

IN SEARCH OF THE HOLY GRAIL

Extract from the book “The Long Jump: Technical Skills and Drills, Training and Coaching for the Event”

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In this abstract from his newly published book, the author examines the relationship between speed and long jump performance. The book can be purchased on-line at the author’s website: www.longjumping.co.uk

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Bio-mechanical analysis has determined that no long jumper can take-off effectively at maximal speed and expect to jump long distances.

The key to long jumping is speed - speed on the runway and speed at the point of and just after take-off.

There has to be a compromise of the speed attained on the runway in order to take-off in the right position with the right body angles. This is a part of the whole skilled process that some coaches and jumpers find great difficulty with.

There is running speed and jumping speed. Tests indicate that if the jump speed is near maximal - or speed loss of less than 10% in the last 6 strides to the board then possibly the result will be that the jumper is taking-off at his/her optimal speed.

Top jumpers succeed in maintaining run-up speed without a too drastic loss of horizontal momentum at take-off.

I have explained many times that a great deal of my skill coaching time is taken up with runway development. I believe that if the jumper can get this part right then longer distances can be achieved.

Runway development begins as soon as the jumper returns after the recovery period following the competitive season.

Every one of my technical sessions contains some element of runway development.

But first, important questions have to be asked and discussed before the winter and spring training programme begins. Questions such as:

- How long should next season's approach run be?
- Did last season's approach run work?
- Should we shorten or lengthen?
- Were we losing speed in the last 6 strides?
- Was there enough emphasis on the last two strides?
- Did we have enough time to lift from the board?
- Was the take-off leg at touchdown firm enough?
- Was the ankle strong at touchdown?
- Were you 'sweeping' that ankle and lower backwards?

Remember, the forces at touchdown are immense and it doesn't matter how quick a jumper is on the runway, any yielding at take-off will mean that most of the speed generated on the runway is totally wasted.

So I include touchdown in the equation that makes up approach run.

SO HOW DO WE FIND THAT SPEED OR 'THE SPEED'?

So it is not maximal speed but **optimal speed** that allows a jumper to take-off efficiently. But how do you discover 'the speed'. It does take time and a 'lot' of patience from both jumper and coach.

Obviously this optimal speed will depend on each jumper's maximal speed over prescribed distances. The correct length of approach run will depend on the jumpers speed generation capacity. Generally, the better sprinter you are the shorter your approach. Some jumpers are able to 'get fast early' whereas others 'need time' to attain higher speeds.

Sidorenko [Russia] believed that the speed ratios of a jumper approaching the board depended on the sprinting capacity of the jumper and reflected whether he/she was a 'power' or a 'speed' type of jumper.

So knowing your jumper is important. Regular speed tests over distances from 20m to 50m should form part of the overall training programme.

The jumpers in my group are all speed jumpers. I favour accelerating away

quickly and then maintaining fast movements to take-off. We look to ATTACK in the last 6 strides but with extra emphasis on the last two strides in. This gives another focus nearer the board.

We make use of timing gates in the last 6 strides. Gates are placed 11m/6m and 1m from the board. All the group like this testing procedure and makes them truly focused on the last 6 strides to the board.

Popov [1982] states that the rate of acceleration in the run up depends on the stride length and stride frequency of the jumper. Whatever the rate, maximum speed and readiness for the take-off must be achieved in the last 2-4 strides.

Detailed analysis of elite jumpers shows that, on average, most jumpers reach speeds around 6.6/7.0m/sec during the first strides. This increases to 9.4/9.7m/sec in the middle phase [7-15 strides] of the run up to reach 10.0/10.1m/sec four strides before the take-off.

Rhythm and posture runs over these distances will go a long way to establishing the coordination and timing required to get from point A to point B. Jumpers need to develop the spatial awareness that all top class jumpers possess. The ability to make minor positional body changes at high speeds to compensate for under and over striding and environmental conditions such as wind.

Once the jumper is able to move from one point to another point in a straight line effectively then you can begin to add the speed element.

Remember, as a coach your major aims are to make your jumper faster and stronger. This will have an effect on approach run distance. The approach run check mark is not set 'in tablets of stone'. It is a working point that changes as the jumper develops during the conditioning and skill building periods.

So constant repetitions over the full approach run distance must be done at all stages of the training year. It can not be left until the competitive season begins.

It will change and more so as the season is nearly upon you. This is where the pure speed sessions are now taking place. We do a lot of competitive speed sessions within a session because our policy within the jumps group is that they run 60mts indoor during the winter and 100m during the summer.

Only the better jumper is able to compete competitively at these distances but most of the group are able to run these distances for their clubs in minor meetings. We find the speed transfer from track to runway encouraging. So until we find otherwise that is how we do it. It works for us.

By including these sprint elements means that we can go a lot further in discovering 'the optimal speed' on the runway.

We can not compromise speed. Our jumpers have to take-off at that optimal speed. We have specific skilled runway sessions where we ask the jumpers to run in faster than they have ever done so.

What's the worst that can happen? You simply can not take-off. You haven't the time on the board. You run through or you take-off, attain to much rotation and have to 'bail' out in mid-flight.

But I believe that you have to 'go there' in order to discover 'the speed'. Yes, it does take time and a lot of observation, questioning and feedback to **FIND AND DISCOVER** the optimal speed to take-off with. I encourage the jumpers to watch each other and I direct them and ask them to look for important technical elements that lead up to and into take-off because there are some athletic meetings which I can not attend so the group are able to look after each other.

There are those jumpers who can go through their whole competitive life not having discovered 'the speed'. Jumpers have to be directed sometimes bullied into charging that board. The higher speed you can take-off will ultimately lead to longer distances jumped.

The jumper gets used to the higher speeds and learns to adapt to the lowering of contact time on the board. They learn to be more reactive. They learn how to **DRIVE** up the free thigh with no pause between touchdown and vertical lift. They develop the timing. Their neural system adapts, Movement patterns are learned with constant reinforcement and effective coach feedback.

But the search for 'the speed' is complex. It can not be discovered without a great deal of hard work.

It is difficult to do a lot of repetitions within a single training unit. That's why it is an ongoing process spread throughout the training programme.

Athlete	Distance	Times [secs]		
		11m - 6m	6m - 1m	Average
Mike Powell [USA]	8.73m	0.46	0.46	0.93
Larry Myricks [USA]	8.33m	0.46	0.48	0.94
Henrietta Paxton [GB U23]	6.37m	0.60	0.59	1.19
Rebecca White [GB]	6.22m	0.62	0.57	1.19

Run Up Speeds of Mike Powell and Larry Myricks [both USA] plus two of my own group

I've already mentioned the three basic ratios for the whole approach run. They are to accelerate, then to align then attack into the board.

If a jumper has an 18 stride approach then NO stride can be wasted. The control for the whole approach run comes from the very first stride. I don't encourage any form of run on or jog on. My jumpers utilise a standing start position. They are still and in charge. Linear motion begins from this point—there must be no lateral movements at all.

The first four strides have to be effective—I call it being 'busy' in these first four strides. If the jumper is not concentrating then important centimetres are being 'lost' very early on in the approach run. Remember, the board is only 20cm wide. So every centimetre is important. We work hard in training sessions on our starting position and the first four strides

We encourage rapid acceleration for 6-8 strides which takes the jumper into the alignment phase where the body becomes more upright, with shoulders low which encourages effective arm range. The head is still and fixed. There is not a great deal of acceleration during this phase although there is some. When the jumper comes to the check mark which is approximately 6 strides out from the board he/she begins to attack the board and leg cadence increases.

The jumper is attempting to attain that optimal speed which will allow him to effect an effective touchdown with the take-off foot, ankle and leg. As I will explain later in the book—it is imperative that the jumper arrives at the board tall, with centre of mass high and with active, driving arms. This body initial position will give the take-off leg every opportunity to pre-tense before touchdown, the time to 'lock' the ankle at 90° and the time to effect what I call the ankle-sweep back. I'll explain this in detail in a later chapter.

So you are preparing to take-off from the very first stride. Every stride down the runway is important. There must be NO wasted stride. That is why I place such emphasis on runway preparation and why its place in the training programme is so important.

Countless repetitions are done. Approach runs are filmed so that essential feedback can be given. All my jumpers are made well aware of runway importance.