

ATHLETICS OMNIBUS - JAVELIN THROW

From the Athletics Omnibus of Richard Stander, South Africa

JAVELIN THROW

Javelin Throw is regarded as a strength event. The Javelin Thrower is required to throw a spear shaped implement called a Javelin as far as possible. Depending on the age and gender of the athlete the weight of the implement will vary between 500gm and 800gm.

1. THE COMPETITION AREA

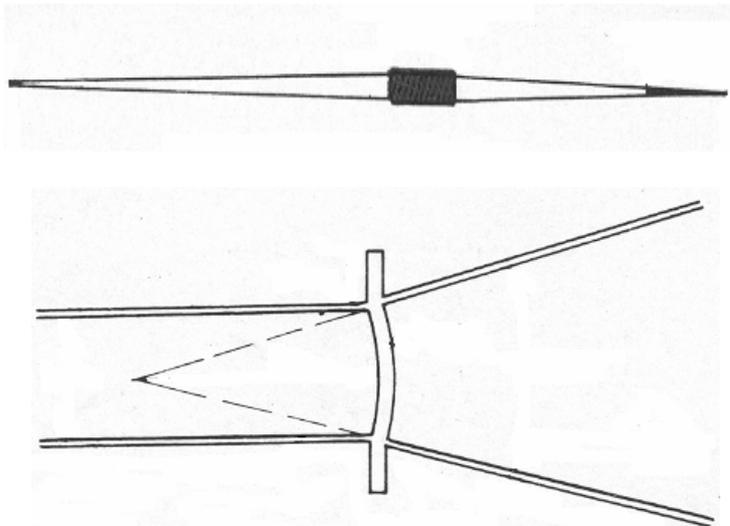
There is only one basic javelin throw technique with individual variations within the technique, but the aim is always to deliver the javelin with optimum speed and balance.

IMPLEMENT: The javelin consists of three parts: the point or metal head, the wooden or metallic shaft and a cord grip placed around the centre of gravity. The length of the men's javelin is 2.6 to 2.7m and that for women is 2.2 to 2.3m in length.

THE RUNWAY: The length of the runway should be not more than 36.50m but not less than 30m and should be marked by two parallel lines 50mm in width and 4m apart.

THE THROWING ARC: This should consist of a strip made of paint, wood or metal 70mm in width, painted white and flush with the ground, and should be an arc of a circle drawn with a radius of 8m. Lines, 1.5m in length, are drawn from the extremities of the arc at right angles to the parallel lines marking the run way.

THROWING SECTOR: This is bounded by the inner edges of two lines which are drawn from the centre of the arc through the points at which the arc joins the lines marking the edge of the run way. The angle formed by these two lines at the centre of the arc is approximately 29°.



2. JAVELIN TECHNIQUE

The right-handed technique will be explained in all examples used in this book.

2.1. THE GRIP

The javelin must lie in the fold of the hand so that it is in line with the direction of throw. The javelin must lie along the length of the palm and not across. The javelin must be held at the back of the cord, with at least one finger placed behind the edge of the binding. Three different types of grips are commonly used.

THE AMERICAN GRIP

The thumb and the first two joints of the index finger are behind the cord.



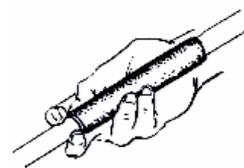
THE FINNISH GRIP

The thumb and the first two joints of the index finger are behind the cord, while the index finger supports the shaft. The extended finger assists the rotation of the javelin during delivery.



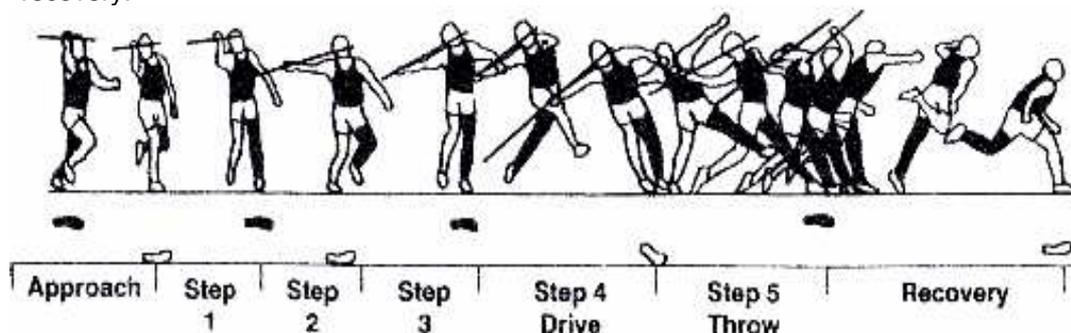
THE "V"- GRIP

The javelin is held between the index and middle fingers behind the cord. The position of the fingers assists the throwing arm in staying at shoulder height during the approach.



2.2. THE STAGES

The javelin technique sequence comprises of 4 phases: An approach, a 5-step rhythm, throw and recovery.



2.3. THE JAVELIN THROWER SHOULD AVOID:

- Grasping the javelin with a tensed fist.
- Jumping upwards during the final strides.
- Having two “cross steps”.
- Keeping the shoulders facing the front.
- Breaking at the hips and allowing the trunk to bend forward.
- Bending the throwing arm and taking the javelin off its throwing line.
- Placing the front foot down too far to the left.
- Throwing around the right side of the body.

2.4. THE JAVELIN THROWER SHOULD AIM TO:

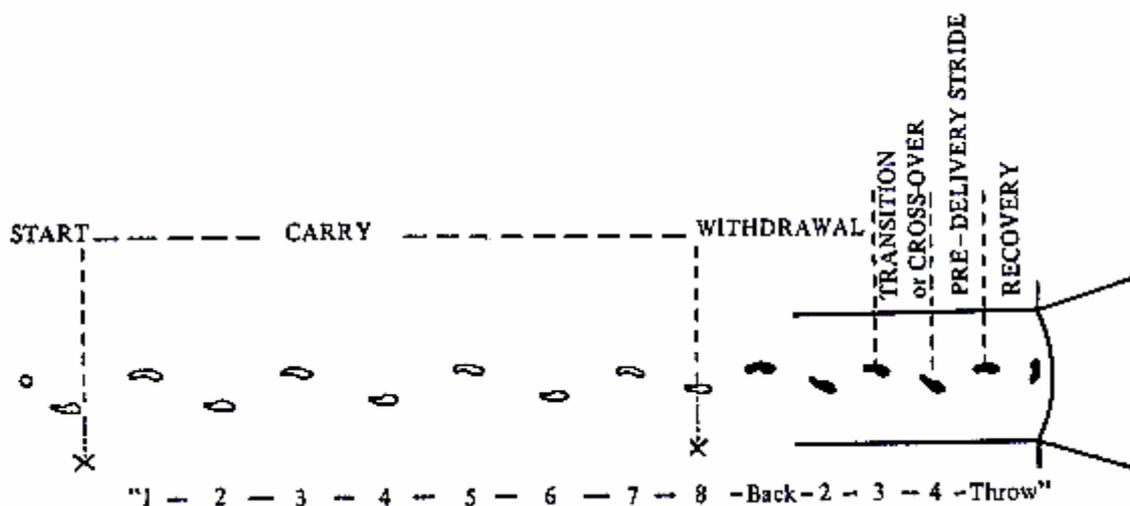
- Hold the javelin along the length of the hand.
- Widen the final strides and gradually increase the flexion of the right leg.
- Run straight during the approach.
- Keep the body weight over the back leg.
- Get a twist between the upper body and lower body (left shoulder in a closed position).
- Keep the throwing arm straight and the palm of the throwing hand uppermost.
- Get the left leg well out to the front and brace it.
- Arch the body in the throwing position and keep the elbow up during the throw.

2.5. APPROACH AND 5 STEP RHYTHM

The approach run is divided into two phases; a preliminary phase and a final phase commonly referred to as the “rhythm of five”.

The average length of approach, including the 5 step rhythm is:

- Juniors - 9- to 13 strides
- Seniors - 13 to 19 strides



2.6. THE APPROACH (PRELIMINARY)

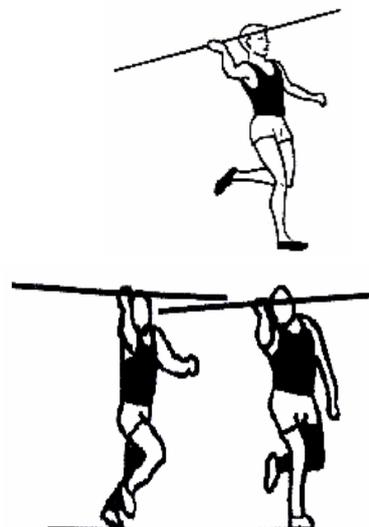
During this phase the javelin is carried at head height, with the arm bent, the elbow pointing forward.

The palm of the hand must face upwards. This will help the wrist, elbow and shoulder to relax, and therefore lead to an easy running action.

The shoulders are parallel to the run-up and the hips are kept high, with the body-weight carried on the ball of the foot. The javelin is lined up approximately parallel to the ground.

The approach speed increases constantly to the maximum controllable speed. The length of the preliminary approach run is:

- Juniors: 4 – 8 strides long, finishing on the right foot contact with the ground.
- Seniors: 8 – 14 strides long, finishing on the right foot contact with the ground.



2.7. 5 STEP RHYTHM (TRANSITION)

- A clear marker must be placed next to the run-up area to indicate the start of the 5 step rhythm.
- The approach speed continues to increase constantly to the maximum controllable speed, without lengthening the stride.

STEP 1 AND 2

On landing on the right foot, move the throwing arm straight forward and then back to the rear, over the right shoulder, until the arm is fully stretched at shoulder height, with the palm of the throwing hand facing upwards.

Do not rush the withdrawal to avoid running sideways to long.

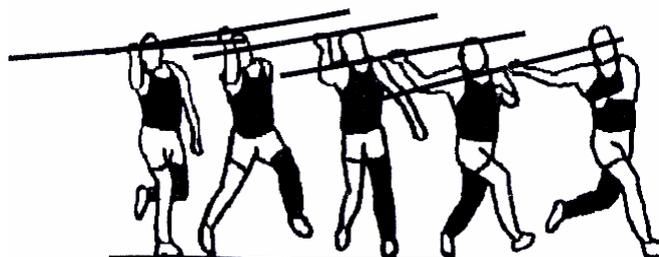
Try to accelerate ahead of the javelin, rather than pushing the javelin back.

This way, it will be easier to maintain the approach speed.

The shoulders turn to be in line with delivery area, while the hips remain square with the delivery area, with the feet pointing forward, to maintain the approach speed, and to produce torsion in the upper body prior to the throw.

The right leg must drive forwards and upwards to assist the hips to maintain their position, and to assist the left leg in maintaining approach speed.

The javelin must remain pointing in the direction of the throw.



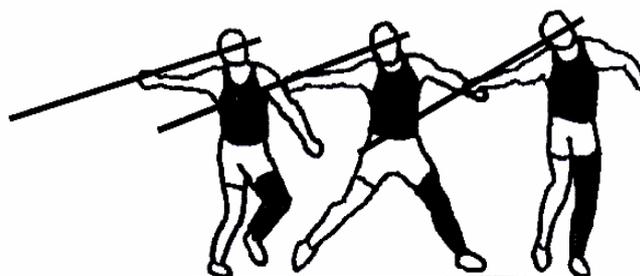
STEP 3

Step 3 serves as preparation for the subsequent drive step.

Hold the javelin close to head with the point in line of the eyebrows.

It must remain in this position until the final delivery action.

The eyes look straight ahead.

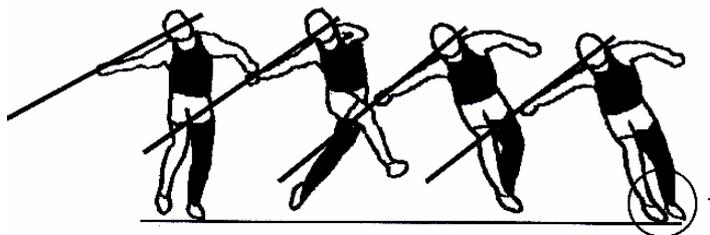


STEP 4 - DRIVE

A longer, flatter drive step of the right leg takes place after pushing off with the left leg. The trunk starts to lean back because of the long stride and this facilitates a long, final delivery pull of the throwing arm.

The right foot is kept low while the right leg drive forward, across the left foot (the shortest possible path).

The left leg, after completion of the drive, is brought forward, and is in front of the right leg before the right foot touches the ground (1).



The right foot touches the ground ahead of the hips and shoulders, on the outside edge, heel first. The right leg is bending to absorb the shock.

The right foot is placed on the line of throw to ensure that the eventual drive is directed through the hips and trunk.

As the right foot lands, at the end of the “cross-step”, the heel is quickly lifted and rotates clockwise until the foot finishes up on the little toe, thus bringing about a clockwise rotation of the right knee and hip. The angle of the foot in relation to the line of throw should not be more than 45°, to ensure an active drive through the hips.

The shoulders are still in line with the direction of the throw. The left arm is folded across the chest to keep the chest muscles relaxed.

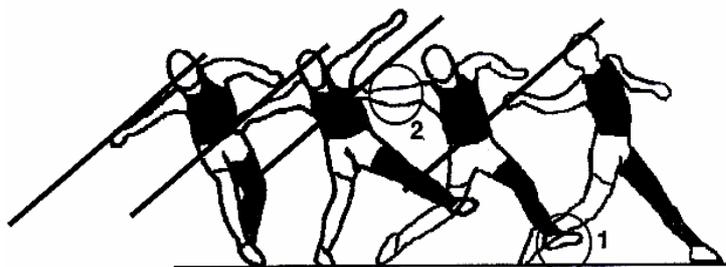
The right arm is stretched, with the wrist closed and the palm up, to prevent the tip of the javelin to lift. The tip of the javelin must still be in line with the eyebrows.

STEP 5

The left leg is brought forward to bring the body in the power position.

The right leg drives forward and upwards while waiting for the left foot to come down. Do not force the left foot down, otherwise the centre of gravity will move to behind the right leg, losing the forward driving action.

The braced left leg lands flatfooted, pointing forward (1), to avoid the knee from collapsing and absorb the momentum of the approach run. The braced left leg is kept straight and acts like a wooden leg. The touchdown of the left leg takes place very soon after the right foot.

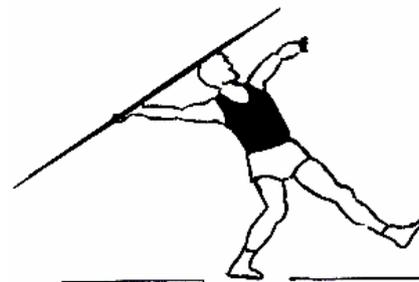


With both legs on the ground, the driving through the hips is accelerated, causing the upper trunk to form a backward arc to create torque prior to delivery.

Keep the throwing arm still extended at shoulder height (2). The free arm remains relaxed ahead of the body.

2.8. THE POWER POSITION

- The body is arched in the “power” position.
- The head faces the direction of throw.
- The shoulders and javelin are roughly parallel.
- The throwing hand is held high, palm facing upwards and the wrist closed.
- The left leg is well forward, held like a “wooden leg”.
- The left leg is totally extended.
- The right leg is slightly bent with the foot on the ground ahead of the hips and shoulders.



2.9. THE THROW

- With both feet on the ground, the right leg drives the right hip forward over an extended left leg in front (1). Almost 80% of the launching speed is generated during this phase. The front leg must be extended to ensure a high point of release.
- Turn the right hip quickly forward and up to bring it square with the delivery area. The chest and shoulders must follow in rapid succession.
- The right elbow will follow by rotating outwards and up, alongside the head (2), while the right shoulder is pulled through and the arm is “whipped over the shoulder” with a vigorous forward

and upward extension. The “whipping” action should be a result of the hip / chest / shoulder movement, and not an action on its own. The delivery arm must start its final action when the hand is above the shoulder.

- Keep the left arm relaxed, next to the body and then remain firm (blocked) during the final thrust of the right side of the body. It must not be allowed to sweep too far backwards.
- The eyes look forward towards the point of the javelin to avoid the shoulders from turning.
- The launching takes place above the left foot. The outward rotation of the elbow along with the release of the fingers on the javelin causes the javelin to rotate clockwise to create stability during flight.

2.10. RECOVERY

Ride over the left leg after delivery, while keeping the left foot on the ground. Bring the right leg quickly forward, immediately after the release of the javelin to prevent fouling of the throw. Place the foot on the ground with the leg slightly bend to absorb the forward momentum.

2.11. DELIVERY ANGLE

The optimum delivery angle is 30 and 36°. The faster the javelin is thrown, the lower the trajectory will be.

Strong headwinds require a lower delivery angle and strong tailwinds require an increased delivery angle.

Javelins are manufactured according to distance rating. A thrower who throws 50 m requires a javelin, which flies optimally at 50 m, etc. The higher the distance rating of the javelin, the lower the angle of release.

2.12. MEASURING THE RUN-UP

The check marks for the javelin thrower are as important as those used in the jumping events. The elite thrower knows almost to the centimetre how close he will be to the scratch line. This technique should be practised on every throwing day.

To establish a check mark, which is placed at the position where the rhythm must change, the thrower begins 2 steps before the first check mark. The first check mark is hit with the left foot, then the thrower continues for 6 steps to hit the T with the left foot. The T point is the start of the five-count final approach, which includes the cross-step.

As the technique of the thrower develops, the run-up will be lengthened by adding two strides at a time. In a longer run-up, the total length of the last 5-stride rhythm will also be longer.

KEY:

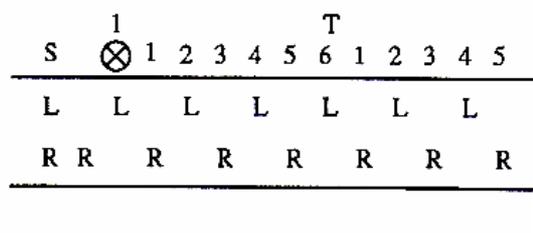
L = LEFT FOOT

R = RIGHT FOOT

S = START OF APPROACH

⊗ = CHECK MARK,

T = START OF FIVE-COUNT APPROACH.



The athlete should run the full run-up while an observer marks the position of the check marks. This is done six times, and the farthest markers from the scratch line is measured and written down.

These distances are measured next to the run-up prior to the competition and tested. Small adjustments can be done according to the specific situations.

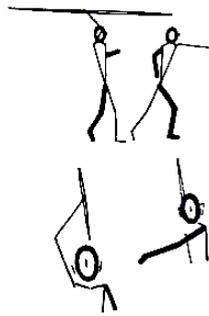
Keep in mind that the run-up will differ slightly on different approach surfaces, or weather conditions.

Running into a headwind will require a shorter run-up and running in a tailwind will require a longer run-up. In bad weather, the run-up must be shortened for better control in the 5-step rhythm.

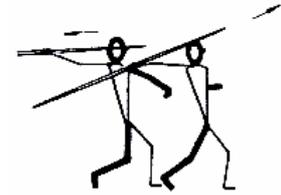
2.13. EXERCISES TO IMPROVE THE TECHNIQUE

FINAL ARM ACTION

To learn the final arm action, stand with the left foot forward, holding the javelin above the shoulder with the elbow forward and the tip of the javelin pointing slightly downwards. Throw the javelin into the ground 3-4 m ahead, with a stabbing action, with a pull from the shoulder straight through the shaft of the javelin, and an extension of the elbow and hand.



Repeat the action above, lean further back with the javelin not pointing to the ground and throw the javelin to land 10-15 m ahead.



POWER POSITION THROW

- To execute the throw from the power position, stand with the feet 60 - 90 cm apart, with the feet pointing forward, and the weight on the rear leg.
- Lift the left foot off the ground, keeping the weight on the bent right leg and drive the right leg hard, pivoting clockwise, on the ball of the foot.
- Ground the lengthened left foot flatfooted, to block the left hip and allow the right hip to rotate to the front, forming a bowed back, with the shoulder, arm and hand to follow.
- Keep the elbow close to the javelin throughout the action.



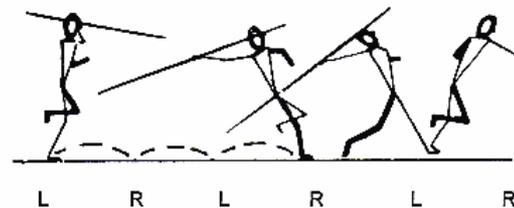
3 - STEP RHYTHM WITH RECOVERY

- Start with the right foot forward, with the javelin fully withdrawn.
- The left foot stride forward, followed by a longer, higher stride with the right foot.
- The emphasis of the big stride will leave the body weight back over the rear in the Power position.
- The three strides should be on flat feet, not on the toes.



5 STRIDE RHYTHM

- To learn the 5-stride rhythm, stand, facing the throwing direction with the right foot forward.
- Turn the shoulders 90° to the right and reach back with the throwing arm and javelin, folding the left arm loosely across the chest, and looking straight ahead.
- Keeping the throwing arms straight and well up so that the tip of the javelin lies levels with the brow, takes 5 steps.
- Step one, on to the left foot, step two on the right foot, step 3 on to the left foot, preparing to make a low jump for step 4 on to the right foot and then step 5, quickly on to the left foot, pushing the right hip forward and landing with the left foot pointing straight ahead.
- Brace the left side of the body and make a throw.
- The rhythm is one, two, three...four-five, followed by one more step on to the right foot to pull up without fouling the throwing arc.
- First walk, then at a jog, then at a run and finally after a preliminary run-up.



HEAVY BALL THROW

Standing with the feet well apart and with the body weight well supported on the rear leg. The rear leg should be well bent and the front leg slightly bent. Turn the shoulders to the side and lean well back with the arm well extended and the palm of the hand facing upwards, while holding a small heavy ball. Rotate the right knee and hip to the front and throw the ball with a high elbow, a strong pull from the shoulder and a final extension of the throwing arm high above the shoulder. Follow through with the right arm over the front foot to make a recovery step.

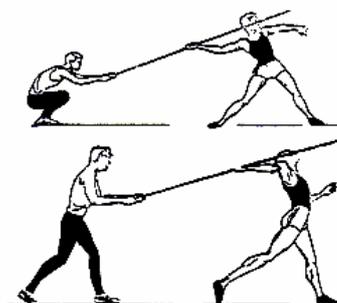


DIRECTING FLIGHT

To direct the flight and to 'feel' the javelin in order to guide it, stand in the same position as above, holding a javelin in the hand.

Another athlete holds on to the end of the javelin while driving through.

The hips must stay in front of the shoulders and the javelin must pass over the right shoulder.

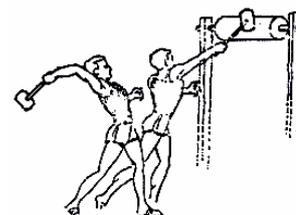


HAMMER EXERCISE

To strengthen the final delivery action, stand in the final stride position, while holding a 4-kg hammer, palm facing upwards.

Drive through with the right hip and shoulder with the right arm following, and drive through to hit a log.

The hammer must hit the log when the right hand is directly above the left foot.



3. TYPES OF TRAINING

3.1. GENERAL CONDITIONING

The need for endurance training for the thrower, such as jogging sessions, is very small. However a change of environment is sometimes needed, and circuit training in a gymnasium, a game of soccer or volleyball can come in handy.

3.2. TECHNIQUE

Technique exercises must be done on a regular basis. A high school athlete for example should throw at least 75 - 100 technique specific throws per week during the preparation phase and at least 40 full throws. At least 75 - 100 full throws should be executed per week during the high intensity phase.

3.3. MOBILITY

Strength training tends to reduce mobility especially in the ankle, hip and shoulder joints as well as the spine. This will drastically reduce the capacity to perform, and increase the injury risk. Intensive stretching exercises must be done with every technique session and must be event specific.

3.4. STRENGTH ENDURANCE

Strength endurance and muscle endurance are not taxed during competition but is necessary to develop to be able to cope with high quality output during long periods of training. It is also valuable when mental endurance is needed during concentration at an intense level over a long period of time.

Using medicine ball exercises, or weight training at low intensity e.g. 75%, 10 - 20 repetitions and 3 - 5 sets can develop it.

3.5. MAXIMUM STRENGTH

Maximum strength is not valuable during the execution of the throw because of the slow muscle contraction, which develop because of maximum strength exercises. However, it provides the foundation upon which all other strength development is based e.g. specific strength, elastic strength and static strength.

Maximum strength can be developed with 80 - 100% weight lifting with 1 - 5 repetitions and 5 - 8 sets.

3.6. STATIC STRENGTH

Static strength is used during the blocking of the left side of the body, while the right side of the body delivers the implement. It is developed mainly during weight lifting sessions at 100% intensity with 1 - 3 repetitions and 1 - 3 sets.

3.7. SPECIFIC STRENGTH

Specific strength is developed when throwing with implements slightly heavier than competition implements, or with medicine balls.

3.8. ELASTIC STRENGTH

Elastic strength is developed during exercises such as jumping, bounding, and hopping and plays an important roll in the delivery speed of the implement.

3.9. SPEED

General speed can be developed by means of:

- 30 - 50 m sprints,
- elastic strength exercises
- explosive use of weight lifting.

3.10. SPECIFIC SPEED

For specific speed the athlete can use under-weight implements e.g. a shot with a hole drilled through. The lighter implement (not more than 15% lighter) will give the athlete the experience of throwing distances to which he aspires. To light implements will cause elbow injuries and destroy his timing for the event.

The exercises above are combined in a long term training program that would look more or less as follows:

THROWS LONG TERM PLAN	PHASE					
	Conditioning		Preparation		Competition	
	1	2	1	2	1	2
Training Methods						
General Conditioning	30%	25%	20%	15%	10%	5%
Technique + Mobility	20%	20%	25%	25%	25%	30%
Strength Endurance + Maximum Strength	30%	25%	20%	15%	10%	5%
Specific, Elastic And Static Strength	10%	15%	15%	25%	25%	20%
Speed + Competition	5%	10%	10%	10%	15%	20%
Active Rest	5%	5%	10%	10%	15%	20%

4. A TRAINING PROGRAM FOR THE THROWER

- 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 throwing disciplines are given. One in the pre-season and one in the peak season.

CONDITIONING PHASE	MONTH													
CONDITIONING	M	T	W	T	F	S	S	M	T	W	T	F	S	S
General conditioning e.g. circuit training, volley ball		#		#					#		#			
Technique throws concentrating on specifics	#		#					#		#				
Full throw														
Mobility - event specific	#		#					#		#				
Endurance Strength		#		#					#		#			
Maximum Strength	#		#					#		#				
Static Strength														
Specific Strength														
Elastic Strength														
Speed														
Competition														
Rest					#	#	#					#	#	#

PREPARATION PHASE	MONTH													
CONDITIONING	M	T	W	T	F	S	S	M	T	W	T	F	S	S
General conditioning e.g. circuit training, volley ball				#							#			
Technique throws concentrating on specifics		#		#					#		#			
Full throw	#		#					#		#				
Mobility - event specific	#	#	#	#				#	#	#	#			
Endurance Strength		#		#					#		#			
Maximum Strength	#		#					#		#				
Static Strength														
Specific Strength			#							#				
Elastic Strength														
Speed	#							#						
Competition						#							#	
Rest					#	#	#					#	#	#

COMPETITION PHASE	MONTH													
CONDITIONING	M	T	W	T	F	S	S	M	T	W	T	F	S	S
General conditioning e.g. circuit training, volley ball														
Technique throws concentrating on specifics		#		#					#		#			
Full throw	#		#		#			#		#		#		
Mobility - event specific	#	#	#	#	#			#	#	#	#	#		
Endurance Strength														
Maximum Strength														
Static Strength	#		#					#		#				
Specific Strength		#		#					#		#			
Elastic Strength	#		#					#		#				
Speed	#		#					#		#				
Competition						#							#	
Rest				#	#	#	#				#	#	#	#

5. RULES

5.1. IMPLEMENT

The javelin consists of three parts: a head, a shaft and a cord grip. The shaft must be constructed of metal and has, fixed to it, a metal head terminating in a sharp point.

The rules regarding specifications for both men's and women javelins are very complex, in order to guarantee a regular flight and legal landing. Great care must be taken by the Technical Manager to ensure that all javelins to be used in a competition comply strictly with these rules. The weight of the men's javelin is 800 gm and that for woman is 600 gm. The lengths are respectively 2,60 to 2,70 m and 2,20 to 2,30 m.

At meetings such as the Olympic Games, World or Regional Championships etc., only javelins provided by the Organising Committee may be used.

At other, smaller competitions, competitors may use their own javelins, provided that they are checked and marked as approved by the Organising Committee before the competition and made available to all competitors.

5.2. THE RUNWAY

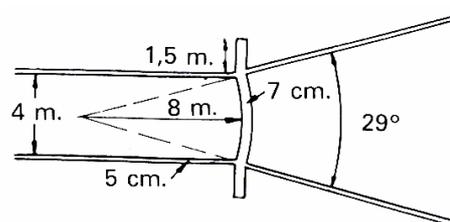
The length of the runway should not be more than 36,50 m but not less than 30 m and should be marked by two parallel lines, 50 mm in width and 4 m apart.

5.3. THE THROWING ARC

This should consist of a strip made of paint, wood or metal 70 mm in width, painted white and flush with the ground, and should be an arc of a circle drawn with a radius of 8 m. Lines, 0,75 m in length, are drawn from the extremities of the arc at right angles to the parallel lines marking the runway.

5.4. THROWING SECTOR

This is bounded by the inner edges of two lines, which are drawn from the centre of the arc through the points at which the arc joins the lines marking the edge of the runway.



5.5. GENERAL RULES

- The javelin must be held at the grip and the throw must be made over the shoulder or upper part of the throwing arm.
- For a throw to be valid the tip of the metal head must strike the ground before any other part of the javelin and it must fall completely within the inner edges of the landing sector.
- The competitor must make his approach and throw within the lines demarcating the runway.
- It is a foul throw if, after starting his throw, he touches the lines or the ground outside with any part of his body.
- The athlete must not leave the runway until the javelin has landed and then his first contact with the parallel lines or the ground outside the runway must be completely behind the lines, at the ends of the arc at the right angles to the parallel lines.
- Once the athlete has started the throw, the athlete must not turn completely around so that the back is towards the throwing arc.
- The number of throws allowed is the same as for the shot and discus.

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