SPEED AND COORDINATION PROBLEMS IN THE 110M HURDLES

By Ludvik Svoboda

Some common technique development drills are responsible for a hurdle clearance technique that is useless in maximal performance. The following text makes recommendations to avoid this problem by adjusting training runs to correspond with the timing and coordination of the racing technique. The article is a slightly edited version of the author's address to the European Athletics Coaches Association's Congress on Sprints and hurdles at Bad Blankenburg in 1989. Re-printed with permission from Modern Athlete and Coach.

Performance efficiency and success in the sprint events is always linked to the development of maximum speed. This in flat races is relatively easy to achieve as the valid rule is that:

- Speed equals stride length times stride frequency.

By finding the optimum between these two components of speed, and by using the appropriate training means, it is possible for the coach to plan and carry out training in a purposeful and logical way. The preparation structure for flat races is relatively simple.

In the case of hurdlers, further factors that have an effect on the target result have to be considered. These include, among others, an efficiently coordinated and economical hurdle clearance and the ability to achieve rhythmical movements. Finding the optimal combination of running speed with the proper crossing of the hurdles is what leads to success. Both these factors must therefore be represented at every stage of the annual training plan.

The work that leads to the improvement of the hurdle clearance technique is, above all, associated with mobility and with a perfect motor coordination capacity. However, the aim of this text is not to deal with mobility and dexterity but with problems associated with the motor coordination in the hurdle clearance at maximal training speed.

Modern recording techniques make it possible to obtain an objective assessment of the hurdle technique during the training processes. Scientists, who are dealing with high performance athletes in Prague, using methods of spatial analysis of the individual body segments, have shown the advantages of the techniques used by the world's best athletes (analysis of the World and European

championships), allowing to make an objective assessment of the fine level of coordination in the individual 110m hurdlers.

It is particularly relevant to the coach that considerable differences have been discovered in the hurdle clearance techniques at racing speed (maximum speed) in comparison to the techniques used in classical warm-up exercises (5-stride rhythm when the hurdles are standard distances apart), a method used most frequently for the development of technique in hurdling. The differences apply mainly to the duration of the flight phase after the takeoff drive, the angle of the takeoff, the changes to the knee angle of the lead leg, the speed of the individual body segments and so on.

In other words, the hurdlers are very often actually developing a technique that is useless in maximal performance. They develop a coordination habit for a hurdle stride that is far too long for an effective hurdle clearance. At the same time, frequent technique development of hurdling speed in the three-stride rhythm with the hurdles placed the competition distance apart, or closer, achieves very little.

It is well known that, as maximum speed is increased, the support phase decreases. This is responsible for the coordination differences in the hurdle technique in the preparation and the competition periods. With the shortening of the support phase the hurdler has to bring the individual body segments into the pre-takeoff position in a very short time period. At a lower speed there is sufficient time to perform the entire takeoff correctly but what is needed during a training year is to establish a hurdle stride technique that corresponds to the competition technique.

HURDLING SPEED

In order to achieve this, my training group has for the development of hurdling speed and hurdling speed endurance runs over hurdles placed further than competition distances apart in a 5 or 7-stride rhythm. As an alternative the speed to the hurdle can be increased by adding one or two double strides to the run-up.

Both of these methods make it possible to train speed and the hurdle stride with the intensity and quality that corresponds to the performance target of an athlete.

Athletes, whose target time is 13.50 sec., run distances from 50 to 130m at a speed that always corresponds to the intermediate times for a 13.50 sec. 110m hurdles. The distances between the hurdles are selected according to the current training state of an athlete. For example, in the case of a 5-stride rhythm the hurdles are 12.00-13.50m apart, in the case of a 7-stride rhythm 17.50-18.50m. Three-stride rhythm runs are performed between the other rhythms. In case the run-up is lengthened 3.50 to 4.00m are added for one double-stride, 7.50 to 8.00m for two double-strides.

All this has the purpose of increasing speed in order to create conditions for the development of hurdle clearances in competition rhythm of coordination. This is supplemented during the preparation period with runs over hurdles placed 8.50, apart to develop stride frequency in the sprinting between the hurdles. It is only at the end of the preparation period that the athletes run in a three-stride rhythm over hurdles placed the competition distance apart.

An analysis of the race performance of European indoor champion, A. Hoffer, establish his support phase duration during the takeoff in the range of 0.123 to 0.131 sec. In the technique training over hurdles placed the competition distances apart and using a five-stride rhythm the support phase increased by 150ms. On the other hand, in training over hurdle placed further apart the support phase duration values shifted to 0.130 sec., depending on the athlete's state of training. There is no need to stress that other values from the spatial analysis of the hurdle clearance also moved closer to the competition parameters.

As far as the development of speed is concerned, it ought to be emphasized that the athletes in the author's training group usually carry out their speed training together. This is a great advantage to the hurdlers because they have fast sprinters for training partners, often turning accelerations into competitions. It should also be noted that photo-electrically activated devices, placed 10m apart along the track, are used in the development of maximal speed.

VOLUMES OF SPEED TRAINING

Fig. 1 shows an analysis of the volume speed training in the preparation period up the start of the summer season. The volume is expressed in average weekly values of acceleration and maximal speed work in meters. Speed development is almost throughout the entire year assisted by varied speed training in which combinations of running under standard conditions are alternated by runs under difficult (various types of breaking effects) conditions and runs under easier than standard conditions.

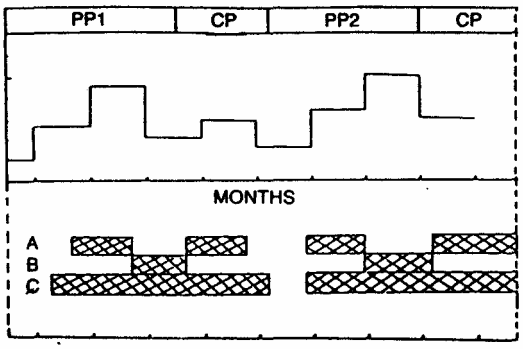

FIG. 1: DISTRIBUTION OF THE SPEED TRAINING VOLUME
PP = preparation period; CP = competition period;
A = resisting runs; B = assisting runs;
C = stride frequency runs

Fig. 2 shows an analysis of the volume of hurdling speed development over distances up to 80m in three, five and seven stride rhythms in times that correspond to the performance of the summer season. As can be seen, the main hurdling speed development takes place in the months of January and May, when athletes allocate two training units a week for the task.

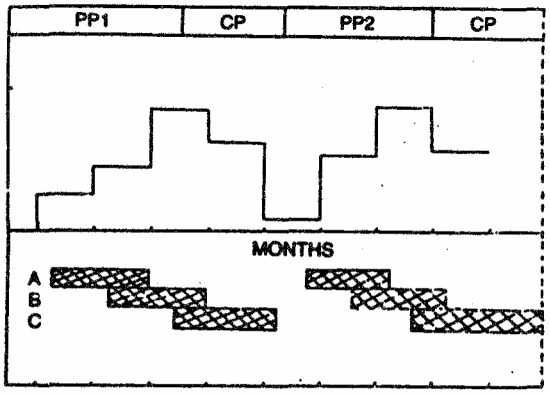

FIG. 2: DISTRIBUTION OF THE HURDLING SPEED VOLUME
PP = preparation period; CP = competition period
A = 5-7-stride rhythm with increased distances between hurdles; B = extended run-up; C = 3-stride rhythm with standard distances between hurdles.

An example of such a training unit prior to the European indoor championships and restricted only to hurdling is as follows:

- Hurdling warm-up, using the lead leg and the trail leg drills (a total of 30 to 50 hurdles);
- Standing starts over 2 hurdles, one start from a 9-stride run-up;
- 3 to 4 standing starts over 5 hurdles from a 17.50m run-up in 3-5-5-5-3 stride rhythm.

Another training unit, that is very similar to the one described, is devoted to hurdling from the blocks.

Fig. 3 shows an analysis of the volume of hurdling speed endurance development over distances ranging from 80-100m in three, five and seven stride rhythms. This is in the autumn performed over 100cm high hurdles before changing to the standard height. An example of such a training unit, conducted twice in a microcycle in April is as follows:

- Hurdling warm-up (a total of 30 to 50 hurdles);
- Four standing starts over 20m;

- Two standing starts over two hurdles from a nine-stride (17.50m) run-up;
- 4 to 6 repetitions of 130m hurdles from a 17.50m run-up in 3-3-7-3-3-5-3-7-3 rhythm. Touchdown times after the last hurdle 15.5 to 16.0 sec.

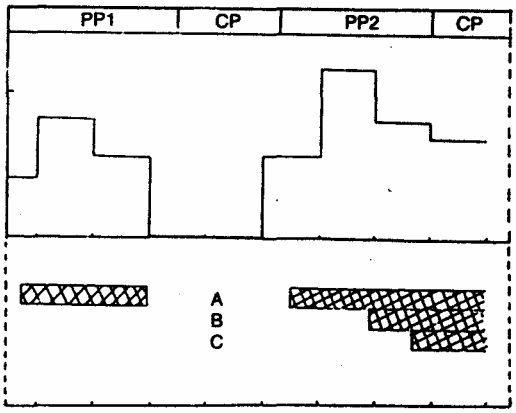

FIG. 3: DISTRIBUTION OF HURDLING SPEED ENDURANCE TRAINING VOLUME
PP = preparation period; CP = competition period
A, B and C = as in Fig. 2.

An increase in the maximum speed depends on the development of many motor capacities, particularly the absolute and the dynamic strength. However, it must never be overlooked that the main aim of the training procedures is to improve speed. The incorporation of measures for the development of other capacities into the training plan should be adjusted in such a way that it is possible to improve the development of maximum speed.