



ARMY RESERVE MARKSMAN



New Army Training Circulars

The Army Publishing Directorate has released a number of new manuals that completely revise and update small arms training for all Soldiers. For Soldiers to be expert and professional and able to maintain arms requires knowing how best to use them. For leadership to remain technically and tactically proficient, seeking continually to improve knowledge and practice of their profession requires learning current doctrine as it evolves.

The Evolution

Back in the early 1980s, Army publication Field Circular 23-11, *Unit Rifle Marksmanship Training Guide* was designed to provide useful marksmanship guidance to combat, combat support, and combat service support units. It covered a wide range of topics from the basics, such as zeroing and shot-group analysis, to advanced information, such as night firing, automatic firing, and using the then-new Multi-integrated Laser Engagement System (MILES).

The information was specific to guide trainers in providing a sound unit marksmanship program without

- Rifle and Carbine: TC 3-22.9
- Pistol: TC 3-23x35
- Light Machine Gun M249 series: TC 3-22.249
- (Automatic Rifle and Light Machine Gun use) Medium Machine Gun: TC 3-22.240
- Heavy Machine Gun M2 series: TC 3-22.50
- Grenade Machine Gun Mk19 MOD 3: TC 3-22.19

bogging them down in needless detail. Its intent was to provide deeper understanding behind the how and why of the then-current small arms Field Manuals, such as FM 23-9.

The most current Training Circulars are very new and are complete rewrites that establish new procedures and doctrine. Many units have not yet implemented this and many leaders remain unaware of these changes. This is the first major overhaul of small arms doctrine in four decades. Like the FC 23-11 did in the eighties, this article provides an up-to-date overview of implementing current Army small arms training doctrine into a sound unit marksmanship program without bogging down into needless detail.

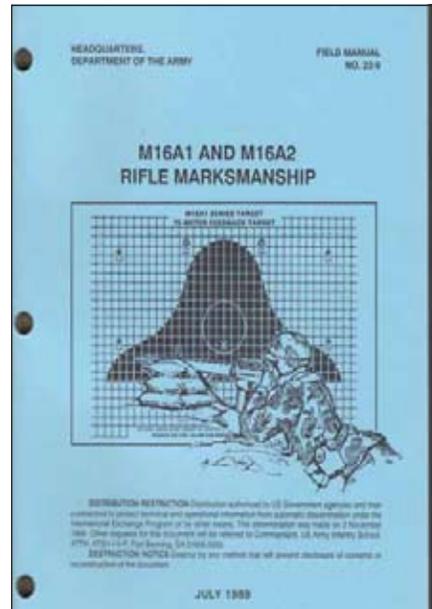
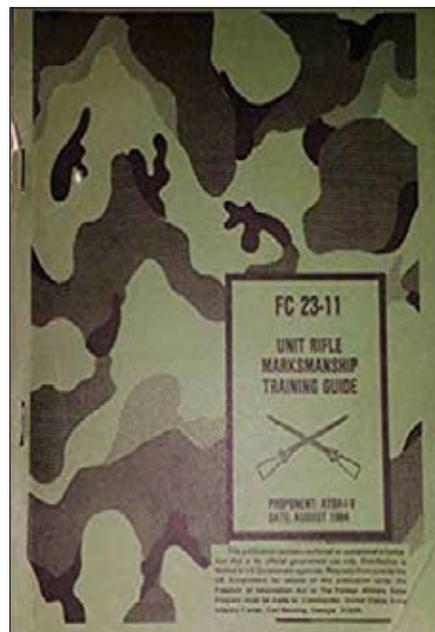


Training Circular 3-22.9, Rifle and Carbine was officially released May 2016 with Change One in January 2017, superseding FM 3-22.9 dated August 2008. Since then, all of the Army's small arms manuals have been completely rewritten from scratch throughout Fiscal Year 2017. If you haven't downloaded the most current versions since before then, you're completely behind on current training procedures.

Note these are listed as Training Circulars, not Field Manuals. Previously-released small arms doctrine were released as Field Manuals. The current manuals have been released as Training Circulars.

Doctrine changes don't replace fundamental principles for the same reason that doctrine changes don't supplant known laws of physics. What does change is how the official approach organizes and describes those principles.

These new manuals are well over a thousand pages of new training and technical information. Unless they're gun nerds like us, most Soldiers won't read all this. My purpose here is to distill the new information in these Training Circulars into something more manageable. **ARMY**



Shot Process and Functional Elements

The Army's previous training doctrine distilled basic shooting procedures into four fundamentals. The idea was to eliminate details and only use those components deemed absolutely necessary. These four fundamentals were: Steady Position, Aiming, Breath Control, and Trigger Control.

This was intended as a checklist, a minimalist set of procedures that should get minimally-trained Soldiers guided by non-experts (i.e., drill sergeants) to hit full-size targets 50-300 meters away 58% of the time (23 out of 40.) The primary failure of this approach has been that it dumbed down the shot process by ignoring concepts that are very useful and critical for anyone wanting to shoot better than merely passing routine qualification. It also gave equal weight to a comparatively unimportant concept like breath control to the point that it has wrongly been considered to be as important as factors that really are very important, such as trigger control.



The Shot Process

Regardless of the weapon system, the goal of shooting remains constant: well-aimed shots. To achieve this end state there are two truths. Soldiers must properly point the weapon (sight alignment and sight picture) and then fire the weapon without disturbing the aim (trigger control.) Even though the Shot Process and Functional Elements might seem to additive, this approach is really about gaining enough control for this to occur.

The Shot Process is the basic outline of the engagement sequence needed to land a hit. Learning how to pay attention to detail requires learning which details are worth paying attention to. The Shot Process formulates an approach to learning and using those elements that are actually important and necessary.

Every well-delivered shot uses this. The concept does not change, although the application of each element varies based on the conditions of the engagement. Grouping, for example, is simply moving through the shot process several times in succession. Rapid fire speeds this up. Multiple targets in quick succession adds the need to transition between them. Regardless of application, need for a developed shot process remains the same.

The Shot Process allows focus on one cognitive task at a time. As a shooter becomes more skillful, they need to mentally organize the shot process tasks and actions identified as important. For a novice and new

Left: Popular myth is shot stringing is due to breathing. Good shooters know this is wrong and likely caused by other, much more important factors. Learning the Shot Process helps identify these more

recruit, a simplified approach such as the old Four Fundamentals is adequate. When a Soldier decides to become a skilled marksman, additional elements and points of emphasis are added to their Shot Process as needed to obtain improved results. In competitive shooting circles, it is common for the developing marksman to write out a personal Shot Process that expands to several pages of description. Such detail creates a disciplined mental checklist which becomes a subconsciously-controlled task through practice. The focus for a skilled shooter becomes a simple anchor allowing them to focus their attention on their external environment while executing their Shot Process as a subconsciously-programmed response.

The Shot Process has three distinct phases: Pre-shot, Shot, and Post-shot. Pre-shot items include position, natural point of aim, initial sight alignment/picture, and hold stability. Shot items include refinement of the aim and trigger control causing discharge. Post-shot includes follow-through, recoil management, shot call, and evaluation.

Functional Elements

Functional elements of the shot process are the linkage between the Soldier, weapon system, environment, and the target that directly impact the consistency of each fired shot. Used appropriately, the Functional Elements build a greater understanding of delivering accurate fire in any engagement. The Functional Elements are Stability, Aim, Control, and Movement.

Stability is stabilizing the weapon well enough to provide a consistent base to fire from and maintain through the shot process until the recoil pulse has ceased. This includes

the hold, position or posture during the engagement and structures or objects used to provide stability.

Aim is the continuous process of orienting the weapon correctly, aligning the sights and on target, and the appropriate lead and elevation (hold) during a target engagement to obtain the lay of the bore needed for a hit.

Control are all actions taken before, during, and after the shot process that the shooter is specifically in control of. Of primary concern is trigger control and body control so as to avoid a flinch, pre-ignition push, or other unintended reaction/anticipation during the shot phase of the Shot Process. Control also includes whether, when, and how to engage. It incorporates the Soldier as a function of safety.

Movement is the process of moving during the engagement. It includes moving into and out of positions, adjusting as needed (natural point of aim), and moving laterally, forward, diagonally, and in a retrograde manner while maintaining stabilization, aim, and control of the weapon.

Functional Elements include important concepts during all phases of the Shot Process and the emphasis will vary based on the shooting. For example, being particular about position stabilization, natural point of aim, a highly refined aim, and smooth, controlled trigger press is important for a Designated Marksman shooting at 500 meters. This changes for a Soldier conducting a room entry and engaging quickly at a target inside the room while moving. The Shot Process concepts remain the same but the emphasis on various Functional Elements varies based on the shooter and environment. This requires more thought than mindlessly regurgitating “the four fundamentals” and claiming only they are important and of equal importance in all situations for everyone. **ARMU**

Table 5-1. Shot Process example

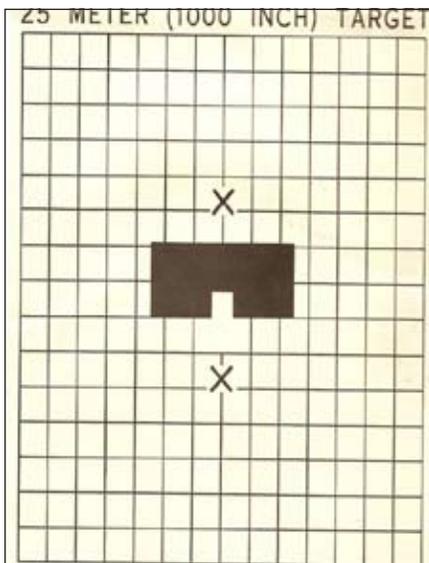
Pre-shot	Position
	Natural Point of Aim
	Sight Alignment / Picture
	Hold
Shot	Refine Aim
	Breathing Control
	Trigger Control
Post-shot	Follow-through
	Recoil management
	Call the Shot
	Evaluate

- **Stability** – the Soldier stabilizes the weapon to provide a consistent base to fire from and maintain through the shot process until the recoil pulse has ceased. This process includes how the Soldier holds the weapon, uses structures or objects to provide stability, and the Soldier’s posture on the ground during an engagement.
- **Aim** – the continuous process of orienting the weapon correctly, aligning the sights, aligning on the target, and the appropriate lead and elevation (hold) during a target engagement.
- **Control** – all the conscious actions of the Soldier before, during, and after the shot process that the Soldier specifically is in control of. The first of which is trigger control. This includes whether, when, and how to engage. It incorporates the Soldier as a function of safety, as well as the ultimate responsibility of firing the weapon.
- **Movement** – the process of the Soldier moving during the engagement process. It includes the Soldier’s ability to move laterally, forward, diagonally, and in a retrograde manner while maintaining stabilization, appropriate aim, and control of the weapon.

New Zeroing Procedures

The Army's previous training doctrine attempted a simplified approach to zeroing that tried to be successful without having to explain concepts that are important to marksmanship, gunnery, and a basic understanding of ballistics. As explained in *FC 23-11 Unit Rifle Marksmanship Training Guide* doctrine developed for many decades and used through the Viet Nam era started with a 1,000-inch range. Up through the end of the 1970s, the Army used bullseye-type targets intended to maximize consistent sight picture. The last of those was the so-called Canadian bull.

This target was in use when the M14 and M16 were both in service. Set at 25 meters (1,000 inches) the grid has squares at two minutes in size. The aim point is fairly obvious at 6 o'clock and centered at the white square, making for a consistent mark, especially with iron sights. Doctrine then was to establish a 250 meter zero, which requires two different points of impact for the M14 compared to the M16. Note the two Xs. The top X above the mark is the intended impact for the M14 and the bottom X below is for the M16.



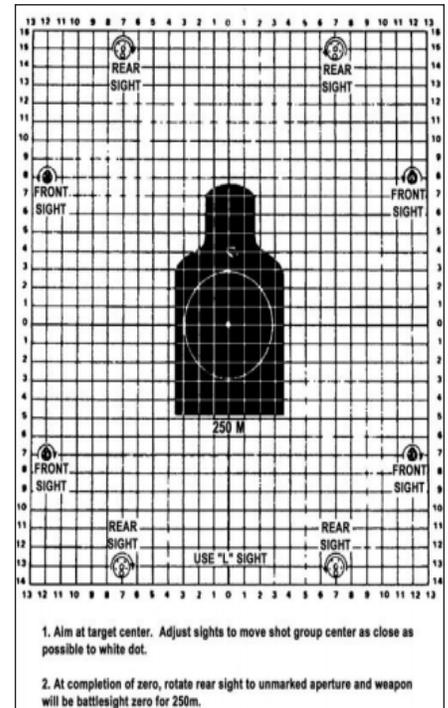
The target doesn't explain any of this. While it's a great mark and grid for knowledgeable shooters, this does not describe most Soldiers and the Army found most personnel didn't understand how to use this.

There are two ways to fix such a deficiency: The first is to teach everyone in the Army units of angular measurement and basic ballistics to ensure understanding among personnel down to the unit level. The second approach is to develop a method that eliminates the need to know or understand any of this. The Army chose the second option.

A silhouette was chosen over a more refined aiming mark because it mimics the targets used in qualification and the field, not because it's ideal for zeroing. The M16A1 rear sight had two apertures: The normal height one intended for a 250 meter zero and a second, taller aperture marked with an "L" setting for longer range shots past 300 meters. With an M16A1, a 250 meter zero intersects initially at 42 meters. The taller "L" aperture is about 3.5 minutes higher and an initial intersection of 25 meters yields a 375 meter zero. This allowed personnel to shoot point of aim for point of impact at 25 meters on a scaled silhouette that appears like a full-size silhouette at 250 meters. Using the "L" aperture at 25 meters and then flipping back yields a 250 meter zero. While the M16A1 sights were in one-minute increments, no attempt was made to teach that. In fact, the zero target has drawings and arrows directing what and how to spin the sights as needed. No understanding of the why or how was deemed necessary.

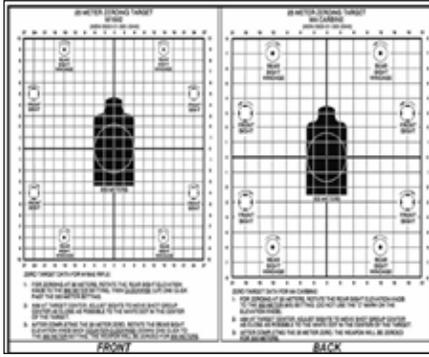
This worked fine, until the M16A2 was released. While useful for marksmanship, the A2 sight design is lost on

Left: The Canadian Bull



novice shooters. Worse, it ruins that one square=one click simplicity with the A1. Rather than explain these facts, the target was redesigned to take this into account and the provision to go up one click on the rear sight for 25-meter zeroing was made. While not a perfect solution, it was deemed close enough given the novice skill levels of most Soldiers to manage to pass routine, basic qualification.

Simplicity was retained for a while, until the M16A4 and M4 was adopted. The removable rear sight is in half minute elevation increments instead of full minute clicks. Unless mounted on an M4, with its shorter sight radius which moves the point of impact further with each click. Again, no attempt was made to explain any of this to rank-and-file Soldiers. This complicated things a bit but a dual-sided zero target with different size grid squares tried to retain the original simplicity without the need to educate Soldiers about why.



Left: M16A2 and M4 zero targets, printed front and back.

This was fine... up until technology ruined everything.

As the Army trudged into the 21st Century, a host of new aiming devices, lasers, optics, and mounting systems became available. Equipment intended to help Soldiers become more effective destroyed the no-explanation approach used for zeroing as each unique combination of weapon, device, and mounting demanded a unique offset.

In response, the Army released the *Small Arms Integration Book*. Consisting of 448 pages of instructions and charts, the SAIB provided zeroing and offset data for all the then-current options. The problem was the Army had spent the past two decades trying to eliminate the need to understand units of angular mea-

surement and basic ballistics to the point – for simplicity’s sake – that it was found necessary to publish the *Small Arms Integration Book*. When your organization is forced to publish a 448-page book of instructions and charts in order to retain “simplicity” then it is long past time to consider you’ve lost the plot.

New Zero Procedure

Rather than hide from it, the current approach to zeroing is to start by explaining how and why it works. With better understanding comes better capability and the knowledge to adapt when things change. Think of this as a validation of your GT score.

Zeroing a weapon is not a training exercise, nor is it a combat skills event. Zeroing is a maintenance procedure that is accomplished to place the weapon in operation, based on the Soldier’s skill, capabilities, tactical scenario, aiming device, and ammunition. Its purpose is to achieve the desired relationship between the line of sight and the trajectory of the round at a known distance. The ze-

roing process ensures the Soldier, weapon, aiming device, and ammunition are performing as expected at a specific range to target with the least amount of induced errors.

For Soldiers to achieve a high level of accuracy and precision, it is critical they zero their aiming device to their weapon correctly. The Soldier must first achieve a consistent grouping of a series of shots, at least three but ideally five. This is a Shot Process and Functional Elements exercise. When the groups look good, the shooter aligns the mean point of impact of that grouping to the appropriate point of aim. Depending on the equipment and distance used, the point of impact may be in a different place than the point of aim. Consult the appropriate Technical Manual to learn what this is.

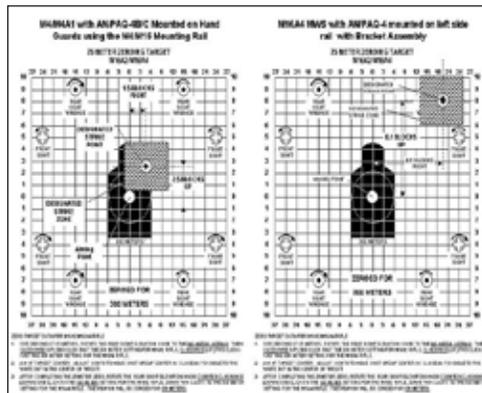
Angular Deviation

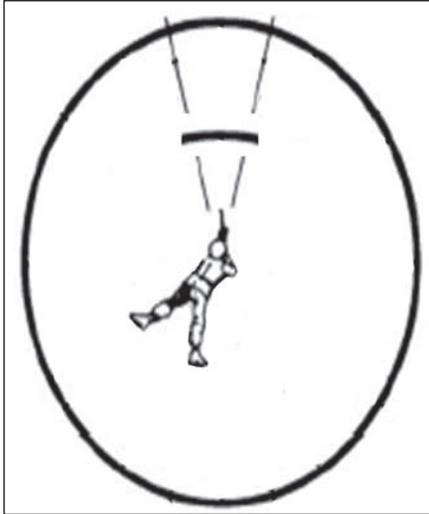
For adjustment, we must understand angular deviation. Imagine the shooter is inside the middle a very large circle with the target on the circle’s edge. Any movement or adjustment is an angle from circle-center to circle-edge where the target is. The range to the target is the circle’s radius. Every movement or sight adjustment is a set angle and the size (radius) of the circle determines how much that adjustment moves at the target. With the target half as far away, the same size angle or sight adjustment moves half as far.

Anyone that ever used a compass during Land Navigation understands degrees and that there are 360 degrees in a circle. There are always 360 degrees in a circle, no matter how big the circle.

Degrees are far too large for marksmanship and gunnery. A target at 100 yards puts us inside a circle with a 100 yard radius. One degree of angle moves more than five feet at that distance. Just as we can measure length in inches, meters, or miles, we can also measure angles in different increments. Dividing one degree of angle into 60

Below: The Small Arms Integration Book is a huge index of offset data for establishing zeroes at 25 meters. This requires offsets depending on the specific weapon, sight, and mount. The two targets below have correct impact boxes for differing setups. Soldiers that fail to understand this completely fail to zero.

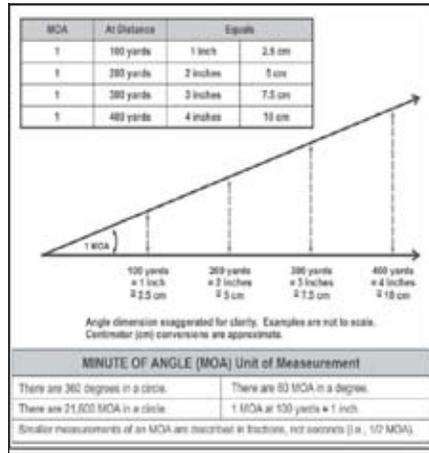




Above: Imagine the shooter in the middle of a very large circle, the radius of which is the distance, with the target on the circle.

equal parts gives us sixty minutes of angle, just like having 60 minutes in one hour. This makes for an angular measure that moves about one inch with a target at 100 yards or so and close enough when measuring in meters.

The same idea works with mils, short for milliradian. A circle has two pi radians, or just over 6.283 ra-

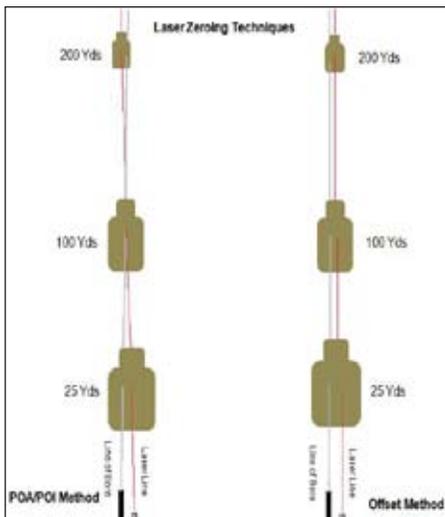
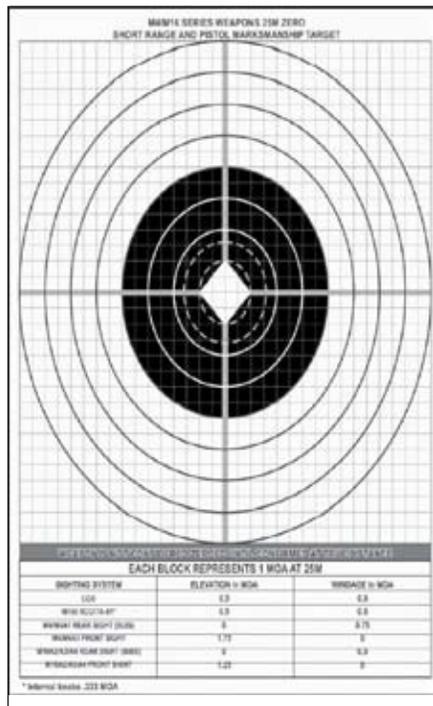


dians. With metric measurement, the mil- pre-fix indicates thousandths. That measures about 6,283.18 mils in a circle. For simplicity, the military often rounds this to 6,400 mils – a so-called artillery mil.

New Zero Target

The new zero target demands understanding of these concepts.

In the center is a 4 MOA diamond and dashed circle, surrounded by a 6 MOA (4cm) dashed circle, same size as old zero target. This is surrounded by 8, 12, MOA rings inside a 16 MOA bull (4-inch black circle, which scales the same as B-6 NRA bull at 50 yards.) Around this are 20, 24, 28, 32 MOA circles (5, 6, 7, 8 inches, respectively.) The entire target has 1 MOA grid squares. Soldiers are expected to learn MOA/mils and use as appropriate.



Notice the grid is in an even adjustment of one minute when placed 25 meters downrange, not for any particular sight's adjustment. No cartoons or pictures show which way to turn the sight for a desired adjustment. The Army's current doctrine for zeroing procedure demands Soldier understanding of their issue equipment. The Technical Manuals list appropriate offsets as needed. Of course, because the laws of physics haven't changed, the data in the *Small Arms Integration Book* is still a valid resource. That will take research on your part.

For lasers, it's likely ideal to establish a fixed offset instead of a crossing point of aim/point of impact zero. The offset method zeroes the windage setting of the laser to remain constantly parallel to the line of bore at all ranges.

Zero Confirmation

The most important step in the zeroing process is confirmation at full distance. If we're supposed to establish a 300 meter zero then confirmation is needed at 300 meters. The 25-meter exercise is a "nearo" that does not guarantee a center hit at distance. The only way to rely on a 300 meter hit is to confirm a 300 meter zero at 300 meters.

Confirmation can be done on any range where shooters can see the impacts of their rounds. Groups should be fired and aiming devices should be adjusted. At a minimum, the confirmation should be done at 300 meters or similarly-appropriate zero distance. If rounds are available, groups can be fired at various ranges to show the firers where their impact will be.

When confirming zero at ranges past 100 meters, the effects of the wind needs to be considered and acted upon, if necessary. If a zero is confirmed at 300 meters on a windy day, and then the weapon is fired at a later date in different wind conditions or no wind at all, the impact will change. **ARMO**

Dry Practice and Drills

In the 2016 Rio Olympics, Vietnam won their first-ever gold medal in ten-meter air pistol with Hoang Xuan Vihn's victory. He was at a severe disadvantage compared to most of the other competitors because he was very limited in the amount of ammunition available to him prior to the Olympics.

Hoang incorporated a regimen of dry-fire, practicing thousands of repetitions of his shot process, and practiced honest self-assessment of what he was doing. These things are what allowed him to compete at the highest level and win. Dry fire drills work for an Olympic-level competitive shooter. They are more than good enough to work for Soldiers.

Dry fire drills are built around the following Principles: Mindset, Efficiency, Individual Tactics, and Flexibility.

Mindset is the Soldier's ability to perform the functional tasks of operating the weapon under stress. Mindset is what will make or break your focus on your environment. Efficiency in reference to these drills is being able to use the minimal amount of time and resources to achieve the desired outcome. In other words, producing repeatable results in minimum time. Individual Tactics are done to maximize chances of survival and victory. Examples include choice of cover and standoff from the threat. Flexibility is realizing multiple techniques can be used to achieve the same goal.



Left: Olympic shooters have won medals using dry practice drills. They will work for

The Drills

A dry practice plan is covered in current Army Training Circulars for small arms training. Appendix Delta covers these dry-fire drills.

Having covered principles, what drills should we use? While skilled shooters already have and regularly use useful dry practice drills (that's how they became skilled) most Soldiers do not. Appendix D of all current small arms Training Circulars lists eleven recommended drills to get started. With slight variation, these Drills are common to all small arms, modified as appropriate for each particular weapon and its intended role and application. We'll look at the drill list for M16/M4 rifle/carbine as an example.

Drills Alpha through Charlie are the basic functional tasks that it takes to operate a weapon. These reinforce that the Soldier is the weapon's safety.

Drill A the Weapon Check, an accountability check and visual inspection that it's clear, conducting a functions check, location of the rail, data and zero dope, magazines, and noting all serial numbers. The weapon check is a visual inspection of the weapon by the Soldier, verifying at a minimum that the weapon is clear, serial numbers (weapon and devices) and attachments, Functions Check, and serviceability. This is initiated when first receiving the weapon from the arms room, storage facility, or stacked/grounded location.

Drill B is place weapon in action. With rifles and automatic rifles, this is Sling/Unslung, pistols is Draw/Holster,

and crew-served machine guns it is the crew drill of mounting and emplacement. This tests the ability to change the location of the weapon on demand.

Drill C is an equipment check, a pre-combat check that the system is ready for action. This Pre-Combat Check ensures the aiming devices, equipment, and accessories are prepared. This includes any batteries are installed, that everything is secured correctly, that equipment does not interfere with tactical movement, and the basic load of magazines are stowed properly.

This builds in some redundancy from **Drill A** to ensure everything is ready to go. Note, this requires organizing and repurposing the issue Pogie Bait pouches and MRE holsters, otherwise known as "magazine pouches." This provides a place to carry those spring-loaded bullet boxes, otherwise known as "magazines."

Drills D and E are the basic functional tasks for handling the weapon in a combat environment.

Drill D is an 'administrative' load, done after Drill C as the weapon is placed into Amber or Red status.

Drill E is the Carry 5/3 which goes through five methods of carry three times. Five carry methods include Hang, Safe hang, Collapsed low ready, Low ready, High ready or Ready up). Moving through these as appropriate for your weapon at least three times show proficiency at basic handling skills.

A leader will announce the appropriate carry term to initiate the drill. Each carry method should be executed in a random order a minimum of three times.

The next drills cover moving into and out of useful positions.

Drill F is Fight Down, moving effectively and efficiently downward

into lower firing postures. Starting from the standing position, on command the shooter moves into the next lower position as announced. This typically goes from Standing, Kneeling or Squatting, Sitting, then Prone in order. Variations of each position as appropriate to the weapon and conditions are encouraged.

Start standing. “Kneeling” (move and settle). “Sitting” (move and settle). “Prone” (move and settle.)

Drill G is Fight Up and is the same idea but done moving into higher positions.

Drill H is Go-To-Prone, which is ability to drop from a standing or crouching position to prone. This should also be done from a walk and a forward sprint. Standard time is below two seconds. This is time to drop, not to fire a hit if done with live ammunition or simulator.

The focus needs to be on natural point of aim and wobble zone so the position can be shot from accurately. These drills should not be done for time initially, as the Soldier needs to be able to self-assess their positions. Begin by announcing each position and allowing plenty of time to assume it. As shooters improve, increase the tempo of the drill to assume positions faster. This can be incorporated while walking and rushing. Add variations to the call and use irregular intervals.

Drill I is Reload. Executed from load-bearing equipment, working on quickly and reliably reloading from various positions, such as standing, kneeling, and prone. Soldiers must be encouraged to adjust ammunition pouches to facilitate this. There will be variations between personnel. Uniformity should not be considered, only performance. For machine guns, this also includes a barrel change as appropriate.

The first step is to organize the ammunition pouches and magazines so they can be reached from various positions as done in Drill C. To conduct a reload, sweep from center to the next ammunition pouch.

If a reload is needed and there’s no magazine in the pouch, then sweep until the next available magazine in your load-bearing equipment is found. It’s important to set this up so the reload is efficient. Uniformity among Soldiers should not be considered, only performance.

Drill J is Clear Malfunction. The best approach is doing whatever is required to make the weapon functional. This requires understanding the cycle of function and knowing what to do with it. Overly-simple approaches that previously attempted to avoid learning this have been found to be ineffective. Any reference to a game played with a ball is wrong because no single response can address every possible malfunction type.

The problem with an overly-simple, stepped mechanical fix is that no single procedure or approach can fix every possible cause. The better solution is to understand the cycle of function and then do the simplest, fastest thing possible.

The most common malfunction is a failure to fire and the most common symptom is a tell-tale click when a bang is expected. The fastest means to reduce this problem is the best approach here. Let’s say our shooter here has a failure to fire. He attempts to shoot by applying smooth trigger pressure straight to the rear and gets a click. To reduce this stoppage, the fastest thing is likely to ensure the magazine is seated and run the bolt.

Another form of immediate action is to transition to a secondary weapon.

If immediate action fails and no secondary is available, remedial action is likely best served by clearing the weapon to find the problem. Perform an Unload/Show Clear. This also happens to be Drill K.

Drill K is Unload/Show Clear. This is another ‘administrative’ drill, but important. The Soldier needs the instilled habit of making their weapon safe and clear, both

to an instructor and for their own situational awareness.

These drills only work if they’re done regularly. It’s recommended that active duty and mobilized personnel should be doing these at least once a week. That won’t be enough for a high level of skill but it will create solid familiarity. Done dry or with a simulator, they cost nothing and can be done right outside of the arms room, or at home with personally-owned firearms. As with the Army Combat Fitness Test, a respectable score (to say nothing of a perfect 600) is not possible without on-going work. The same goes for weapons mastery. **ARMU**