

Instructor and Coaches Guide

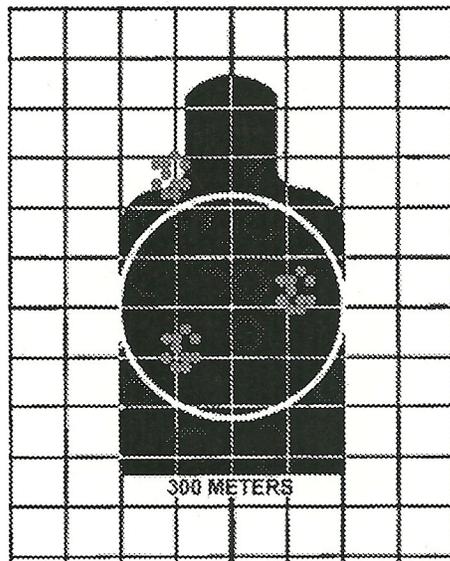
Marksmanship Error

When conducting the integrated act of firing, errors may occur during the process. The main errors are universal to rifle or pistol marksmanship from the basic to advanced level. They will manifest whether on a flat range or while conducting CQB. These errors occur as a result of errors which fall into two main categories: Errors in Aiming and Moving the Weapon While Firing. The errors can be observed by an instructor/ coach at two points: while evaluating the shooter's position during firing and the resulting group on the target after firing is complete. Ideally, the suspected error is identified by an Instructor/Coach (IC) observing error in one and confirmed by the other. Care should be taken to not issue correction until the suspected error is confirmed.

The first live firing exercise that should be conducted is grouping. While three rounds are the minimum used to triangulate a shot group, giving a point of impact to be associated with the shooter's point of aim, more rounds are needed to evaluate a shot group to identify specific shooter error. The ideal number of rounds that should be fired is ten. Firing less than ten rounds may not allow the evaluator to identify the specific error. Firing more than ten rounds will decrease the life of the target and naturally allow additional error to enter the firing process, due to shooter fatigue, and mask specific errors.

AIMING:

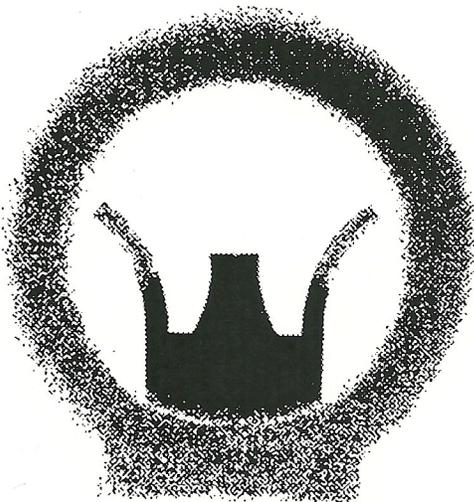
Errors in aiming should be the first error to identify and correct. If the soldier cannot consistently aim his weapon, it will be impossible to correctly identify the specific error. To identify errors in aiming the shooter should fire at least 2 separate shot groups. The shot groups should be separated in a way in which the shooter obtains a new sight picture each time. It is preferred to mark the first shot group before the next is fired to help identify other suspected errors identified during the coach/instructor's evaluation of the shooter's position. The following picture is an example of two shot groups which would indicate only errors in aiming:



By analyzing the shot groups it is apparent that, while the shooter is aiming his weapon consistently during the integrated act of firing, each time the shooter acquires his sight picture he is aiming his weapon inconsistently. (NOTE: weapon sights CAN be inconsistently aimed during the integrated act of firing between each shot of the shot group. This error is very difficult to diagnose, due to the fact that it can represent itself with a shot group that would normally be caused by moving the rifle during the firing process. Because of this, it is essential that the shooter receive adequate training and reinforcement on correct sight alignment.) This error is caused by incorrectly accomplishing the following tasks:

Inconsistent Sight Alignment:

When using non-optical fixed sights (ie: Iron Sights), inconsistent sight alignment is caused by improperly centering the front sight assembly within the rear sight aperture. The following is an example of proper sight alignment:



The critical point is that the front sight post is in the same position inside the rear aperture each time the weapon is fired. The center of the top blade of the front sight post is in the center of the rear aperture. Because the distance from the point on the front sight post to the inner edge of the rear aperture is large, the front sight post guards can be used to gauge whether or not the sight post is centered horizontally. This can be done by ensuring the space between the edge of the sight post guard and the inner edge of the rear aperture is equal on both sides. This method cannot be used to ensure the sight post is centered vertically. This must be done with only the sight post and rear aperture.

When using optical sights, sight alignment induces less error to the aiming process. The degree that it mitigates the error is dependent on the level of parallax the sight has. Most combat optics are near parallax free, however small errors can be induced by viewing the target at different angles through the sight. The aiming point in the optic should remain generally centered in the sighting window whenever possible.

Inconsistent Sight Placement:

Sight placement is the integrated act of placing the center point of an aligned sighting system on the specifically desired point of impact on a target. The following picture depicts the integrated act of sight alignment and sight placement:



Note that the soldier has selected the center mass of his desired target. To achieve a tight shot group, the soldier must not aim at the target as a whole, but at a specific point on the target. For accuracy, the same method used to align the sights can be used to confirm a consistent point of aim on the target. The shooter can now use the side edges of the front sight post to gauge horizontal alignment by ensuring the space between the side edges of the front sight post and the side edges of the target are equal on both sides. (NOTE: any portion of the aligned sight may be used to confirm a consistent aim point as long as the same portion is used each time). Vertical placement can be more difficult and it may be necessary to align the sights to the left or right of the target, confirm vertical alignment, and then move the aligned sights horizontally to the desired aim point.

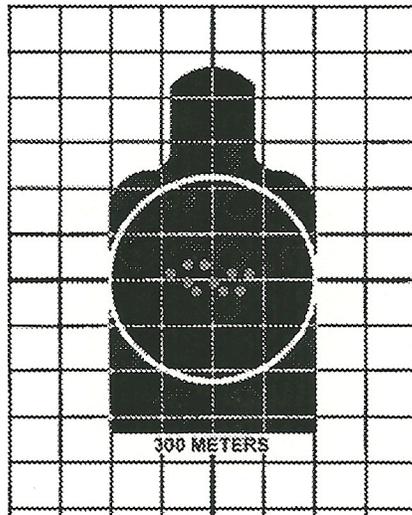
Sight alignment and sight placement, together, make up the integrated act of aiming. Sight alignment and sight placement should be continually checked and confirmed by the shooter throughout the aiming and firing process.

READING SHOT GROUPS:

The following section details reading shot groups to identify a suspected error. Note: the error is suspected until the I/C confirms the error by watching the shooter during the firing process as any of the shot groups could be caused by errors in the integrated act of aiming.

Body Position/ Natural Point of Aim:

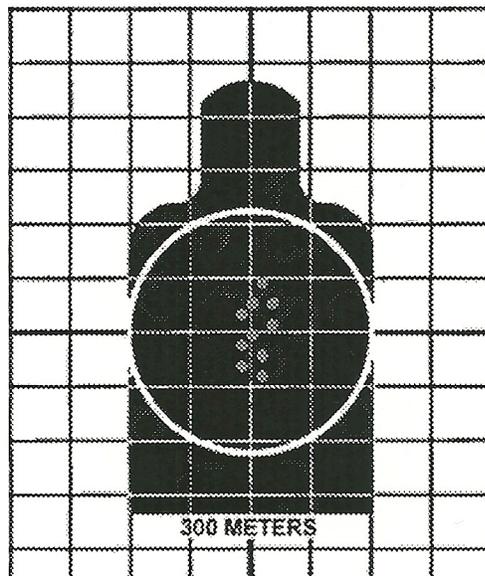
As you stand, your body naturally faces forward. If you turn your upper body, you can hold it in that position using muscle tension. However, your body will naturally attempt to realign itself to the natural state. Any time you alter the body's natural alignment, you are inducing muscle tension to the shooting position. If the position is disrupted, the muscle tension will be momentarily imbalanced and cause the position to move towards the natural state. Disruption can occur during the firing process due to recoil, ground vibration, fatigue, or the contact of the foot to the ground if the shooter is moving. When the movement occurs during the firing process, the sights will generally move laterally (in extreme cases it is possible to have vertical movement). This produces a generally horizontal shot group, such as the following:



If this shot group is observed, the shooter's position needs to be evaluated. In addition to the normal position checks, the I/C must ensure that the shooter is conducting the natural point of aim drill. He then should stand in a position where he can observe any lateral movement in the barrel during the firing process. (NOTE: if the shooter is conducting the natural point of aim drill and no lateral movement is observed, the likely cause is errors in aiming. Confirm with the student how he is referencing his sights). Once the error is confirmed, reinforce with the shooter the importance of the natural point of aim. Because human targets as well as training targets are narrower horizontally than they are vertically, this error will have the most drastic effect on the shooter's effectiveness.

Breathing/ Stable Body Position:

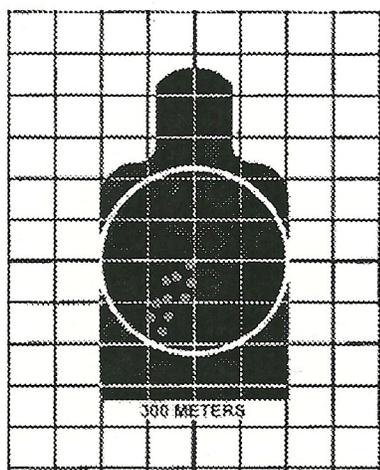
The next most common error causes vertical movement in the sights. This is generally induced by one of two ways. The first is from breathing. Breathing during the breathing process causes the barrel to move vertically and the round to exit the barrel at various points of vertical movement. It can also be caused by the shooter pausing his breathing at inconsistent points in his breathing cycle. This causes the body to be in a slightly different position, forcing the shooter to look through his sight at a slightly different angle. The second cause is an unstable body position. If the body is unstable, the shooter will not be able to effectively manage the recoil of the weapon. This causes vertical movement of the barrel during the firing process. These errors will produce the following shot group:



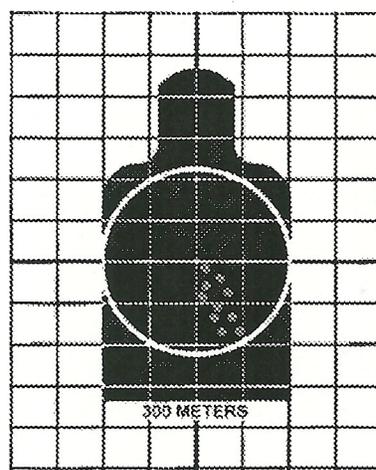
If this shot group is observed, the I/C should observe the shooter's position during the firing process as before. The I/C should position himself where he can observe vertical movement in the barrel during the firing process. **(NOTE: there will always be vertical movement in the barrel. The amount of movement will differ depending on the type of weapon and the stability of the type of position it is employed from.)** The I/C should note the shooter's breathing: if he is breathing during the firing process and if not, what point of the breathing cycle the shooter pauses at during each shot. The body position should be evaluated to ensure that there is no excessive movement during the recoil management. **(NOTE: If neither condition is observed, the likely cause is inconsistent aiming. Reinforce proper aiming as before).** Once the error is confirmed, review with the shooter the proper position and breathing technique.

Trigger Squeeze:

If a shooter does not squeeze and reset the trigger properly during the firing process and follow through, it can cause horizontal movement during the firing process. The movement direction will differ based on what hand the shooter is employing the weapon from. The most common error is slapping the trigger (hard squeeze) or trigger push. The shot groups will appear as follows:



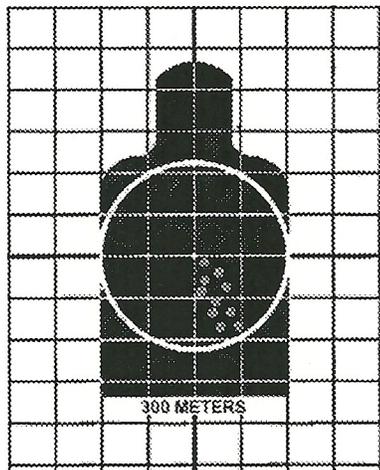
Right-Handed Firing



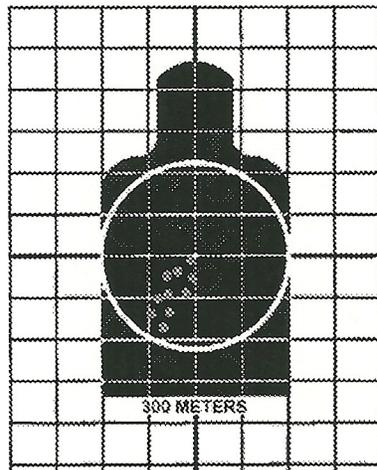
Left-Handed Firing

If this shot group is observed, the I/C again observes the shooter from a position where he can observe the shooter's trigger squeeze and follow through. If the I/C confirms the error by observing improper trigger squeeze, reinforce with the student proper trigger squeeze, reset and follow through. Trigger push is caused by the shooter not placing his finger deep enough in the trigger well. (Usually a shooter with long fingers attempting to place the trigger on the first joint, or second bad from the finger tip). The finger actioning the trigger should naturally lay on the trigger to achieve a proper trigger squeeze. **(NOTE: While unlikely, this error can be caused by inconsistent aiming. If no physical error is observed from the shooter's trigger squeeze, review proper aiming).**

In some uncommon cases this shot group's diagonal axis can be reversed due to pulling or steering the trigger towards the firing hand. This is caused by inserting too much of the finger actioning the trigger into the trigger well. The shot group observed will then be as follows:



Right-Handed Firing

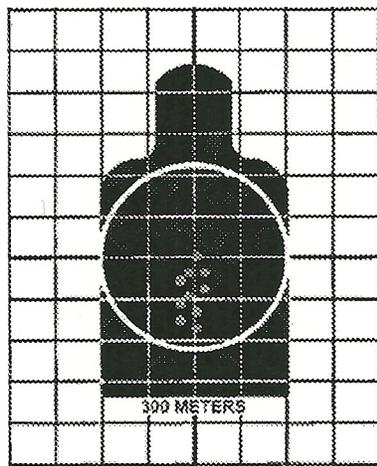


Left-Handed Firing

If these shot groups are observed, the actions are the same as before.

Anticipation:

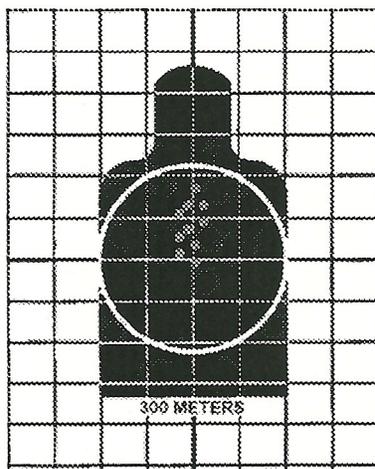
If the shooter is not relaxed and is not prepared to allow the shot to break naturally, it can cause a downward movement in the barrel in the firing process. This error is more evident with pistol marksmanship than in rifle marksmanship, but it can manifest in either. This shot group is very similar to the group that is observed from improper breathing/stabile body position. The key indicator is that the shot group will be vertical, but below the desired point of impacts rather than spaced above and below. The shot group produced will be as follows:



If this shot group is observed and anticipation is suspected, the quickest way to confirm and to correct the error is by employing the ball/dummy drill. The I/C will immediately see the barrel dip when the hammer falls on the dummy round and continued ball/dummy drills and encouraging the shooter to relax during the firing process will correct the error. **(NOTE: While unlikely, this error can be caused by inconsistent aiming. If no physical error is observed, review proper aiming).**

Overgrip/ Heeling:

If the shooter grips the weapon too firmly with his firing hand it inhibits his ability to properly manage recoil and causes increased muzzle rise. In pistol marksmanship, the increased muzzle rise is called barrel flip. As with the anticipation error, the shot group can be confused with the shot group produced by breathing/stabile body position. The shot group will usually differ in that, it will usually be vertical above the desired point of impact. The shot group produced will be as follows:



As before, if this shot group is present, the I/C confirms the error by observing the shooter during the firing process. Key indicators will be excessive straining in the muscles in the firing forearm or white knuckles in the grip. If the error is confirmed the shooter should be again coached to relax during the firing process. In some upright shooting positions, tension in the shooter's upper body can cause the error. If the error is confirmed the shooter should be again coached to relax during the firing process. **(NOTE: While unlikely, this error can be caused by inconsistent aiming. If no physical error is observed, review proper aiming).**

A large shot group may be caused by a combination of any or all of these errors. Specific diagnosis will not be possible without a complete observation of all of the fundamentals during the firing process and major review of them with the shooter.

While this guide is written as an aid to the I/C, the shooter himself is able to more effectively identify these errors by observing movement in his sights during the follow through. The sight movement that begins when the trigger is squeezed

and ends when the trigger is reset and the sights settle will mirror the direction that will be reflected by the pattern of the shot group. With experience and concentration on the follow-through, self diagnosis will be possible.