start. Since 2010 disqualification is carried out from the first false start. If false start takes place through no fault of someone from sportspersons, but for any other reason, green card is shown to all the athletes.

Order of arrangement of sprinters on lanes is determined by results of toss-up. At the first stage of competitions (in heats) it is defined by a lottery. At subsequent stages - in quarterfinals, semi-finals and in a final toss-up is carried out, taking into account results, demonstrated at the previous stage, and consists of two parts. First of all, all participants are arranged in heats, and after that they are placed on corresponding lanes. For this purpose 8 participants of a heat, according to their results at the previous stage, are divided into two groups. The first group includes four runners with the best results; they are placed on lanes 3-6 according to results of toss-up, and the second quartet toss-up 1-2 and 7-8 lanes.

Lap run is carried out to the left side and lanes are numbered from the left to the right. Sprinters have no right to go outside their lanes.

Finish is designated by a white strip with width of 5 cm. For successful work of referees vertical poles are placed at ends of the finish line. Some time ago special assistants stood at these poles and held a finish ribbon, replaced later with wool yarn, attached to poles. Currently special equipment has replaced this yarn. Transmitters and sensors create an invisible sensitive vertical plane of the closest edge of the finish line. The result and a place of a sportsperson in a heat are automatically registered, when his/her torso (not the head, the neck, part of an arm or a leg!) reaches this plane.

The photo finish system displays on a monitor the order of arrival of runners and their results with accuracy of milliseconds, though official results of runners are recorded with an accuracy of 0.01 sec.

To have certain results even in the case of failure of electronic equipment, for example, at power failure, referees duplicate work of equipment by manual timing. They use chronometers or electronic stopwatches. Corresponding results displayed on them are rounded with accuracy 0.1 sec (with overshooting), even if these chronometers can register results with accuracy of 0.01 sec.

Results of each runner are fixed by three stopwatches simultaneously. The officially recognized result is selected as follows: it must be displayed (the same result) on two chronometers from three, if all three chronometers show different time, then the average value is recognized as official. If there are only two stopwatches, then official result is the worst of the two displayed values.

For more exact registration of the order of arrival of runners to finish the last five meters of a distance are marked by cross lines (through each meter) with width of 5 cm,

forming so-called “finishing boxes”, which, especially in absence of electronic equipment, facilitate referees’ perception of sportspersons finishing.

In sprint, measurement of speed and direction of wind is carried out. For this purpose in 50 m from finish, in 2 m from a racetrack and at a height of 1.22 m from its surface there is special equipment, switched on with a signal “start” (run 100 m) or at appearance of a leader in straightaway (run 200 m). In both cases measurement is carried out during 10 sec. Records of any level in sprint are registered only when speed of a fair wind did not exceed 2 m/s.

2.1.2. Hurdling

It is sprint with distances of 110 m (men), 100 m (women) and 400 m (for both genders). The only difference from common sprint – athletes jump over 10 barriers of different height.

Here the rules regulating height of barriers and their arrangement on a distance.

Run 110 m. Height of barriers: for men – 1.067 m, for juniors (up to 20 years) – 0.99 – 1.00 m, for youth (up to 18 years) – 0.914 m. The first barrier is placed at a distance of 13.72 m from a starting line, distance between neighboring barriers is equal to 9.14 m and from the last barrier to finish is equal to 14.02 m.

Run 100 m. Height of barriers: for women and juniors – 0.84 m, for young girls – 0.762 m. Distance from start to the first barrier is equal to 13.00 m, between barriers – 8.50 m and from the last barrier to a finish line – 10.5 m.

Run 400 m. Height of barriers: for men and juniors – 0.914 m, for young men – 0.84 m; for women, juniors and young girls – 0.762 m. Distance between barriers is the same for men and women of all age groups: from start to the first barrier - 45 m, between barriers - 35 m and from the last barrier to a finish line - 40 m.

Indoor competitions of athletes are held at distances of 50 or 60 m. Here conditions are the following. Men: height of barriers – 1.067 m, number of barriers - 4 (50 m hurdling) or 5 (60 m hurdling), distance from start to the first barrier – 13.72 m, between barriers – 9.14 m and from the last barrier to a finish line – 8.86 m (50 m hurdling) or 9.72 m (60 m hurdling). Women: height of barriers – 0.84 m, number of barriers - 4 (50 m hurdling) or 5 (60 m hurdling), distance from start to the first barrier – 13.00 m, between barriers – 8.50 m and from the last barrier to finish – 11.5 m (50 m hurdling) or 13.00 m (60 m hurdling).

Each barrier consists of two feet with length up to 70 cm, two vertical poles with changing height, and two cross-section laths - upper and lower. More often the main frame is metal, the upper lath is wooden. Width of a barrier – 1.18-1.20 m, weight - not less than 10 kg. Each barrier should fall forward (to the side of runner movement) at application of force F ($3.6 \text{ kg} < F < 4 \text{ kg}$) to the upper lath.

During a run a sportsperson can unintentionally knock down by arms or legs any number of barriers on his/her own lane. But if the referee registers that it is made deliberately, an athlete can be disqualified. Infringement of rules, also leading to disqualification, is movement of a leg or a foot of a sportsperson below a horizontal plane of the top of a barrier (aside it) and a jump over a barrier of another athlete.

Measurement of speed and fair wind direction in hurdling (100 and 110 m) is carried out during 13 sec.

2.1.3. Relay Race

It is the unique group of kinds in track and field athletics, where competitions have a team character. There are two classical relay races, included into the program of official competitions, and both of them sprint - 4x100 m and 4x400 m. But a range of relay race is great and various. World records are registered also in such kinds of relay race, as 4x200 m, 4x800 m, 4x1500 m and even in Ekiden - relay race with a marathon distance, divided into 6 stages - 5 km, 10 km, 5 km, 10 km, 5 km and 7.195 km.

The program of large competitions quite often includes also combined (they are also named Swedish) relay races with stages of different length. For example, 800+400+200+100 m or 400+300+200+100 m. Or similar indoor relay races - 4+3+2+1 circles. All these relay races can be held also in reverse order (with return sequence of stages), starting with the shortest stage. Relay races 10x1000 m or even 100x1000 m are held rarely enough. During many decades traditional multistage relay races are held successfully in many cities.

The motto of track and field athletics relay race – “One for all and all for a team! ”. During relay races emotions overwhelm spectators and sportspersons, so, traditionally relay races end the program of the largest competitions of athletes - the Olympic Games and the World and European Championships.

This program includes two sprint relay races: 4x100 and 4x400 m. Each of stages or laps of competitions - in heats, quarter- and semi-finals and in finals four runners sequentially pass the baton to the next athlete from their team. Each team can include up to 6 runners, each of them can run any stage of a certain competition. But return substitution is not allowed, i.e. the runner, replaced on one of stages can not run any more at any further stage. However, all performed sportspersons are considered as full participants of a team, and if their team becomes a prize-winner, for example, at the Olympic Games or the World and European Championships, all of them are awarded with medals, as well as their colleagues, running in a final.

But “joy and trouble is one for all”. It means that if someone from the members of a team breaks rules, for example, is disqualified for application of forbidden drugs, the team result is cancelled.

Both relay races are sprint; however, they have some important distinctions. First of all it concerns substitution. In relay race 4x100 m, where the success is brought by right baton hand off, performed with the maximum speed, it is very important to optimize this

operation (up to automatism). Therefore substitution here takes place only in extreme case, more often after traumas.

In relay race 4x400 m, on the contrary, two strongest runners do not appear at preliminary stages, they are kept for a final, since they usually run 400 m (individual competitions) prior to relay races.

There is also the other important tactical difference. In relay race 4x100 m responsibility for quality of hand off is guaranteed by a passing runner. Exactly he/she must rapidly and precisely hand off a baton to the next runner from his/her team. But in relay race 4x400 m, on the contrary, a leading role is played by a receiver. Exactly he/she must quickly snatch out a baton from hands of an extremely exhausted team mate and, rushing forward, to separate from contenders.

The baton is a whole, smooth, hollow, round in section tube, made from wood, metal or other hard material, its length - 28-30 cm, weight is not less than 50 g, color is bright enough to see it throughout the whole competition. When someone from runners drops a baton, exactly he must pick it up, even if he/she has to change the lane for it, but at the same time he/she must not reduce own distance and hamper contenders. And if someone from his/her team instead of him picks up the baton, all this team is disqualified.

Baton can be handed off only in a special 20-meter zone. Each lane has three lines, designating the beginning of a zone of handing off, its middle and its ending. Baton handing off begins at the moment when a receiving runner touches it, and is finished when it is completely in his/her hand. Correctness of handing off is registered when baton is handed off strictly in a corresponding zone (not out of limits), position of trunks and extremities of partners in (or out) this zone are not taken into account.

In relay races 4x100 and 4x200 m all participants run along separate lanes and can start run, being 10 m prior to the beginning of a zone of handing off. In relay race 4x400 m participants of a starting stage remain in separate lanes, of the second stage - the first turn also run along separate lanes, and after that run along the common lane. The exit place is marked by an arched cross line and 1.5 m flags aside from the whole lane, and crossing of each lane with the mentioned line is marked also by small cones or other signs.

2.1.4. Middle Distance Run

This group includes distances from 600 to 2000 m. There are two basic distances - 800 and 1500 m, but all other distances are also very popular. 600 m is mainly indoors run distance, but 1000 and 2000 m and also 1 mile (1609 m) are included sometimes into the program of large international competitions (in the summer at a stadium, and in the winter indoors).

Run 800 m (and 600 m) is characterized by start of sportspersons in separate lanes, and (if necessary) two sportspersons in one lane. After the first turn runners remain in one lane. The place of transition into one lane is designated by the arched line, crossing all lanes, and also by flags. On other distances sportspersons start from an arched line.

After a signal of a Starter “On start!” runners take a place before a starting line, without stepping on it, when they stop any movements, the Starter fires a starting gun or switches on a starting unit.

The special place in this group is occupied by 1 mile run. This is some kind of a symbol, a monument to British “roots” of modern track and field athletics. Only in the USA still there are yards, feet and inches as units of measurement, but the mile is international. Mile run is not included into the program of official competitions - the Olympic Games or the World Championships. It is forced out by the younger, but very popular on the Earth kind of run - 1500 m. However, in 1 mile run world records are registered, and not only for men, but also for women, not only at a stadium, but also indoors, and this kind of run is very popular among spectators, when it is included into the program of large commercial competitions.

There are still 2 and 3 miles run categories, but they are kinds of track and field athletics from the following group.

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(inclusive), and also about records of the USSR and the world records and lists of the best athletes for the whole history of athletics].

<http://www.iaaf.org/> [The official website of the IAAF containing much information on track and field athletics.]

Biographical Sketch

Orlov Rostislav Vasilyevich is the Honored Worker of Physical Culture of the Russian Federation, the member of the International Association of Sport Press and the International Association of Track and Field Statisticians. Throughout many years, he is the member of the Presidium of the Federation of Sport Journalists of Russia. As the journalist, tele- and radio commentator, he took part in extensive coverage of eight Summer Olympic Games and several tens of the World and European Athletics (and other kinds of sport) Championships. He is the author of some books and many publications on track and field athletics in the Soviet, Russian and foreign printed media.