

Prone shooting

By

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Introduction

These notes I wrote and submitted as part of the assessment for being a NSRA Club Instructor (3 position). The examiner has added some comments and these have been incorporated into the notes. The main change has been the introduction of a flow chart for the analysis of making a shot. The notes covered standing, kneeling and prone but here I have only included the prone part and parts which are common to all three positions

The notes were originally typed using a type writer so they have now been scanned and converted to a word document using optical character reader so there may be the odd funny left which I have not found

Prone position

The basic position for prone shooting is laying face downwards with the chest slightly raised so that the body position is not influenced by the breathing process and so that the head is not excessively strained backwards. The recommended position which should achieve a stable and comfortable position is based on the Estonian position. The body and gun are mainly supported at three points, the left elbow, the left hand side of the body, at the left hip and the right knee. The position is very similar to the relaxation position used in first aid in that it lifts the chest for easy breathing. The points of contact with the ground form a triangle to stop sideways roll and very little effort is required to maintain this state.

Details of the position

The shooter lies down with the spine straight and at an angle of 5-15 degrees (20 degrees for smaller persons) to the line of fire. The left leg is left in a relaxed position approximately parallel to the spine. The foot is turned slightly inwards so not to create any strain in the leg. Under no circumstances should the foot be supported on the toes. The right leg is drawn up so that the upper part of the leg is at approximately 45° to the spine and the lower part is parallel to the spine. This has the action of lifting the chest and the diaphragm and makes for easier breathing.

The left elbow should be placed so that the hand, shoulder and the elbow are in a straight line when viewed from above. The sling should also lie along this line creating a triangle composed of the forearm, upper arm and the sling and this should be in the vertical plane. Triangular shapes being the most stable shape for a structure composed of rigid elements pivoted at each corner joint.

The sling can be set high or low on the arm according to personal preference so that it provides best support for the weight of the rifle with the minimum of pulse beat. It should form a perfect Y at the cuff where it leaves the upper arm. The cuff should not be too tight so to cause circulation problems. At the hand the sling should pass flat along the back of the hand so to trap the hand between itself and the stock. The pressure should not be excessive as this could affect circulation.

The gun stock should rest over the heel of the hand not the fingers and it should not be gripped by the fingers or thumb. A shooting glove will assist in achieving a relaxed hand position without the sling creating excessive pressure across the back of the hand. The hand stop should be positioned to produce a horizontal gun when offered to the shoulder. This will depend on the shooters arm length, however the angle of the forearm to the ground must not be less than 30 degrees. As a guide to start with, the distance from the trigger to the hand stop must equal the distance from the trigger to the butt.

The right hand should be positioned on the pistol grip to achieve the optimum trigger finger position and then the right elbow lowered on the ground so not to exert any pressure on the gun. The butt hook should be set high so that the cheek piece will be lower thus preventing excessive pressure from the cheek on to the rifle. The butt should fit snugly into the shoulder.

With the head butt level i.e. the eyes horizontal, it should be tilted forward to set the eyes at the height of the sights. The gun can then be canted into the face to align the sights with the eye. The eyes should be 2 to 4 inches from the rear site aperture in order to get the correct eye relief. It may be necessary to adjust the position of the sights or the butt length to achieve this.

To adjust the position of the target in the sight picture, the body position must be adjusted. No attempt should be made apply pressure from either hand, or move the arms to achieve this.

Breathing control and heart cycle

The action of breathing involves altering the volume of the chest cavity in order to inflate and deflate the lungs. This change in chest dimension can alter the body position and thus affect the line of sight. Also holding the breath reduces the oxygen and increase the carbon dioxide in the blood. This increase in carbon dioxide is detected by the brain which will try to tell the lungs to try to breath deeper and faster. Excessive over breathing (hyperventilation) will only increase the oxygen content of the blood by a small amount as it is normally near to saturation. However it can reduce the carbon dioxide which can reduce the level of consciousness and produce dizziness. Thus it is important to control the breathing to reduce any body movement and maintain the level of consciousness.

This is achieved by using natural shallow breathing during preparation, sighting and taking up initial trigger pressure. Natural shallow breathing consists of inhalation and exhalation which take 2 second followed by 2 - 3 seconds pause where the diaphragm and chest muscles are in a naturally relaxed position.

This process is normally involuntary process. The shooter then takes several deep breaths to give a reduction of CO₂ followed by an extended pause of up to a maximum of 6-8 seconds during which the shooter increase trigger pressure in order to get the shot off. If the shooter detects involuntary movement of the diaphragm initiated by excess CO₂ he should release trigger pressure, resume normal breathing and start the shooting cycle again. He should not attempt to try to get the shot off quickly if he gets this feeling.

The heart function is related to the lung/breathing function as the heart pumps the oxygenated blood obtained from the lungs to the muscles and brain and return the CO₂ to be expelled by the lungs. When the muscles require more oxygen and give up more CO₂ the heart must pump faster to achieve this as well as the lungs must expand and contract faster or bigger. The heart is like a piston pump in that it pumps blood as a series of pulses at a normal rate of about 60 - 70 pulses minute. This pulsing will cause body movement, but can be minimised by care in selecting the body position, selecting clothing and sling position and tightness. It is important not to trap pressure points, as this can induce large pulse bounce effects or even stop circulation. The Brachial pressure point (inside of the upper arm) is particularly vulnerable with an over tight sling (over tight at the sling cuff). Padding at the upper arm will ease this. Pulse bounce can be induced if the head is held high bent back position.

To reduce the effects of pulse the shooter can also, with practice, control the instance operation of the action relative to the heart cycle to be the same each time, but this must be ultimately done subconsciously. With the use of Yoga techniques it is possible to reduce the heart rate which makes this task easier. The use of drugs to achieve this is illegal. Suffers of certain diseases such as asthma may be routinely taking these drugs (e.g. Ventaline) so they must produce medical evidence, in any competition, of their medical needs. Stimulants such as coffee should also be avoided as these can increase heart rate.

Trigger Control

Objective of trigger control is to move the trigger in such a manner as not to influence the direction the gun is aimed during the time from the initiation of the application of pressure to the trigger until the bullet finally leaves the end of the barrel.

Theory

The pressure applied by the finger should be in line with the direction the gun is aligned. The reaction of this pressure will be taken by the shoulder, via the spring mechanism of the trigger. Any sideways pressure will result in the sights being pulled off the target and also, which if corrected for by forces elsewhere, will also result in the bullet missing the target. The pressure created by the trigger finger should be reacted against the shoulder and not against the thumb as a squeeze between the trigger finger and the thumb or the rest of the hand. Any pressure created by the thumb if not exactly balanced by that from the trigger will have the tendency to pull the butt out of the shoulder and push the barrel down and to the left. The function of the thumb is to locate the hand and thus the trigger finger in the correct position to achieve the correct line for the pull.

Implementation

The first requirement for correct trigger control is to position the trigger finger in the correct position. The trigger finger must be aligned on the trigger so that when the muscle contracts to operate the trigger the finger at the point of contact with trigger moves along the line the gun is aimed, see figure. On some guns it is possible to adjust the position of the trigger relative to the butt. This allows the position of the trigger to be optimised for the shooters hand size to achieve the line of pull and for comfort.

When taking up the firing position, the right hand is first located on the gun in a light grip, so that correct finger position is first achieved, then the arm, is located in its correct position. This ensures that the position of the trigger finger takes priority in positioning the right hand and arm. Care should be taken that the trigger finger does not touch any other part of the gun.

When the correct sighting picture is produced and the shooter is confident that this is achieved with a relaxed position i.e. the sights are not held onto the target, the pressure from the trigger finger is gradually increased. This should continue past the point where the trigger operates until the trigger reaches the stop. Where two stage triggers are used a skilled shooter can start applying pressure to complete the first stage during his final preparation. The aim is to get the bullet off within 5 seconds from the time the breathing cycle has been halted. If this is not achieved pressure is relieved from the trigger and the whole cycle is repeated again. With practice it is possible to hold the trigger position for short periods, to allow for wind fluctuation. The aim of trigger control is to make the process a subconscious exercise, where the mind can concentrate on other factors

Cant

Definition

Cant is the leaning of the rifle out of the vertical plane in order to align the sights with the sighting eye, whilst keeping the head vertical.

Need

It is necessary to use cant when it is not possible to get the sighting eye in line with the sights without tilting the head.

Advantage

The advantage of canting is that if the head is held vertical i.e. the eyes are on a horizontal plane, it eliminates the natural reaction of the brain to try to put it in a vertical position. Its elimination leaves the brain to concentrate on other aspects of shooting. Also tilting the head onto the rifle butt tends to push the butt downwards with the cheek.

Disadvantages

The disadvantage of canting is that it is necessary to maintain a constant angle of cant for each shot to avoid horizontal scatter in the group. Also, when changing the range shot it is necessary to adjust the horizontal position of the sights as well as the vertical height in order to maintain the same relative point of impact of the bullet.

Analysis of the action of making a shot

The first action in making a shot is the positioning of the equipment at the firing point. Following the placing of the shooting mat, adjustment of the clothing and putting on the sling, the shooter should take up the appropriated firing position. The spotting telescope should be positioned so it is only necessary to move the head to use. The ammunition in the ammunition box should also be positioned where it can be reached by the right hand with the minimum change in body position.

The body is put into the appropriate shooting position, the gun is taken up and the sling is attached. Any major adjustment of the sights to allow for changes in shooting distances should be made prior to getting settled. With the butt set in the shoulder, the body position is adjusted so that the sights are aligned with the target. Normal breathing is taking place during this time. The body position should be such that the target and sights are correctly aligned when the lungs are deflated in a natural deflated state rather than a forced deflation. With correct body position it will not be necessary to hold the breathing cycle to check the sighting, as one can relate the correct point in the breathing cycle to the required sight picture.

Following the obtaining of the correct position, one takes a number of deep breaths to increase the oxygen content in the blood and then holds ones breath in the natural low exhaled position for shallow breathing. Pressure is begun to be applied to the trigger with the shooter all the time assessing the sighting picture for correct alignment, and checking to see if the wind will untoward influence his shot. If he finds that he is moving off the target, he detects he is introducing strain to keep alignment or that the wind will cause problems, he releases the trigger pressure and resumes normal breathing. Again if he fails to get off the shot in 5 seconds, he relaxes trigger pressure and resume normal breathing. Depending on the reason for abandoning the shot he starts the shooting cycle at the appropriate place. If he has drifted off sight or found he was introducing strain to keep alignment, he should start from checking his body position. If he failed to get the shot off because of the wind or he ran out of time he can restart from the deep breathing. However if it was caused by running out of time he should ask himself why he failed to achieve this, as there may be some underlining reason for this that might require action.

Having let off his shot he should continue to apply trigger pressure until the trigger reaches the stop and he should maintain sighting. The shooter will learn with experience how the sighting mark will move within the sights as the gun operates for good shots to be achieved. Having let off the bullet, the shooter should not be too quick in opening the breach and checking his target; there is the danger that concentration in letting off the shot could be interfered with by the mind preparing for these next tasks.

Having completing the shooting cycle he should open the breach, reject the empty cartridge and then check with his telescope to see where his shot went.

Position equipment at firing point.

Gun	Shooting glasses
Mat	Spotting scope
Glove	Ear muffs



Check ammunition

Purchase more if necessary
Place in blocks in groups of 5 or 10
Place in position suitable for shooting



Select targets to be shot

Check dates
Check it is your target
Fit on frame with sighters bulls
Place in correct lane on frame at correct distance



Check sights

Set for correct distance
Check filter and aperture
Check for foreign matter in sights



Personal

Remove watch and items from pockets
Put Shooting jacket on
Fit sling with clips set at your own settings

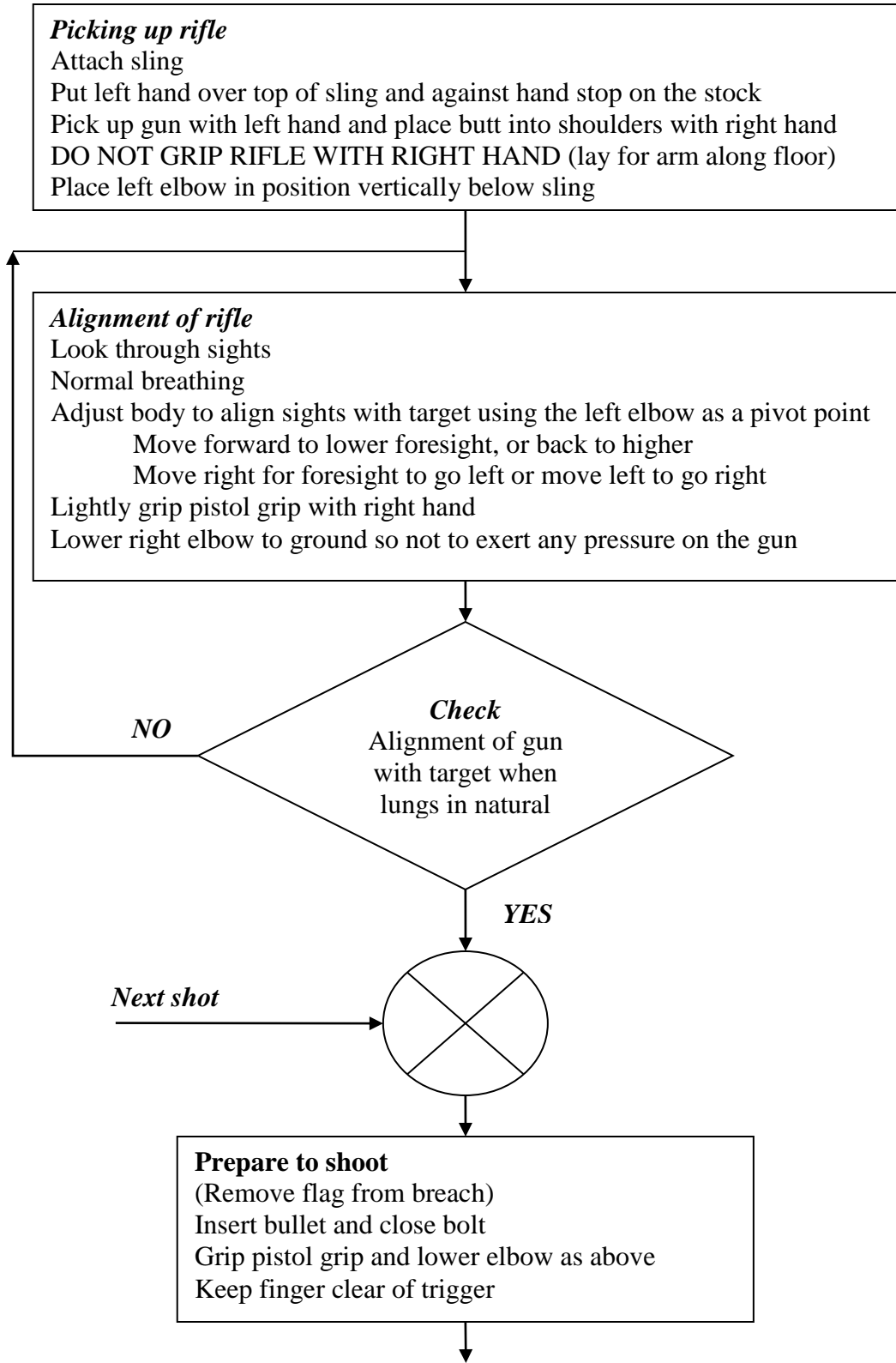


Preparation

Take up firing position in the prone position
Focus scope
Check you are in correct lane for target.
Position ammunition block in place suitable for picking up bullets with right hand
Put on ear muffs shooting glasses and glove



***You are now ready to
start shooting when
the Range officer has
given you the go-a-
head***



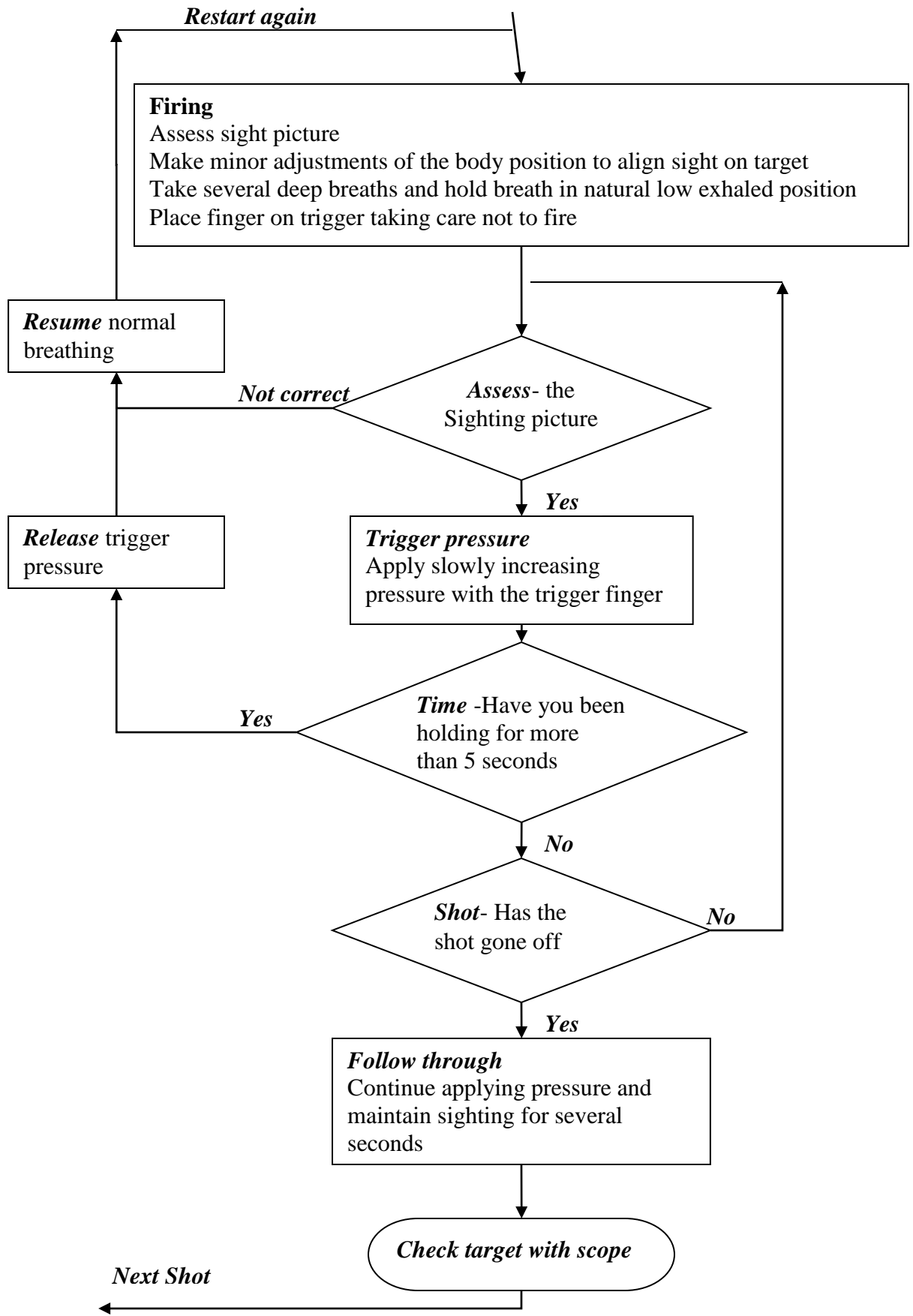
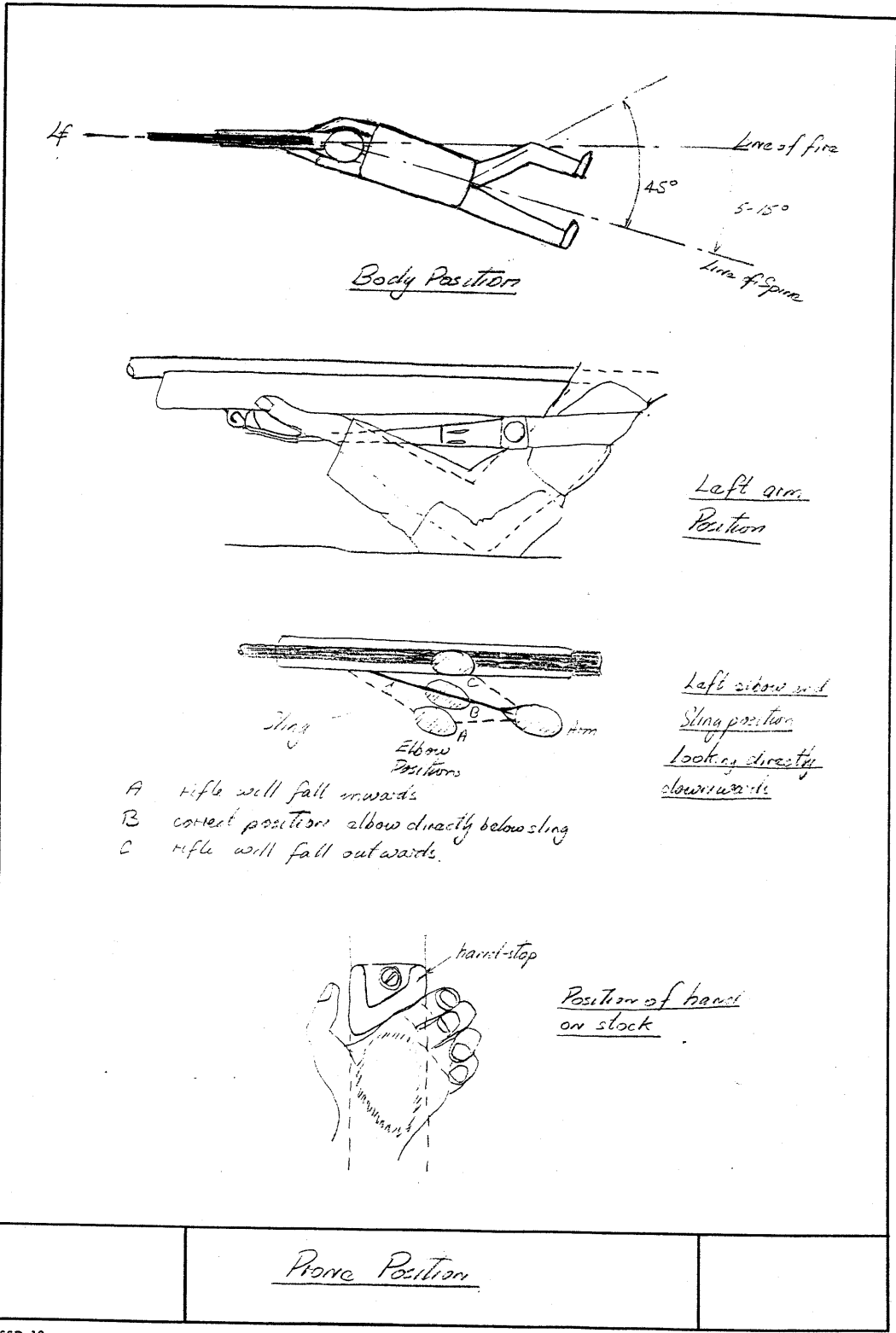
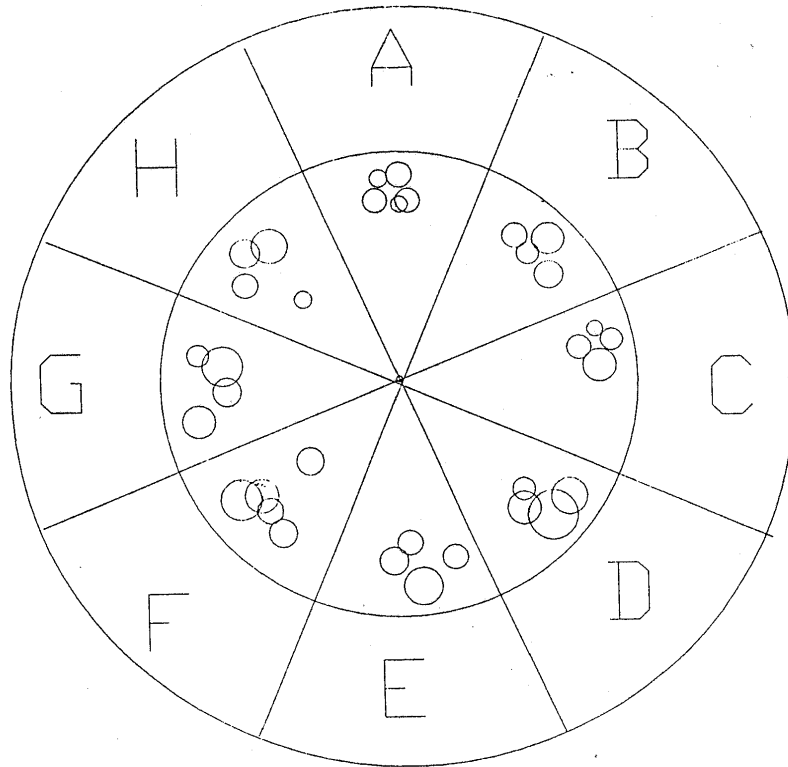


Diagram of body, sling and left elbow positions



Shooting faults finding diagram



AREA	A	<ol style="list-style-type: none"> 1 Looking through top of aperture 2 Cheek pressing on butt 3 Aim acquired by dropping left hand 4 Butt too low in shoulder
AREA	B	<ol style="list-style-type: none"> 1 Sling too loose 2 Looking through side of aperture 3 Handstop too far back
AREA	C	<ol style="list-style-type: none"> 1 Sling too loose 2 Elbow not under rifle 3 Left hand pushing right
AREA	D	<ol style="list-style-type: none"> 1 Sling too loose 2 Right elbow slipping 3 Elbow not under rifle 4 Sights canted to the left 5 TRIGGER SNATCHING
AREA	E	<ol style="list-style-type: none"> 1 Incorrect control of breathing 2 Aim corrected by raising left hand 3 Foresight low in aperture 4 Finger too low on trigger
AREA	F	<ol style="list-style-type: none"> 1 Sling too tight 2 Sights centred to the right 3 Finger incorrectly positioned on the trigger 4 Pushing with the right shoulder
AREA	G	<ol style="list-style-type: none"> 1 Left hand pulling left 2 Sling too tight
AREA	H	<ol style="list-style-type: none"> 1 Cheek pressing against side of butt