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CLOSING A CRITICAL GAP:

ENHANCING SMALL ARMS COMBAT SKILLS TRAINING

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Soldiers' small arms engagement skills have been critical to the tactical success of the U.S. Army since its founding. A strong argument can be made that these skills are of heightened importance today. Because the U.S. Army has dominating conventional combat capabilities, it is highly likely that in future conflicts a competent enemy will use hit-and-run guerrilla-type tactics such as ambushes and hiding among noncombatants. Combat arms Soldiers require rapid and precise fire to prevail in such encounters. Moreover, because rear areas and support units will be likely targets in future conflicts, small arms proficiency will be just as important for support as for combat arms Soldiers.

In this article we outline what we see as a serious gap in current small arms training strategies. The issue is that current small arms qualification standards do not include many critical engagement skills necessary for combat success. This is a serious problem because the only way to have a reasonable assurance that Soldiers possess these needed skills is to include them as qualification standards. We also outline directions for closing this gap.¹

Current Small Arms Qualification Standards and Gaps

Current small arms training standards include individual/crew and squad and higher collective live-fire exercises (LFX). Summaries of these standards and key combat critical skills not included are outlined below.²

Individual Rifle Standards. Qualification consists of both live-fire (record fire) and Engagement Skills Trainer (EST — the Army's primary small arms training simulator) tables.³ Record fire consists of engagement of frontal, stationary targets arrayed in a 16-meter wide lane at ranges from 50 to 300 meters.⁴ Of the 40 targets, 30 are single-target engagements with three-second (for the 50-meter target) to eight-second exposures (for the 300-meter target). Two targets appear simultaneously in 10 of the engagements, with six-second (for the targets at 50 and 100 meters) to 12-second exposures (for the 150 and 200 meter targets). The Soldier engages 30 targets from the prone position and 10 from the kneeling unsupported position. A Soldier must successfully complete a record-fire table with the primary

sight and a similar table with each other assigned sights semi-annually to qualify. There are two semi-annual EST tables: unassisted night fire and chemical, biological, radiological, and nuclear (CBRN) fire. On the CBRN table, the Soldier must hit 11 of 20 targets while wearing a protective mask, and on the unassisted night-fire table, the Soldier must hit seven of 30 targets.

Individual Rifle Qualification Gaps. Many important types of combat engagements are not rifle qualification requirements. Some key examples are:

- When attacking, enemy soldiers would be moving (often in short rushes), but there are no engagements of this type.

- Engagements closer than 50 meters with wide sectors of fire are included in Advanced Rifle Marksmanship (ARM) tables, but these tables are optional and ammunition is only authorized for Infantry Soldiers. Furthermore, the “reflexive” engagements in the ARM tables are offensive in nature. The Soldier begins each engagement from a ready position as though expecting to see a threat. The Soldier then progresses through a series of drills that are based upon conducting an attack of a building. There are no requirements for Soldiers to demonstrate proficiency in reacting to an unexpected threat, such as an insider threat. Although the rifle manual discusses “eliminating threats” and talks about incapacitation, there are no drills that include more than two or three shots to a close-range target.

- In the offense, moving Soldiers must often stop and engage the enemy either from a standing position or from standing to kneeling, but there are no qualification requirements for a moving Soldier to demonstrate “short halt” engagement proficiency. The Combat Pistol Qualification Course (CPQC) range found in Training Circular (TC) 25-8, *Training Ranges*, supports these kinds of engagements.

- Combat arms Soldiers generally use night vision goggles and IR aiming lights during offensive operations and patrolling at night, but qualification to use these devices is the same as day record fire. The course of fire is from a stationary position and defensive in nature on modified, stationary record-fire ranges.

- When defending, tactically proficient enemy soldiers will hide and expose themselves as little and as briefly as possible, but target exposures during record fire are relatively long from this perspective.

- Record fire does not realistically exercise acquisition skills as the targets are designed to replicate a fully exposed kneeling or prone Soldier. The kneeling type-E plastic silhouette target is 40.25 inches wide by 19.5 inches tall, and the prone type-F plastic silhouette targets found at the 50- and 100-meter range band are 21 inches high by 26 inches wide.

- The fields of fire on the record-fire course are very narrow compared to many combat requirements, especially at longer ranges.

- There is no requirement that the olive-green silhouettes blend into terrain beyond the target. On some ranges, they blend in well, and on others they do not.

- There are no events that exercise the area-fire skills needed to suppress or kill concealed enemy soldiers, nor is there any required training on the engagement techniques

These points do not mean that the current record-fire standards are wrong; the current practices do exercise some important skills. But it does mean current practices are not complete. Success on the record-fire tables will not necessarily fully transfer to all the engagements a Soldier may face in combat.

needed for effective area fire.

- The M16/M4 is designed to fire three-round bursts, and the M4A1 is designed to fire on full automatic, but there are no requirements for Soldiers to demonstrate proficiency in burst or full-automatic fire.

- The ranges are level whereas shooting at elevated targets or from elevated firing positions is common during urban operations and has been frequent in Afghanistan. Although some variance in terrain exists, the ranges do not offer the combination of distance to target and angle necessary to force Soldiers to adjust their aiming point.

- The backup iron sight and carrying handle sight are equipped with adjustments for elevation and windage, but Soldiers are not required to demonstrate proficiency in adjusting these sights to account for the effects of wind or distance to the threat.

- The Squad Designated Marksman (SDM) has proven to be a highly effective combat multiplier, but qualification is required and resourced only for SDM in Stryker brigades.

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Individual/Crew Machine Gun and Squad Automatic Weapon (SAW) Standards. Both machine gun and SAW individual/crew qualification requires completion of three tables. Table I is a short-range (10-meter) exercise that is done in the EST. Table II is a day live-fire event, and Table III is a limited visibility live-fire event required for Soldiers equipped with thermal sights or IR aiming lights.

Table I EST qualification requires the gunner and assistant gunner to exercise their ability to engage targets using traverse and search techniques by engaging a series of linear targets in depth and area targets with width and depth. A five- to seven-round burst is fired at each target, and the shooter gets a point for each target hit (up to seven per target). A total of 63 of 91 rounds must be hits for qualification.

Table II, the day live-fire qualification, involves seven engagements of point targets for both the machine gun and the SAW. Four are single targets, two have two targets, and one has three. The ranges are longer for the M240 machine gun (400-800 meters) than the SAW (100-400 meters). The SAW requires one engagement with the protective mask, but the mask is not required for the machine gun. Engagement

times for the single targets are 10-30 seconds for the single targets, 30-40 seconds for the two-target engagements, and 45 seconds for the three-target engagement. Seven of 11 targets must be hit to qualify. The machine gun may be fired from either the tripod or bipod.

Table III, night live-fire qualification, is similar to Table II with seven-point target engagements and a similar mix of single and multiple targets. However, the ranges are shorter.

Individual/Crew Machine Gun and SAW Qualification Gaps. There are similar but in many ways more important gaps in machine-gun and SAW qualification requirements than for the rifle:

- The standard machine-gun/SAW ranges have limited width (about 10 degree) sectors of fire compared to typical combat sectors of fire.

- A competent enemy will not willingly stay stationary and fully exposed while being shot at with an automatic weapon, yet these are the only types of engagements exercised.

- Machine guns and SAWs are primarily area-fire and suppression weapon systems, but area-fire skills are only exercised during the EST tables and this EST training is mechanical and does not present the gunner with tactically realistic engagements.

- There is no live-fire qualification requirement or authorized ammunition to qualify assistant machine gunners or ammunition bearers even though it would be critical to keep these key weapons firing in casualty situations and for sustained operations. Assistant machine gunners and ammunition bearers qualify on their rifles, separate from the machine-gun team, in the same manner as other Soldiers armed with rifles.

- Machine guns are normally employed in pairs, and alternating fires is a key tactic, but there are no structured exercises of these types of engagements.

- In the offense, machine guns often “march” their fires ahead of assaulting fires. Overhead fire is another technique,

but neither of these techniques are exercised or feasible on standard live-fire ranges.

Collective Small Arms LFX. Completion of LFXs is required for qualification of collective elements including rifles, SAWs, and machine guns. These exercises require a large amount of unit effort to plan, coordinate, and conduct. The majority of a combat arms unit’s authorized 5.56 and 7.62mm ammunition is allocated to collective LFXs. Given the significant effort and resources required, it is important that a commensurate training benefit in terms of the ability to individually and collectively engage the enemy be gained; however, there is little systemic support to this training goal. TC 7-9, *Infantry Live-Fire Exercises*, the main doctrinal guidance, does not have any guidance on what type of small arms engagements should be included in these events. Engagement standards are not outlined even in general terms, nor are there any guidelines on how trainers should assess and provide engagement skill feedback. Additionally, because there is limited instrumentation on most standard collective live-fire ranges, high levels of trainer observation and assessment skills are required for training success. In other words, after completing the individual record fire, Soldiers are not required to hit any targets during the LFX. Without evaluating the ability to hit or suppress during the LFX, there is a large possibility that ammunition will be wasted, and it is likely that Soldiers are reinforcing habits that are counter to solid fundamentals of marksmanship.⁵

Directions for Improvement

While acknowledging resource constraints, there are several possible improvements. The suggestions outlined below have been selected and developed with affordability as a major consideration. Some meet the need for basic unit self-defense and would apply to all Soldiers while others would apply to Soldiers in units that conduct offensive operations. For example, while support Soldiers could

focus on self-protection type engagement skills and engagement skills relevant to defending a position or vehicle, Infantry Soldiers should also have offensive individual and collective engagement skills.

Train combat-critical engagement skills that are not feasible on live-fire ranges on the EST. Currently, the EST plays a limited role in small arms training strategies, but with the ability to portray realistically moving/evasive targets and the ability to capture and show exactly where rounds hit, the EST has a major capability to train combat engagement skills that are not practical on live-fire ranges. In fact, in terms of pure complex engagement skills training, the EST is better than a live fire in many ways. Moreover, ESTs are widely

U.S. Army Soldiers conduct training using the Engagement Skills Trainer (EST) at the Training Support Center in Grafenwoehr, Germany, on 20 June 2013.

Photo by Markus Rauchenberger





Paratroopers assigned to 2nd Battalion, 503rd Infantry Regiment, 173rd Infantry Brigade Combat Team (Airborne), conduct a squad-level live-fire exercise in Ravenna, Italy, on 2 April 2014.

Photo by Massimo Bovo

available but have very low utilization rates. Moving in this direction would require development of combat-critical small arms EST tables/standards and adding them as qualification requirements. The Maneuver Center of Excellence (MCoE) could develop practice and qualification tables in the near term by using the system's scenario editor to modify current collective scenarios and by providing guidance on how these tables should be conducted. The ability to take greater advantage of the use of these simulators will likely require additional investment. For example, the development of more realistic combat-engagement scenarios and diagnostics that could further improve effective training on these skills.

Add short-range and night vision goggle engagements as rifle qualification requirements. The current short-range qualification tables described in ARM tables in Chapter 7, FM 3-22.9, *Rifle Marksmanship M16/M4-Series Weapons*, could be used as the basis for a qualification standard and could be made a qualification for all Soldiers before deployment to an operational theater. Likewise, a requirement for short-range, IR aiming light with night vision goggle qualification should be added for Soldiers equipped with these systems.

Make SDM training a requirement for rating squads as qualified. Qualification engagements and standards would have to be developed and include both long-range live-fire engagements and more difficult EST engagements than in the standard rifle-qualification tables.⁶

Improve capabilities to evaluate engagement standards during LFX. As discussed earlier, there are no engagement standards for LFX. There are no guidelines that identify specific live-fire engagement tasks for inclusion or outline methods for promoting effective weapons skills evaluation. Given the considerable resources (both unit effort and ammunition required) needed to conduct this type of training and the fact that the number of current LFX qualification requirements are large (five annually for Infantry units and once annually for all others), formulating some engagement skills standards required for a successful exercise certainly makes sense.

While commanders need flexibility for conducting these types of events (e.g., the capabilities of collective live-fire ranges vary considerably across installations and units have different operational requirements), a greater degree of structure and guidance could provide for greater engagement skill benefit. For example, there could be guidance on target exposure times and presentations. Engagement-specific

checklists to supplement tactically focused training evaluation outlines and support after action reviews (AARs) that include a discussion of the unit's demonstrated weapons proficiency during AARs could be developed (e.g., what percentage of targets were engaged; how many machine gun, automatic rifle, and rifle rounds were fired compared to target hits; was area fire effective; how well did each weapon crew and Soldier in the organization identify and engage targets in their sector?).

A reasonable approach to support collective live-fire improvement would be to involve the maneuver Combat Training Centers and the MCoE in a joint effort to develop and institutionalize improved techniques, procedures, and guidelines for conducting LFXs.

Develop specific combat critical engagement skills, tasks, and standards and tactics, techniques, and procedures (TTPs) to support their execution and training. Development of enhanced combat critical qualification requirements (types of engagements, conditions, accuracy, and speed requirements) could be done by a structured effort of a specially picked group of small unit combat experts.

A key consideration in developing these tasks and standards is ensuring that they are critical — that is that they are truly needed for combat success. But they must also be reasonable. The bar can be set high but should not be so high that most Soldiers cannot achieve them after a reasonable, and realistic, preparation program. This means that the standards and supporting train-up developed by proponent subject matter experts should be tested and validated in actual units before being prescribed Army-wide.

Coupled with this effort would be a complementary effort to develop small arms engagement TTPs that support reaching the combat skills standards (e.g. how to identify likely enemy fighting positions; how to acquire defending enemy soldiers, points of aim, and firing techniques for effective area fire; how to assume hasty firing positions while conducting fire and movement; how to position machine guns for maximum effect in the offense and defense, etc.). More effective TTPs on how to be an effective trainer are also needed (e.g. how do you assess the effectiveness of fire control/area fire during a squad LFX).

Establish a Small Arms Skills Tests (SAST) and rifle-

grouping exercises as standards or as qualification “gates.” A final component of expanding weapon training standards would be to develop non-firing skills tests either as direct qualification requirements or as gates to live-fire or simulation engagement qualification exercises, similar to the Tank Crew Gunnery Skills Test (TCGST) or the Artillery Skills Proficiency Test (ASPT). The items on the test should be drills or skills with prescribed standards that are either directly related to combat-engagement success (e.g. rifle magazine changes/machine-gun reloading, immediate action procedures, weapon/ammunition/magazine maintenance, siting machine-gun final protective lines, etc.) or are needed to effectively engage targets (e.g. knowledge of ballistics, etc.). A structured analytical approach to determine the tasks and skills that should be gates to qualification would be important to ensure these tasks and their standards relate to engagement success.

A second gate would be a test of each Soldier's ability to shoot a tight shot group and, if this standard is not met, having the Soldier go through remedial training before moving on to rifle qualification. FM 3-22.9 and DA Pamphlet 350-38, *Standards in Training Commission*, combine zeroing with grouping. Under today's training strategy, Soldiers do not first demonstrate the ability to shoot accurately with live ammunition from various positions and under various conditions before executing record fire. Current record-fire qualification tables have limitations in increasing fundamental marksmanship skills because the Soldier only knows that the target was hit but never receives feedback on exactly where the bullet impacted. Precise feedback is necessary to diagnose, correct, and improve basic rifle-shooting skills. Precise feedback also allows Soldiers to continue to strive to improve their fundamentals of marksmanship. Although the need for this type of training is recognized in current weapons publications and widely accepted by the shooting community, there is no ammunition specifically allocated in DA Pam 350-38 for training of this type, nor are there any reporting requirements associated with executing this kind of training. By emphasizing the fundamentals of marksmanship, this type of training builds the skills necessary to progress to other, more realistic, courses of fire.

Formally Trained Small Arms Master Trainers Are Needed for Real Improvement

Implementing these suggested directions would require a high level of training skills from NCO supervisor to commander/staff levels. Teaching and coaching engagement tasks and skills, use of simulators, and the setting up effective collective live-fire exercises all require small arms expertise. A review of the small arms training programs of several other nations and the U.S. Marine Corps (USMC) shows that the U.S. Army is alone in not having formal

courses to train NCO small arms unit trainers. This gap is even wider for machine-gun training, where other armies and the USMC think effective engagement and employment is important and specialized enough to have a separate military occupational specialty (MOS) for machine gunners.

Such training could be institutionalized in many ways. However, the option with the greatest potential would be to establish a unit small arms weapons master gunner course at the MCoE, as is done for the tank, Bradley Fighting Vehicle, and Avenger. Included would be the award of an additional skill identifier and establishment of “communities of practice” for keeping graduates updated and contributing to the exchange of best practices. A reasonable goal would be to have battalion- and company-level small arms master gunners in military police, combat engineer, Infantry, and combined arms battalions and to have battalion-level small arms master gunners in other type units.

The concept of a small arms master gunners program has long been advocated by various organizations in the MCoE, but the resources necessary have never been provided and the concept has never progressed to implementation.

Improving Small Arms Standards and Training Will Not Be Easy

The Army should include more types of important engagements that would be frequently encountered in combat as qualification requirements.⁷ While adding qualification requirements for successful combat engagements is logical, making such changes will be difficult.

Defense budgets are under great pressure. So adding resources to enhance qualification requirements would be a challenge. Current range capabilities (for example, wider sectors of fire, moving targets, and automated area-fire scoring for machine guns, SAWs, and collective LFX) are not sufficient to support adding these as live-fire qualification requirements.⁸ Likewise adding qualification requirements



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A 2nd Cavalry Regiment Soldier fires at a target during M4 carbine rifle qualification at the Grafenwoehr Training Area, Germany, on 30 July 2014.

would require ammunition and would require unit commanders to allocate added time, both to conduct the events and to prepare their Soldiers to reach the heightened standards, so adding qualification events must be carefully considered.

Implementing the qualification enhancements suggested will require allocation of ammunition, but the amount would not be large. SDM qualification could be implemented using the ammunition currently allocated for ARM. The amounts of ammunition needed to add close-range self-defense and night vision goggle qualification would be modest if ARM allocations were used for Infantry Soldiers; for non-Infantry Soldiers, these types of engagements can be a pre-deployment qualification requirement with ammunition coming from contingency allocations.

If there needs to be a “zero-sum” approach, there are “bill-payers” that could allow re-allocation of ammunition in current strategies to enhancement of combat-critical engagement skills training. One possible target could be the semi-annual requirement to shoot the same 40-round, record-fire table with each sight semi-annually. There are others — for example, is it really necessary to fire 40 rounds to validate proficiency on the current record-fire tables? Do Infantry units need to fire a LFX every quarter given a progressive readiness Army Force Generation (ARFORGEN) training strategy? Should there not be ammunition allocated to training and sustainment of individual skills rather than repetitive qualification?

A major shift would be using the EST to train and qualify combat-engagement skills that are not practically possible using live-fire modalities. The low EST utilization rates indicate this is possible. Moreover, this use of EST meets a far higher readiness need than the CBRN and unassisted night-fire skills that could be exercised using other approaches.

A second issue is that a focused effort will be needed to select the engagement tasks that must be added and to develop standards that adequately test the skills but are also realistic in that they can be achieved with a reasonable amount of unit training effort. Expert judgment as well as testing will likely be required in a sustained effort. Making such an effort would be a challenge given the other claimants on the U.S. Army Training and Doctrine Command's (TRADOC's) limited training development staffing, and it would likely require a high-level TRADOC and MCoE priority and support for a reasonable chance of success.

Conclusion

In this article, we have outlined directions the Army should take to address a serious shortfall in the Army's small arms training strategies — critical engagement skills that are not prescribed qualification requirements. It is very likely that operational success in many future operational settings will depend on small arms proficiency on these skills. This article argues that the Army should take the needed but difficult actions to address this issue. We have presented our conclusions to a wide number of members of the Army's training community, and there have been no challenges to these conclusions. However, an underlying consensus seems to be that the efforts needed to move in these directions are so large that it would take an Army decision at a high leadership level to make real improvement.

Notes

¹ The content of this article is based on a recently published (2014) RAND Report, “Changing the Army's Weapon Training Strategies to Meet Operational Requirements More Efficiently and Effectively (RR-448-A),” which examines a broad range of weapon training strategies and their improvement. This report is available for download or order at http://www.rand.org/pubs/research_reports/RR448.html.

² The data in this section come from DA Pamphlet 350-38, *Standards in Training Commission (STRAC)*, which outlines the training events required for qualification on a weapon, other events in the weapon's training strategy, frequency of the events, and number of rounds authorized for each event. FM 3-22.9, *Rifle Marksmanship M16/M4 Series Weapons*, and FM 3-22.68, *Crew-Served Machine Guns 5.56mm and 7.62mm*, were also examined to provide detail on the standards (type and number of targets presented and number of hits required) for each event.

³ The EST used for unit training has 10 firing lanes. The basis of issue is one per brigade combat team or equivalent. The EST is a computer-operated simulator that provides the Soldiers with a realistic opportunity to engage targets with simulated weapons that physically replicate shooting actual weapons. The strike of rounds on the target is ballistically accurate, and the software provides for feedback (e.g. where target was hit, how the sight picture changed). Weapon modifications include an eye-safe laser; sensors to measure trigger pressure, cant, and ammunition magazine/belt status; and a compressed air operating system to provide recoil. “Shoot, don't shoot,” collective, and marksmanship scenarios are also preloaded onto instructor/operator stations.

⁴ See TC 25-8, *Training Ranges*, May 2010, for a full description of the standard record-fire rifle range.

⁵ The Army is developing improved range-instrumentation capabilities, but fielding a capability to make them available on a scale to support current small arms strategies is not possible in the near or mid-term. Moreover, the degree these will allow automated feedback (e.g. suppressive fire effectiveness) is not clear.

⁶ FM 3-22.9 outlines an SDM training program, but it has no specific qualification standards. It requires the Soldier to hit 14 of 20 targets at ranges of 100 to 500 meters, but specific ranges, types of targets, and engagements times are not provided. The issue is that the SDM can be armed with different types of rifles, and specific engagement standards would vary by the rifle's capability.

⁷ Even having a qualification standard does not guarantee that all units will execute the events. For example, EST tables are semi-annual qualification requirements for the rifle, SAW, and M240B machine gun, but utilization rates of the EST are far below what would have been required to meet this requirement. Similarly, five LFX a year are required for rifle, SAW, and M240B qualification, but a RAND review of heavy and light brigade combat team (BCT) training programs in 2000-2001 shows that the typical light performed only about three annually, and the average for heavy BCTs was less.

⁸ Location of Miss and Hit (LOMAH) is a range instrumentation system with the potential to support area fire scoring, but it is mainly used to support basic rifle marksmanship in Initial Entry Training and is not fielded at unit installations.

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