

# ATHLETICS OMNIBUS - HAMMER THROW

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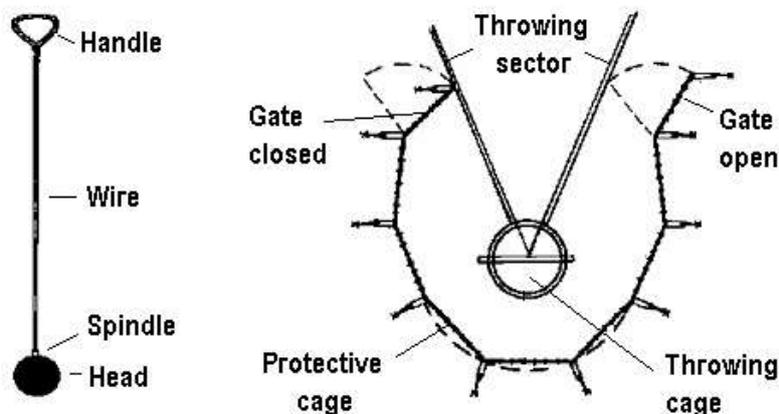
## 1. HAMMER THROW

Hammer Throw is regarded as a strength event. The Hammer Thrower is required to throw a steel ball with a steel wire attached to it as far as possible. Depending on the age and gender of the athlete the weight of the implement will vary between 3kg to 7.26kg.

## 2. THE COMPETITION AREA

**THE HAMMER** - The hammer consists of three parts; a metal head and spindle, a wire and a grip (handle).

- **THE HAMMER HEAD AND SPINDLE** - The head is usually made of steel shells filled with lead. The lead can be added or taken out according to the different weights needed in the various competitions. The spindle, which attaches the wire to the hammerhead, is screwed into the casing and lock in position with an Allen screw. A ball-race is mounted inside the casing of the hammerhead, to allow the spindle to turn.
- **THE WIRE** - The wire is a single, unbroken and straight spring steel wire at least 3 mm in diameter. The steel wire is very brittle and any kink in the wire will cause it to break. It is therefore safest to replace it immediately when a kink appears. Hammers, when stored, should hang from a hook, to keep the wire straight.
- **HANDLE** - The handles vary in shape, size, and weight, and are usually chosen by throwers according to how the handle fit in their hand.
- **THE THROWING CIRCLE** - This is the same as for putting the shot.
- **PROTECTIVE CAGE** - The panels are identical to that outlined in discus.
- **THE GATE** - The left hand gate must be open for throwers rotating anti-clockwise. The right hand gate must be open for throwers turning clockwise.
- **THROWING SECTOR** - This is the same as that for the discus.



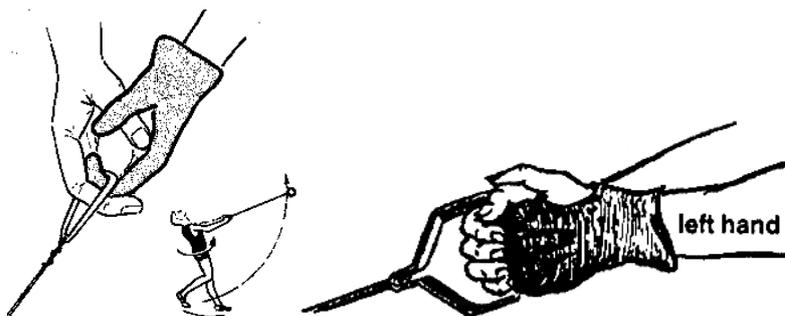
## 3. GRIP ON THE HANDLE

Right hand throwers turn to the left and hold the handle with the left hand, which is then covered by the right hand.

Gloves should be worn to protect the hand from skin damage, blisters and calluses.

For further protection, the fingers can be taped individually with PVC insulation tape.

Tape that is not smooth should be avoided to prevent chafing inside the glove.

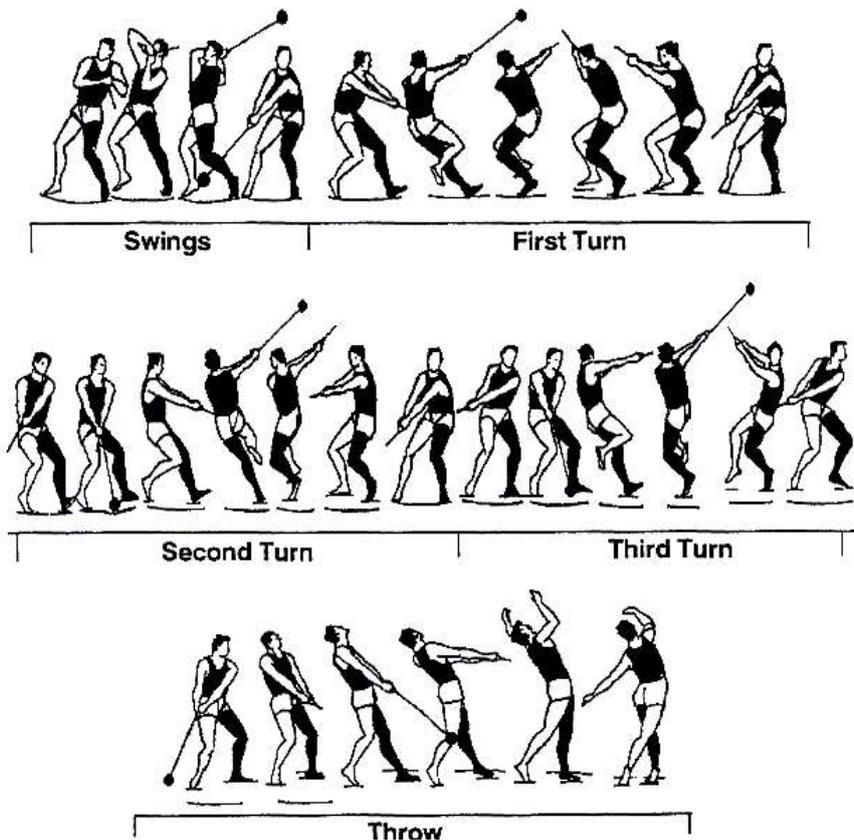


#### 4. HAMMER THROW TECHNIQUE

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

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

- The hammer throwing technique is divided up into three phases: swings, turns and the throw.
- 3 or 4 turns are normally used to accelerate the hammer.



The three most difficult skills for the hammer thrower to learn are:

- To keep the arms lengthened for the greatest arm radius and therefore faster hammer speed.
- To stay low to allow for leg explosion at delivery.
- To execute tight, quick turns to develop maximum speed prior to delivery.

##### a. THE HAMMER THROWER SHOULD AVOID

- Pulling with the arms in the swing (bending the arms).
- Taking the hands behind the head.
- Having the high and low points on the same side, both on the right or both on the left.
- A stiff leg action.
- Turning on "tiptoes" of both feet.
- An incomplete pivot of the left foot and the right foot taken too wide.
- Movement outside the line of the throw.
- Not "accompanying" the hammer at the end, or lifting the right leg.

##### b. THE HAMMER THROWER SHOULD AIM TO

- Keep a wide radius of throw (keep the hands far from the body).
- Open the elbows and keep the hands in front of the forehead.
- Move the hammer to the left (upwards) and rapidly rotate to the right (downwards).
- Keep the legs bent.
- Carry out a heel-toe action on the left foot.

- Lower right knee to the calf of the left leg as the left foot is turned towards the front of the circle.
- Keep the left leg bent during the turn.
- Pivot at the end of the turns and arch the body backwards.

## 5. STARTING POSITION

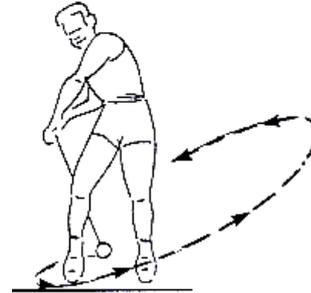
Stand in the back of the circle, facing away from the direction of throw, with the feet spaced approximately shoulder width apart.

The hammerhead is placed on the ground, to the rear and right hand side of the thrower.

The wire is kept straight, with the arms stretched as long as possible, and slightly away from the body.

The legs are slightly bent, appearing to be sitting.

The head is kept upright.



## 6. PRELIMINARY SWINGS

Before starting the first turn of the sequence, 2 - 3 wide, flat preliminary swings must be executed to:

1. give the hammer momentum
2. feel the rhythm of the throw
3. establish the correct plane for the hammer
4. establish correct balance of the body.

As the hammerhead comes to the front, during the start of the first preliminary swing, the body weight shifts to the left heel and the hammer is swept in a wide path in front. The arms are kept straight. The eyes look at the horizon. The chin and knee forms a vertical line through the left toe.

As the hammer crosses the front, the arms start to bend and the hands are brought up to be in line with the head. The arms form a "window" in front of the face (1), with the elbows open, and the athlete must look through the "window" to the horizon. The hands (not the hammerhead) pass behind the head, at the same height as the forehead.

The shoulders, which were turned to the right, now turn to the left. The hips are displaced laterally in the opposite direction of the shoulders.

This causes the right leg to bend and creates a pulling action on the hammer through the arms.

The legs remain slightly bent throughout the swing to maintain balance and a low centre of gravity.

The hands are now brought forward while the arms are stretched to allow the widest possible range for the hammer to travel.

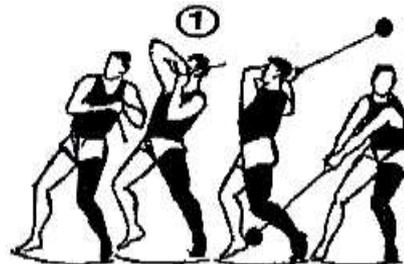
The hammerhead falls to its lowest point just to the right of the right foot. If the low point is too early e.g. directly to the right of the body, the hammerhead will rise too steeply in front throwing the athlete off balance.

The second swing must be slightly higher and faster until the fastest controllable speed is achieved. A third swing, slightly higher than the first and second swings can also be executed, providing the speed remains at the fastest, controllable pace. In the final preliminary swing, the hammer, at its highest point, should not rise above the head, and should be just below the knee at the lowest point, to create a flat plane prior to entry into the first turn.

## 7. FIRST TURN

The entry into the first turn must be executed correctly, to ensure a good technique in the remainder of the turns. Preparation already starts when the hammer is at its highest point during the last preliminary swing.

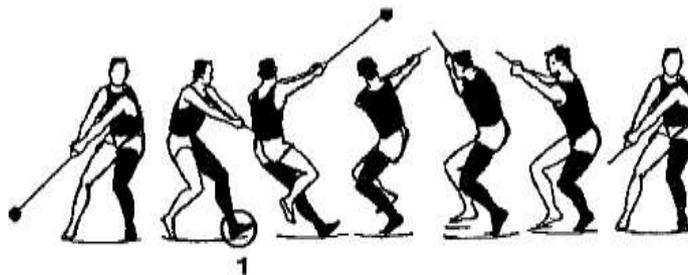
The hips are pushed in the opposite direction to counteract the pull off the hammer. The right leg bent, and creates a pull action on the hammer.



Foot movement start when the hammer reaches the low point in the final preliminary swing.

Most of the body weight must be on the left heel.

Pivot 180° anti-clockwise on the heel off the left foot (1) and 90° on the toes of the right foot, in unison with the torso and the hammer.



The hammer and the two shoulders form an isosceles triangle at all times.

Push off with the right foot. The body weight is transferred from the heel to the ball of the left foot. Continue to turn for a further 180° on the ball of the left foot.

The right foot only leaves the ground once the hammer has reached its highest point. This is done to maintain double foot contact as long as possible.

Rotate the right foot quickly and smoothly around the left foot and place it on the ground next to and parallel to the left foot, in the same position as when the movement had started.

This causes the hips and shoulders to overtake the hammer, thus creating torsion in the upper body. The torsion in the upper body, along with the continues rotation of the body, causes the hammer to accelerate.

The body weight must be back on the heel of the left foot before the right foot touches the ground. The trunk must lean slightly forward, but must remain straight, with the shoulders closed to ensure maximum travel range of the hammer. The eyes are focused on the hammer.

The arms also remain stretched until delivery to achieve maximum speed of the hammer.

The thrower now has travelled one-foot length in the direction of the delivery area.

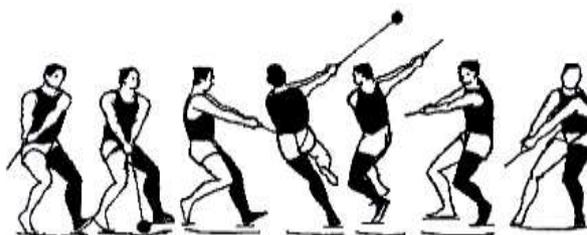
## 8. SECOND TURN

A second left foot heel-ball turn is executed with the right hip and right leg overtaking the hammer in the second half of the turn.

Push the left knee anti-clockwise to guide the rotation of the left foot, directly after the right foot touches the ground to ensure continues movement of the hammer.

Place the right foot on the ground quickly and smoothly, using the a shorter route around the left foot. Because of the shorter route, more torsion is created in the upper body to accelerate the hammer speed.

After completion of the second turn the thrower now has travelled two foot lengths in the direction of the delivery area.



## 9. THIRD TURN

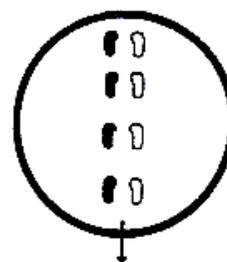
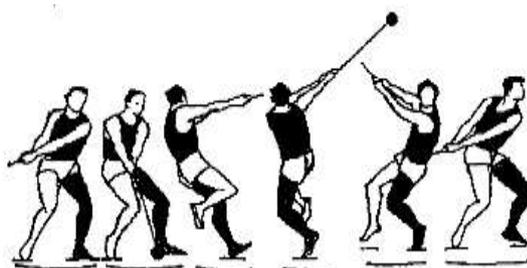
A third left foot heel-ball turn is executed with the right hip and right leg overtaking the hammer in the second half of the turn.

The right leg uses the shortest possible route around the left foot to create more torsion in the upper body, to accelerate the hammer even faster.

Push the left knee anti-clockwise to aid the rotation of the left foot, directly after the right foot touches the ground to ensure continues movement of the hammer.

With each turn, the lead of the lower body over the hammer must be increased.

After completion of the third turn the thrower now has travelled three-foot lengths in the direction of the delivery area.



## 6 THROW

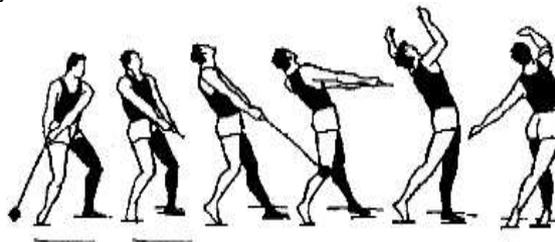
The delivery starts when the right foot touches the ground at the end of the final turn.

The weight of the body is on the left leg.

Throw by extending the ankle, knee and hip joints of both legs, while turning the right hip forward. The trunk and the head form a backward arc. The eyes remain focused on the hammer. At the same time the left side of the body is braced and the left hip is kept stationary.

The arms move upwards, and to the left in a whiplash movement.

The pull action of the arms on the hammer must continue even after the release took place to ensure no loss of velocity prior to release. Release takes place when the hands reach shoulder height. The delivery angle is approximately 42 - 44 °.



### 1. RECOVERY

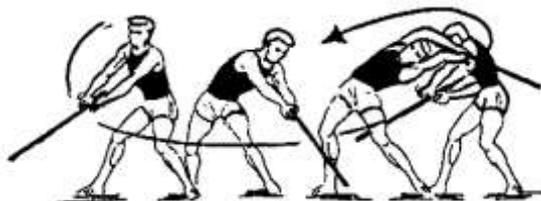
After delivery, lower the centre of gravity by bending the legs and reverse the foot positions with a little jump and keep the eyes on the hammer in flight.

### 2. EXERCISES TO IMPROVE THE TECHNIQUE

#### STICK SWING

To get the feel of the hammer and learn the swing, stand with the feet astride, legs slightly bent and the arms straight, with a broom or stick held with both hands.

Start a pull from the shoulders to swing the broom from the right-rear to the front and then continue the swing so that it rises to the left (elbows open and the hands in line with the forehead) and then descends to the right again, the left arm lowering in front of the chest, with rotation of the trunk, and the hips swing in the opposite direction.



#### SHORT HANDLE HAMMER THROW

To learn the delivery phase, swing as in the previous exercise using a short, light hammer or sandbag, and then throw, pivoting in the direction of the throw and then extending the legs and trunk. Try to achieve a good arched position and keep the arms straight. The left foot must turn on the heel and the right foot on the toes.

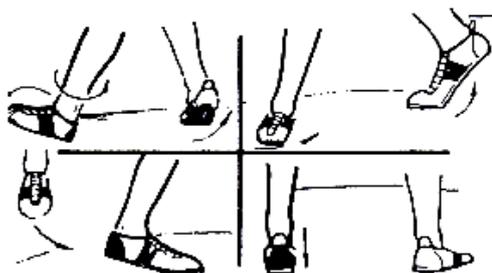


It is very important that the weight used during this phase is lighter than the competition weight to ensure the development of the correct technique. Only when the technique is technically correct, the athlete can progress to a regulation hammer.

#### 180° PIVOTING ACTION

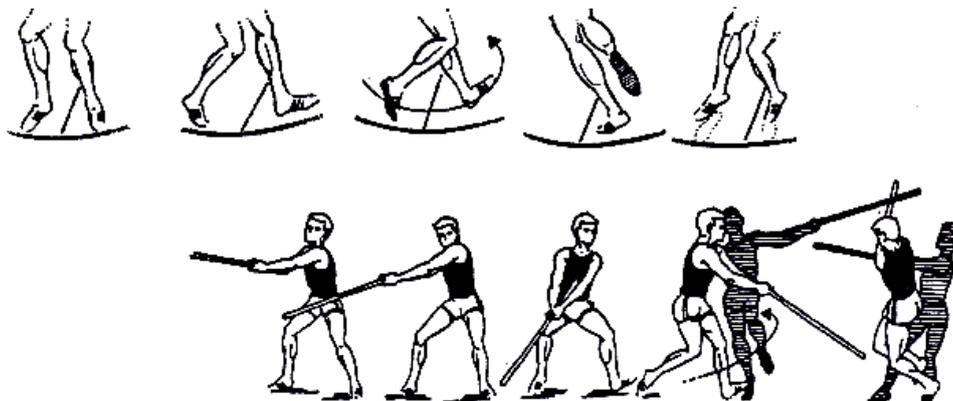
To learn the pivoting action of the turns, stand in the hammer throw position with the body weight that rests over the left heel. Turn the left knee anti-clockwise while pivoting on the left heel and the toes of the right foot. The right foot is taken off the ground as the right knee comes close to the left leg, and on completion of the heel part of the turn.

The left foot role onto the ball of the foot while the right foot rotate closely around the left leg and placed next to the left foot, shoulder width apart.



### 360° PIVOT AND STICK SWING

To learn the pivot action of one full turn stand in the hammer throw position, holding a broom or stick with both hands. Turn the knee anti-clockwise while the left foot rotates 180° on the ball of the foot and the right foot 90° on the toes of the foot. The right foot leave the ground when the stick is at its highest point, and rotate 360° closely and anti-clockwise around the left leg, and placed next to the left foot on the ground. The hands and the shoulders must form an isosceles triangle throughout the entire turn. Only when the technique is technically correct, the athlete can progress to a regulation hammer.



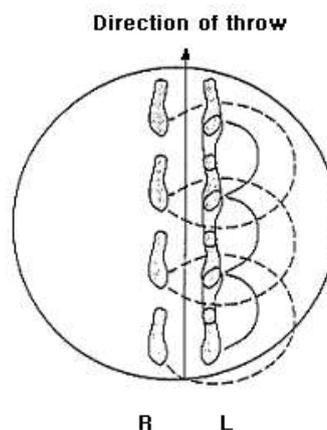
### 3 TURNS AND THROW

To co-ordinate the total movement execute 3 full turns as explained in the previous exercise.

The movement must flow from one turn to the next without any interruption.

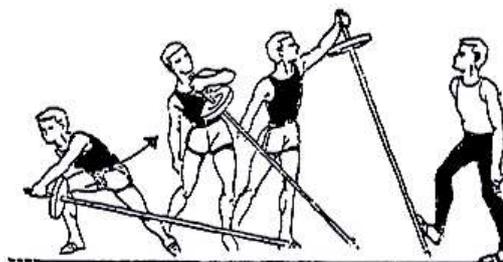
Each time a turn is completed, the athlete travelled one-foot length in the direction of the throw.

Only when the technique is technically correct, the athlete can progress to a regulation hammer.



### DELIVERY ARM THROW

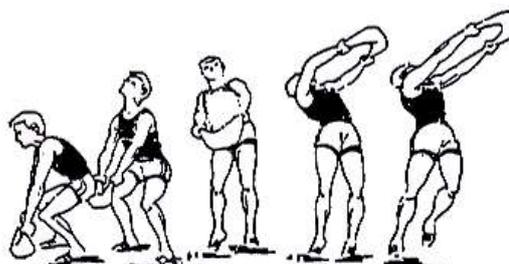
To develop the final pulling action of the left arm prior to the delivery, place the one end of a bar on the ground and the other weighted end in the left hand. Go down by bending the right leg, and pull the bar through vigorously while stretching the ankle, hip and shoulder joints. A bystander can support the bar after completion of the action to stop the weight from pulling the athlete of balance.



### PULL THROUGH AND DELIVERY

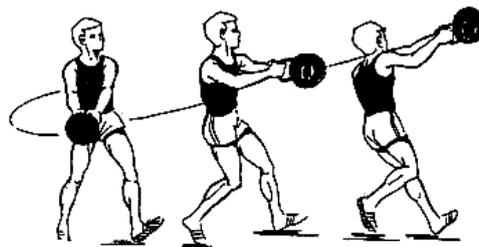
To develop the final pull through action and delivery, hold a sandbag or medicine ball in both hands and go down with the chin, knee and left toes in a vertical line. The body weight must be on the left heel. Execute the final throwing action and deliver the sandbag at shoulder height.

The ankle, hip and shoulder joints must be fully extended at delivery while the back is arched and the eyes focused on the sandbag.



## WEIGHTED 180° TURN

To develop the push with the right foot and the turn on the heel of the left foot holds a heavy ball between the hands and stand in the chin-knee-toe position. Turn the left knee anti-clockwise while the left foot turns 180° on the heel of the foot. The left foot rolls over onto the ball of the foot as the right foot is rotating around the left foot and placed next to the left foot. Progress to a 360° turn when the athlete can control the weight.



### 3. TRAINING

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

- a. Use an over distance approach.
- b. First quantity, then quality.
- c. Build a foundation of endurance and then develop speed gradually. This will prevent injury.
- d. For the first month of training you will do no speed work and you will not time anything.
- e. You will develop speed by doing a great deal of short, fast work and by improving your sprinting form.
- f. 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.
- g. As the season progresses, you will do less work but faster work.
- h. 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.
- i. Your schedule is flexible. You may change the daily routine because of weather, body condition, or emotional outlook.
- j. You should completely recover from one workout to the next. If you are not completely recovered, do less work, or rest.
- k. You should never train when you are ill nor have an injury.
- l. If your training schedule is limited, you may telescope this schedule into two-week periods instead of month periods.
- m. Your workouts must be fun or rewarding, preferably both.

### 4. TRAINING SESSIONS

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

### 5. TYPES OF TRAINING

#### a. 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.

#### b. 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.

#### c. 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.

**d. 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.

**e. 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.

**f. 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.

**g. SPECIFIC STRENGTH**

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

**h. ELASTIC STRENGTH**

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

**i. SPEED**

General speed can be developed by means of:

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

**j. 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%

**k. 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.

<b>CONDITIONING PHASE</b>	<b>MONTH</b>													
<b>CONDITIONING</b>	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					#	#	#					#	#	#

<b>PREPARATION PHASE</b>	<b>MONTH</b>													
<b>CONDITIONING</b>	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					#	#	#					#	#	#

<b>COMPETITION PHASE</b>	<b>MONTH</b>													
<b>CONDITIONING</b>	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				#	#	#	#				#	#	#	#

## 6. RULES

### a. THE IMPLEMENT

This may be made of iron or other suitable material not softer than brass. It may be filled with lead or other solid metal. It should be completely spherical with a minimum diameter of 110 mm.

### b. THE WIRE

This joins the ball to the grip, should be a single, unbroken and straight length of spring steel at 3 mm in diameter.

### c. THROWING CIRCLE

This shall be the same as for putting the shot.

### d. PROTECTIVE CAGE

This should be U-shaped in plan, consisting of a minimum of 7 panels of netting, each 2,74 m wide. The width of the mouth should be 6 m, positioned 4,2 m in front of the throwing circle. The minimum height of the netting panels should be 5 m. Provision should be made to prevent the hammer from sliding along the ground underneath the netting.

### e. GENERAL RULES

- These are the same as for shot put and discus throw, but the gloves are permitted for the protection of the hands.
- The gloves must be smooth on the back and the front, and the fingertips must be exposed.
- The fingers must not be taped together, but individual fingers may be taped only to cover an open wound.
- To protect the spine from injury, a competitor may wear a belt of leather or suitable material.
- To obtain a better grip, the hammer thrower may use a suitable substance on his hands or gloves, but no substance may be spread on his shoes, or in the circle.
- At the competition area and before the start of the event, each competitor may have practice trials, in draw order and always under supervision of the Judges.
- Once the competition has started competitors are not permitted to use implements for practice purposes.
- The throw shall be made from the circle. The competitor shall commence the throw from a stationary position. He is allowed to put the head of the hammer on the ground inside or outside the circle, prior to the preliminary swings or turns.
- It shall not be considered a foul if the head of the hammer touches the ground, or the top of the iron band, when the competitor makes the preliminary swings or turns, but if, after having so touched the ground, or the top of the iron band, the competitor stops throwing so as to begin the throw again, this shall count as a failure.
- It shall be a foul throw if the competitors, after he has stepped into the circle and begun to make a throw, touches with any part of his body the ground outside the circle or the top of the iron band.
- For a valid trial, the hammerhead shall fall completely within the inner edges of the landing sector.
- The competitor shall not leave the circle until the implement has touched the ground. When leaving the circle, the first contact with the iron band or the ground outside the circle shall be completely behind the white line drawn outside the circle.
- Time allowed for a trial is 1 minute.
- If two to three competitors continue the time should be increased to 1 minute.
- If only one competitor is left the time should be increased to 2 minutes.
- For consecutive trials by the same athlete when more than three athletes are still competing the time is 2 minutes.
- All measurements must be made from the nearer edge of the first mark in the ground by the implement, to the inner edge of the circle rim along a line drawn from the mark to the centre of the circle.

#### **f. ASSISTANCE**

- An athlete shall not use any device of any kind - e.g. the taping of two or more fingers together or using weights attached to the body - which in any way provides assistance when making a trial. If taping is used on the hands and fingers, it may be continuous provided that as a result no two or more fingers are taped together in such a way that the fingers cannot move individually. The taping should be shown to the Chief Judge before the event starts.
- An athlete shall not use gloves except in the Hammer Throw. In this case, the gloves shall be smooth on the back and on the front and the tips of the glove fingers, other than the thumb, shall be open.
- In order to obtain a better grip, an athlete may use a suitable substance on his hands only or in the case of hammer throwers on their gloves. Shot putters may use such substances on their neck. In addition, in the Shot Put and Discus Throw, athletes may place chalk or a similar substance on the implement.

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4. IAAF Rule Book, IAAF 17,rue Princesse Florestine, B.P. 459, MC 98007, Monaco Cedex
5. Techniques of Athletics and Teaching Progressions - I.A.A.F., 3 Hans Crescent, Knightsbridge, London SW1X, England.