

ATHLETICS OMNIBUS - POLE VAULT

From the Athletics Omnibus of Richard Stander, South Africa

The objective of pole vaulting is to try and jump as high as possible by using a pole. The athlete is allowed a short run-up. To avoid injury, the landing is on a mat filled with soft synthetic material that give way on landing.

1. THE COMPETITION AREA

THE POLE: This may be of any material, of any length and of any diameter, but the basic surface must be smooth. It may have a binding of not more than two layers of adhesive tape of uniform thickness. This restriction does not, however, apply to binding the bottom end of the pole with protective layers of tape for a distance of about 30cm to reduce the risk of damaging the pole when striking the back of the box. In recent decades we have seen poles made of bamboo, steel, aluminium and of various fibres (glass and carbon).

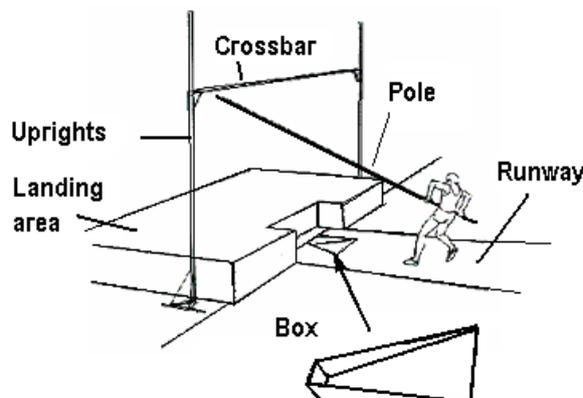
THE RUN WAY: Minimum length, 40 metres. Maximum length unlimited (45 metres is advised).

THE BOX: This may be made of wood or metal, 1m long and 60cm wide at the front narrowing until it is only 15cm at the back end. The sides are inclined outwards slightly.

THE UPRIGHTS: Any model or type may be used as long as it is firm. The distance between the uprights should be not less than 3.66m or greater than 4.32m (except when extending arms are used).

THE CROSSBAR: This may be made of wood, metal or other materials and may be of triangular or circular cross section. The sides of the triangular bar should be 30mm in width and the diameter of the circular bar should be at least 25mm but not more than 30mm.

LANDING AREA: This should measure not less than 5x5m. Nowadays the landing area is built up with blocks of foam rubber or polyurethane in order to make the landing safe.



2. THE POLE VAULT TECHNIQUE

The pole-vaulter is a sprinter in the approach run, a jumper at take-off, a gymnast in the flight and a thrower in the final phase.

THE GRIP THE RIGHT HAND VAULTER

To determine the correct placing of the top hand on the pole, place the pole perpendicular to the ground against the cross bar. Place the top hand (right hand) at the crossing of the pole and the cross bar. His left hand is placed about 50 cm below his right hand (shoulder width).

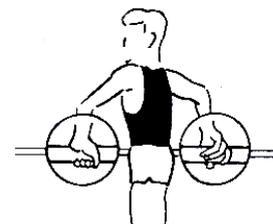


THE POLE CARRY THE RIGHT HAND VAULTER

The top hand holds the pole at the hip, palm facing forward with the pole resting between the thumb and first finger.

The arm should be bent at 90°. The bottom hand grasps the pole, palm downward with the arm again bent at the elbow at 90°.

Avoid cocking the left wrist or allowing the right hand to move away from its position close to the hip.

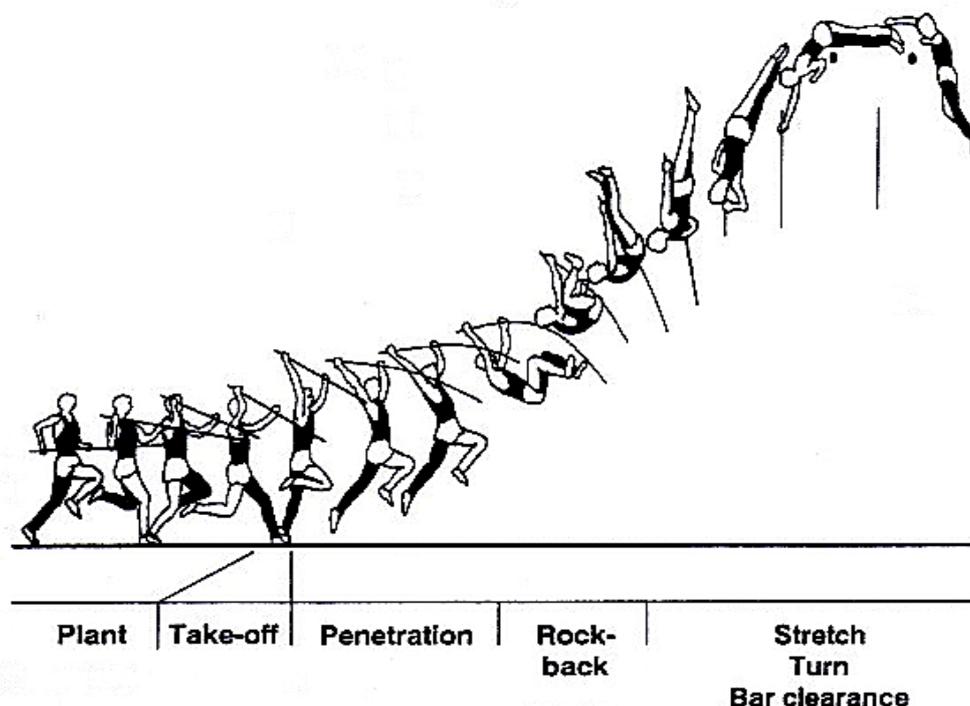


THE PHASES

The pole vault technique comprises of the following phases: approach, plant, take-off, penetration, rock back, stretch turn, bar clearance and landing.

The right-handed vaulter grips the top end of the pole with his right hand. His left hand is placed about 50 cm below his right hand, the width of the shoulders.

The right-handed vaulter carries the pole on the right-hand side of his body and takes off on the left foot.



2.1. THE POLE VAULTER SHOULD AVOID

- Slowing down and running on the heels in the last few metres.
- Not lifting the pole high enough and not bringing it in front of the face at take-off.
- Slowing down and running on the heels in the last few metres.
- Not lifting the pole high enough and not bringing it in front of the face at take-off.
- A late plant of the pole or a plant to one side.
- Pulling with the arms and carrying the trunk in towards the pole.
- Taking off too far forward or too far back.
- Bending the rear arm at take off.
- Raising the free leg with the hip left behind.

2.2. THE POLE VAULTER SHOULD AIM TO

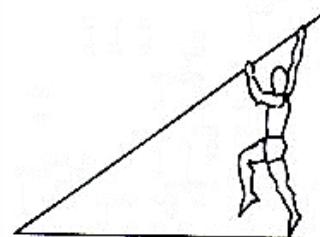
- Accelerate during the last few strides.
- Push the pole forward and up from the last but one approach stride.
- Accelerate during the last few strides.
- Push the pole forward and up from the last but one approach stride.
- Keep the shoulders away from the pole both in take-off and flight.
- Have the take-off foot directly below the rear hand.
- Push the pole forward with the front arm.
- Drive forward with the free leg.
- Delay the turn until the pole has begun to straighten.

3. THE APPROACH

The approach run for the novice is 10-12 strides and for the top class runner up to 18 strides from the **take-off point**.

3.1. TO DETERMINE THE TAKE-OFF POINT

Place the tip of the pole in the box with the vaulter positioning him so that his right arm is fully extended vertically and the left foot is placed directly beneath the right hand. The position of the left foot marks the take-off position. At the start of the approach run the tip of the pole is lifted in line with the eye level. The body must remain upright while running tall. The arms should be kept still. Avoid pumping of the arms. Lower the pole gradually and smoothly during the approach run.



3.2. THE STRIDE PATTERN

In order to ensure a consistent run-up, markers must be placed on the run-up. The markers indicate the three stages of the approach.

STAGE 1

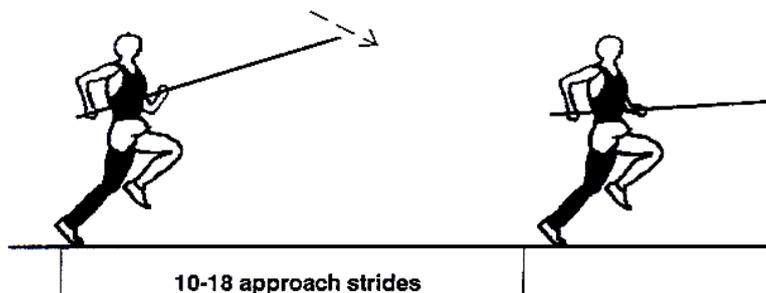
Place a marker at the beginning of the run-up. Stand back a few strides and start jogging towards the take-off point, ensuring a comfortable stride rhythm at the first marker.

STAGE 2

The vaulter starts to accelerate smoothly while the upper body remains upright and relaxed.

STAGE 3

The acceleration continues until a maximum controllable speed is reached. The knees are lifted high and the take-off point is approached aggressively without loss of speed. The last stride is slightly shorter to ensure a higher centre of gravity at take-off.



3.3. PLANT

Planting of the pole commences on the next to last contact of the left foot by pushing the pole forward.

Bring the left arm forward.

The plant must be high, fast and early.

On contact with the right foot, raise the right arm quickly forward and upwards, like the uppercut of a boxer, until the arm is fully extended.

Keep the arm close to the body.

At the completion of the plant, the chest leans into the pole and lead the body forwards.

The plant seen from behind for a right handed vaulter.

Planting of the pole commences on the next to last contact of the left foot.

Bring the left arm forward and up.

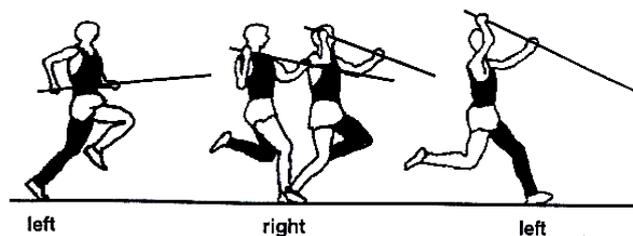
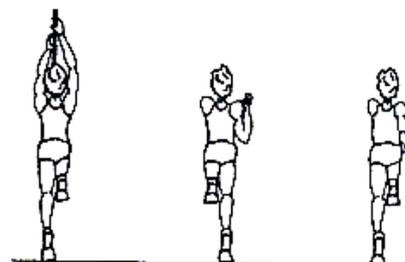
The plant must be high, fast and early.

The lower arm assists in bending and directing the pole and to keep the vaulter's body behind and away from the pole.

This is done by keeping the arm rigged.

Do not collapse the lower arm.

The eyes should be looking between the hands and not towards the box.



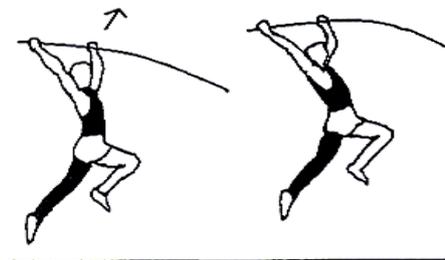
3.4. TAKE-OFF

The take-off foot should land flat-footed on the ground.
The vaulter achieves total body stretch.
Both arms must be stretched.
Drive the thigh of the non take-off leg vigorously upward (1) until well after take-off took place.



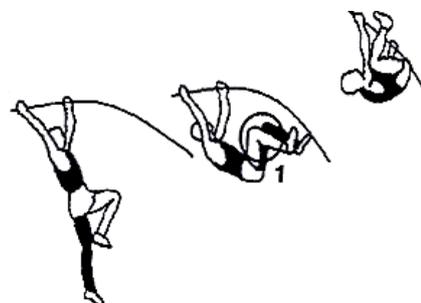
3.5. PENETRATION

Push the left arm forwards and upwards.
The left arm must not collapse.
Freeze in the take-off position.
The take-off leg should be pushed backwards and kept extended to aid the penetration and to assist the vaulter's swing.
The swinging should not be too long because too much penetration will reduce the ability to reach an effective extended position on the pole.



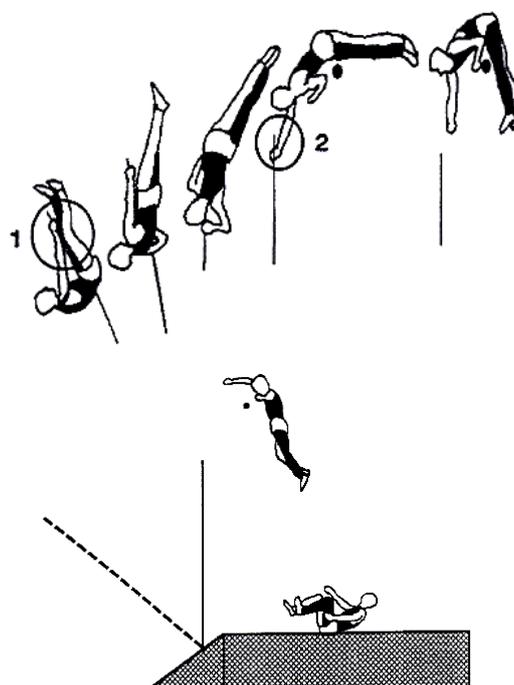
3.6. ROCK-BACK

Draw both legs in to the chest during rock-back (1).
Bend the left arm slowly to bring the body and pole closer together.
At the end of the rock-back stage, the back is roughly parallel with the ground.
The head remains in line with the upper body.
The rock-back position must be achieved by the time the pole reaches its maximum bend.



3.7. STRETCH, TURN AND BAR CLEARANCE

Keep the legs parallel with the pole (1). Keep the body as straight as possible.
The lower arm must keep the body close to the pole.
The upper arm, which is still straight, should pull directly down the line of the pole simultaneously with the hip elevation and the pole's recoil.
The turn must be delayed as long as possible.
The turn commenced through the pull of both arms.
Turn to the left.
Turn the stomach towards the bar.
Push off from the pole with the right arm (2).
During the clearance the centre of gravity must be kept above the handgrip.
To assist this, the vaulter must drop his legs by flexing at the hips.
Allow the arms to follow the curve rather than pulling them up to avoid the chest from touching the bar. Depress the stomach and turn the elbows outward, not upwards.
Land on the back.



4. TEACHING THE POLE VAULT TECHNIQUE

ALL EXAMPLES ARE FOR A RIGHT HAND VAULTER

4.1. THE GRIP

The correct grip of the pole as discussed in the beginning of this chapter, and should first be explained to the athlete before training drills begin.

4.2. BENDING OF THE POLE

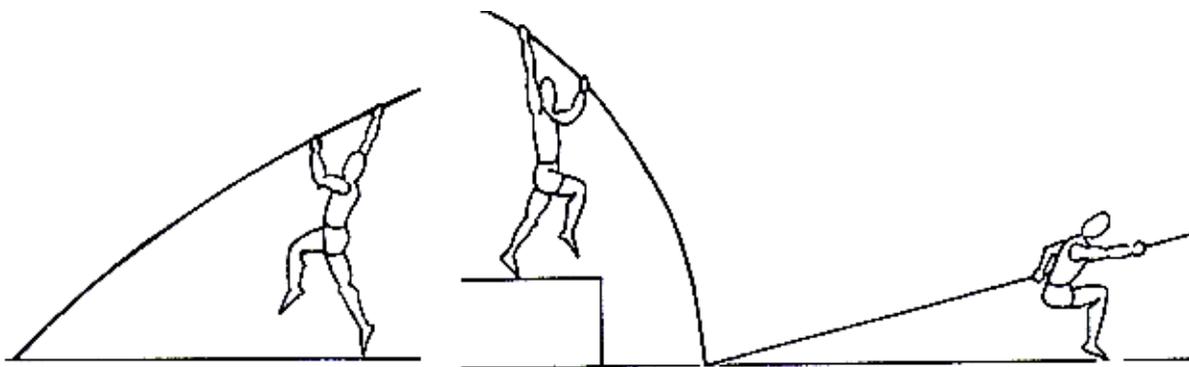
The athlete should not attempt to bend the pole until after he has mastered the basic skills of pole vaulting.

The athlete must know that the poles come in a variety of sizes according to the length required and the body weight of the athlete. Thus an athlete who weights 60 kg and has a handhold of 3,40m would use a 3,60 m / 60 kg pole.

Athletes should use only the pole in their own weight category.

If the grip is too low on the pole, the athlete will have difficulty in bend it. He should not widen his grip even though this may assist the bending action.

To assist the bend, the vaulter should attempt to keep the body away from the pole at and immediately after take-off, using the lower arm. It should be easier with a short approach, or simply jumping from a box into a sandpit.



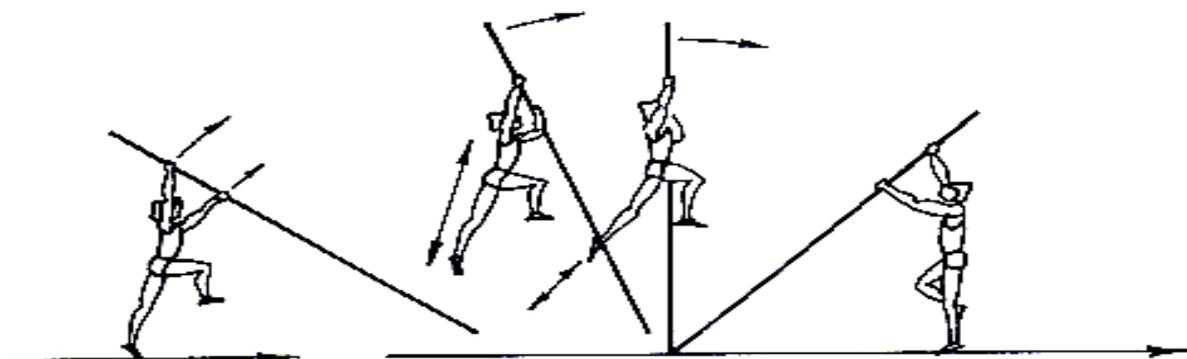
4.3. THE CARRY AND SWING OF THE POLE

Carry the pole on the right side of the body and step forward.

Place the top of the pole on the ground in front.

Place the left foot as close as possible to the bottom of the pole and keep the top hand as high as possible.

Take off from the left foot, drive the right knee forward, and pass the pole on the right side. Turn and land on the feet facing the run-up, still holding the pole with both hands.

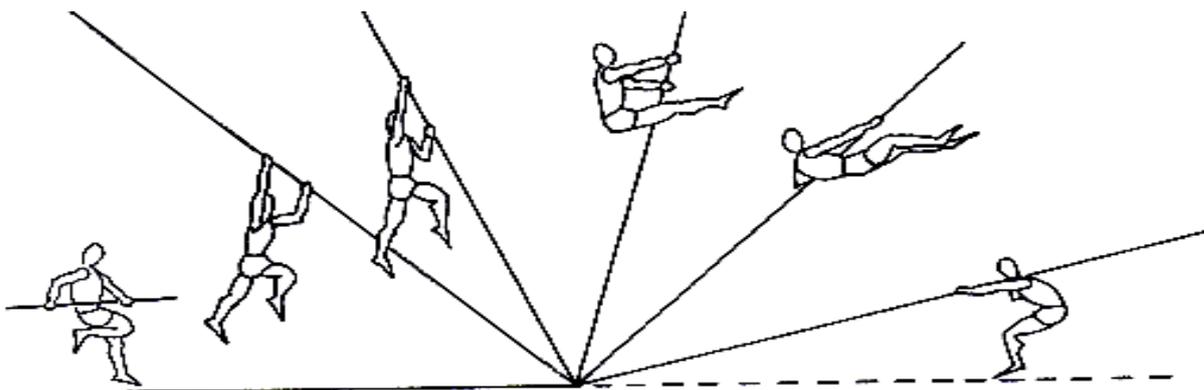


4.4. VAULT INTO SAND

Raise the handgrip, approximately 5 m higher than the maximum reach of the athlete.

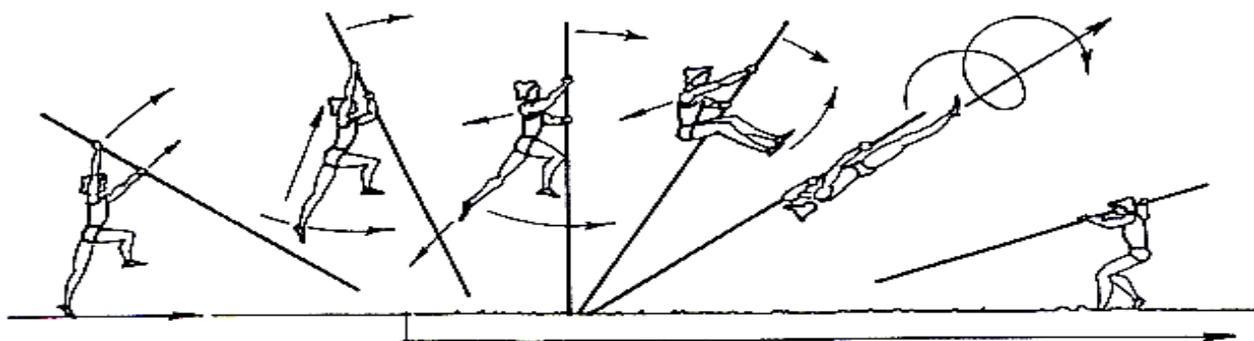
Take a 4-6 stride approach.

Plant the pole well in front in a sandpit and take off with the top arm high and straight at take-off. The athlete should first vault for distance and then for height. Only when the athlete can consistently lift both legs higher than 90 cm, and land well into the sand should he progress to the next stage.



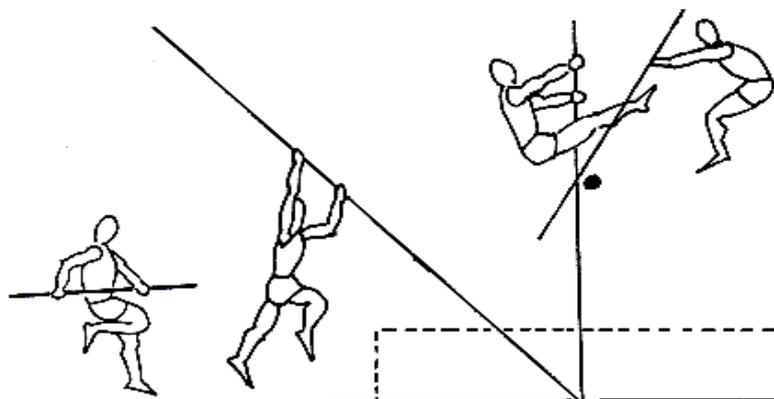
4.5. VAULT INTO SAND WITH ROCK BACK AND LANDING

Raise the handgrip approximately 1 m higher than the maximum reach of the athlete. Take a 6-8 stride approach. Plant the pole well in front in a sandpit and take off with the top arm high and straight. The plant action should start two strides from the take-off when the vaulter's left foot touches the ground. Refer to the chapter on technique. The athlete should first vault for distance and then for height. During the second half of the swing, do a rock-back as discussed in the chapter on technique, and land in the sandpit facing the run-up.



4.6. LEARNING THE SWING

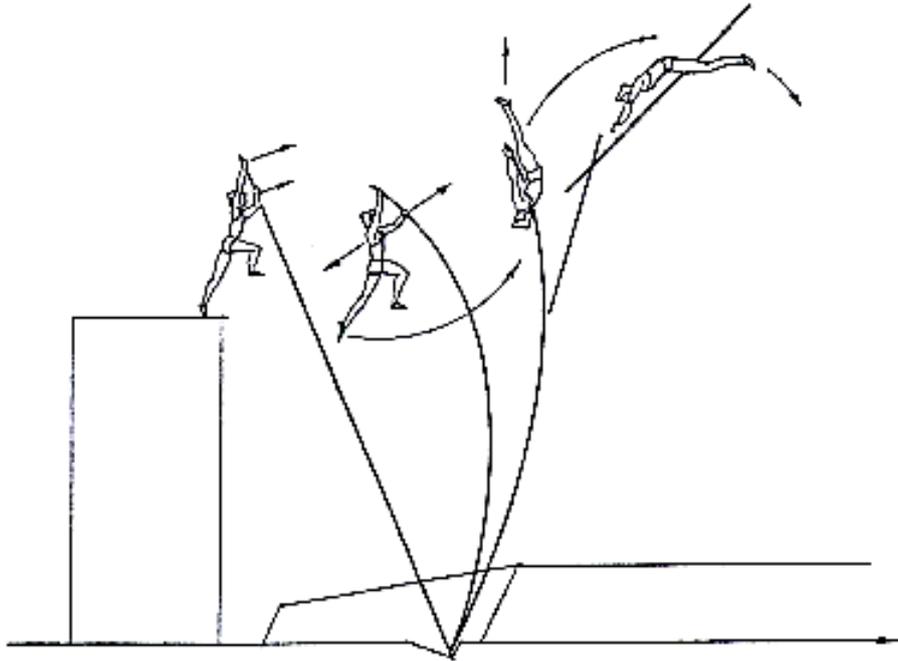
After the take-off the vaulter must learn to swing the left leg and bring both legs into a tucked position. Turn and clear the bar, pushing the pole away with the right hand. Use an elastic band in the place of the bar until the technique is developed.



4.7. LEARNING THE ROCK-BACK, STRETCH, TURN AND BAR CLEARANCE FROM A HIGH POSITION

This exercise is necessary to help the athlete to overcome the fear of landing from a high position.

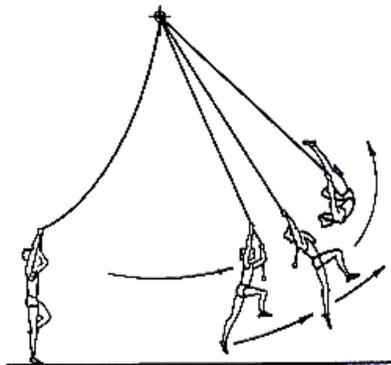
The athlete stand on a box approximately 3 m high and do the rock-back, stretch, turn and bar clearance, while landing on the back.



4.8. EXERCISES TO IMPROVE THE TECHNIQUE

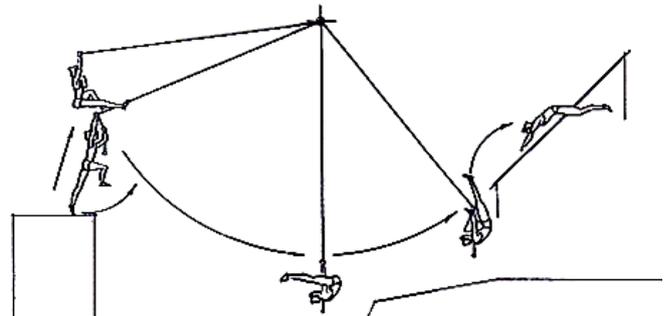
SWING, ROCK-BACK AND EXTENSION

Hold a rope in a high position and take a 3-5 stride approach, swing, rock back and extend the body parallel to the rope.



SWING ON ROPE OVER BAR

Take a 3-5 stride run up, holding the rope in a high position, take off, swing back in the hang position, rock back at the beginning of the second swing to gain momentum and stretch, turn and clear an elastic bar.



5. TRAINING

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

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

- 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.
- As the season progresses, you will do less work but faster work.
- 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.
- Your schedule is flexible. You may change the daily routine because of weather, body condition, or emotional outlook.
- You should completely recover from one workout to the next. If you are not completely recovered, do less work, or rest.
- You should never train when you are ill nor have an injury.
- If your training schedule is limited, you may telescope this schedule into two-week periods instead of month periods.
- Your workouts must be fun or rewarding, preferably both.

6. TRAINING SESSIONS

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

7. TYPES OF TRAINING

7.1. 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

7.2. 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

7.3. 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

8. 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:

POLE VAULT 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	25%	30%	30%	25%	20%	20%
TECHNIQUE + RHYTHM	40%	30%	25%	30%	25%	25%
ACTIVE REST	5%	5%	5%	5%	15%	20%

A TRAINING PROGRAMME FOR THE POLE VAULTER

- 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.

POLE VAULT

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	20 x pull ups	#		#					#		#				
	20 x rope swing	#		#					#		#				
	20x wall bar	#		#					#		#				
	20x swing, rock-back, extension	#		#					#		#				
TECHNIQUE	5x rock-back + landing in sand		#		#					#		#			
	5x the swing		#		#					#		#			
	5x high position-full technique		#		#					#		#			
	5x carry and swing of pole		#		#					#		#			
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			#						#					
	5x 100m 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 leg throw	#							#						
TECHNIQUE	5x full run up		#		#					#		#			
	5x last three steps and take-off		#		#					#		#			
	5x high position-full technique		#							#					
	5x penetration, rock-back, stretch		#							#					
RHYTHM	5x 50m straight leg drills	#		#					#		#				
	5x 50m long / short leg drills	#		#					#		#				
	5x 50m front / side drills	#		#					#		#				
REST				#	#		#				#	#		#	
COMPETITION						#							#		

9. RULES

9.1. THE POLE

This may be made of any material or combination of materials and of any length or diameter, but the basic surface must be smooth. It may have a binding of not more than two layers of adhesive tape of uniform thickness. This restriction does not apply to binding of the bottom end of the pole with protective layers of tape for a distance of about 30 cm, to reduce the risk of damaging the pole when striking the back of the box.

9.2. THE RUN-WAY

This should be at least 40 m long and 1,22 m wide.

9.3. THE BOX

This is made of a suitable rigid material, 1 m long (measured along the inside of the bottom of the box) and 60 cm wide at the front end, tapering to 15 cm wide at the bottom of the stop board. The angle between the base and the stop board is 105°. The sides are inclined slightly outwards.

9.4. THE UPRIGHTS

Any style of uprights may be used, provided they are rigid. The distance between the uprights should be at least 4,30 m - 4,37 m.

9.5. THE CROSS-BAR

This may be made of wood, metal or other suitable material, and circular in cross-section. The length must be between 4,48 m - 4,52 m. The diameter must be between 29 mm and 31 mm and there must be one flat surface, 29 -35 mm x 150 - 200 mm at each end for the purpose of placing the bar on the support.

9.6. LANDING AREA

The landing area should measure at least 5 m x 5 m, and should be built up with blocks of foam rubber or polyurethane, in order to make the landing safe.

9.7. GENERAL RULES

- A competitor may begin vaulting at any height, at or above the minimum height, and may vault at his own discretion at any subsequent height.
- Three consecutive failures, regardless of the height at which the failures occurred, debar the athlete from further vaulting.
- Any competitor may have the uprights moved in either direction, but not more than 0,4 m in the direction of the runway and not more than 0,8 m to the landing area from the prolongation of the inside edge of the box.
- A competitor fails if:
 - After the jump, the bar does not remain on the supports;
 - he touches the ground, including the landing area beyond the vertical plane through the upper part of the stop board with any part of his body or with the pole, without first clearing the bar; or
 - After leaving the ground, he places his lower hand above the upper one or moves the upper hand higher on the pole.
- The official time for the completion of a vault is 1 minute. When only 2 or 3 competitors are left in the competition, this is increased to 2 minutes and, when only one competitor is left, to 5 minutes.
- Competitors may use their own pole, and no one may use a competitor's pole without his permission. The allocation of places and the determination of ties are similar to high jump.

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. How to teach the jumps, David Johnson, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
5. IAAF Rule Book, IAAF 17, rue Princesse Florestine, B.P. 459, MC 98007, Monaco Cedex
6. Pole vault, Peter Sutcliffe, British Amateur Athletic Board, Edgbaston House, 3 Duchess Place, Birmingham B16 8NM.
7. Techniques of Athletics and Teaching Progressions, IAAF 3 Hans Crescent, Knightbridge, London SW1X 0LN, England.