

ATHLETICS OMNIBUS - HIGH JUMP

From the Athletics Omnibus of Richard Stander, South Africa

1. HIGH JUMP

The objective of high jumping is to try and jump as high as possible by taking a run-up and jump over a cross bar. To avoid injury, the landing is on a mat filled with soft synthetic material that give way on landing. There are many different methods of high jump. The most popular methods are:

1.1. SCISSORS

It is a very simple and natural method, and easy to learn by the novice. It allows considerable use of the free leg and both arms, gets the body efficiently aligned over the take-off foot, but is very inefficient at layout.

1.2. FOSBURY FLOP

It is also a very simple and fairly natural method. It allows all the benefits of the scissors take-off but a bend free leg is used instead, to allow for a fast, dynamic take-off. Speed and elasticity is emphasised in this method.

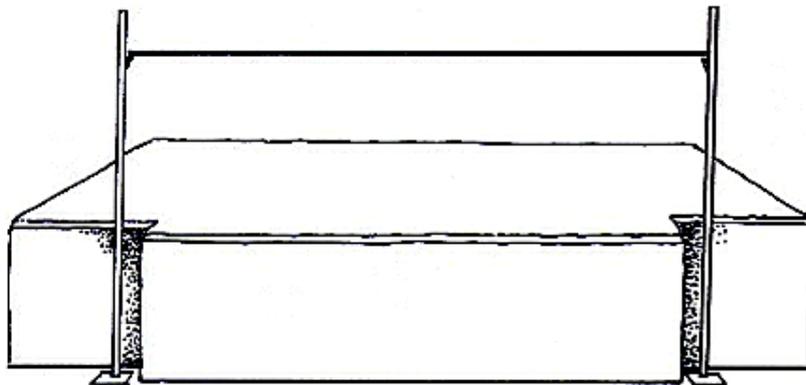
1.3. STRADDLE

Without doubt, the greatest advances in high jump accompanied the development of Straddle. In this method momentum and strength is emphasised. Because of the greater strength needed, it is not suitable for the novice because of their natural lack of strength.

It is suggested that the novice start with the Fosbury Flop method. Once the athlete has gained enough strength, he may choose to change to the Straddle.

However, together with the Fosbury Flop, Straddle will continue to raise the world standards - but only when Flop and Straddle are considered as total jumps, from the start of the approach to the bar clearance.

2. THE COMPETITION AREA



2.1. CROSS BAR

This may be made of metal or wood, circular in cross section, with a diameter of 29 mm to 31 mm. Each end should have one flat surface for the purpose of resting the bar on the supports. The length of the crossbar should be between 3,98 m and 4,02 m and the maximum weight allowed is 2,0 kg. The support for the crossbar must be flat and rectangular, 40 mm wide and 60 mm long and each must face inwards, towards the opposite upright.

2.2. UPRIGHTS

Any style of upright may be used, provided they are rigid and sufficiently tall to exceed the maximum height to which the crossbar can be raised by at least 100 mm. The distance between the uprights must be 4,00-4,04 m.

2.3. THE RUNWAY AND TAKE-OFF AREA

The length is unlimited but a minimum length of 15 m is obligatory. For important competitions the minimum is 20 m; if possible it is recommended to make this 25 m.

2.4. THE LANDING AREA

This should measure not less than 5 m x 3 m and can be covered by landing mats or other material.

3. FOSBURY FLOP TECHNIQUE

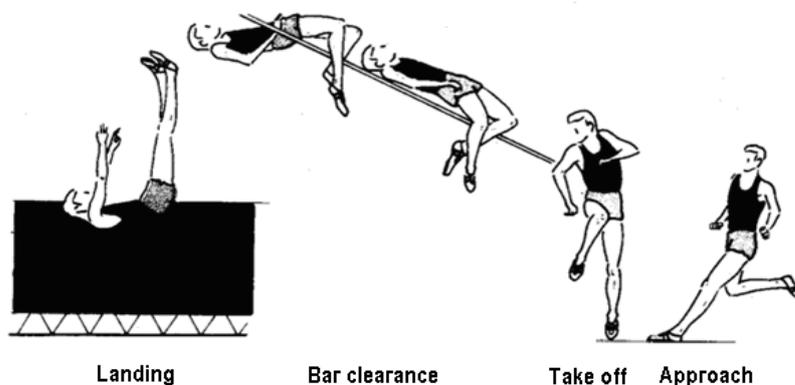
During the teaching of jumping skills the following must be stressed:

- The approach must be at a controlled speed.
- During the approach the trunk must be upright and the head held high.
- Make the last stride fast.
- Gain vertical lift at take-off.
- Drive the shoulder and arms upward at take-off.
- Drop the head and lift the hips over the bar.
- Go for maximum lift before rotation.
- Lift and then straighten the legs rapidly as soon as the hips have cleared the bar.

The high jump technique is divided into the following phases;

- approach,
- take-off,
- bar clearance
- landing.

Of the four stages, the take-off is the most important.



3.1. The High Jumper should avoid:

- Approaching too fast.
- Stretching the take-off leg too far forward.
- An incomplete combined action of the legs at take-off.
- Leaning into the bar with the trunk.
- Too high a position of the arms at bar height.
- Crossing the bar in a sitting position.
- Premature arching of the body.
- Delayed action of the final leg lift (dislodging the bar with the legs).

3.2. A High Jumper should aim to:

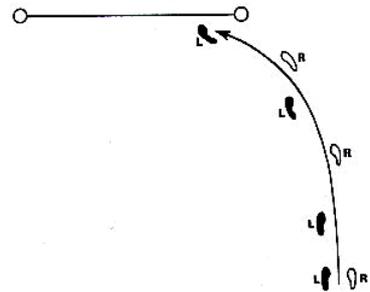
- Approach at a controlled speed.
- Avoid too much backward lean of the trunk.
- Achieve a very rapid action at take-off and attack.
- Achieve a vertical lift at take-off.
- Drive the shoulders and arms upwards in the take-off.
- Arch the back over the bar.
- Achieve complete elevation with inward rotation of the knee of the free leg.
- Lift and then straighten the legs immediately after arching.

4. TECHNIQUE TRAINING

4.1. THE APPROACH

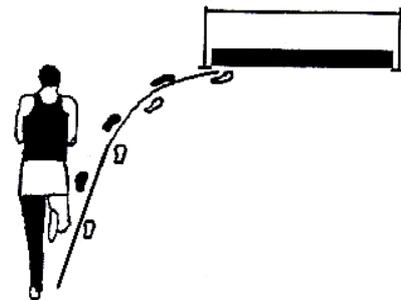
THE SHAPE OF THE APPROACH

- The 'J' shape approach is commonly used due to more consistency in the run-up during competition.
- The approach comprises of a straight and curved section.
- The straight line allows for a build up of speed.
- The curved section allows for the build up of centrifugal force, which will throw the high jumper over the bar after he breaks with the ground at take-off.



THE FIRST STEP

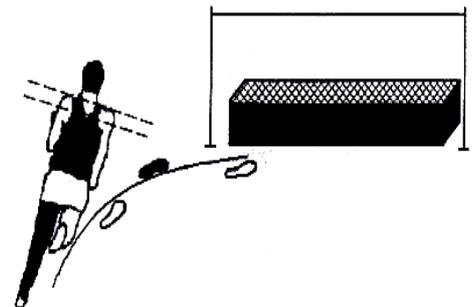
- The first step determines the pace of the approach run.
- It should be measured, marked and practised regularly.
- Run the straight section of the approach with an upright trunk.
- Increase the approach speed with large, forceful strides.



STEPS TWO TO FIVE

These are the steps ran in a straight line. After pushing off, the strides are a reflection of the pace established by the first stride.

- The head and body must be upright and should not lean forward or backwards.
- The knee action is exaggerated.
- The eyes are focused on the point of turning.
- The athlete must reach the marker at the point of turning, on the non take-off leg.
- Lean towards the inside of the curve during the curved part of the approach.
- The shoulder on the inside is lower than the shoulder on the outside of the curve.
- Continue to increase the approach speed with forceful strides.



4.2. THE CURVE

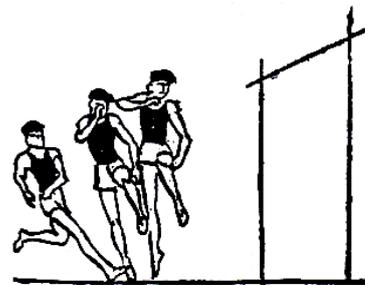
- A marker should be placed at the place where the curve should start.
- At this point he starts to lean into the bend to build up a centrifugal force.
- The lean position is vital, for this will project the jumper over the bar at take-off.
- The angle of the body lean should be 10-15° to the inside of the curve.



The ascent during the last 4-5 strides is on the maximum controlled speed, which will be transferred into vertical height. The eyes are now focused above the crossbar.

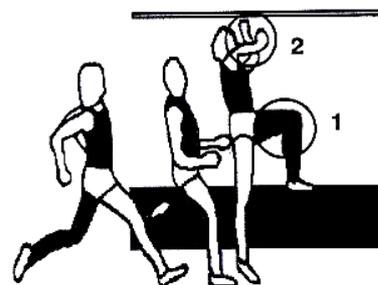
4.3. THE LAST THREE STEPS

During the last three strides the athlete should lower his hips. This should be done without any loss of speed. The penultimate stride of the run-up is lengthened to facilitate the lowering of the body's centre of gravity into a more favourable position for take-off. Particular emphasis should be placed on this stride. The final stride is somewhat shorter. The take-off should land quickly and with accelerated action. The toes point to the landing position. The foot should not be parallel to the front of the landing area.



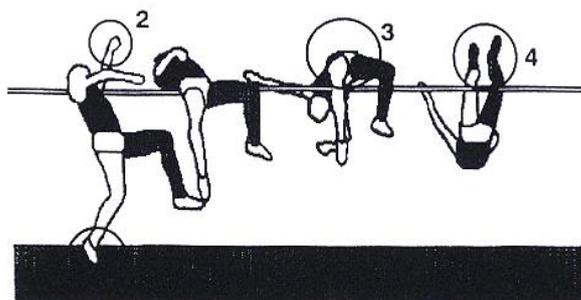
4.4. THE TAKE-OFF

- Bring the athlete to a take-off point that will allow the high jump point of his jump to be in the same plane of the uprights and at the low point of the bar (middle).
- The final stride is somewhat shorter than the penultimate stride to force the centre of gravity upwards.
- The take-off foot must be placed in natural alignment with the take-off leg, pointing to the landing position, and not turned to anticipate the rotation.
- The take-off foot must be 2-3 foot lengths ahead of the hips and trunk during first contact.
- The heel of the take-off foot is placed on the ground first so that a heel-toe roll action takes place.
- The take-off foot forms an angle of 20-40° with the cross bar.
- The body is leaning away from the cross bar.
- The free leg must drive strongly upwards.
- On the final take-off the body is in the six o'clock position, with the centre of gravity directly above the take-off foot.
- The arms are stretched upwards; head held upright, the inner shoulder high, back straight, take-off leg and foot straightened.
- Rotation begins after the take-off foot left the ground.
- Raise the thigh of the free leg quickly to the horizontal position (1) and maintain the position.
- Swing the arms up to head height and maintain the position (2).
- Extend the ankle, knee, hip and shoulder joints into a vertical and natural alignment on take-off.



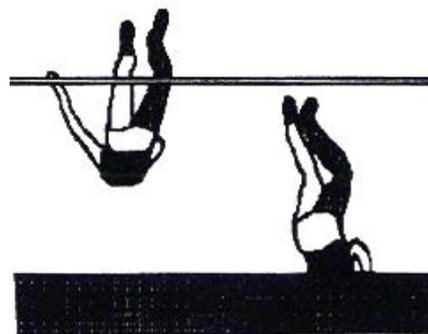
4.5. THE BAR CLEARANCE

- After take-off, continue to keep the free leg in a horizontal position. The take-off leg continues to be extended (1).
- Move the left arm as leading arm first over the bar (2) followed by the head and shoulders.
- The elbow must point towards the bar to prevent the arm from bending prematurely.
- The take-off leg is now bent and brought in line with, but apart from the other knee.
- The arms are at the side or above the body so that the cross bar is not touched.
- Lift the hips while clearing the bar (3).
- This is done by dipping the head and shoulders behind the crossbar, and forcing the arms towards the body and down.
- The head must not turn to either side, otherwise the shoulders will drop.
- The legs will follow the body in a curve.
- When the hips have cleared the bar, draw the head towards the chest and extend the legs (4) to prevent the heels from touching the bar.



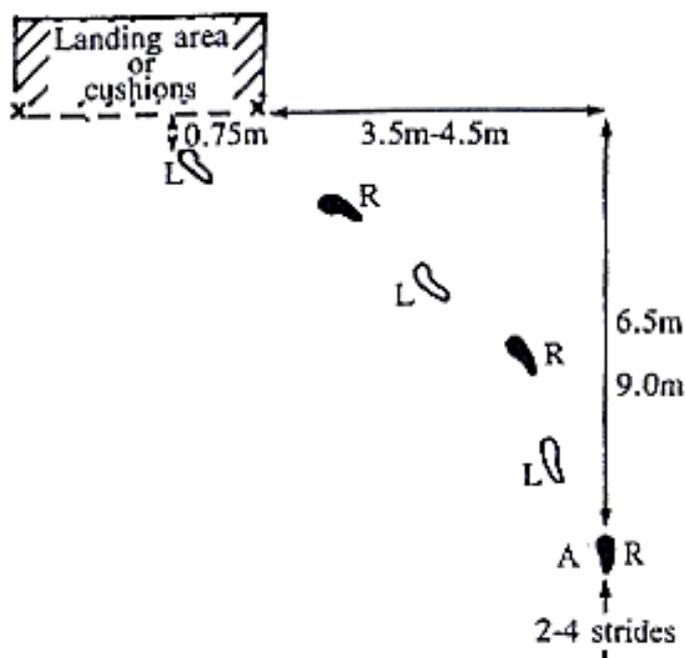
4.6. THE LANDING

- Keep the chin pressed to the chest.
- Land on the whole back, supported by the arms.
- Keep the knees apart whilst landing.
- The momentum of the fall will make the athlete roll backwards until he lands in the hand-knee position facing the crossbar.



5. HOW TO MARK THE RUN-UP AREA

- The diagram shows a 7-9 stride approach run for an athlete taking off on the left foot.
- Mark the bend as shown; 3,5 m - 4,5 m to the right, and 6,5 m - 9,0 m forward.
- Take a 2 - 4 stride approach run.
- The right foot must be placed on the marker (A) indicating the beginning of the bend.
- The last three strides are forming a curve according to the strength of the athlete.
- The length of the run-up should be:
 - 10-14 years: 5-6 strides
 - 15-18 years: 6-9 strides
 - 18 and older: 9-11 strides.
- The radius for the bend should be:
 - Juniors: 6-8 m radius
 - Seniors: 12-14 m radius

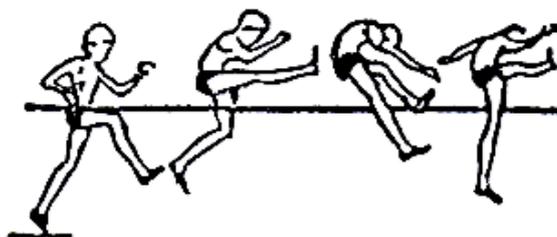


- The stronger the athlete, the larger the radius of the curve and more strides will be added to allow for a faster approach run.
- Once the curve is established, any other markers, e.g. position the take-off foot, penultimate stride, start, etc. must also be recorded in the same fashion.
- These markers must be placed prior to the competition to ensure a consistent approach run during the competition.

6. HOW TO IMPROVE TECHNIQUE

In order to build confidence in the high jump, it is advisable to start with scissors technique and then to progress to the more technical skills of the Fosbury Flop or Straddle.

- The run up must be from the side the novice feels comfortable with.
- Start with a 3-5-stride approach.
- Use an elastic band in the place of the bar.
- Encourage free limb movement.
- The take-off must be such that the hips and legs cross close to the low point of the bar.
- It must be closer to the upright than it is to the centre of the bar.
- The take-off must be quick and vigorous, aided by a fast acceleration of the free limbs.



- The inside shoulder must not drop in towards the bar.
- The take-off must be such that the hips and legs cross close to the low point of the bar. It must be closer to the upright than it is to the centre of the bar.
- The take-off must be quick and vigorous, aided by a fast acceleration of the free limbs.
- The inside shoulder must not drop in towards the bar.
- Start of at a low height and race the elastic band gradually after each clearance.
- Once the novice has gained enough confidence, progress to the more advanced skills of the Fosbury Flop.

7. LEARNING OF THE FOSBURY FLOP TECHNIQUE

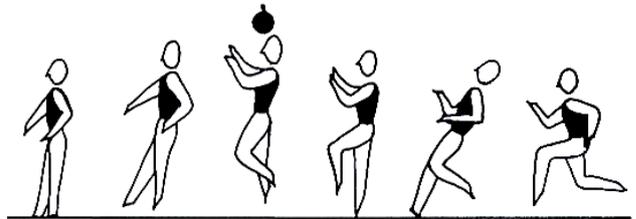
Throughout the development of the technique, the emphasis must always be to jump high first, and then over second.

HEAD TO BALL

Suspend a ball approximately 60 cm above the head of the athlete.

Take a 3-5 stride approach and jump from one foot to try and meet the ball with the head.

Encourage upward movement and discourage travelling in the jump.



JUMP AND TURN

To imitate the take-off and turn action, jog a few steps, jump from the take-off leg, spin in the air to turn 180° and land on the take-off leg again. Pull the free leg up and slightly inwards towards opposite shoulder, to assist the turn.



JUMP, TURN AND SIT

Once the turning technique is mastered, combine the lift and turn by jumping up and turn to land in a sitting position on a stack of cushions.



JUMP, TURN AND LAND

Stack the cushions now, so that they are above head height. Of 3-5 strides, jump from the take-off foot to land on the shoulders on the topmost cushion.

The athlete approaches the cushions from an angle of about 45° and jump from there outside foot.



BACK FLOP

Set cushions at normal height and stretch a broad elastic band between the uprights at hip height.

Standing with the back to the bar, the athlete jump upwards and backwards, arching their back to land on their shoulders on the cushion.

The starting position is 2-foot lengths from the cushion to the heel.

Gradually increase the height of the elastic band until it reaches shoulder height.

Once enough confidence is gained, take a one-stride approach and jump as discussed above.

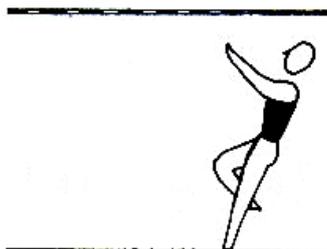
Progress to a three stride approach while the following points are emphasised at take-off:



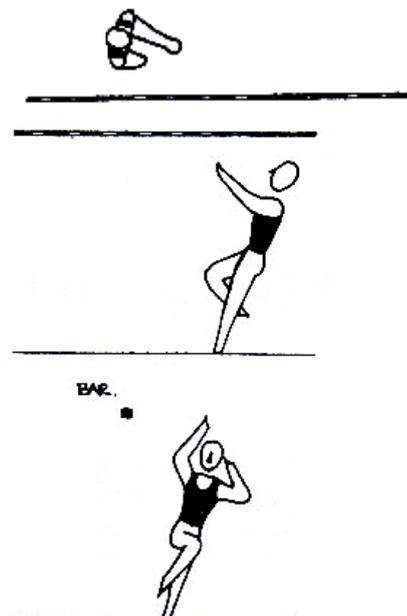
1. If the athlete uses a left foot take-off, start of with the left foot.
2. The left shoulder is kept high and square with the left leg. Do not twist away or towards the bar.
3. The right shoulder is turned slightly away from the bar, but is also lifted high.

The right knee is kept bent for the beginner, with the foot always behind the knee.

The right thigh is driven across the body towards the left hip.



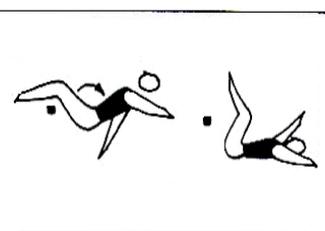
- a. If the athlete uses a left foot take-off, start of with the left foot.
- b. The left shoulder is kept high and square with the left leg. Do not twist away or towards the bar. The right shoulder is turned slightly away from the bar, but is also lifted high. The right knee is kept bent for the beginner, with the foot always behind the knee.
- c. The right thigh is driven across the body towards the left hip.



The hips are lifted forwards and upwards vigorously. Both arms are punched upwards vigorously. Once off the ground, the left heel is pulled backwards towards the head (arching the back) whilst the right leg is dropped and the heel pulled back.



Once the hips are over the bar, pike the thighs to the chest, and then straighten the knees, finally landing on the shoulders. Gradually build the total jump to use the run-up as described in the chapter on how to measure the approach run. From here the athlete will develop his own individual approach run.



8. TRAINING

During the period of training, the conditioning philosophy will be as follows:

- 8.1. Use an over distance approach.
- 8.2. First quantity, then quality.
- 8.3. Build a foundation of endurance and then develop speed gradually. This will prevent injury.
- 8.4. For the first month of training you will do no speed work and you will not time anything.
- 8.5. You will develop speed by doing a great deal of short, fast work and by improving your sprinting form.

- 8.6. The test distance for endurance will be 300m, and test distance for speed will be 30-50 m. A jumper will only be successful when both tests are done well.
- 8.7. As the season progresses, you will do less work but faster work.
- 8.8. Workouts will generally be a hard day followed by an easy day, with a lightening up of work two days before competition or time trail.
- 8.9. Your schedule is flexible. You may change the daily routine because of weather, body condition, or emotional outlook.
- 8.10. You should completely recover from one workout to the next. If you are not completely recovered, do less work, or rest.
- 8.11. You should never train when you are ill nor have an injury.
- 8.12. If your training schedule is limited, you may telescope this schedule into two-week periods instead of month periods.
- 8.13. Your workouts must be fun or rewarding, preferably both.

9. TRAINING SESSIONS

- 9.1. All training sessions should always start of with warm-up session and stretching exercises.
- 9.2. After all training sessions a cool down and stretching session should follow.
- 9.3. Refer to the chapter on mobility for event specific warm –up and stretching exercises.

10. TYPES OF TRAINING

10.1. MUSCLE ENDURANCE TRAINING

INTERVAL RUNS E.G.:

- 12 x 150 m @ 75% - rest 1 minute between reps.
- 8 x 200 m @ 75% - rest 1 minute between reps.
- 6 x 300 m @ 75 % - rest 2 minutes between reps.

BREAK DOWN INTERVAL RUNS E.G.:

- (400 m, 300 m, 200 m, 150 m, 100 m) @ 75% - jog back

BUILD UP INTERVAL RUNS E.G.:

- (150 m, 200 m, 300 m, 400 m) @ 75% - jog back.

PYRAMID INTERVAL RUNS E.G.:

- (150 m, 200 m, 300 m, 200 m, 150 m) @ 75% - jog back

10.2. SPEED ENDURANCE TRAINING

NORMAL TEMPO RUNS E.G.:

- 6 x 110 m @ 90% - rest 1 minute between reps.
- 4 x 150 m @ 90% - rest 2 minutes between reps.
- 3 x 300 m @ 90% - rest 3 minutes between reps.

BREAK DOWN TEMPO RUNS E.G.:

- (300 m, 200 m, 150 m, 100 m, 50 m) @ 90% - walk back.

BUILD UP TEMPO RUNS E.G.:

- (50 m, 100 m, 200 m, 300 m) @ 90% - walk back.

PYRAMID TEMPO RUNS E.G.:

- (50 m, 100 m, 150 m, 100 m, 50 m) @ 90% - walk back

COMBINATION TEMPO RUNS e.g. for a 60 sec. 400 m sprinter:

- 300 m in 45 sec., rest 30 sec. and sprint 100 m.

HOLLOW SPRINTS E.G.:

- 40 m sprint, 30 m cruise, 30 m sprint, and walk back.

STEP DOWN 200'S

- Each successive 200 m is one second faster. Walk or jog between. When you can do 25-24-23, you can run a 47 sec. 400 m.

10 X 110M SPRINT @ 90% EFFORT.

- Concentrate on correct form the last 30 m.

SPEED ENDURANCE TIME TRAILS

- 300 m sprint - take time
- 100 m sprint - take only time of last 30m

10.3. SPEED TRAINING

50 M DOWN HILL SPRINTING X 5

- The slope must not be more than 6°.

FLYING 30'S

- The athlete takes a flying start, and the time is taken between two beacons when the athlete is full speed.
- 30 m acceleration - 30 m sprint x 5

SPEED TIME TRAILS

- 50 m sprint - take time
- bend sprint over 70 m - take time
- 30 m sprint from start.

RUNNING DOWN HILL - slope 6° - 5 x 50 m

ELASTIC BAND - exercise 5 x 10 m

MOTOR CYCLE PULL - 5 x 30 m with 30 m acceleration

11. TRAINING PROGRAMMES

Muscle endurance, speed endurance, rhythm drills and pure speed training forms a vital part of the jumper's training program and is covered in detail in the manual for sprinting.

The exercises above, together with the jump technique exercises and strength training are combined in a long term training program that would look more or less as follows:

HIGH JUMP LONG TERM PLAN SEPTEMBER TO APRIL TRAINING METHODS	PHASE					
	CONDITIONING		PREPARATION		COMPETITION	
	1	2	1	2	1	2
MUSCLE ENDURANCE (STAMINA)	20%	15%	10%	10%	10%	5%
SPEED ENDURANCE	5%	10%	15%	15%	15%	15%
SPEED	5%	10%	15%	15%	15%	15%
STRENGTH	30%	25%	25%	25%	20%	20%
TECHNIQUE + RHYTHM	35%	35%	30%	30%	25%	25%
ACTIVE REST	5%	5%	5%	5%	15%	20%

A TRAINING PROGRAMME FOR THE JUMPER

- If your training schedule is limited, you may telescope this one month cycles into two week cycles.
- Phase 1 of each sub-section of the program is used as a conditioning period for the new exercises.
- During phase 2 the intensity of the training is gradually increased.
- Two examples of a 14-day training program in all the jump disciplines are given. One in the pre-season and one in the peak season.

CONDITIONING PHASE		MONTH: SEPTEMBER													
CONDITIONING	EXERCISE	M	T	W	T	F	S	S	M	T	W	T	F	S	S
M. ENDURANCE	5x 100 m / 75%/ rest 1 min	#		#					#		#				
	4x 150 m / 75%/ rest 1½ min		#		#					#		#			
S. ENDURANCE	3x 100m step-down / 1 min. rest														
	5x100m hollow sprints/ 1 min. rest														
SPEED 100%	5x 50m / recover	#													
	5x flying 30's / recover			#											
STRENGTH	5x Hurdle bounding	#		#					#		#				
	20 x pike and arch	#		#					#		#				
	20x ankle reinforcing	#		#					#		#				
	20x legthrow	#		#					#		#				
TECHNIQUE	5x last three steps		#		#					#		#			
	5x jump and turn and land		#		#					#		#			
	5x back flop		#		#					#		#			
	5x head and ball		#		#					#		#			
RHYTHM	5x 50m straight leg drills	#		#					#		#				
	5x 50m long / short leg drills	#		#					#		#				
	5x 50m front / side drills	#		#					#		#				
REST						#	#	#					#	#	#

COMPETITION PHASE		MONTH: FEBRUARY													
CONDITIONING	EXERCISE	M	T	W	T	F	S	S	M	T	W	T	F	S	S
M. ENDURANCE	5x 100 m / 75%/ rest 1 min														
	4x 150 m / 75%/ rest 1½ min		#		#					#		#			
S. ENDURANCE	3x 100m step-down / 1 min. rest			#							#				
	5x100m hollow sprints/ 1 min. rest	#							#						
SPEED 100%	5x 50m / recover	#							#						
	5x flying 30's / recover			#							#				
STRENGTH	5x box take-off	#		#					#		#				
	20 x pike and arch	#		#					#		#				
	20x ankle reinforcing	#							#						
	20x legthrow	#							#						
TECHNIQUE	5x full run up		#		#					#		#			
	5x last three steps		#		#					#		#			
	5x back flop		#							#					
	5x box bounding		#							#					
RHYTHM	5x 50m straight leg drills	#		#					#		#				
	5x 50m long / short leg drills	#		#					#		#				
	5x 50m front / side drills	#		#					#		#				
REST				#	#		#				#	#		#	
COMPETITION						#							#		

12. RULES

12.1. GENERAL RULES

- Before the competition begins, the judges announce the starting height and the successive heights to which the bar will be raised.
- The athletes may begin jumping at any height they wish, at or above the minimum height.
- Three successive failures, at any height, debar the athlete from further jumping.
- The take-off must be from one foot.

12.2. SPECIFIC RULES

- Athletes may participate bare footed, or wearing shoes with soles not more than 13 mm and heels more than 19 mm thick.

- The athlete is allowed 1 min. for each trial.
- In the case of a tie, the competitor with the lowest number of jumps at the height at which the tie occurs wins. If the tie still remains, the competitor with the lowest total of failures throughout the competition, up to and including the last height cleared wins the competition. If the tie still remains and it concerns any other than the first place, it will remain a tie. If it concerns first place, the competitor tying are given one more jump at the lowest height at which any of those involved in the tie failed, and if no decision is then reached, the bar is lowered or raised 2 cm. The athletes' then attempt one jump at each height until the tie is decided. Competitors so tying must jump on each occasion, when deciding the tie.

BIBLIOGRAPHY

1. ASA Domestic Rule Book, Athletics South Africa, Athletics House, P O Box 2712, Houghton, 2041
2. Basic Coaching Manual, IAAF 3 Hans Crescent, Knightbridge, London SW1X 0LN, England.
3. But First, B.A.F., British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
4. High Jump, Frank Dick, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
5. How to teach the jumps, David Johnson, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
6. IAAF Rule Book, IAAF 17,rue Princesse Florestine, B.P. 459, MC 98007, Monaco Cedex
7. Techniques of Athletics and Teaching Progressions, IAAF 3 Hans Crescent, Knightbridge, London SW1X 0LN, England.