

## **EXHIBIT 61**



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9 *in his official capacity*<sup>1</sup>

10 IN THE UNITED STATES DISTRICT COURT  
11 FOR THE CENTRAL DISTRICT OF CALIFORNIA  
12 WESTERN DIVISION  
13

14  
15 **STEVEN RUPP; STEVEN**  
**DEMBER; CHERYL JOHNSON;**  
16 **MICHAEL JONES;**  
**CHRISTOPHER SEIFERT;**  
17 **ALFONSO VALENCIA; TROY**  
**WILLIS; and CALIFORNIA RIFLE**  
18 **& PISTOL ASSOCIATION,**  
**INCORPORATED,**  
19

20 Plaintiffs,

21 v.

22 **ROB BONTA, in his official capacity**  
**as Attorney General of the State of**  
23 **California; and DOES 1-10,**

24 Defendants.  
25

8:17-cv-00746-JLS-JDE

**SUPPLEMENTAL EXPERT  
REPORT AND DECLARATION  
OF COLONEL (RET.) CRAIG  
TUCKER**

Courtroom: 8A  
Judge: The Honorable Josephine  
L. Staton

Action Filed: April 24, 2017

26  
27 <sup>1</sup> Rob Bonta has succeeded former Attorney General Xavier Becerra as the  
Attorney General of the State of California. Pursuant to Federal Rule of Civil  
28 Procedure 25(d), Attorney General Bonta, in his official capacity, is substituted as  
the defendant in this case.



**SUPPLEMENTAL EXPERT REPORT AND DECLARATION  
OF COLONEL (RET.) CRAIG TUCKER**

I, Colonel (Ret.) Craig Tucker, declare under penalty of perjury that the following is true and correct:

1. I have been asked by the Office of the Attorney General of the California Department of Justice to prepare an expert report and declaration on the purpose, use, and features of certain semiautomatic firearms. This supplemental expert report and declaration ("Report") is based on my own personal knowledge and experience, and, if I am called as a witness, I could and would testify competently to the truth of the matters discussed in this Report.

**PROFESSIONAL QUALIFICATIONS**

2. I am a Colonel, US Marine Corps, (Retired). I served as an infantry officer in the Marine Corps for 25 years. I have commanded infantry units from platoon to regiment. I commanded Regimental Combat Team -7 (RCT-7) in Iraq from February 2004 to April 2005. During my time in Iraq, I commanded 22 different US Marine, US Army, and Iraqi Army battalions and exercised tactical control over Naval Special Warfare and US Special Forces, and supported National Tier 1 assets. I commanded the Regiment in both Fallujah battles and numerous smaller battles. I was the target of 9 assassination attempts and was wounded in Husaybah Iraq in July 2004. Upon my return from Iraq, I was assigned to the US Marine Corps National Training Center and was responsible for training and certifying units for combat in Iraq and Afghanistan.

3. I have received two Legion of Merit awards for exceptional meritorious conduct in the performance of outstanding combat services, the Military Order of the Purple Heart, the Navy Commendation Medal for Heroic Action, the Combat Action Ribbon, and seven Sea Service Deployment Ribbons, among other awards.



1           4.     After I retired from military service in 2006, I served as an Assistant  
2 Deputy Administrator for the Office of Secure Transportation (OST), National  
3 Nuclear Security Agency. OST is a paramilitary organization consisting of federal  
4 agents armed with M4s.<sup>2</sup> I was also the Department's Render Safe program in  
5 Albuquerque NM.

6           5.     In 2012, I joined Innovative Reasoning LLC, which provides  
7 professional support services to the U.S. Department of Defense and other  
8 government clients. While at Innovative Reasoning, I developed training programs  
9 and planning capabilities for the Marine Corps, and I developed and taught a  
10 training course on tactical decision-making for law enforcement officers.

11          6.     Through my military service, I gained extensive knowledge and  
12 familiarity with the full range of US combat weapon systems. The automatic rifle  
13 is the foundational combat weapon system. Ground and aviation weapon systems  
14 are specifically designed to support the automatic rifle. My primary purpose in the  
15 latter stages of my career was coordinating, and teaching others to coordinate, air  
16 and ground weapon systems to support the rifleman and his automatic rifle.

17          7.     I have fired the Colt AR-15 5.56 rifle and the Smith and Wesson 5.56  
18 AR rifle. Both are advertised as the civilian version of the M16 combat rifle. In  
19 addition to my automatic rifle experience, I have extensive experience with the  
20 AK-47, having been on the receiving end of hundreds of 7.62 rounds; an experience  
21 best typified during the Battle of Hit when a single individual with one rifle and  
22 apparently inexhaustible supply of 7.62 ammo and magazines kept nine Marines  
23 pinned down for 15 minutes until a LAV-25 20mm chain gun solved the problem. I  
24 have extensive experience with the Colt 1911 .45 caliber semi-automatic and the  
25 Berretta .9m semi-automatic pistol and used both weapons in Iraq.

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27  
28           <sup>2</sup> The M4 is a gas-operated, magazine-fed carbine. It is the shortened version  
of the M16 assault rifle.







1 under California Penal Code § 30510(a), which have many of the same features and  
2 accessories listed in § 30515(a).

3 13. I am familiar with the features, accessories, and capabilities of rifles  
4 regulated by Penal Code § 30515(a). The AR-15, like the M4, is an offensive  
5 combat weapon system. The only difference is the AR-15 cannot fire on full-auto  
6 (continual shots fired in succession so long as the trigger is pulled) or burst (several  
7 shots fired in succession with a single pull of the trigger)—a picayune difference  
8 that cannot serve to support a non-combat role for the AR-15. In my experience,  
9 soldiers are trained to set select-fire weapons to semi-auto mode, so that a single  
10 round is fired with each pull of the trigger. An M4 or M16 on full-automatic is an  
11 area fire weapon: the auto rate of fire makes the weapon too difficult to control on a  
12 point target. Rifle fire on full automatic is not aimed fire, uses an excessive amount  
13 of ammunition and will damage the weapon if used too often. In fact, in my 14  
14 months of combat, I did not once see an M4 or M16 fired on full auto. Semi-auto  
15 function is used almost exclusively in combat. When operated in semi-auto mode,  
16 the AR-15 and M4 share the same rates of fire, the same maximum effective range,  
17 the same maximum range, use the same magazines designed for combat and the  
18 same ammunition. The AR-15 and M4 are both designed to fire a .223 round that  
19 tumbles upon hitting flesh and rips thru the human body. A single round is capable  
20 of severing the upper body from the lower body, or decapitation. The round is  
21 designed to kill, not wound, and both the AR-15 and M4 contain barrel rifling to  
22 make the round tumble upon impact and cause more severe injury. The  
23 combination of automatic rifle and .223 round is a very efficient killing system.  
24 The same can be said of the AR-15.

25 14. Automatic rifles, like the M-16 and its more modern carbine variant  
26 M4, are functionally similar to semiautomatic rifles regulated under California's  
27 AWCA and often are equipped with the very same features, like pistol grips and  
28 adjustable stocks. It is my opinion, based on my military service, that these



1 features, individually and in combination, make semiautomatic rifles more lethal  
2 and most useful in combat settings, as described in more detail below.

3 15. Detachable magazines: In order for a rifle to qualify as an assault  
4 weapon under California Penal Code § 30515(a), the rifle must have the capability  
5 of accepting a detachable ammunition magazine (by not having a fixed magazine).  
6 Detachable magazines improve the killing efficiency of automatic rifles, allowing  
7 the combat rifleman to efficiently carry a combat load of 120 rounds in four 30-  
8 round magazines, to rapidly change magazines in combat, and to increase killing  
9 efficiency by significantly reducing reload time. Changing magazines during  
10 intense combat is the most important individual skill taught to Marines. During  
11 intense combat, the detachable magazine provides a rifleman the capability to fire  
12 120 rounds on semi-automatic in three minutes at a high-sustained rate of 45 rounds  
13 per minute. In a civilian self-defense context, by contrast, an individual would not  
14 have a need for such a high rate of fire.

15 16. Pistol grip protruding beneath the action of a rifle: I am a 15<sup>th</sup> Award  
16 Expert on the M16 and M4. I carried an M4 every day for 14 months during my  
17 time in command of RCT-7 in Iraq. I used an M4 in combat, and I killed with it.  
18 The pistol grip beneath the action of an automatic rifle serves only two purposes.  
19 First, the pistol grip allows the rifleman to pull the rifle into her shoulder with each  
20 shot, an action which increases stock weld, reduces semi-automatic/automatic  
21 recoil, and reduces barrel rise. Stock weld or cheek weld refers to the firmness of  
22 the contact between the rifle stock, the shooter's cheek, and the shooter's shoulder.  
23 A firm stock weld is required for effective semi-automatic and automatic rapid fire.  
24 Absent any pistol grip, a semi-automatic rifle would be difficult to operate when  
25 fired rapidly, as the rifle barrel would seesaw up and down with each shot fired in  
26 succession. Second, the pistol grip functions as a hand rest to reduce hand/finger  
27 fatigue during long combat engagements. Both actions increase the killing  
28



1 efficiency of automatic rifles and are necessities in sustained combat operations of  
2 weeks or months when firing a rifle rapidly.

3 17. Forward pistol grip: The forward pistol grip provides leverage to  
4 tighten a stock weld on short barrel automatic weapons and reduces recoil and  
5 barrel rise on short barrel automatic rifles. Forward pistol grips were added to the  
6 M4 to increase M4 killing efficiency.

7 18. Folding stock: A folding stock causes weapon instability. For that  
8 reason, folding stock automatic rifles are designed for military personnel, whose  
9 primary weapon is vehicle or air-mounted (tank, Bradley, Apache), who may be  
10 required to escape from a mangled vehicle, or who may need to abandon a  
11 destroyed weapon system and need a substitute weapon for offensive combat.  
12 Outside of the military context, folding stocks that are not properly locked in place  
13 can cause significant safety risks to the shooter due to recoil.

14 19. Grenade or flare launcher: A Marine Corps fireteam consists of a  
15 fireteam leader, a rifleman, an assault gunner, and a grenadier. The grenadier is  
16 armed with a grenade launcher. The grenadier uses the grenade launcher to  
17 suppress or kill human beings so the rest of the fireteam can maneuver into position  
18 to kill those humans with automatic rifle fire. The launcher is a separate weapon  
19 system attached to as few rifles as possible dependent on the combat mission. In  
20 my experience, grenade launchers attached to rifles are cumbersome, difficult to  
21 aim, difficult to carry, and are not as effective as a standalone grenade launcher.  
22 They have no legitimate use in self-defense.

23 20. Flash suppressor/flash hider: The purpose of the flash suppressor is to  
24 reduce combat signature by cooling and dispersing burning gases. This makes it  
25 more difficult for the enemy to pinpoint a rifleman's location, especially in low  
26 light conditions. The flash suppressor facilitates night combat operations by  
27 reducing muzzle flash and mitigating muzzle flash impact on night vision goggles.  
28



1 This accessory serves specific combat-oriented purposes and is not needed for self-  
2 defense.

3 21. Fixed magazine with the capacity to accept more than 10 rounds:

4 Automatic rifles are offensive combat weapons systems designed to kill efficiently  
5 and effectively. Any increase to magazine capacity increases the killing efficiency  
6 of the automatic rifle. A 30-round fixed magazine can fire more rounds in a given  
7 amount of time than three 10-round detachable magazines, which would need to be  
8 reloaded to fire the same number of rounds, slowing down the rate of fire.

9 Similarly, a 100-round drum magazine can fire more rounds in a given period of  
10 time than ten 10-round detachable magazines. As noted above in connection with  
11 detachable magazines, an individual using a rifle in self-defense would not need  
12 such a high, continuous rate of fire.

13 22. The AR-15 is an offensive combat weapon no different in function or  
14 purpose than an M4. In my opinion, both weapons are designed to kill as many  
15 people as possible, as efficiently as possible, and serve no legitimate sporting or  
16 self-defense purpose. Self-defense and military combat are different. The weapons  
17 and accessories needed in one may not be needed or appropriate in the other. For  
18 instance, when I was serving in the military, I carried my M4 for offensive combat  
19 and a handgun for self-defense. Defensive combat is generally up close and very  
20 personal. At that range, it is very difficult to use a rifle as a defensive weapon,  
21 except as a blunt force instrument. My 9mm pistol was the self-defense weapon of  
22 choice, and we were trained to expend only 1-2 rounds per adversary in pistol  
23 combat. The features identified in California Penal Code § 30515(a) enhance the  
24 lethality of both semiautomatic and automatic rifles and are most appropriate for  
25 combat applications when used in conjunction with those types of weapons  
26 systems.



1 I declare under penalty of perjury that the foregoing is true and correct.

2 Executed on January 6, 2023 at Sandia Park, New Mexico

3  
4  
5 

6 Col. (Ret.) Craig Tucker



## **EXHIBIT A**



Craig A. Tucker  
Colonel, US Marine Corps, (Ret)  
65 Harms Rd  
Sandia Park NM 87047  
[catucker@protonmail.com](mailto:catucker@protonmail.com)  
505-504-4289

**CITY OF ALBUQUERQUE OFFICE OF EMERGENCY MANAGEMENT (07/2021-PRESENT)**

- Training and Education Coordinator/Acting Senior OEM Planner
  - Coordinate with County and State agencies to develop training and exercise programs that prepare the City of Albuquerque to mitigate, respond to, and recover from disasters.
  - Develop response plans for wildfire, flood, earthquake, and weapons release and test the plans in tabletop exercises and drills.
  - *In coordination with Albuquerque Public Schools developed and executed a school drill assessment/evaluation program.*
  - *Created, developed, and initiated training for APS, APD, and AFR on a doctrinal, best-practices-based approach to "Command and Control, Active Shooter, in a School, School in Session"*
  - Develop a training and exercise program to meet FEMA National Qualification Standards.
  - Serve as the Operations Chief for EOC activations and training.
  - Responsible for Plans updates and revisions, including a rewrite of the CABQ Comprehensive Emergency Management Plan.
  - Write and manage OEM Grants, including SHSGP, EMPG and Hazard Mitigation Grants.

**RAVENSWOOD SOLUTIONS INC. (10/2019 – 06/2021)**

- Program Manager, US Marine Corps Operations
  - Provide subject matter expertise and develop capture plans to provide live, virtual, and constructive capabilities in support of the Commandant's Planning Guidance.
  - Project Manager for Ravenswood Solutions live-instrumented training and AAR support to MAGTF Warfighting Exercise-20 (MWX 20), the largest instrumented exercise in USMC history.
  - Co-authored White Paper on the application of machine-learning and Artificial intelligence to support unit readiness reporting.
  - Provided subject matter expertise to support ML/AI Wargaming prototype development.

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- Project Director, Middle East Operations
  - Lead planner and primary proposal author of a multi-corporation proposal to develop an 800-structure urban live fire and maneuver range in a Gulf Coast Coalition country.
  - Lead planner and primary proposal author of a multi-corporation proposal to develop a comprehensive training program for an emergent Marine Corps in a Gulf Coast Country.
- Program Manager, National Security Operations
  - Provide subject matter expertise, develop, and supervise training services in support of Department of Energy nuclear security and non-proliferation operations.
- Independent Contractor (01/2022 – 06/2022)
  - Acted as the Ravenswood Solutions Inc. US Marine Corps subject matter expert.
  - Acted as the Ravenswood Solutions Inc., training and leadership subject matter expert.

**INNOVATIVE REASONING, LLC (08/2012 - 09/2019)**

- Director, Studies and Analysis
  - Provided analyses, recommendations and participated as the senior tactical SME in support of the following Marine Corps Combat Development Command requirements.
    - Development of the U.S. Marine Corps post-war on terror Training Strategy.
    - Development of an adaptive planning capability employing multi-agent modeling, experiential learning theory, and machine learning.
    - Improving Small Unit Leader Decision-making through training in Recognition Primed Decision-making and experiential learning theory.
    - Chaired US Marine Corps 3d Annual Maneuver Warfare Conference (2018).
- Director, Federal Programs
  - Provided direction, supervision, and oversight to 5 program managers assigned to DOD and Department of Energy contracts in the United States and overseas.



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- Program Director, Law Enforcement Tactical Decision-making
  - Created, certified, and taught tactical decision -making courses focused on making decision in high risk, low occurrence, fast moving circumstances with risk of death, serious injury.
  - Developed and taught 400+ series of National Incident Management Courses to support local law enforcement requirements.

**DEPARTMENT OF ENERGY (09/2006 – 07/2012)**

- Render Safe, Program Manager (SES)
  - Responsible for the Department of Energy (DOE) operational elements conducting nuclear counterterrorism and nuclear accident response in support of Tier 1 elements.
  - Responsible for organizing, resourcing, developing, and executing crisis response render-safe operations in support of Presidential and National Security policy.
- Assistant Deputy Administrator (SES), Office of Secure Transportation (OST)
  - Responsible for the safe and secure transportation of nuclear weapons, materials, and components in the continental United States.
  - Acted as the Senior Energy Official and National Nuclear Security Administration Incident Commander for incidents involving OST assets and during DHS-directed NIMS National Training Programs
  - Provided leadership, vision, and direction to a 1000+ mixed para-military and civilian workforce.
  - Developed and implemented innovative security practices focused on intelligence-driven operations, leadership, and performance-based approach to training. Resulting security Doctrine provided a blueprint for significant changes to DOE physical security doctrine.
  - Provided astute and responsible management of a \$270 million budget.

**UNITED STATES MARINE CORPS (06/1981- 08/2006)**

- Director of Training, Tactical Training Exercise Control Group (TTECG) (07/2005-08/2006)
  - Selected by the Commandant to rebuild and lead the Marine Corps



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Service-level pre-deployment training program.

- Responsible for the successful integration of emergent and innovative urban operations with conventional combined arms operations. Trained organizations from the US and numerous allied countries.
- Managed a training budget of \$30 million. Developed and implemented new approaches to training to maximize effective use of increased training budget. Increased the number of Marines/units trained per year and successfully integrated complex, multi-discipline training requirements into a coherent, effective training program
- Commanding Officer, Regimental Combat Team 7 (RCT-7) (06/2003 - 07/2005)
  - Commanded U.S. Marine Corps Regimental Combat Team 7 during Operation Iraqi Freedom II. Tour included 14 months of continuous combat command in Al Anbar Province.
  - Commanded RCT-7 during major urban combat operations to include battles of Fallujah I, Al Fajr (Fallujah II), Husaybah, Ramadi, and Hit.
  - Developed and implemented successful strategic plans for reconstruction of western Iraq; managed over \$200 million in construction and procurement contracts. Responsibilities included establishing border security, counter-terrorism operations, infrastructure development, and security forces training.
  - Acted as Superintendent for an elementary school system consisting of 12 elementary schools throughout Al AnBar province. Constructed the schools, hired teachers, hired administrators, and provided safety and security for students, teachers, and staff.
  - Responsible for the Force Protection and security of US bases and approximately 20,000 military and contractor personnel.
- Director of Operations, Training and Education Command (06/2002-05/2003)
  - Responsible for the Marine Corps' training programs, with an 80,000+ personnel annual throughput.
  - Developed and successfully initiated programming and procurement for the Marine Corps' 10-year range modernization and instrumentation plan. Established and chaired Range Instrumentation Working Group.
  - U.S. Marine Corps Service-level representative to the OSD working group responsible for developing training transformation strategies.



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- Successfully led USMC effort to meet the congressionally mandated requirement to replace Vieques Island with a CONUS based amphibious live-fire training capability within the year.
- Commander, 2<sup>nd</sup> Battalion, 7<sup>th</sup> Marine Regiment,
- Director of Operations, 7th Marine Regiment.
- Director of Operations, 13th Marine Expeditionary Unit (13th MEU).
  - Responsible for leadership and performance of a task-organized team with 1000+ members.
  - Served as primary planner in Naval and Joint crisis action planning and execution, to include the development of training plans, equipment procurement, and exercise development for the organization's worldwide contingency operations.
- Operations Planner, I Marine Expeditionary Force (I MEF). Primary planner and architect for a multi-national effort to rewrite the operations plan for defense of the Republic of Korea.
- Commander, Presidential Security Force, Camp David, MD
  - Commanding Officer of Marine Corps Detachment responsible for the security of the Presidential Retreat at Camp David.
  - Successfully balanced a 33% reduction in force structure with implementation of an innovative physical security plan that integrated personnel reductions, new technologies, and manpower, while increasing the security posture.
- Commanding Officer:
  - Weapons Company, Marine Infantry Battalion. (1988-1989)
  - Infantry Company, Marine Infantry Battalion. (1986-1988)
  - Guard Company, Nuclear Weapons Security, Adak, AK. (1984-1986)
  - Headquarters Company, Supply Battalion. (1983-1984)

#### **AWARDS**

(2) Legions of Merit with Combat Valor device, Purple Heart, Navy Commendation Medal for Heroic Action, Combat Action Ribbon, (7) Sea Service Deployment Ribbons, numerous other awards, and



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decorations.

#### **PAPERS**

- “On Demand Readiness for Army Commanders Through AI and Machine Learning” (2020) (White Paper for Army Applied Laboratory and the Office of Naval Research. (co-authored with SOMETE Technology and Lockheed Martin)
- “Band of Brothers: The 2D Marine Division and the Tiger Brigade in the Persian Gulf War”  
An Analysis of the Impact of Organizational Culture on Tactical Joint Warfare (School of Advanced Military Studies, US Army Command and General Staff College)
- “False Prophets: The Myth of Maneuver Warfare and the Inadequacies of FMFM ‘Warfighting’”  
(School of Advanced Military Studies, US Army Command and General Staff College,
- “Towards an Intellectual Component to Joint Doctrine: The Philosophy and Practice of Experiential Intelligence” (Naval War College)

#### **EDUCATION**

- B.S. Criminal Justice, University of Dayton
- MMAS, U.S. Army Command and General Staff College
- MMAS, US Army School of Advanced Military Studies
- MA, National Security and Strategic Studies, College of Naval Warfare (Highest Distinction)



## **EXHIBIT 62**



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Attorney General of California  
2 P. PATTY LI  
Supervising Deputy Attorney General  
3 ANNA FERRARI  
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10  
11 IN THE UNITED STATES DISTRICT COURT  
12 FOR THE CENTRAL DISTRICT OF CALIFORNIA  
13 WESTERN DIVISION  
14

15 **STEVEN RUPP; STEVEN**  
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21 **& PISTOL ASSOCIATION,**  
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25 **ROB BONTA, in his official capacity**  
26 **as Attorney General of the State of**  
27 **California; and DOES 1-10,**

28 Defendants.

8:17-cv-00746-JLS-JDE

**SUPPLEMENTAL SUR-  
REBUTTAL EXPERT REPORT  
AND DECLARATION OF  
COLONEL (RET.) CRAIG  
TUCKER**

Courtroom: 8A  
Judge: The Honorable Josephine  
L. Staton

Action Filed: April 24, 2017

<sup>1</sup> Rob Bonta has succeeded former Attorney General Xavier Becerra as the Attorney General of the State of California. Pursuant to Federal Rule of Civil Procedure 25(d), Attorney General Bonta, in his official capacity, is substituted as the defendant in this case.



**SUPPLEMENTAL SUR-REBUTTAL EXPERT REPORT AND  
DECLARATION OF COLONEL (RET.) CRAIG TUCKER**

I, Colonel (Ret.) Craig Tucker, declare under penalty of perjury that the following is true and correct:

1. I have been asked by the Office of the Attorney General of the California Department of Justice to prepare a sur-rebuttal expert report and declaration responding to the February 3, 2023 Rebuttal Report of J. Buford Boone III and in further support of my opinion that firearms covered by California Penal Code § 30515 are designed and best suited for military use. This supplemental sur-rebuttal expert report and declaration (“Report”) is based on my own personal knowledge and experience, and, if I am called as a witness, I could and would testify competently to the truth of the matters discussed in it.

2. Despite Mr. Boone’s assertion to the contrary, the entirety of my declaration extensively explained, based on my experience, how the features identified in California Penal Code § 30515(a) enhance the lethality of both semiautomatic and automatic rifles, and why they are most appropriate for combat applications when used in conjunction with those types of weapons systems.

3. The Armalite-15 (AR-15) and its derivatives from other manufacturers are described as the “civilian version” of the M4/M16 military series. Generally, the only difference between the two is that the M4/M16 can fire on automatic and the AR-15 cannot. That means that the M4/M16 will continue firing rounds with a single pull of the trigger until the trigger is released, the ammunition magazine is emptied, or the weapon malfunctions. But all the other elements that make the M4/M16 an assault weapon are present in the AR-15: 8 cycles of functioning (i.e. feeding, chambering, locking, firing, unlocking, extracting, ejection, and cocking), barrel rifling, rates of fire when fired semi-automatically, round caliber, internal, external, and terminal ballistics, attachments, sights, rails—all are the same in the civilian version and the military version.



1           4.     The M16/M4 is a lightweight, 5.56 mm, air-cooled, gas-operated,  
2 magazine-fed assault rifle, with a rotating bolt. The M16/M4 is a weapon of war  
3 specifically designed to kill as many people as possible as quickly as possible. The  
4 entire weapon is designed for efficient killing in rifle combat.

5           5.     So is the AR-15. Same design. Same weapons purpose. Simply  
6 labeling the civilian version of an M16 as a “sporting rifle” or a “hunting rifle” does  
7 not change the true nature of the weapon of war, including its purpose and  
8 capabilities. The AR-15 and M16/M4 are both designed to kill efficiently and  
9 effectively and serve no legitimate use for personal self-defense.

10          6.     In my opinion, a baseline requirement for claiming expertise on the  
11 AR-15/M4 is to have employed the weapon, and employed it properly, consistent  
12 with training and doctrine, during offensive and defensive rifle combat. In other  
13 words, to have employed the weapon for its intended purpose. Assault rifle  
14 “expertise” does not exist absent that experience. I have known many combat  
15 heroes who could be considered assault rifle experts. Any individual claiming that  
16 same expertise based on a lifelong “interest in firearms,” technical knowledge of  
17 .223/5.56 ballistics, or some shooting trophies is not an expert on the suitability of  
18 assault weapons for combat and dishonors those who are. Mr. J. Buford Boone III  
19 had the opportunity to gain the appropriate level of expertise and experience while  
20 fighting alongside heroes I served with. Yet he chose to not serve.

21          7.     Despite Mr. Boone’s enumeration of the many different types of 5.56  
22 and .223 projectiles, the fact remains that the AR-15 and M4/M16 fire similar  
23 .223/5.56 rounds. The spiraling on the barrel is designed to cause the projectile to  
24 yaw in flight after leaving the barrel. The “yaw” is designed to present the long axis  
25 of the projectile upon impact with flesh. This ensures that the maximum mass and  
26 energy is imparted from the projectile to the victim. Mr. Boone and I agree on this  
27 point.  
28



1           8.     And while Mr. Boone may have general ballistics experience, it does  
2 not appear that Mr. Boone has ever witnessed a .223/5.56 projectile strike a living  
3 being, from a weapon whose distinguishing quality as a weapon of war is its ability  
4 to inflict a maximum amount of damage to a human being. Mr. Boone mocks my  
5 comments on .223/5.56 projectiles being capable of causing decapitation, or  
6 wounds so large that they separate the upper body from the lower body. But I have  
7 seen the results of that terminal velocity on a human being. The round strikes flesh  
8 with maximum energy and mass, cavitates through the body, tumbling on a fairly  
9 direct line until it contacts bone, at which point the bullet fragments tear out organs,  
10 blood vessels, viscera, etc.

11           9.     One example of such damage occurred during a particular fight during  
12 the Second Battle of Fallujah. One of the Marines under my command was on a  
13 third story roof, keeping overwatch, with the rest of my team in an adjacent alley  
14 huddled over maps. Suddenly, there was an AK-47 burst of fire from the rear. The  
15 Marine yelled a warning, exposing himself on the roof, and with his offhand, aimed  
16 his M4 and killed the aggressor before the aggressor got a second shot off. The  
17 projectile struck the aggressor in the shoulder, and exited through his groin, as  
18 intestines, blood, and pieces of liver flowed out the exit wound.

19           10.    Even setting aside the effects of .223/5.56 rounds (and similar AK-47  
20 and -74 rounds) on adult male bodies, Mr. Boone forgets, or ignores, that adult  
21 males are not the only victims of yawing, tumbling, rounds fired from an assault  
22 weapon. I have seen the bodies of young children torn in half on the streets of Al  
23 Rutbah. And it does not take much reading between the lines to understand the  
24 effect of 5.56 rounds on first graders, or fourth graders.

25           11.    Given that Mr. Boone did not serve in the military, his declaration  
26 reflects his unfamiliarity with combat, military operations, military nomenclature,  
27 and military training. I will address these each in turn:  
28



1           12.   Pistol grips and folding stocks: Pistol grips are not designed for safety.  
2 Safety is not even a secondary consideration. In fact, Mr. Boone agrees with my  
3 assessment that pistol grips on automatic weapons increase control in rapid-fire  
4 scenarios, and therefore increase killing efficiency. This makes sense, since  
5 automatic weapons are designed for efficient and effective killing by the military  
6 and for use by law enforcement personnel, all of whom are taught proper weapons  
7 handling and employment and are subject to rules of engagement and strictly  
8 defined tactical controls.

9           13.   Mr. Boone misunderstands my assessment of the danger of folding  
10 stocks. While making sure a folding stock is properly locked is a pretty simple  
11 process when you are sitting in a chair on a rifle range, that action is much more  
12 complicated in combat or self-defense. Mr. Boone has never climbed out of a  
13 burning vehicle into machine gun fire and in the adrenaline of the moment failed to  
14 lock the folding stock on his M4. Mr. Boone does appear to concede that not all  
15 folding stocks are stable, and I have personally witnessed as much during combat.

16           14.   Changing magazines: I have 25 years of experience as an infantry  
17 officer in the Marine Corps, including 14 months of continuous combat command,  
18 after which I was responsible for training and certifying Marine infantry battalions  
19 for combat. I know what I am talking about when I state that changing magazines is  
20 the most important individual skill taught to Marines.

21           15.   Rates of fire: Mr. Boone was apparently confused by my use of tactical  
22 terms to describe the tactical function of automatic weapons.

23           16.   There are two tactical and one physical rates of fire associated with an  
24 automatic weapon. The rates provided below are the firing rates for automatic  
25 weapons fired in semi-automatic mode  
26  
27  
28



1           *Tactical rates of fire:*

2           17. Sustained rate of fire: 12-14 rounds per minute, when fired semi-  
3 automatically. A ‘sustained’ rate of fire is the rate one can fire an automatic weapon  
4 for a long period of time without undue wear and tear on the weapon.

5           18. Maximum rate of fire: 45 rounds per minute, when fired semi-  
6 automatically. The “maximum” rate of fire is used for short range and short-term  
7 engagements, for short periods of time.

8           19. Tactical rates of fire: depends on the type of fire-rate used in fire  
9 commands—i.e. soldiers are ordered to fire at a sustained or maximum rate  
10 depending on the tactical situation.

11           *Physical rates of fire:*

12           20. Physical rates of fire refer to the “cyclic rate,” or maximum rate at  
13 which the firearm can go through a full cycle of operation. The cyclic rate is 700-  
14 970 rounds per minute.

15           21. In my previous declaration I used the maximum rate of fire (45 rpm) to  
16 illustrate the inanity of using an assault weapon as a self-defense weapon. I stand by  
17 that conclusion.

18           22. The sustained and maximum rates of fire for the AR-15 mirror the M4  
19 at 12-14 rounds-per-minute and 45 rounds-per-minute, respectively, when fired  
20 semi-automatically.

21           23. Mr. Boone’s assessment that any weapon can have the same rate of  
22 fire as an assault weapon fails to account for the other attributes of AR-platform  
23 rifles and automatic M4s that make them particularly dangerous. In any event, Mr.  
24 Boone’s assessment is inaccurate. As an example, a Ruger revolver has an  
25 approximate cyclic rate of 20 rounds per minute and the Colt Model 70 has an  
26 approximate cyclic rate of 50 rounds per minute, compared to the cyclic rate of  
27 automatic weapons of 700-970 rounds per minute.  
28



1           24.   Forward pistol grip: Mr. Boone agrees with me that pistol grips are  
2 used for ergonomics and control. As the purpose of the automatic weapon is to kill  
3 efficiently, ergonomics and control increase that killing efficiency. For purposes of  
4 clarification, I used “short barrel” to refer to the length of the M4 barrel compared  
5 to the M16 barrel. I stand by my comments in that regard.

6           25.   Flash suppressors: Regarding night vision: it takes 20-40 minutes to  
7 gain night vision and 2-20 minutes to regain night vision if it is interrupted by any  
8 light source, including muzzle flash with or without a flash suppressor. In other  
9 words, the recovery time is not impacted by whether or not an assault weapon has a  
10 flash suppressor; the amount of flash generated by firing an assault weapon—even  
11 with a flash suppressor—impacts the shooter’s vision in a similar way. So the type  
12 of “night vision recovery” that Mr. Boone describes is not an issue if there is no  
13 flash suppressor on the weapon. This is yet another reason AR-15s are poor self-  
14 defense weapons. As I stated in my declaration, flash suppressors mitigate muzzle  
15 flash impact on night vision goggles used in combat. Mr. Boone does not dispute  
16 that. The impact of full muzzle flash is compounded when a soldier is wearing night  
17 vision goggles because those goggles are designed to magnify contrasting light. The  
18 flash suppressor blunts that, to some extent. But without such goggles (such as  
19 non-combat self-defense), this purpose of the flash suppressor is negated.

20           26.   Use for sport: Assault weapons serve no legitimate hunting purpose  
21 because the terminal ballistics of the projectile ruin the meat. And in my opinion, it  
22 is not appropriate to use weapons of war just for sport.

23           27.   Defensive use: Mr. Boone is incorrect in stating that all legal law  
24 enforcement use of firearms is defensive in nature. Special Weapons and Tactics  
25 Teams (SWAT) are specifically designed for offensive operations and are thus  
26 armed with assault weapons for offensive operations, but pistols for self-defense.

27           28.   In fact, I cannot bring to mind a single law enforcement agency,  
28 military organization, or para-military organization that employ assault weapons as



1 the primary firearm for self-defense purposes. To my knowledge, all of those  
2 organizations use pistols for self-defense and close combat—proof of how those  
3 organizations view the viability of assault weapons as the self-defense weapon of  
4 choice.

5 29. Mr. Boone is correct that if my regiment were attacked with long range  
6 rifle fire, I would respond with every weapon system at my disposal except the M4.  
7 (The M16 is much more effective in defensive combat than the M4.) But that is in  
8 the military context. It does not make assault weapons necessary for self-defense.  
9 The reality is that, in the defensive context, assault weapons (especially with more  
10 than 10 rounds) are unnecessary. It rarely takes more than a couple of rounds to  
11 incapacitate an intruder. Any fantasy of fighting machine gun battles in your living  
12 room is exactly that: a fantasy. Self-defense gun battles, should they come to pass,  
13 are generally fought with combatants in close proximity, with few if any shots  
14 fired.

15 30. Mr. Boone describes what he calls “Close Quarters Combat,” or CQB.  
16 Neither of these are terms recognized by the Department of Defense or any of the  
17 military services. Close Quarters Battle (CQB) was a training technique employed  
18 by special operations forces engaged in direct action or precision raids. The .45  
19 caliber pistol was the weapon of choice for those units, not the M4 or M16. CQB  
20 describes a training method, not a tactical method. Mr. Boone claims that “[o]ver  
21 the past 20 years, there has been news coverage of U.S. Marines engaged in or on  
22 their way to potentially engage in CQB” that “were armed with M4 or M16 style  
23 carbines/rifles and/or squad automatic weapons.”

24 31. What Mr. Boone likely observed on his TV or in the press was  
25 Marines, Soldiers, Sailors, and Airmen engaged in offensive rifle combat in an  
26 urban environment—heroic young men and women earning the right to be called  
27 expert riflemen. Again, Mr. Boone’s observations have nothing to do with self-  
28 defense.



1           32. Mr. Boone's declaration demonstrates his unfamiliarity with military  
2 service and combat. Based on my personal military experience, I stand by the  
3 opinions in my declaration and reiterate that firearms covered by California Penal  
4 Code § 30515 are designed and best suited for military use.

5  
6           I declare under penalty of perjury that the foregoing is true and correct.

7           Executed on February 24, 2023 at Sandia Park, New Mexico.  
8

9  
10           

11           Col. (Ret.) Craig Tucker  
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## **EXHIBIT 63**



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*Attorneys for Defendant Rob Bonta,*  
9 *in his official capacity*<sup>1</sup>

10 IN THE UNITED STATES DISTRICT COURT  
11 FOR THE CENTRAL DISTRICT OF CALIFORNIA  
12 WESTERN DIVISION  
13

14  
15 **STEVEN RUPP; STEVEN**  
**DEMBER; CHERYL JOHNSON;**  
16 **MICHAEL JONES;**  
**CHRISTOPHER SEIFERT;**  
17 **ALFONSO VALENCIA; TROY**  
**WILLIS; and CALIFORNIA RIFLE**  
18 **& PISTOL ASSOCIATION,**  
**INCORPORATED,**

19 Plaintiffs,  
20

21 v.

22 **ROB BONTA, in his official capacity**  
**as Attorney General of the State of**  
23 **California; and DOES 1-10,**

24 Defendants.  
25

8:17-cv-00746-JLS-JDE

**SUPPLEMENTAL EXPERT  
REPORT AND DECLARATION  
OF MICHAEL VORENBERG**

Courtroom: 8A  
Judge: The Honorable Josephine  
L. Staton

Action Filed: April 24, 2017

26 <sup>1</sup> Rob Bonta has succeeded former Attorney General Xavier Becerra as the  
27 Attorney General of the State of California. Pursuant to Federal Rule of Civil  
28 Procedure 25(d), Attorney General Bonta, in his official capacity, is substituted as  
the defendant in this case.



1           **SUPPLEMENTAL EXPERT REPORT AND DECLARATION OF**  
2           **MICHAEL VORENBERG**

3           I, Michael Vorenberg, declare under penalty of perjury that the following is  
4 true and correct:

5           1.     I have been asked by the Office of the Attorney General of the  
6 California Department of Justice to prepare an expert report on the existence, usage,  
7 and regulation of high-capacity firearms (guns capable of firing more than 10  
8 rounds without re-loading) during Reconstruction. This supplemental expert report  
9 and declaration (“Report”) is based on my own personal knowledge and experience,  
10 and, if I am called as a witness, I could and would testify competently to the truth of  
11 the matters discussed in this Report.

12                           **PROFESSIONAL QUALIFICATIONS**

13           2.     I am an associate professor of history at Brown University. I received  
14 my A.B. from Harvard University in 1986, and my Ph.D. in history from Harvard  
15 in 1995. After receiving my Ph.D., I began a postdoctoral fellowship at the W.E.B.  
16 Du Bois Institute at Harvard, and then served as an assistant professor of History at  
17 the State University of New York at Buffalo. I joined the faculty at Brown  
18 University in 1999, and have taught history there ever since.

19           3.     I have concentrated my research on the history of the U.S. Civil War  
20 and Reconstruction. My first book, *Final Freedom: The Civil War, the Abolition of*  
21 *Slavery, and the Thirteenth Amendment*, was published by Cambridge University  
22 Press in 2001. The book was a Finalist for the Gilder Lehrman Lincoln Prize. I am  
23 also the author of *The Emancipation Proclamation: A Brief History with*  
24 *Documents*, published by Bedford/St. Martin’s in 2010. I am the author of a  
25 number of articles and essays on Reconstruction and the law. These include: “The  
26 1866 Civil Rights Act and the Beginning of Military Reconstruction,” in Christian  
27 Samito, ed., *The Greatest and the Grandest Act: The Civil Rights Act of 1866 from*  
28 *Reconstruction to Today* (Southern Illinois University Press, 2018); Citizenship and



1 the Thirteenth Amendment: Understanding the Deafening Silence,” in Alexander  
2 Tsesis, ed., *The Promises of Liberty: The History and Contemporary Relevance of*  
3 *the Thirteenth Amendment* (Columbia University Press, 2010); “Reconstruction as a  
4 Constitutional Crisis,” in Thomas J. Brown, ed., *Reconstructions: New Directions*  
5 *in the History of Postbellum America* (Oxford University Press, 2006); and  
6 “Imagining a Different Reconstruction Constitution,” *Civil War History*, 51 (Dec.  
7 2005), 416-26.

8 4. My curriculum vitae is attached as **Exhibit A**.

9 5. I have been retained by the California Department of Justice to serve  
10 as an expert witness in this case. I am being compensated at a rate of \$250 per  
11 hour.

12 6. I have provided expert testimony in *Miller v. Bonta*, a lawsuit in the  
13 Southern District of California (Case No. 3:19-cv-01537-BEN-JLB) challenging  
14 how California regulates assault weapons; *Duncan v. Bonta*, a lawsuit in the  
15 Southern District of California (Case No. 17-cv-01017-BEN-JLB) challenging how  
16 California regulates large-capacity magazines; *Ocean State Tactical LLC v. Rhode*  
17 *Island*, a lawsuit in the District of Rhode Island (Case No. 1:22-cv-246-JJM-PAS)  
18 challenging that state’s regulation of large-capacity magazines; *Oregon Firearms*  
19 *Federation, Inc. v. Brown*, a lawsuit in the District of Oregon (Case No. 2:22-cv-  
20 01815-IM) challenging that state’s regulation of large-capacity magazines; and  
21 *National Association for Gun Rights, et al. v. City of Naperville, Ill.*, a lawsuit in  
22 the Northern District of Illinois (Case No. 1:22-cv-04775) challenging the City of  
23 Naperville’s regulation of semi-automatic rifles.

## 24 OPINIONS

### 25 I. SUMMARY OF OPINIONS

26 7. This Report provides results of an investigation into the existence,  
27 usage, and regulation of high-capacity firearms (guns capable of firing more than  
28 10 rounds without re-loading) during the Reconstruction period of U.S. History



1 (1863-1877), with special focus on the period during Reconstruction when the  
2 Fourteenth Amendment to the U.S. Constitution was created, ratified, and enforced  
3 (1866-1876). The result of the investigation can be summarized as follows: There  
4 were high-capacity firearms during Reconstruction, and all of them, including those  
5 that could easily be carried by a single individual, were regarded in all the states at  
6 the time as weapons suitable only for law enforcement officers, not for ordinary  
7 citizens. With very few exceptions, almost all of which were in the Western  
8 Territories, high-capacity firearms during the era were understood to be weapons of  
9 war or anti-insurrection, not weapons of individual self-defense.

10 8. Evidence for these assertions does not necessarily take the form of  
11 statutes or court decisions, and that is entirely unsurprising: explicit legal text  
12 prohibiting civilian possession of the most dangerous weapons of war was not  
13 commonly the means by which such weapons were regulated in the United States  
14 during the Civil War and Reconstruction.<sup>2</sup> Rather, prohibitions existed in the  
15 policies and practices of the U.S. army and its auxiliary or allied units, such as the  
16 state-wide militias that operated as law enforcement bodies during Reconstruction.  
17 No statutes or court opinions can be found during the period that banned civilian  
18 possession of artillery pieces, hundreds of which existed unused after the Civil War,  
19 but of course the absence of such express prohibitions cannot be read as evidence  
20 that civilians were allowed to possess such pieces. Rather, policy and practice  
21 dictated that only the U.S. army and its allied military units could possess such  
22 weapons. High-capacity firearms, which like artillery pieces were created as  
23 weapons of war, were regulated in the same way, through policy and practice  
24 limiting possession of such firearms to the U.S. army and its allied military units.  
25 Unlike artillery pieces, however, high-capacity firearms during Reconstruction did  
26

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27 <sup>2</sup> In contrast, state and local laws did regulate other types of weapons, such as  
28 concealable weapons associated with criminal use, during this period.



1 come to be regarded by their manufacturers as having a potential market among  
2 U.S. civilians.

3 9. However, efforts to create a market for high-capacity firearms in the  
4 United States during Reconstruction failed miserably. Americans who were not  
5 part of legal law enforcement bodies rarely bought high-capacity firearms. One  
6 reason why these firearms failed to sell was the regulatory climate surrounding  
7 them. U.S. and pro-Union state authorities sometimes seized shipments of such  
8 weapons on the assumption that they were intended for use by insurrectionary  
9 groups. Because of the negligible demand for such weapons, owners of gun shops  
10 rarely stocked them. The primary, almost exclusive buyers of high-capacity  
11 weapons during Reconstruction were a small number of U.S. army units and state  
12 law enforcement bodies. Manufacturers of high-capacity firearms during  
13 Reconstruction thus looked outside the United States for buyers. The Winchester  
14 Repeating Rifle Company, the only company to produce such weapons during post-  
15 Civil War Reconstruction, stayed afloat during Reconstruction only by selling high-  
16 capacity firearms to foreign armies.

17 10. During Reconstruction, high-capacity firearms did not circulate widely  
18 among the civilian population; thus there was no need for legislative efforts to  
19 regulate them among civilians. Instead, during Reconstruction, high-capacity  
20 firearms were possessed almost exclusively by the U.S. army and related military  
21 units, and they were regulated by the policies and practices of the army and these  
22 related military units.

## 23 **II. SCOPE**

### 24 **A. Time Period Covered**

25 11. The time period covered by this Report is Reconstruction, typically  
26 defined as 1863-1877. This is the time period assigned to Reconstruction in the  
27  
28



1 most commonly used study of the period, Eric Foner's *Reconstruction*.<sup>3</sup> The start  
2 point of 1863 correlates to the Emancipation Proclamation, the final version of  
3 which was signed by President Abraham Lincoln on January 1, 1863. The endpoint  
4 correlates to March 1877, when a new president, the Republican Rutherford B.  
5 Hayes, was inaugurated after a months-long contested election; and Hayes, once in  
6 office, oversaw the removal of all remaining U.S. troops in southern states that had  
7 been part of the Confederate States of America, the rebellious entity that had fought  
8 the United States during the Civil War of 1861-1865. Within the general period of  
9 Reconstruction, the more narrow time period examined in this Report is 1866-1876.  
10 This is the period covering events relevant to the relationship between the  
11 Fourteenth Amendment and firearms during the greater period of Reconstruction.  
12 Such events include (in chronological order): the passage by the U.S. Congress of  
13 the Civil Rights Act of 1866 and the new Freedman's Bureau Act (the initial  
14 Freedman's Bureau Act, passed in March 1865, was for one year only); the passage  
15 of the Fourteenth Amendment by Congress in 1866; the passage by Congress of the  
16 Reconstruction Act of 1867 (sometimes referred to as the "Military Reconstruction  
17 Act"); the adoption of the Fourteenth Amendment by state ratification in 1868; the  
18 enforcement of the Fourteenth Amendment by U.S. Statutes adopted in 1870-71;  
19 and the first interpretation of the Fourteenth Amendment's relation to the Second  
20 Amendment by the U.S. Supreme Court, in *U.S. v. Cruikshank* of 1876 (92 U.S.  
21 542). This Report also mentions the opinion in *Presser v. Illinois* (116 U.S. 252  
22 (1886)), even though it came well after Reconstruction, because the events that led  
23 to the case occurred in early 1879, very soon after the end of Reconstruction.

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27 <sup>3</sup> Eric Foner, *Reconstruction: America's Unfinished Revolution, 1863-1877*  
28 (New York: Harper and Row, 1988), xxvii.



**B. Geographical Focus**

12. This Report covers the geographic area of the entire United States, both its states and territories, during Reconstruction. However, its particular regional focus is on the southern states that had declared themselves seceded in 1860-61 and had joined together into the Confederacy by April 1861. These states collectively represented the region during 1866-1876 where there was the most frequent use of firearms, mainly because of armed conflict either between contending factions within these states or between the U.S. army and insurgents in these states. Even more specifically, this was the only region outside of the Western Territories where Henry Rifles and Winchester Repeating Rifles were used. As will be explained later, these are the weapons examined most closely in this Report (see IV. Historical Background and Terminology). In the Western Territories during Reconstruction, these weapons were used primarily by the U.S. army against Native Americans in the so-called “Indian Wars” that extended from the 1860s to the 1890s. Some civilian U.S. citizens in the Western Territories during this period also possessed these weapons. However, as with all firearms in the region at the time, it is difficult to determine how common possession of Henry Rifles and Winchester Repeating Rifles was in the Western Territories in the Reconstruction period. Also, laws in these territories in this period were in flux, so it is difficult to know whether possession by civilian U.S. citizens there was lawful. Whatever the laws were at any given moment in this region during Reconstruction, the number of non-army U.S. citizens in the Western Territories was always negligible.

**III. RESEARCH MATERIALS AND METHODOLOGY**

13. Research materials included standard scholarly works on firearms and U.S. history for the period of Reconstruction—roughly twenty scholarly books and thirty scholarly articles. Materials also included newspaper and magazine articles contemporary to the period studied. Hundreds of these are accessible and were



1 accessed via commonly used databases by scholars, such as Chronicling America,  
2 Pro-Quest Historical Newspapers, and the Hathi Trust. U.S. government  
3 documents and documents from U.S. states and territories were accessed via the  
4 Hein Online database or the Nexis Uni database (a version of the better-known  
5 Lexis Nexis legal database).

6 14. All of these documents, whether contemporary to the period studied or  
7 produced by scholars after that period, were searched for information regarding  
8 firearms—especially Henry Rifles and Winchester Repeating Rifles—with special  
9 attention to the presence, use, and regulation of these firearms during the  
10 Reconstruction era (1863-1877).

11 15. In all my research, I gave more weight to evidence that attested to  
12 firearms being owned and/or used than to evidence that manufacturers of the  
13 firearms or other sellers were trying to get people to buy and use them.  
14 Advertisements for the firearms are not evidence of possession. However, if  
15 advertising material provided testimony of the firearms being owned or used, I  
16 treated that testimony as legitimate evidence, albeit evidence that might have been  
17 embellished, even invented, for the sake of sales.

#### 18 **IV. HISTORICAL BACKGROUND AND TERMINOLOGY**

##### 19 **A. Firearm Capacity at or Near the Founding**

20 16. Weapons capable of holding more than ten rounds did exist by the  
21 time that the Second Amendment was adopted in 1791, but only in very small  
22 numbers, and almost exclusively in Europe. Those that might have existed in the  
23 U.S. at the time were made to order by individual gunsmiths for individual  
24 customers. These bespoke weapons were extraordinarily rare in the United States  
25 surrounding the period of the adoption of the Second Amendment.

26 17. One of these rare guns was the “Cookson” or “Hill” model, based on  
27 the “Lorenzoni system” established in Europe in the 1600s. Only one gun of this  
28 type definitively existed in early America; it was an 11-shot rifle mentioned in an



1 account of 1722 from Boston. Even if others of this type existed in British North  
2 America, they would not have been well known. According to one expert, the  
3 slightest defect in these weapons would lead to an explosion, so they required  
4 perfect construction by “fine craftsmen.” Thus, only “wealthy sportsmen” could  
5 afford them.

6 18. Another rare high-capacity gun of the era was the Girardoni (or  
7 Girandoni) air rifle, which could hold at least 20 rounds. The Girardoni was  
8 manufactured exclusively in Europe. Most of the guns manufactured were custom-  
9 ordered in the late 1700s by the Austrian army, which used the weapons with some  
10 success. To maintain a military advantage, the Austrians demanded that the guns  
11 be manufactured in secret.<sup>4</sup> No Girardoni is known to have appeared in America  
12 prior to 1800. There were about 30-40 guns on the Lewis and Clark expedition of  
13 1804-1806, including a single Girardoni. Expedition leaders used it not for self-  
14 defense or hunting but for one purpose only: to impress Native Americans with  
15 white Americans’ advanced technology.<sup>5</sup> Its presence on the expedition is not  
16 evidence that the gun was well-known to Americans of the period, much less to  
17 Americans at the time of the Second Amendment’s adoption more than ten years  
18 earlier

19 **B. The Henry Rifle and the Winchester Repeating Rifle**

20 19. For the purposes of this Report, a high-capacity firearm is defined as a  
21 firearm that can hold more than 10 rounds. The magazine holding the rounds can  
22 either be integral to the gun or external to it. The gun itself can be carried by a  
23 single person. Finally, the gun must have the potential for common usage: it has to

24 <sup>4</sup> W. H. B. Smith, *Gas, Air and Spring Guns of the World* (Harrisburg, Penn.:  
25 Military Service Publishing Company, 1957). 30.

26 <sup>5</sup> Jim Garry, *Weapons of the Lewis and Clark Expedition* (Norman, Okla.:  
27 Arthur H. Clark, 2012), 94; S. K. Wier, “The Firearms of the Lewis and Clark  
28 Expedition” (2010), [http://www.westernexplorers.us/Firearms\\_of\\_Lewis\\_and\\_Clark.pdf](http://www.westernexplorers.us/Firearms_of_Lewis_and_Clark.pdf) (accessed Nov.  
7, 2022).



1 be mass-manufactured or have the potential to be mass-manufactured, thus  
2 excluding experimental weapons that were never widely adopted.

3 20. Within these specifications, there were only two high-capacity  
4 firearms in the entire world that were produced during Reconstruction: the Henry  
5 Rifle and the Winchester Repeating Rifle. I note the exclusion here of the Gatling  
6 Gun. That weapon was indeed a high-capacity firearm produced during  
7 Reconstruction, but it could not be carried by a single person, as it was massive in  
8 size and nearly 200 pounds in weight.

9 21. The Henry Rifle and the Winchester Repeating Rifle were nearly the  
10 same weapon. Manufacturing of the Henry began soon after the weapon was  
11 patented, in 1860. In 1866, the Winchester Repeating Rifle was established in New  
12 Haven, Connecticut. Its owner, Oliver Winchester, hired the inventor of the Henry,  
13 who designed a slightly modified version of the Henry Rifle. The new model was  
14 dubbed a Winchester Repeating Model. Because it was released in 1866, it was  
15 sometimes called the “Winchester 66.” In 1873, a new model of Winchester was  
16 released, the “Winchester 73.” The rifle was nearly the same as the “Winchester  
17 66” but used a slightly different type of ammunition. All of these rifles, the Henry  
18 and the two models of the Winchester, had the following features: they held fifteen  
19 rounds in a chamber fixed within a stock just below the rifle barrel; they used a  
20 lever below the trigger to eject spent shells and load new rounds; and they were  
21 easily reloaded. The Winchester was easier to reload than the Henry—it had a  
22 “gate” on the side near the trigger that allowed the user to feed rounds into the gun  
23 during lulls in firing or after all the rounds in the chamber were spent).

24 Advertisements for Henrys and Winchesters claimed that the weapons could fire  
25 two rounds per second (this rate might have been exaggerated—some of the same  
26 ads made the false claim that the guns held eighteen rounds, not fifteen—but all  
27 agreed that the rifle could fire at a rate at least as fast as any existing rifle).  
28



22. There were other individual-use weapons during the Reconstruction era that could fire multiple shots in rapid sequence, but none had a higher capacity than ten rounds. Some sidearms, most notably six-shot revolvers, could fire rounds in rapid sequence. But no sidearm held more than ten rounds. Certain rifles beside the Henry and Winchester could fire multiple rounds rapidly, but none held more than ten rounds. These included the Spencer Rifle (4-round capacity) and the Sharps Rifle (7-round capacity). The U.S. army and the Confederate army approved the adoption of the Spencer and Sharps rifles. These weapons were known either by their company name or by the generic term “repeaters” or “repeating rifles.” Henrys and Winchesters were also repeating rifles, but because they were in a class of their own, due to their high capacity, they were generally known only as Henrys or as Winchesters. In the language of the day, they did not fall into the generic category of “repeaters” or “repeating rifles” (thus a very well-armed individual of the period might be described as having “a revolver, a repeater, and a Winchester”—three distinct categories).

23. This Report occasionally uses the term “Henry-Winchester.” Although the Winchester Repeating Rifle effectively replaced the Henry Rifle, Henry Rifles continued to be used long after Winchesters began to be produced. At certain times and places during Reconstruction, both types of weapons might be found in possession of a single, armed group. For such situations, the phrase “Henry Rifles and/or Winchester Repeating Rifles” would be appropriate, but seeing how cumbersome that phrase is, it has been shortened in this Report to “Henry-Winchester” or “Henry-Winchesters.”

### **C. The Henry Rifle and the American Civil War**

24. Production and sales numbers reveal that Henry Rifles and their successors, Winchester Repeating Rifles, were uncommon during the Civil War and



1 Reconstruction compared to other rifles.<sup>6</sup> Until 1866, manufacturers of Henrys and  
2 Winchesters concentrated their marketing efforts within the United States on trying  
3 to persuade the U.S. army and pro-Union state militias to adopt the high-capacity  
4 rifles as standard weapons for soldiers.<sup>7</sup> The U.S. War Department never adopted  
5 Henry-Winchesters. The army's chief of ordnance, General James Ripley, reported  
6 early in the war that these rifles, along with lower-capacity rifles were "too  
7 complicated, too heavy, and too costly . . . and apt to waste ammunition."<sup>8</sup> The  
8 ordinance department never changed its position on Henry-Winchesters. During  
9 the Civil War, the U.S. army opted instead for single-shot rifles and, in some  
10 instances, low-capacity "repeaters" (rifles that held magazines of two to seven  
11 rounds). The U.S. army did allow individual commanders of army units or allied  
12 units to buy Henry-Winchesters for their soldiers. For example, of the 900 Henry  
13 rifles sold during 1862, 300 went to Kentucky's pro-Union state militia.<sup>9</sup> Although  
14 some military units that purchased Henry Rifles were able to do so using funds  
15 allotted to them by state governments, most of the soldiers and officers who  
16 purchased the weapons used their own money. By the end of the Civil War in  
17 1865, U.S. soldiers had purchased about 8,500 Henry Rifles; most of those had  
18  
19

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20  
21 <sup>6</sup> Unless otherwise noted, this Report relies on two sources for numbers of  
22 Henry Rifles and Winchester Repeating Rifles manufactured and sold: Pamela  
23 Haag, *The Gunning of America: Business and the Making of American Gun Culture*  
(New York: Basic Books, 2016); and John E. Parsons, *The First Winchester: The  
Story of the 1866 Repeating Rifle* (New York: Morrow, 1955).

24 <sup>7</sup> Haag, *The Gunning of America*, 65-81. During the Civil War, the pro-  
25 Union border states of Kentucky and Missouri had state-wide militias that were  
26 authorized by state governments to fight for the Union.

27 <sup>8</sup> Haag, *The Gunning of America*, 70.

28 <sup>9</sup> Haag, *The Gunning of America*, 76.



1 been bought with the soldiers' own money. By contrast, the U.S. government had  
2 purchased nearly 107,000 Spencer single-shot rifles for use by the army.<sup>10</sup>

3 25. Meanwhile during the Civil War, the Confederate War Department  
4 also never adopted Henry Rifles. Whether that was by choice is unclear. Oliver  
5 Winchester, who had the greatest control of the company that made Henrys,  
6 declared that he did not want the weapons sold to Confederates. His policy may  
7 have been due to pure loyalty to the Union cause or to fear that he would be  
8 charged with treason by the U.S. government if he facilitated gun sales to the  
9 rebels. Some Confederate soldiers were able to acquire Henrys by theft or by using  
10 agents who purchased them in the North and smuggled them to the South.<sup>11</sup> Most  
11 Confederates knew about the weapon. A widely-circulated story told of a  
12 Confederate soldier who called the gun "that damned Yankee rifle that can be  
13 loaded on Sunday and fired all week." One of the soldiers in Robert E. Lee's Army  
14 of Northern Virginia regretted that "we never did secure the Winchester."<sup>12</sup> Some  
15 Confederate soldiers did manage to obtain Henry-Winchesters, either by smuggling  
16 or, more commonly, by confiscating them from captured Union soldiers. In late  
17 1862, for example, a number of pro-Union Kentucky soldiers who had just acquired  
18 Henry Rifles were overrun by pro-Confederate Kentuckians and Tennesseans. As  
19 many as 300 Henry rifles ended up in Confederate hands as a result.<sup>13</sup> These  
20 weapons probably did not stay with the southerners for very long. By June 1865,  
21 all of the major Confederate armies had surrendered. Typically, surrender required  
22 all Confederate soldiers to "stack arms." If they had sidearms, they could keep

23 \_\_\_\_\_  
24 <sup>10</sup> Haag, *The Gunning of America*, 81.

25 <sup>11</sup> Ibid., 65. For evidence that U.S. authorities would have regarded the sale  
26 of Henrys to Confederates as treasonous, and thus that Winchester had good reason  
27 to avoid such sales, see Haag, *The Gunning of America*, 90.

28 <sup>12</sup> Harold F. Williamson, *Winchester: The Gun That Won the West*  
(Washington, D.C.: Combat Forces Press, 1952), 38.

<sup>13</sup> Haag, *The Gunning of America*, 76.



1 them, but any rifles had to be relinquished. Confederate veterans would thus have  
2 been prohibited from having Henry-Winchesters. At least some ex-Confederate  
3 soldiers ended up with Henry-Winchesters, however, though not legally. If they  
4 failed to turn in their rifles, they were in violation of the “parole” agreement that  
5 protected them from imprisonment after surrender. Some ex-Confederates  
6 managed to get Henry-Winchesters by stealing them from U.S. army depots.  
7 Others bought them from smugglers who had gotten the weapons in Mexico and  
8 then carried them across the border to Texas. Henry-Winchesters were easier to  
9 find in Mexico than in the U.S. in 1864-1867. They had been sold by the thousands  
10 to the Juaristas, the rebel force that would ultimately wrest Mexico from  
11 Maximilian, the self-proclaimed “Emperor” installed in Mexico City by Napoleon  
12 III of France.

13 26. Not only the Juaristas but other non-U.S., non-Confederate armies  
14 possessed Henry-Winchesters. Indeed, foreign armies were the main market for  
15 Henry-Winchester manufacturers during Reconstruction. Had it not been for the  
16 war in Mexico, along with the Franco-Prussian War and the various armed conflicts  
17 between the Russian and Ottoman empires—all wars involving thousands of  
18 Henry-Winchesters—the manufacturers of these weapons would likely have gone  
19 bankrupt.<sup>14</sup>

20 27. In the United States by 1866, Henry-Winchesters did exist, to be sure,  
21 but in much smaller numbers than in foreign countries. U.S. veterans of the Civil  
22 War could possess Henry rifles. Beginning in May 1865, U.S. army volunteers  
23 began mustering out in significant numbers. The non-regular U.S. army (that is, the  
24 volunteer force), nearly a million strong by April 1865, would fall well below  
25 100,000 by the end of the year. Unlike ex-Confederate soldiers, ex-U.S. soldiers  
26 could keep their rifles upon discharge. This meant that U.S. soldiers at the time

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28 <sup>14</sup> Ibid., 109-42.



1 who had Henry rifles might continue to possess them once they re-entered civilian  
2 life. However, the number of such U.S. veterans who kept their Henrys was small,  
3 perhaps 7,500,<sup>15</sup> and those that opted to keep them paid dearly. The U.S. army did  
4 not simply give weapons away for free to discharging soldiers who had acquired  
5 them at no cost from their military units. Rather, soldiers wanting to keep their  
6 weapons had to buy them at market value. A Spencer carbine (a short-barreled,  
7 repeating rifle, and one of the most popular weapons among U.S. soldiers), would  
8 cost a discharging soldier about \$10 (roughly \$175 in 2022 dollars). A Henry  
9 would cost at least \$30 (roughly \$525 in 2022 dollars). A private in the U.S. army  
10 typically made \$13 per month. If he had a Spencer that he wanted to buy, he would  
11 have to pay less than one month's wages—not a bad deal for a perfectly sound and  
12 popular rifle. If he wanted to buy a Henry, though, that would cost him more than  
13 two months' wages, and there would be little to persuade him that the difference in  
14 price corresponded to the difference in value. The result was that very few Henrys  
15 were purchased by discharged U.S. soldiers. According to a U.S. army report, 808  
16 Henrys were purchased by discharging Civil War soldiers, compared to 8,289  
17 Spencer Carbines.<sup>16</sup> Henrys that were not purchased went to the U.S. War  
18 Department's ordnance department, which did not sell them.

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20 <sup>15</sup> The figure of 7,500 Henrys kept by pro-Union soldiers after the war is  
21 reached in the following way. 8,500 had been purchased by or for U.S. soldiers.  
22 See *ibid.*, 81. Of these, roughly 2,000 were purchased for soldiers (based on a  
23 count of regiments known to have bought the rifles with public funds). Thus 6,500  
24 Henrys were privately owned by soldiers. Of the roughly 2,000 Henrys purchased  
25 for soldiers, 808 were known to have been bought by the soldiers at the end of the  
war. See 42nd Cong., 2nd sess., S. Doc. 183, "Sale of Ordnance Stores," *U.S. Congressional Serial Set* (1871), pp. 167-172. Thus, a generous estimate of how  
many U.S. veterans had Henrys after the war is 7,500.

26 <sup>16</sup> General Orders, No. 101, May 30, 1865, *The War of the Rebellion*  
(Washington, D.C.: Government Printing Office, 1880-1901), ser. 3, vol. 5, p. 43;  
27 42nd Cong., 2nd sess., S. Doc. 183, "Sale of Ordnance Stores," *U.S. Congressional*  
28 *Serial Set* (1871), pp. 167-172.



28. By the end of the Civil War in 1865, very few combatants had used Henry Rifles, and fewer still had kept them once they were discharged. The result was that only a small number of Henrys were in circulation in the United States immediately after the war—perhaps 10,000, and this in a country of roughly 35 million people.<sup>17</sup> Those veterans who possessed the guns understood that they were weapons of war—they had used them as such—rather than weapons of individual self-defense. Maybe veterans kept them as souvenirs, maybe as commodities to be sold at a later date, maybe as novelties to be displayed at local shooting contests or social gatherings (rifle clubs and shooting galleries were common in the North). Maybe they planned to travel to or through the Western Territories, where Henrys were gaining a reputation as good weapons against hostile Native Americans or roaming bands of criminals, known as “highwaymen” or “road agents.” Regardless of why a U.S. veteran might have kept a Henry, he would have understood that it was an uncommon weapon, and one not intended for individual self-defense. It was strictly a weapon of war.

**D. State Secession, State Readmission, State Redemption**

29. Reconstruction was a time period (1863-1877) but also a process. The process was described by President Abraham Lincoln in his last public speech (April 11, 1865) as getting “the seceded States, so called,” which were “out of their proper practical relation with the Union,” back into their “proper practical relation” with the Union.<sup>18</sup> To better understand this process, one must understand the

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<sup>17</sup> 11,000 Henry Rifles were produced between 1861 and 1865; see Parsons, *The First Winchester*, 48. Assuming that all were sold—a generous assumption—then 2,500 were sold to civilians and 8,500 to U.S. soldiers (the 8,500 figure comes from note 11 above). Of the 8,500 U.S. soldiers who had Henrys, 7,500 kept them after the war; see note 11 above. Thus 10,000 Henrys were in circulation after the war (again, a generous estimate). The U.S. census of 1860 reported just over 31 million Americans; the census of 1870 reported just over 38 million. Thus 35 million is given as an estimate of the population of the United States in 1865.

<sup>18</sup> Roy P. Basler, ed., *Collected Works of Abraham Lincoln* (New Brunswick, N.J.: Rutgers University Press, 1953), 8:403-4.



1 meaning of key terms used during the Reconstruction period: state secession, state  
2 readmission, and state redemption.

3 **1. State Secession**

4 30. Lincoln used the phrase “seceded States, so called” because he did not  
5 accept the constitutionality of state secession. All eleven states of the Confederacy  
6 had declared themselves “seceded” from the Union by May 20, 1861. The  
7 governments of all of these states regarded state secession, by which they meant a  
8 breaking-off from the Union, as constitutional. The Lincoln administration rejected  
9 this interpretation and declared instead that the “so-called” seceded states had  
10 remained in the Union but had had their governments overtaken by disloyal,  
11 insurrectionary groups. Reconstruction, therefore, would be complete when all of  
12 the “so-called” seceded states had governments that were loyal to the Union. The  
13 presidential administrations of the Reconstruction era that followed Lincoln’s  
14 (Andrew Johnson’s and Ulysses S. Grant’s) adopted this understanding of  
15 secession. So, too, did all the Reconstruction-era Congresses, though a minority of  
16 Congressmen took a somewhat different view, claiming that secession was indeed  
17 unconstitutional but that the states in question had indeed broken off from the  
18 Union and therefore could be treated as territories. This Report does not delve into  
19 the question of the constitutionality of secession. It simply notes that U.S.  
20 lawmakers of the Reconstruction era generally regarded secession as  
21 unconstitutional and a form of insurrection.

22 **2. State Readmission**

23 31. There were competing views among U.S. lawmakers during  
24 Reconstruction as to when a “so-called” seceded state could be deemed  
25 “readmitted” to the Union. The dominant view among U.S. lawmakers was that a  
26 state was deemed readmitted when Congress agreed to seat Representatives and  
27 Senators from that state. This meaning of state readmission is used in this Report.  
28 In justifying federal intervention into “so-called” seceded states and the imposition



1 of qualifications on states for readmission, national law makers relied on two  
2 constitutional principles: 1) “war powers”; and 2) the “guarantee clause”—the  
3 clause of the U.S. Constitution declaring that “The United States shall guarantee to  
4 every State in this Union a Republican Form of Government” (U.S.C., Art. IV, Sec.  
5 4). This Report does not delve into the question of the legitimacy and scope of  
6 these constitutional principles. It simply notes that these were the principles of the  
7 time used to justify federal policy towards the “so-called” seceded states during  
8 Reconstruction.

### 9                   **3. State Redemption**

10           32. Between 1866 and 1871, all of the “so-called” seceded states were  
11 readmitted to the Union. At the point of readmission, each state had a government  
12 that was loyal to the Union and controlled by a political party affiliated with the  
13 national Republican Party, which for all the years of Reconstruction was the Party  
14 in control of the U.S. government. In 1866-68, the last years of the administration  
15 of Andrew Johnson, he renounced the Republican Party and declared himself a  
16 Democrat, which he had been prior to the Civil War, but the U.S. government as a  
17 whole was still Republican. The Republicans in Congress beginning in December  
18 1866 had a two-thirds majority that allowed them to override Johnson’s vetoes; and  
19 beginning in March 1867, with the Reconstruction Act, they effectively took  
20 control of the “Commander-in-Chief” powers typically vested in the Executive  
21 branch. In each state after readmission there was internal conflict. Part of that  
22 conflict involved efforts by Democrats, many of whom were former Confederates  
23 or Confederate-sympathizers, to take control of the state government from  
24 Republicans. By 1877, the Democrats had taken control of the governments of all  
25 the states of the former Confederacy. At the point when Democrats took control of  
26 a state, they declared the state “redeemed” and began rolling back reforms instituted  
27 by prior Republican state authorities. In this Report, state redemption means the  
28



1 period when Democrats declared a state “redeemed” and began instituting  
2 reactionary measures.

3 **E. Militias**

4 33. Militias have a long history in the United States, and they have been  
5 studied extensively by scholars investigating the Second Amendment, especially for  
6 the period of Colonial America and the Early Republic. Militias existed during  
7 Reconstruction, but the militias of that period were fundamentally different from  
8 the militias of the earlier periods.

9 34. By the time that the Civil War broke out in 1861, well-organized state  
10 militias such as had existed in the Early Republic technically existed but were  
11 practically defunct, except in frontier states like Missouri and Texas. Militias by  
12 1861 essentially existed as volunteer local groups authorized by state governments  
13 but were only lightly controlled by those governments. Such militias were used, to  
14 be sure. Local militias in Virginia in 1859, for example, had worked together with  
15 a unit of the U.S. army commanded by Robert E. Lee to put down the effort by  
16 John Brown to seize the U.S. armory at Harpers Ferry and distribute arms to  
17 enslaved Black Americans in the region.

18 35. The fact that state militias did technically exist by 1861 became very  
19 important once the Civil War broke out. The power under the U.S. Constitution for  
20 a President to call up state militias is what Abraham Lincoln invoked at the start of  
21 the war when he authorized up to 75,000 men to come together to put down the  
22 insurrection in the southern states. The Confederate States of America, which  
23 adopted a constitution quite similar to the U.S. Constitution, invoked this same  
24 authority when calling up its national army.

25 36. Although soldiers had been called to national armies in their role as  
26 state militiamen, the armed units that formed the basis of national armies during the  
27 Civil War were not state-based militia units but rather state-formed regiments  
28 approved as national army units by the U.S. War Department (hence only in rare



1 instances would a regiment be a replica of a local militia unit). Nonetheless, the  
2 national armies continued to be managed at times by laws designed in the pre-war  
3 era to manage state militias. In July 1862, for example, the United States passed a  
4 Militia Act that standardized the terms of membership in state-wide militias even  
5 though state-wide militias had grown defunct in the North prior to the war; only in  
6 this way—by legislating via the old state militia system—did the U.S. War  
7 Department have the authority to manage the personnel of the national army. The  
8 July 1862 Act significantly declared that Black Americans could not be denied  
9 admission to state militias. That was a pivotal development, as most state militias  
10 prior to the war (all of them in the South, most of those in the North), had denied  
11 membership to Black Americans.

12 37. When the Civil War ended in mid-1865, state militias, which had been  
13 given new life by the war, thrived, but not everywhere. In the North, they fell again  
14 into disuse, though they would begin to appear again with strength in the late 1870s  
15 and 1880s. In the border states of Missouri and Kentucky, which had remained  
16 loyal to the Union despite being slave states, state militias continued to be  
17 important, as guerrillas caused disturbances in the states long after the Civil War  
18 was over. In the states of the former Confederacy after the war, the state militias  
19 had the most visible—and notorious—presence. Invoking newly passed  
20 discriminatory state laws (“Black Codes”), or simply acting on their own discretion,  
21 southern state militias, which excluded all Black Americans, harassed, assaulted,  
22 and even killed Black Americans and pro-Union whites. These militias were  
23 composed mostly of former Confederate soldiers, many of whom wore their  
24 Confederate uniforms while in action. These militias were regarded by U.S.  
25 lawmakers as pernicious and unlawful. Leaving aside the obvious illegality of the  
26  
27  
28



1 many acts committed by these militias, they were in violation of U.S. law simply by  
2 wearing Confederate uniforms.<sup>19</sup>

3 38. In March 1867, the U.S. Congress abolished all southern state militias,  
4 with some exceptions. Exempted were the border states, the four slave states that  
5 had never seceded, though Kentucky and Missouri were the only border states with  
6 state militias, and both states would disband their militias by 1868. Also exempted  
7 were two states that had joined the Confederacy: Arkansas and Tennessee.<sup>20</sup>  
8 Arkansas was exempted because it had proven itself to President Johnson as a  
9 genuinely loyal state. It had established a loyal state government, led by Governor  
10 Powell Clayton, that conformed to the guidelines that Abraham Lincoln had laid  
11 out in December 1863 and that Johnson had affirmed soon after taking office.  
12 Arkansas in 1868 created a state militia that U.S. authorities regarded as a  
13 legitimate armed organization loyal to the United States.<sup>21</sup> Tennessee was  
14 exempted because it, too, had established a loyal state government, led by Governor  
15 William (“Parson”) Brownlow. It had gone one step further. It had ratified the  
16 Fourteenth Amendment, passed by Congress in mid-1866, thus becoming the first  
17 southern state to do so and, as a result, becoming the first formerly seceded state to  
18 be formally readmitted to the Union. With Brownlow’s urging, Tennessee in 1866  
19 had created a state militia, the “Tennessee State Guard.” This organization was  
20 composed of both white and black members; it was well-armed (with Enfield

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21 <sup>19</sup> James Speed, “Surrender of the Rebel Army of Northern Virginia,” April  
22 22, 1865, *Opinions of the Attorney General*, 11:208-09. For these immediate post-  
23 war southern militias, see William A. Blair, *The Record of Murders and Outrages:  
24 Racial Violence and the Fight Over Truth at the Dawn of Reconstruction* (Chapel  
Hill: University of North Carolina Press, 2021), 66-67.

25 <sup>20</sup> 14 U.S. Statutes 487, Chap. 170, Sec. 6 (Approved March 2, 1867); James  
26 E. Sefton, *The United States Army and Reconstruction, 1865-1877* (Baton Rouge:  
Louisiana State University Press, 1967), 112.

27 <sup>21</sup> Michael G. Lindsey, “Localism and the Creation of a State Police in  
28 Arkansas,” *Arkansas Historical Quarterly*, 64 (Winter 2005), 356-58.



1 single-shot rifles, not with Henrys or Winchesters); and it drilled regularly. Former  
2 Confederates in the state despised the force.<sup>22</sup>

3 39. After Congress in 1867 abolished all but the exempted southern state  
4 militias, some of the newly created pro-Union governments in the non-exempted  
5 southern states created new state militias that were expressly tasked with subduing  
6 insurrection and anti-black activities. Such states included Louisiana, North  
7 Carolina, South Carolina, and Texas. Loyal state governments in Alabama and  
8 Florida proclaimed an intention to organize such new state militias, but they never  
9 followed through. A loyal government in Mississippi in 1870 went so far as to  
10 organize such a state militia, but the force was never used. The state militias of the  
11 South that did exist and saw action, those in Arkansas, Louisiana, North Carolina,  
12 Tennessee, South Carolina, and Texas, were wholly new innovations (though Texas  
13 made the dubious claim that the pre-war Texas Rangers was a predecessor  
14 organization). The new, post-1867 southern state militias were under the direct  
15 control of the state (the Governor and/or state adjutant general), as opposed to  
16 merely authorized by the governor. They drilled and paraded regularly. They were  
17 paid and armed by the state, with the arms kept in state-maintained, state-guarded  
18 armories or arsenals. Finally, all of the militias allowed if not encouraged Black  
19 American men to join, though some, like North Carolina's, segregated white  
20 companies from black companies. The high number of Black Americans in the  
21 southern state militias led some people at the time as well as some early historians  
22 to call these organizations "Negro Militias." This Report does not use that label.  
23 Pre-Civil War state militias in the South, in contrast to these wholly new post-war  
24 organizations, were unpaid, self-armed, and all-white.<sup>23</sup>

25 \_\_\_\_\_  
26 <sup>22</sup> Ben H. Severance, *Tennessee's Radical Army: The State Guard and Its*  
27 *Role in Reconstruction, 1867-1869* (Knoxville: University Press of Tennessee,  
28 2005), 1-119.

<sup>23</sup> Otis A. Singletary, *Negro Militia and Reconstruction* (Austin: University



1           40. Two of the new southern state militias, those of Louisiana and South  
2 Carolina, are particularly relevant to the subject of this Report. As will be  
3 discussed below, the state militias of Louisiana and South Carolina—and only those  
4 state militias—were armed with Winchester Repeating Rifles.

5           41. The composition of and membership requirements of the new state  
6 militias indicate much about attitudes toward firearms regulation among law  
7 makers of the time. The inclusion of Black Americans in the militias was part of a  
8 larger understanding among Republicans in the era of the Fourteenth Amendment  
9 that regulations restricting blacks from possessing firearms were no longer to be  
10 regarded as constitutional. The new militias did more than include blacks. They  
11 excluded some whites, specifically those who were regarded as still supporting the  
12 Confederate cause. Thus, the new state militias that began forming in 1868, the  
13 same year as the adoption of the Fourteenth Amendment, indicated that lawmakers  
14 understood that Black Americans' security required not simply the absence of  
15 regulations denying them arms but the presence of regulations denying arms to  
16 those who were known to support insurrection against the United States and  
17 violence against blacks.

#### 18           **F. The U.S. Army During Reconstruction**

19           42. The U.S. army began occupying parts of the South as soon as the Civil  
20 War broke out and would not end its occupation until 1877, the end of  
21 Reconstruction, when it removed its last units from Florida, Louisiana, and South  
22 Carolina. During the war, the U.S. army had exclusive police powers in the  
23 occupied South until or unless local policing institutions—courts and  
24 constabularies—were deemed loyal to the United States. At that point, the U.S.  
25 army cooperated with local police institutions to “keep the peace.” Yet U.S.  
26 of Texas Press, 1957), 3-33; Otis A. Singletary, “The Texas Militia During  
27 Reconstruction,” *Southwestern Historical Quarterly*, 60 (July 1956), 25-28; Allan  
28 Robert Purcell, “The History of the Texas Militia, 1835-1903” (Ph.D. diss.,  
University of Texas, Austin, 1981), 221-27.



1 commanders retained the power, which they had had since the start of the war, to  
2 declare martial law in an area, thus suspending the civil institutions there. This  
3 arrangement carried over from the Civil War into the early years of post-war  
4 Reconstruction. Until April 1866, U.S. troops had unrestrained power to operate  
5 within state boundaries to keep the peace. As part of that power, they could use  
6 troops as police and hold their own courts that could try civilians.<sup>24</sup>

7 43. The army also was willing to use this power in states that had never  
8 declared themselves seceded. The army had overseen arrests and prosecutions of  
9 alleged traitors in Indiana in 1864, actions that were ultimately deemed  
10 unconstitutional in the U.S. Supreme Court's post-war *Milligan* opinion. In June  
11 1866, the army had intervened in New York and Vermont to capture Irish  
12 nationalists known as Fenians who had fought against British troops in Canada and  
13 then crossed over to the United States. (Neither Henrys nor Winchesters were used  
14 in the conflicts between the Fenians and Canadian troops.) General-in-Chief  
15 Ulysses S. Grant ordered General George Meade to inform the New York and  
16 Vermont governors that they should call out volunteer militia units to capture the  
17 Fenians.<sup>25</sup>

18 44. The federal-state structure of armed enforcement that took place  
19 during the 1866 Fenian crisis was the model that U.S. authorities had in mind for  
20 the South once the southern states began creating pro-Union state militias. The  
21 hope was that the southern states would end up like New York and Vermont during  
22 the Fenian crisis: they would develop and sustain new, pro-Republican state  
23 militias that would be the primary armed force in the states, with the U.S. army  
24 playing only an ancillary role.

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26 <sup>24</sup> Sefton, *The U.S. Army and Reconstruction*, 5-106.

27 <sup>25</sup> W. S. Neidhardt, *Fenianism in North America* (University Park: The  
28 Pennsylvania State University Press, 1975), 71.



1           45. This plan for U.S. army-southern state militia cooperation nearly came  
2 apart beginning in April 1866. In that month, President Andrew Johnson  
3 proclaimed that a state of “cessation of hostilities” existed in all the southern states  
4 but Texas (in August 1866 he would proclaim that in Texas, too, there was a  
5 “cessation of hostilities). Johnson thus effectively removed “war powers” as a  
6 constitutional justification for the army’s presence in the South. His move was part  
7 of his general turn against the Republican program of Reconstruction. Also in  
8 April 1866, he vetoed the Civil Rights Act of 1866, a veto that Congress overrode.  
9 Two months earlier, he had vetoed the act renewing the Freedman’s Bureau.  
10 Eventually, Congress passed a new act for the Bureau, which Johnson again vetoed  
11 but Congress overrode. Both the Civil Rights Act and the Freedman’s Bureau Act  
12 established, among other things, that the army would continue to have policing  
13 powers in the southern states. Those powers were to be used specifically to put  
14 down insurrectionaries who threatened to undermine the civil rights of Black  
15 Americans or in any way jeopardize pro-Union citizens and institutions. The Civil  
16 Rights Act contained a military provision that empowered the army to act reactively  
17 or preemptively against any actual or anticipated insurrectionary threat.<sup>26</sup> Even  
18 though Congress was able to sustain this military provision as well as the rest of the  
19 Civil Rights Act of 1866 against Johnson’s veto, the military provision was  
20 jeopardized by Johnson’s declaration of a “cessation of hostilities.” The declaration  
21 signaled that Johnson might not sustain the army in its duties specified by  
22 Congressional measures like the Civil Rights Act. Also in April 1866, the U.S.  
23 Supreme Court announced that it was ruling in favor of the plaintiff in the *Milligan*  
24 case (the actual opinion was not issued until January 1867). That case was  
25 narrowly about the power of the army to try civilians in areas where civil courts

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26           <sup>26</sup> Michael Vorenberg, “The 1866 Civil Rights Act and the Beginning of  
27 Military Reconstruction,” in Christian Samito, ed., *The Greatest and the Grandest*  
28 *Act: The Civil Rights Act of 1866 from Reconstruction to Today* (Carbondale, Ill.:  
Southern Illinois University Press, 2018), 60-88.



1 were operative; more broadly it was about the power of the army to have any  
2 authority at all to occupy an area ostensibly at peace.

3 46. U.S. Republican authorities moved quickly to protect their power to  
4 occupy the formerly rebel South. Secretary of War Stanton prepared an order that  
5 invoked the military provision of the Civil Rights Act of 1866 to justify continued  
6 military occupation of the South. This was a novel move, as it allowed military  
7 occupation in the absence of “war powers.” The Civil Rights Act was justified not  
8 by “war powers” but by the Thirteenth Amendment abolishing slavery. A small  
9 number of Republicans, most notably Representative John Bingham, thought the  
10 Civil Rights Act needed more justification than that. For this reason, among others,  
11 Bingham pressed for a new constitutional amendment, which ultimately emerged as  
12 the Fourteenth Amendment. The resolution for the amendment was passed by  
13 Congress a few months after the Civil Rights Act and sent to the states for  
14 ratification. Congress would ultimately declare that the Civil Rights Act of 1866  
15 was authorized by the Fourteenth as well as the Thirteenth Amendments.

16 47. The military provision of the Civil Rights Act of 1866 was not enough  
17 to put U.S. military occupation of the South on sure footing. The President still  
18 controlled the army in his capacity as commander-in-chief. Congress thus began to  
19 wrest control of the army from President Johnson. First, it passed the  
20 Reconstruction Act of 1867, which formalized military occupation and required  
21 southern states to ratify the Fourteenth Amendment in order to be readmitted to the  
22 Union. Then Congress passed measures (most notably the Tenure of Office Act)  
23 that shifted aspects of army control from the President to Congress. Then it  
24 impeached Johnson, though Johnson was ultimately acquitted by the Senate. In the  
25 meantime, the army and the U.S. Attorney General opted to take the narrowest  
26 possible reading of the Milligan decision, such that the only power deemed out of  
27 the army’s hands in occupied areas was the power to try civilians if civilian courts  
28 were operative. By 1868, then, the year of the Fourteenth Amendment’s adoption,



1 the U.S. army had secured for itself a place in the southern states as a legitimate  
2 occupying force in the South. It would affirm this status with the acts of 1870 and  
3 1871 enforcing the Fourteenth Amendment as well as the Fifteenth Amendment,  
4 which had been adopted in 1870. The last of these enforcement acts, the so-called  
5 “KKK Act,” was aimed directly at breaking up the Ku Klux Klan and similar  
6 insurrectionary, paramilitary organizations that terrorized Black Americans and  
7 pro-Union whites (“terror” was one of the most commonly used words of the time  
8 to describe the Klan’s intent toward Black Americans).

9 48. The reason to understand this sequence of events is to appreciate the  
10 army’s distinctive, unprecedented role in the era of the Fourteenth Amendment. It  
11 did not operate under martial law. It had the power to declare martial law, but in  
12 practice, it avoided using that power. Instead, it looked to pro-Republican state  
13 governors to declare martial law if martial law was deemed necessary (and such  
14 gubernatorial declarations were extraordinarily rare during Reconstruction).  
15 Furthermore, in the wake of *Milligan*, it yielded to the states the judicial power it  
16 had wielded prior to 1866. States’ attorneys and state courts were to be the main  
17 sites of judicial action, though the U.S. Attorney General reserved the power to  
18 remove cases to federal courts if they involved matters relating to civil and political  
19 rights covered by national legislation (to help centralize federal judicial activity in  
20 the South, the Department of Justice was created in 1870). During the era of the  
21 Fourteenth Amendment, then, the main role of the U.S. army was to act as an  
22 ancillary police force to the state militias or other local and state policing  
23 operations. In this capacity, the army worked with states to detect and arrest  
24 insurrectionaries and civil-rights violators. Although sometimes those arrested  
25 would stand trial in a federal court—this happened most famously in the South  
26 Carolina Ku Klux Klan trials of 1871-72—the army and agents of the Department  
27 of Justice looked to the state courts to be the primary judicial institutions of locales.  
28 As an example: President Ulysses S. Grant in 1871, in his capacity as commander-



1 in-chief of the U.S. army, ordered all insurrectionaries in South Carolina to turn in  
2 their firearms to legitimate authorities. If insurrectionaries were found who had not  
3 turned in their weapons, they could be arrested and denied habeas corpus rights  
4 under Grant's order.<sup>27</sup> However, prosecutions and trials of such insurrectionaries  
5 going forward would be conducted by state authorities, if those authorities were  
6 known to be loyal to the United States. In its capacity as an ancillary police force  
7 to state militias, with both armed organizations committed to subduing  
8 insurrectionaries and civil-rights violators, the U.S. army sought to prevent  
9 weapons from reaching unlawful insurgent groups. Army officers relied on their  
10 own intelligence operators as well as private intelligence agencies like the  
11 Pinkertons to learn of arms shipments. By the terms of the Civil Rights Act of  
12 1866 and the Enforcement Acts of 1870, the U.S. army and related military units  
13 were authorized to act preemptively to prevent insurrectionaries from making  
14 armed assaults on loyal Unionists. The seizure of weapons intended for  
15 insurrectionaries thus represented a lawful use of military authority under the  
16 Fourteenth Amendment.<sup>28</sup>

17 49. As a result, any southern person or combination of persons considering  
18 having Henry or Winchester rifles shipped to them faced the prospect that the U.S.  
19 army or state militia might keep the shipment from reaching them and that, even if  
20 the shipment did reach them, the policing forces could arrest them and confiscate  
21 the weapons.

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22  
23 <sup>27</sup> Proclamations of President Ulysses S. Grant, in James Richardson, ed., *A*  
24 *Compilation of the Messages and Papers of the Presidents* (New York: Bureau of  
25 National Literature, 1897), vol. 9, pp. 4086-87 (March 24, 1871), 4089-90 (Oct. 12,  
26 1871), 4090-92 (Oct. 17, 1871), 4092-93 (Nov. 3, 1871; this proclamation revoked  
suspension of habeas corpus in Marion County, South Carolina), 4093-4095 (Nov.  
10, 1871).

27 <sup>28</sup> No U.S. court ever denied the constitutionality of such seizures of weapons  
28 or the legislation that authorized the seizures. See Vorenberg, "The 1866 Civil  
Rights Act and the Beginning of Military Reconstruction."



**V. FINDINGS: HIGH-CAPACITY FIREARMS DURING RECONSTRUCTION**

**A. Overview: Henry Rifles and Winchester Repeating Rifles During Reconstruction**

50. An oft-cited scholar in legal debates over firearms contends that “the Winchester Model 1866 . . . became a huge commercial success. So by the time the Fourteenth Amendment was ratified in 1868, rifles holding more than 10 rounds were common in America.” The first part of this statement is true: the “Winchester 66” did become a commercial success. The author neglects to mention, however, that prior to the end of Reconstruction, that commercial success was due almost entirely to sales to foreign armies. Thus it does not follow that the success of the company during Reconstruction is evidence of the presence of Winchesters in the United States. Indeed, the author’s second statement, that “rifles holding more than 10 rounds were common in America” at the time of the Fourteenth Amendment, is false.<sup>29</sup>

<sup>29</sup> David Kopel, “The History of Magazines holding 11 or more rounds: Amicus brief in 9th Circuit,” *Washington Post*, May 29, 2014, <https://www.washingtonpost.com/news/volokh-conspiracy/wp/2014/05/29/the-history-of-magazines-holding-11-or-more-rounds-amicus-brief-in-9th-circuit/> (accessed September 22, 2022). Kopel’s contention also appears on page 4 of his co-authored Amicus Brief in a federal case from California, *Fyock v. City of Sunnyvale*, Case No. 14-15408 (9th Cir. 2015). See David B. Kopel and John Parker Sweeney, “Amici Curiae Brief for the Center for Constitutional Jurisprudence and Gun Owners of California in Support of Plaintiffs-Appellants and Supporting Reversal,” 2014 WL 2445166 (9th Cir.). For the number of Henrys and Winchesters manufactured 1861-1877, as well as the number of these rifles shipped to foreign armies, see John E. Parsons, *The First Winchester: The Story of the 1866 Repeating Rifle* (New York: Morrow, 1955), 48, 85, 88, 103, 116, 123. To understand the scale of these numbers, one should contrast them to the production and sales of other rifles of the era. For example, according to Parsons, the total number of Henrys and Winchesters manufactured in 1861-1877 was 164,466 (this includes the 56,000 shipped to foreign armies), whereas in the same period, 845,713 Springfield “trap-door” single-shot rifles were manufactured. See “Serial Number Ranges for Springfield Armory-Manufactured Military Firearms,” <http://npshistory.com/publications/spar/serial-nos.pdf>, pp. 1-3; some of the data in this report is aggregated and printed at the Springfield Armory U.S. National Park Website: <https://www.nps.gov/spar/learn/historyculture/u-s-springfield-trapdoor-production-serial-numbers.htm>.



1           51. Rifles holding more than 10 rounds made up a tiny fraction of all  
2 firearms in the United States during Reconstruction. Furthermore, as will be  
3 discussed in more detail below, possession of such rifles—legal possession, that  
4 is—was limited almost exclusively to U.S. soldiers and civilian law enforcement  
5 officers.

6           **B. Henrys and Winchesters in the Reconstruction-Era West**

7           52. One of the places that Henrys and Winchesters could be found during  
8 Reconstruction was in the West, though the weapons did not proliferate there at the  
9 time at anything like the scale invented by novelists and film-makers of the late  
10 nineteenth and twentieth centuries.

11           53. With the passage of the Homestead Act (1862), the end of the Civil  
12 War (1865), the completion of the first transcontinental railroad (1869), and the  
13 discovery of gold in the Black Hills of Dakota Territory, the appeal of traveling to  
14 or through the Western Territories increased. Because law enforcement was  
15 minimal in the region, and also because the U.S. army could offer travelers and  
16 settlers little protection—they were too consumed during the era with subduing  
17 Native Americans—Americans came to regard self-defense as particularly  
18 important in the region. The Winchester company tried to capitalize on the  
19 situation by touting the benefits of its rifle. The “Winchester 73” model in  
20 particular was aimed at Westerners or potential Westerners. The company  
21 emphasized that the speed and high capacity of the rifle allowed a single person to  
22 hold off a band of outlaws or hostile Native Americans.<sup>30</sup> The marketing campaign

23  
24           <sup>30</sup> See, for example, the ad printed over three issues in the *Wyoming Leader*  
25 (March 17, April 21, May 8, 1868, always p. 4). Ads for Winchesters that said  
26 nothing of their possible purposes appeared occasionally in newspapers published  
27 in the Western Territories; see for example, a gun dealer’s ad for “Sharps and  
28 Winchester Rifles” as specialties: *Bismarck Tri-Weekly Tribune* (Dakota Territory),  
June 29, 1877, p. 4. On the post-Reconstruction invention of the myth of  
Winchesters proliferating in the Reconstruction-era West, see Haag, *The Gunning  
of America*, 179-202, 353-68.



1 was aimed especially at Americans hoping to travel to the Western Territories. The  
2 campaign had minimal success.

3 54. Many travelers to the West carried firearms, to be sure, but a very  
4 small number of those arms were Henrys or Winchesters. Most of the accounts of  
5 privately held Winchesters during Reconstruction that I found in the research for  
6 this Report did come from the Western Territories, but there were fewer than fifteen  
7 such accounts that were not expressly fictional. Two such accounts became  
8 legendary, mainly because the manufacturers of the Henry-Winchesters used them  
9 to advertise their rifles. One account was of two former U.S. soldiers who were  
10 part of a mining operation in the Rocky Mountains and used their Henry Rifles to  
11 defeat some raiding Blackfoot Indians. Another was of a private guard hired by  
12 Wells Fargo to accompany a cash shipment to the West; he was attacked by robbers  
13 near Nevada City and used his Henry Rifle to kill them all. It might be noted that  
14 these stories, assuming they are true, did not involve individual self-defense by  
15 ordinary civilians. They involved defense of economic enterprises by trained  
16 gunmen.<sup>31</sup> Less oft-told incidents involving Henrys and Winchesters from the  
17 Western Territories involved brutal violence between thuggish combatants. There  
18 was no heroic road warrior or “Indian fighter” in these tales, and thus they were not  
19 likely to build appeal for the rifles. Particularly gruesome were the murder-by-  
20 Winchester accounts stemming from the Horrell-Higgins feud in New Mexico  
21 Territory near the Texas border.<sup>32</sup>

22 55. Because some Henrys and Winchesters found their way to the Western  
23 Territories, and because some of the U.S. army operations against Native  
24 Americans took place in Western *states* as well as the Western Territories, Henrys  
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26 <sup>31</sup> Williamson, *Winchester*, 42-44.

27 <sup>32</sup> C. L. Sonnichsen, *I'll Die Before I'll Run: The Story of the Great Feuds of*  
28 *Texas* (1951; 2<sup>nd</sup> ed., New York: Devin-Adair, 1962), 125-49.



1 and Winchesters may have ended up in the Western states during Reconstruction  
2 (these included California, Colorado, Nevada, and Oregon). However, I found no  
3 significant evidence of Henrys or Winchesters in the Western states.<sup>33</sup>

4 56. The Winchester company hoped that West-bound Americans' desire to  
5 hunt, and not just their wish for protection, would fuel sales of their weapon. The  
6 great bison hunts on the Plains were famous by the late 1860s, and the Winchester  
7 company tried to capitalize on the craze. Its marketing effort failed. Bison-hunters  
8 preferred other models. It did not help that the most famous Western hunter of the  
9 time, Buffalo Bill Cody, did not use a Winchester. His famous gun, which he  
10 dubbed "Lucretia Borgia," was a single-shot Springfield.

11 57. The Winchester company had only marginally more success trying to  
12 sell its guns elsewhere to hunters and "sportsmen," a term used to describe not only  
13 hunters but competitive target-shooters. The only place where Winchesters caught  
14 on for hunting was in Africa, where American and European "big game" hunters  
15 wanted to shoot large animals with as many rounds as possible, in as fast a time as  
16 possible, in order to avoid being killed by the prey.<sup>34</sup> Target-shooters demanded  
17 accuracy of their guns, and potential buyers worried that a rifle built for capacity  
18 and speed would lose something in accuracy. To assuage such concerns, a  
19 Winchester model that began selling in early 1877 (the "Winchester 76") came with

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20  
21 <sup>33</sup> Exceptions to this statement about the absence of Henry-Winchesters in  
22 western states are the state armories in these states. Reports from these armories  
23 sometimes mention the rifles. For example, the armory in the state penitentiary at  
24 Salem, Oregon in 1868 had 13 Henry rifles and zero Winchesters, compared to  
25 hundreds of other firearms. Because this was a penitentiary armory, the Henrys that  
26 were there necessarily were for use by law enforcement officers, not individuals  
27 seeking self-defense. "Penitentiary Report" to Legislative Assembly, September  
28 1868 (Salem, Oregon: W. A. McPherson, 1868), pp. 94-95.

26 <sup>34</sup> My research uncovered fewer than ten accounts of African big-game  
27 hunting that appeared in U.S. publications during Reconstruction. As an example,  
28 see "Lovejoy," "Letter from Africa," *Fayette County Herald* (Washington, Ohio),  
Dec. 21, 1871, p.2 (by "accounts" I mean supposedly true accounts; there were  
even more accounts that were expressly fictional).



1 the option of a “set trigger,” such that the shooter could set the trigger by moving it  
2 very slightly forward, at which point only a tiny bit of pull would set off the shot.  
3 The “set trigger” type of Winchester was more popular at shooting contests than  
4 earlier Winchesters, but it still was not as popular as other rifles, especially  
5 Remingtons and Springfields. One reason why was its price. The “set trigger”  
6 version of the Winchester was typically \$10 more than the “standard trigger”  
7 models, which already were on the expensive side (“standard trigger” Winchesters  
8 were typically 20-30% more expensive than Remingtons and Springfields).

9 58. Meanwhile, U.S. army units in the West rarely possessed Winchesters  
10 during Reconstruction. The army had continued its Civil War-era policy of non-  
11 adoption of Winchesters. Yet soldiers in the West did understand the weapons’  
12 lethality, in part because they had seen it first-hand in their skirmishes and battles  
13 with the Sioux and their allies on the Plains. U.S. soldiers in the West at first  
14 assumed that the Natives were getting the weapons legally from traders who were  
15 operating with the approval of the U.S. Bureau of Indian Affairs. That assumption  
16 fueled long-standing hostility of the U.S. army toward the Bureau. The main  
17 newspaper of the armed services of the time, the *Army and Navy Journal*, published  
18 a satirical piece in 1867 pretending to be a Native American expressing gratitude to  
19 the Bureau for allowing tribes to acquire single-shot guns and suggesting that the  
20 Bureau might now “give us Spencer or Henry rifles.”<sup>35</sup>

21 59. In fact, the Sioux and their allies did not get their Henrys (or  
22 Winchesters) from the Bureau. Many of the weapons had been seized from  
23 American emigrants and settlers whom the Natives had attacked. Many also had  
24 been robbed from shippers heading to or through the Western Territories.

25 60. Here it is important to understand that no matter who might want a  
26 Henry-Winchester, they were dependent on a successful shipping operation. The

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27  
28 <sup>35</sup> *Army and Navy Journal*, June 1, 1867, p. 350.



1 weapons were manufactured in New Haven, Connecticut and shipped around the  
2 country to U.S. ordnance depots, state arsenals, private gun stores, and, in rare  
3 cases, individuals (individual mail-order did not become common until the 1890s,  
4 and the first mail-order guns were shipped by Sears in the early 1900s).<sup>36</sup> There  
5 was no U.S. parcel post until 1913; all shipping was done by private companies like  
6 Wells Fargo. These companies divided up regions of the country, a legal  
7 monopolistic practice, in order to maximize profits. In practical terms, this meant  
8 that shipping costs were high, so buyers would be reluctant to ship goods that could  
9 be lost. Loss was a very real possibility when it came to shipping weapons to  
10 hostile areas. Shipping companies might use armed guards—some, as we have  
11 seen, armed with Henrys or Winchesters—but the guards stood little chance against  
12 an enemy that outnumbered them and was armed with the same type of guns. The  
13 cost of the risk was passed from the manufacturers and “jobbers” who arranged for  
14 sales to the consumers. The risk-induced increase in cost was a disincentive to  
15 prospective individual or gun-store buyers in the West. This was one more factor  
16 providing a disincentive not only to potential private buyers but to the U.S. army to  
17 adopt Henry-Winchesters.

18 61. Whatever the root causes of the minimal proliferation of Winchesters  
19 among non-Natives of the West, the result was that Natives were more likely to use  
20 Winchesters than anyone else in the region. The most heavily armed Americans of  
21 the region, those of the U.S. cavalry units assigned to the Western Territories, used  
22 for the most part their army-issued single-shot Springfield rifles. Meanwhile, as a  
23 U.S. Colonel noted, Winchesters and lower-capacity repeating rifles in the late  
24 1860s transformed “the Plains Indian from an insignificant, scarcely dangerous  
25 adversary into as magnificent a soldier as the world can show.”<sup>37</sup>

26 <sup>36</sup> Williamson, *Winchester*, 178.

27 <sup>37</sup> Pekka Hämäläinen, *Lakota America: A New History of Indigenous Power*  
28 (New Haven, Conn.: Yale University Press, 2019), 299. In the northwest part of



1           62. The truth of that observation was borne out at the Battle of Little Big  
2 Horn in 1876. Famously, the U.S. army commanded by George Custer was wiped  
3 out by the Plains Indians. Most of Custer's troops carried single-shot Springfield  
4 rifles. The Native Americans carried a variety of weapons, many of which were  
5 Winchesters.<sup>38</sup> One of Custer's underlings, Marcus Reno, wrote after the battle that  
6 "the Indians had Winchester rifles and the column [of U.S. cavalry] made a large  
7 target for them and they were pumping bullets into it."<sup>39</sup> Weaponry was not the sole  
8 reason for Custer's defeat that day at the Little Big Horn. Still, it is worth noting  
9 that "the gun that won the West" was in the hands of Native Americans, not U.S.  
10 soldiers, at the most famous battle in the West of all time.

11           63. Humiliated by Custer's defeat, the U.S. army in the West still did not  
12 choose to adopt Winchesters after Little Big Horn. However, an increasing number  
13 of regiments in the West did act on their own to use ordnance funds to buy  
14 Winchesters. Although the army did not officially adopt the Winchester, it did all it  
15 could to keep the weapon, along with lower-capacity repeating rifles, out of the  
16 hands of the Plains Indians. Right away after Custer's defeat the army banned  
17 traders from trading any types of guns to any types of Natives, friendly or hostile.  
18 U.S. officers sought to arrest traders who had been selling Winchesters to Plains  
19 Indians against government policy.<sup>40</sup> Meanwhile, American civilians in the  
20 Western Territories demanded that Canadian authorities also intervene to keep  
21 Winchesters from Native Americans, specifically the Blackfoot.<sup>41</sup>

22 \_\_\_\_\_  
23 the Western Territories, the Nez Perce also were fond of Winchesters. Chief Joseph  
24 usually kept one close at hand. See Jerome A. Greene, *Nez Perce Summer, 1877: The U.S. Army and the Nee-Me-Poo* (Helena: Montana Society Press, 2001), 34-42, 310-12.

25           <sup>38</sup> Hämäläinen, *Lakota America*, 340.

26           <sup>39</sup> Haag, *The Gunning of America*, 176-77.

27           <sup>40</sup> *Chicago Daily Tribune*, July 23, 1876, p. 4.

28           <sup>41</sup> *Chicago Daily Tribune*, April 15, 1878, p. 4.



64. It is impossible to know all the reasons why the U.S. army did not adopt Henrys or Winchesters before or even soon after Little Big Horn, but one reason was the same one that had lingered on Americans' minds ever since the Henry Rifle was introduced in the early 1860s: the fear that the weapon was as dangerous to its user as it was to its intended target. The stories that manufacturers had helped circulate early on from the West about the power of the rifle to allow one person to defeat many failed to muster much enthusiasm for the weapon. It did not help that some assessments from experts were negative. At a showcase of firearms in Switzerland soon after the Civil War, a judge rendered the verdict that the rifle seemed delicate and unnecessarily lethal—"more wonderful than practical."<sup>42</sup> Back in the U.S., skeptics worried that the rifle would fail at a crucial moment or explode. When it came to Henrys and Winchesters, argued a writer for the New York Herald, the most widely circulating newspaper in the country, the "dangers are too many."<sup>43</sup>

**C. Henrys and Winchesters in the Reconstruction-Era North**

65. The North was the region in the United States where Henrys and Winchesters were hardest to find, either because they were deemed too dangerous or because northerners already felt themselves well-armed. Recall that hundreds of thousands of U.S. soldiers had returned home from the Civil War with rifles in hand, almost all of the weapons Spencers or Sharps or Enfield, rarely Henrys.

66. The near-absence of Henry-Winchester rifles in the North became clear during the "Great Strike" of 1877. The "Great Strike" began as a local labor action in West Virginia and turned into a massive strike stretching from Philadelphia to Chicago. Mob violence was prevalent. In this months-long episode, during which thousands of Americans were injured and hundreds were

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<sup>42</sup> Haag, *The Gunning of America*, 70.

<sup>43</sup> "Breech-Loading Arms," *New York Herald*, Oct. 12, 1866, p. 4.



1 killed, there were only two incidents that I found involving Henrys or Winchesters.  
2 In Chicago during the rioting, a U.S. soldier fired a Henry rifle in response to  
3 civilians pelting his regiment with rocks. He may purposefully have avoided  
4 shooting anyone—no one was hit. But the sound of the shot went a long way  
5 toward quieting the crowd. The soldier in question was from a regiment that had  
6 been assigned to the Western Territories but transferred temporarily to Chicago to  
7 put down the unrest. That explained why he had a Henry. His regiment likely  
8 acquired Henrys to fight Plains Indians; now he used the weapon—albeit  
9 sparingly—to subdue strikers.<sup>44</sup> In Jackson County, Kansas, just north of Topeka,  
10 railroad managers armed forty employees with Winchester rifles, ordering them to  
11 scare off the local strikers. To give the gang the veneer of a legitimate posse, the  
12 managers arranged for the local sheriff to deputize the gunmen. Violence ensued  
13 when the “posse” confronted the strikers, and at least one of the strikers was killed,  
14 though not necessarily by a Winchester.<sup>45</sup>

15 67. In general, however, Henrys and Winchesters were rare to find among  
16 northerners during Reconstruction. They were sometimes mentioned in ads  
17 displayed in northern publications aimed at hunters and target-shooters. If the ads  
18 were any indication of the target audience, the hoped-for buyers of the rifles were  
19 elites—not the types who showed up during the mobbing of the Great Strike of  
20 1877—and they were interested in peaceful shooting contests, not fending off  
21 potential violent attackers.<sup>46</sup> Reports from state adjutant generals in the North  
22 sometimes show Henrys and Winchesters in arsenal inventories, but these guns

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24 <sup>44</sup> Robert V. Bruce, *1877: Year of Violence* (1959; repr., Chicago: Quadrangle Books, 1970), 251-52.

25 <sup>45</sup> “A Tough Customer,” *St. Louis Globe-Democrat*, Oct. 1, 1877, p. 4.

26 <sup>46</sup> See, for example, an ad for many types of guns, including “Henry’s  
27 Sporting Rifle,” in Wilkes’ *Spirit of the Times: The American Gentleman’s*  
28 *Newspaper*, March 24, 1866, p. 59 (the ad was reprinted in the same weekly  
publication irregularly through June 16, 1866).



1 were always far outnumbered by the more popular rifles of the era in the region—  
2 Sharps, Spencers and Springfields.

3 68. Beginning in about the mid-1870s, northerners became more interested  
4 in owning Winchesters and modern rifles in general, not for purposes of self-  
5 defense but for purposes of collective defense of their communities and states. This  
6 was the period when National Guard units came into being, beginning in the  
7 northern states. They were in effect state militias. The engine that drove their  
8 creation was not a fear of tyranny or of insurrection but a nationalistic fervor fueled  
9 in particular by the nation's Centennial, which began to be celebrated in the early  
10 1870s even before the major exhibitions and commemorations of 1876.<sup>47</sup> With the  
11 rise of this movement came a perceived business opportunity for the Winchester  
12 company, which began placing ads for their rifles in northern newspapers,  
13 magazines, and gun catalogs. The greatest number of ads appeared in western  
14 Pennsylvania.<sup>48</sup> The ads seem to have had some effect. A newspaper published in  
15 northwestern Pennsylvania reported in October 1877 that "Winchester rifles are  
16 becoming quite fashionable in this section, and are rapidly displacing the old  
17 double-barreled rifles. . . . The Remington rifle is highly spoken of by those who  
18 have used it, but it is not a repeater, or 'stem-winder,' and so the Winchester is  
19 ahead."<sup>49</sup>

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22 <sup>47</sup> Eleanor L. Hannah, "Manhood, Citizenship, and the Formation of the  
23 National Guards, Illinois, 1870-1917" (Ph.D. diss, University of Chicago, 1997),  
24 15-16. Hannah's dissertation is crucial for countering the assumption, now rejected  
25 by historians, that the rise of the National Guard movement in the northern states  
26 was a reaction to events in the South of the 1870s or to the Great Strike of 1877.  
27 See also, Saul Cornell, *A Well-Regulated Militia: The Founding Fathers and the*  
28 *Origins of Gun Control in America* (New York: Oxford University Press, 2006),  
196-97.

<sup>48</sup> See, for example, *James Bown and Son's Illustrated Catalogue and Price*  
*List*, 29<sup>th</sup> annual ed. (Pittsburgh, Penn., 1877), 33.

<sup>49</sup> *The Forest Republican* (Tionesta, Pennsylvania), Oct. 3, 1877, p. 4.



69. The rise of National Guard units in northern states in the late 1870s inspired private armed companies to form, drill, and parade. One of these groups was the Lehr und Wehr Verein of Chicago, Illinois, led by the Socialist activist Henry Presser. Presser's company paraded one day in the spring of 1879. They carried rifles—not Winchesters but Springfields. Socialist sympathizers nearby joined with the group, and Presser was arrested and tried for organizing a private militia. His case ended up in the Supreme Court, which ruled in the Presser case in 1886 that the armed company's actions were indeed unlawful.

**D. Henrys and Winchesters in the Reconstruction-Era South**

70. In the South during Reconstruction, high-capacity firearms proliferated far more than in any other region of the country. The reason for this proliferation is clear: Winchester Repeating Rifles were the preferred weapon of two large state militias, those of Louisiana and South Carolina, that were organized to put down insurrection against state and national authority as well as terrorism against Black Americans.

71. The story of the South Carolina state militia getting armed with Winchesters begins with the inauguration of Robert K. Scott as the state's governor in 1868. Scott, a white man, was a pro-Reconstruction Republican. He had been born in Pennsylvania, he grew up in Ohio, and he became a high-ranking officer in the U.S. army during the Civil War. After the war, he was an officer in the Freedman's Bureau. As Governor of South Carolina, he endorsed and helped arrange the creation of a pro-Republican state militia open to Black Americans and pro-Republican whites.

72. The state act creating the state militia was adopted in 1868. The militia was always a work-in-progress, so it is impossible to know exactly how many men served in it at any given time. A reasonable estimate is that 1000 men were in the militia by 1869. Scott hoped that the force would grow eventually to 6000. Although the militia was open to pro-Republican whites, most of the



1 members were Black Americans. The state did not have enough arms to supply the  
2 men. In the summer of 1869, the state's adjutant general traveled to Washington,  
3 D.C. to arrange with the U.S. War Department for an allotment of funds to pay for  
4 arms for the state militia. This arrangement was a restoration of a policy that had  
5 long been in place but had often fallen into disuse: the U.S. War Department would  
6 pay each state an annual allotment to sustain its state militia. With the funds that  
7 the South Carolina adjutant general received in mid-1869, he helped arrange the  
8 purchase of hundreds of guns, both Winchesters and Springfields.<sup>50</sup>

9 73. By August 1869, Winchesters had begun to arrive in South Carolina,  
10 earmarked for members of the state militia. In the middle of that month, a company  
11 of Black American state militiamen armed with Winchesters appeared at a wharf in  
12 Charleston. The occasion was the arrival of a white baseball team from Savannah,  
13 which was scheduled to play a white team in Charleston. A few days earlier, the  
14 team had made the same trip. But when it arrived, Black American civilians had  
15 decided to disrupt the match as a form of protest. They showed up on the streets,  
16 got in the way of the white players as they made their way to the field, and hurled  
17 insults. The team turned around and headed back to Savannah. This time, on  
18 August 15, the Mayor of Charleston was prepared to make sure that things went  
19 smoothly—though not in a way that whites in the city would approve of. He had  
20 given the order for the company of black state militiamen to arrive at the wharf and  
21 escort the Savannah baseball team to the playing fields. The game took place. But  
22 white Democrats in the city as well as the rest of the state (and throughout the  
23 whole of the former Confederacy) were furious.<sup>51</sup> Meanwhile, Black Americans  
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26 <sup>50</sup> Richard Zuczek, *State of Rebellion: Reconstruction in South Carolina*  
27 (Columbia: University of South Carolina Press, 1996), 75; Singletary, *Negro*  
28 *Militia and Reconstruction*, 20-21.

<sup>51</sup> *Washington Evening Star*, Aug. 16, 1869, p. 1.



1 throughout the state celebrated the role that members of their race would play in the  
2 keeping of the peace.

3 74. From late 1869 to early 1871, companies of black state militiamen  
4 armed with Winchesters appeared regularly across South Carolina. At first,  
5 Governor Scott was thrilled with the organization. On March 29, 1870, he  
6 delivered a speech that extolled the Black-American dominated militia as the best  
7 way to ensure that peace would return to the state and that future elections would be  
8 fairly held. He particularly recommended that state militias be armed with  
9 Winchesters. He had seen first-hand how these weapons intimidated potentially  
10 violent protesters even without being fired. His neighboring state of Georgia  
11 should have such a militia staffed with blacks and armed with Winchesters, Scott  
12 advised. "I tell you the Winchester rifle is the best law that you can have there," he  
13 declared. Georgia, one of the states that had had its pro-Democrat, anti-black  
14 militia dissolved by Congress in 1867, never did create a new militia. Scott knew  
15 that it wouldn't. His speech was meant to announce not only to South Carolina but  
16 to neighboring states that the old ways of the Confederacy were gone for good.  
17 Members of the opposition to Scott and the Republicans in South Carolina became  
18 furious. Many called him "Winchester Scott" and bewailed "Scott's Winchester  
19 Rifle tactics."<sup>52</sup>

20 75. During the election season of 1870, Scott decided that he had erred.  
21 Opposition papers regularly reprinted his "Winchester" speech and attacked Scott  
22 as a tyrant trying to stir up a race war. Much more troubling was the fact that state  
23 chapters of the Ku Klux Klan began plotting a response to Scott's speech and the  
24 existence of the militia.

25 76. The Klan had decided to meet Winchesters with Winchesters. They  
26 sent agents to the North to buy crates of Winchesters and ship them to South

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28 <sup>52</sup> See, for example, *Charleston News*, Oct. 17, 1870, p. 2.



1 Carolina in crates with false labels (“Agricultural Implements” said one; “Dry  
2 Goods” said another). The state militia and the U.S. army were able to intercept  
3 some of the crates, but others arrived at their destination. The Klan and auxiliary  
4 white supremacist groups distributed the weapons to Scott’s opponents in towns  
5 across the state.<sup>53</sup> Violence broke out across the state. That was a regular  
6 occurrence during election season, but this time the lethality was more severe than  
7 usual. Both sides had Winchesters.

8 77. With the help of the intervention of the U.S. army and his own state  
9 militia, Scott was able to win re-election in 1870. Almost immediately he tried to  
10 draw down the violence in the state by attempting to remove Winchesters from the  
11 population. Aided by U.S. army units, his administration attempted to confiscate as  
12 many Winchesters as they could from insurrectionary groups like the Klan. Then  
13 he asked those state militiamen who were holding onto their Winchesters instead of  
14 storing them in state arsenals to turn the weapons in. Some Winchesters did end up  
15 coming back into state arsenals, either by way of confiscation from Klansmen or  
16 voluntary submissions by militiamen. But most of the Winchesters stayed in  
17 circulation. Scott suspended the state militia.

18 78. In early 1874, South Carolina was again the site of violent uprisings  
19 from insurrectionists, and the pro-Republican government responded by re-forming  
20 the state militia. The adjutant general of the state reported that he barely had any  
21 guns for the men. In fact, a report he had issued the year before declared that there  
22 were 627 Winchesters in state arsenals. Probably the official was worried that  
23 widespread arming of Black Americans and white Republicans with Winchesters  
24 would create a mini-civil war like the one in 1870.<sup>54</sup> The re-activated state militia  
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27 <sup>53</sup> Zuczek, *State of Rebellion*, 79-80.

28 <sup>54</sup> *Ibid.*, 140-41.



1 was poorly organized and poorly armed. For armed support between 1874 and  
2 1876, the Republican administration of the state relied mostly on the U.S. army.

3 79. Then, in 1876, came the final battles between pro-Republican, U.S.-  
4 authorized armed men (the U.S. army units and state militia) and the  
5 insurrectionary opposition forces, the “Red Shirts.” Of the many reasons that the  
6 opposition forces could be categorized as insurrectionary, perhaps the most obvious  
7 was that they regularly stole weapons, including Winchesters, from state arsenals.<sup>55</sup>  
8 When the voting in 1876 was over, the two sides in the struggle each declared  
9 victory. Two governors then existed, and since no one was going to accept a  
10 resolution of the crisis by law, the state was in political chaos, with armed groups  
11 on each side ready to go to battle. When companies of armed men marched for  
12 their respective candidates, plenty of them carried Winchesters. Only some of  
13 those Winchesters had been obtained legally. Those carried by the “Red Shirts”  
14 had almost certainly been stolen from state depots.

15 80. The Louisiana state militia was created in 1870. The story of how  
16 Louisiana state militiamen ended up armed with Winchesters starts before the  
17 organization was created. In 1868, the New Orleans metropolitan police force was  
18 re-organized under Republican leadership. It now used “Metropolitans” as its  
19 nickname. Its members included Black Americans as well as whites of varying  
20 ethnicities, the city being one of the most ethnically diverse in the country. The  
21 number of Metropolitans in 1868 was small—perhaps just over 100—but by 1870  
22 that number was close to 700. During its earliest years, from 1868 to 1870, the  
23 Metropolitans’ superintendent, A. S. Badger, armed many of the men with  
24 Winchesters. In 1870, Governor Henry Warmoth engineered the creation of the  
25 state militia. Warmoth envisioned a state militia that would be composed of 2,500  
26 Black Americans and 2,500 white former Confederates. The Confederates, in

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27 <sup>55</sup> Ibid., 171.  
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1 theory, would be loyal to the United States and thus supportive of Reconstruction  
2 programs created by Republicans. Anyone could see that the two sides of this force  
3 would not fit together easily. To help foster something approaching unity across  
4 the state militia, Warmoth appointed James Longstreet, a former Confederate  
5 General, as head of the state militia. As part of the act creating the state militia, the  
6 New Orleans Metropolitans were incorporated into the state militia. The  
7 Metropolitans after 1870 were thus both an urban police force and a company of  
8 state militiamen. In this latter role, they were authorized to operate outside of city  
9 limits. The Metropolitans were the best-trained unit in the state militia. Because  
10 many of their number carried Winchesters, they were also the best armed.<sup>56</sup>

11 81. Between 1870 and 1874, politics in Louisiana was multifaceted and  
12 ever-shifting. Warmoth regularly changed his political stances, outside blocs  
13 suddenly gained inside influence, and through it all, pro-Democratic factions,  
14 supported by armed “White Leagues,” tried to resurrect the Old South on the soil of  
15 Louisiana. In 1872, William Kellogg won the governorship. Kellogg was a  
16 Republican, one more radical than Warmoth and more in line with the Republicans  
17 in the U.S. Congress. Warmoth in 1872 had sided with John McEnery, a former  
18 Confederate, an anti-Reconstruction Democrat, and a leading voice for state  
19 redemption.

20 82. The state militia, composed of a group loyal to the Warmoth-McEnery  
21 faction and a group loyal to Kellogg, was rendered ineffective after 1872 by its lack  
22 of cohesion. Individual units within the state militia were nonetheless important, as  
23 they were the only legitimate state-level armed forces. Of these units, the  
24 Metropolitans remained the most effective and best armed, as they still carried  
25 Winchesters, whereas most of the other units did not. In politics, whoever

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27 <sup>56</sup> Dennis C. Rousey, *Policing the Southern City: New Orleans, 1805-1889*  
28 (Baton Rouge: Louisiana State University Press, 1996), 130-31; Singletary, *Negro Militia and Reconstruction*, 69-70.



1 controlled the Winchester-armed Metropolitans would always have an advantage  
2 because, as Governor Scott of South Carolina had said in 1870, “the Winchester  
3 rifle is the best law that you can have.” By late April 1873, William Kellogg, the  
4 newly elected Governor, had established control of the Metropolitans.  
5 Unfortunately, he had established that control too late to use the Metropolitans to  
6 help avert the worst racial massacre that the state had ever seen, probably the worst  
7 racial massacre of Reconstruction: the Colfax Massacre of April 13, 1873.

8 83. The tragedy of the Colfax Massacre has been the subject of much  
9 historical study, but never from the perspective of a Winchester Repeating Rifle.  
10 The combatants at Colfax, in Grant Parish, about 200 miles northwest of New  
11 Orleans, consisted of one legitimate armed force and one illegitimate one. The  
12 legitimate armed force was a unit of the state militia led by William Ward, a Black  
13 American who had fought for the U.S. during the Civil War. More than 100 of  
14 Ward’s men, perhaps more than 150, would be murdered at Colfax. The  
15 illegitimate armed force was a “posse” deputized by two local men, one who  
16 claimed to be a judge and one who claimed to be a sheriff. In fact, as all in the  
17 “posse” knew, the so-called judge and so-called sheriff had held those positions  
18 under the former governor, not under the current governor, who had denied them  
19 commissions that would have kept them in office. The claim of the “judge” and  
20 “sheriff” was that the former governor had in fact won the 1872 election and thus  
21 that they held their positions legitimately. (Election-result denial is not a new  
22 phenomenon; it was rampant in the South during Reconstruction.) Years later,  
23 when the Colfax episode came before the U.S. Supreme Court in the form of the  
24 *Cruikshank* case, Justice Bradley, author of the controlling opinion, declared that  
25 leaders of the so-called posse were private citizens, not state officers. Bradley was  
26 technically right. But at the time of the Colfax Massacre, the lead murderers had  
27 donned masks of state-legitimated authority. Neither the legitimate nor the  
28



1 illegitimate side at Colfax carried Winchesters. But if William Ward had had his  
2 way, his side would have had them.

3 84. Two days before the massacre, Ward had left Colfax for New Orleans.  
4 He knew that violence might erupt in Colfax, and he wanted to persuade Governor  
5 Kellogg to send military support. Almost certainly, Ward was going to ask Kellogg  
6 to send the Winchester-armed Metropolitans. Ward never made it to New Orleans.  
7 Even if he had, the Metropolitans could not have made it to Colfax in time to stop  
8 the massacre. They might not have been willing to go—it would be another ten  
9 days beyond the massacre before their loyalty to Kellogg was cemented. The  
10 important point amid all these hypotheticals is this: William Ward believed that a  
11 cadre carrying Winchesters was the best chance his men had.

12 85. By October 1873, the Metropolitans had pledged their loyalty to  
13 Kellogg, and Kellogg had helped secure for them and other state militia units  
14 hundreds of new Winchesters. Kellogg dispatched the Metropolitans to Grant  
15 Parish, the site of the Colfax Massacre, to reestablish control of the area for the  
16 Republicans. They and their Winchesters arrived at the end of the month—more  
17 than 25 weeks after William Ward had hoped they would come.<sup>57</sup>

18 86. The power of the Metropolitans, along with their Winchesters, would  
19 soon stripped away. Opponents of Kellogg gained control of the Metropolitans'  
20 Board by early 1864. They reduced the numbers of the force and limited their  
21 geographical range to New Orleans and its outskirts. If violence broke out in a  
22 rural area like Grant Parish, there would be nothing that the Metropolitans could do  
23 about it. Then, on September 14, 1874, came the final blow: the Battle of Liberty  
24 Place, fought in the heart of New Orleans. Thousands of White Leaguers launched  
25 a coordinated attack on the city. Some of them may have been carrying  
26 Winchesters, but none of the reports from that day mentioned Winchesters in their

27 <sup>57</sup> *New Orleans Republican*, June 13, 1873, p. 1; *Ouachita Telegraph*,  
28 October 24, 1873, p 1.



1 hands. The Metropolitans had Winchesters, of course, but they were outnumbered  
2 more than 10 to 1 and easily overwhelmed. After the White Leaguers had  
3 demonstrated their superior force, Governor Kellogg knew that he might soon be  
4 removed, so he engineered a compromise that kept him in office. Part of the deal  
5 was the disbandment of the state militia. Thus ended the prospect of a reign-by-  
6 Winchester Republican regime in Louisiana.<sup>58</sup>

7 87. In the brief time that Winchesters were in the hands of southern state  
8 militias, the rifles showed that they could do much to intimidate the forces of white  
9 supremacy and insurrection. But there was a dark flip side to the positive quality of  
10 this particular high-capacity firearm.

11 88. Those opposed to the state militias and to Reconstruction in general  
12 used the presence of Winchesters in state militias as fodder to attack all  
13 Republicans and especially Black Americans. At a rally in April 1870, a Georgia  
14 Black-American leader, Simeon Beard, pleaded for more guns so blacks could have  
15 their own militia rather than relying on the U.S. army. “We don’t want soldiers; we  
16 want the power to raise a militia; we want guns put in our hands, and we will see  
17 whether we cannot protect ourselves. Give us this, and we will give you the State  
18 of Georgia evermore.” In response, a redeemer newspaper editor mocked Black  
19 Americans like Beard who clamored “lustily for arms,” including “Winchester  
20 rifles.” The redeemer editor then brought up the South Carolina experiment with  
21 Winchester-armed state militias as evidence that the lives of ordinary white people  
22 were in grave danger. “There are thousands of white people in this State who have  
23 no arms at all, not even a pistol, while there is not one negro in three who does not  
24 own some sort of firearm. They are armed now-fully armed. It is the white people  
25 who need arms, not the negroes.”<sup>59</sup>

26 <sup>58</sup> Rousey, *Policing the Southern City*, 155-56.

27 <sup>59</sup> *Georgia Weekly Telegraph and Georgia Journal & Messenger*, April 5,  
28 1870, pp. 4, 8.



1           89. The Winchester was as much a symbolic weapon as a real one in the  
2 battles between Republicans and Redeemers in the Reconstruction-era southern  
3 states. Republicans saw the gun as the emblem of power—the sign that the cause  
4 of Reconstruction had a strong, locally controlled force behind it. The Redeemers  
5 saw the gun as evidence of the Republicans’ tyranny and barbarity. In Texas,  
6 Democrats opposed to Reconstruction howled that there must be “no money, no  
7 Winchester rifles and ammunition” for Republicans—this despite the fact that  
8 Republicans in the state had never suggested arming themselves with  
9 Winchesters.<sup>60</sup>

10           90. In terms of real as opposed to imagined Winchesters, even though the  
11 weapons in Louisiana and South Carolina were housed under guarded armories,  
12 they could still end up in the hands of insurrectionaries or criminals. In Louisiana,  
13 as in all the states of Reconstruction, there were internal, often violent conflicts  
14 over the control of the state government. By various means, from outright theft to  
15 the legitimate winning of a state election, the opposition to a Republican  
16 government in a state like Louisiana could gain access to Winchesters. Once these  
17 weapons were in the hands of insurrectionary groups, they could end up with  
18 anyone, including an outlaw with no particular political persuasion. That is  
19 probably how a Winchester ended up among a large cache of arms held by the  
20 husband-wife team known as the Guillorys, a pair of marauding thieves who went  
21 on a rampage near Opelousas, Louisiana in the late summer of 1873. When a posse  
22 caught up with them, it easily dispatched the couple, killing the husband and  
23 seriously wounding the wife.<sup>61</sup>

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25           <sup>60</sup> *The Weekly Democratic Statesman* (Austin, Texas), August 24, 1871, p. 2.

26           <sup>61</sup> “Another Battle,” *The Opelousas Journal*, Aug. 29, 1873, p. 3. A side note  
27 to the episode: No one in the posse had a Winchester, and the Guillorys in the  
28 exchange of gunfire opted not to use their Winchester, only their low-capacity rifles  
and shotguns.



1           91. By 1874, all of the state militias had been disbanded. Redeemers—  
2 those in each state wanting state redemption from Reconstruction—had been  
3 against the state militias from the start and were glad to see them go. By the end of  
4 Reconstruction, all of the southern states had reverted to their pre-1867 militia  
5 system, 1867 being the year that the U.S. Congress abolished all southern militias  
6 except those in Arkansas and Tennessee.<sup>62</sup> Under the renewed militia system,  
7 volunteer militias could form on their own with the explicit or implicit approval of  
8 state governors. Because most of the southern state governments after 1874 were  
9 ruled by pro-redemption Democrats, most of the militias that formed after 1874  
10 were of the sort that would have been considered insurrectionary by pro-  
11 Reconstruction Republicans in the states as well as by the Congressional  
12 Republicans who had abolished such militias in 1867.

13           92. The three states that were not controlled by Redeemers after 1874 were  
14 Florida, Louisiana, and South Carolina. In Louisiana and South Carolina, the 1876  
15 state elections were disputed (so, too, quite famously, was the national election of  
16 1876). In both states, as a result, the two contending sides, pro-redemption  
17 Democrats and pro-Reconstruction Republicans, claimed victory and claimed that  
18 their gubernatorial candidate was the legitimate governor of the state. In each of  
19 these states, therefore, there were two governors. Meanwhile, in Florida, there was  
20 no dispute over the governor's office, but there was conflict nonetheless because

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21           <sup>62</sup> The Texas Rangers claimed to be a state militia loyal to the U.S. right up  
22 until it was disbanded in 1877, but by 1874, if not earlier, the group was clearly on  
23 the side of the Democrats in the state. A number of Democrats in 1877 pleaded  
24 with the state government not to disband the Rangers. One wealthy Democrat in  
25 1877 even offered the state government a voluntary donation of Winchesters for the  
26 state militia (the militia had not used Winchesters prior to that point). The state  
27 government rejected the offer and disbanded the militia. See Robert M. Utley,  
28 *Lone Star Justice: The First Century of the Texas Rangers* (New York: Oxford  
University Press, 2002), 169-70; Walter Prescott Webb, *The Texas Rangers: A  
Century of Frontier Defense* (1935; 2<sup>nd</sup> ed., Austin: University of Texas Press,  
1965), 292-93.



1 the electoral board of the state was controlled by pro-Reconstruction Republicans  
2 while the rest of the state government was controlled by pro-redemption  
3 Democrats.<sup>63</sup> As a result of the internal conflicts within Florida, Louisiana, and  
4 South Carolina, the U.S. army dispatched troops to the capitals of each state. The  
5 troops were intended to “keep the peace” in all the states, to ensure that the pro-  
6 Reconstruction Republican governors of Louisiana and South Carolina were  
7 accepted as the only legitimate governors of the states, and to protect the Florida  
8 electoral board from being disbanded by pro-redemption Democrats.

9 93. The circumstances described above had important consequences for  
10 who came to possess Henrys and Winchesters by the end of Reconstruction. In  
11 Louisiana and South Carolina prior to 1874, these high-capacity firearms were  
12 possessed and regulated by pro-Reconstruction Republicans, who possessed them  
13 specifically for the purpose of state defense against armed insurrectionaries allied  
14 with pro-redemption Democrats. Once pro-redemption Democrats in these states  
15 after 1874 claimed that their “governor” was the only legitimate governor of the  
16 state—a position supported by most whites in each state—the “governor” in  
17 question used his alleged authority to distribute Winchesters held in state armories  
18 to pro-redemption volunteer militia groups. In Louisiana, the pro-redemption  
19 groups known as White Leaguers in 1876-77 marched through the streets of New  
20 Orleans demanding that their “governor,” Francis T. Nicholls, be recognized as the  
21 sole governor of the state. At least 500 of the White Leaguers, but probably  
22 hundreds more, carried Winchester rifles.<sup>64</sup> According to a Black American who  
23 later testified about events in New Orleans at the time, some of the White Leaguers  
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25 <sup>63</sup> Jerrell H. Shofner, “Florida Courts and the Disputed Election of 1876,”  
26 *Florida Historical Quarterly*, 48 (July 1969), 26-46.

27 <sup>64</sup> *Chicago Daily Inter Ocean*, January 12, 1877, p. 2; *New Orleans*  
28 *Republican*, March 13, 1877, p. 2.



1 not only paraded with their Winchesters but also wore their old Confederate  
2 uniforms.<sup>65</sup> The U.S. army regarded these marchers as insurrectionaries.

3 94. A similar situation played out in South Carolina, though there, the pro-  
4 redemption Democrats were known as Red Shirts. Beginning in 1874 and  
5 continuing through 1876, South Carolina Red Shirts created volunteer militias that  
6 obtained Winchesters from pro-redemption authorities in the state government.  
7 There were many Winchesters to be had in that state, as the pro-Reconstruction  
8 Governor Robert “Winchester” Scott back in 1869-1870 had purportedly ordered  
9 thousands of them. The exact number that Scott had acquired remains in dispute.<sup>66</sup>  
10 Whatever the number was, it seems that only a few hundred ended up in the hands  
11 of Red Shirts in the 1874-76 period, though that was still a few hundred more than  
12 Republicans of the era thought was legal.<sup>67</sup>

13 95. Despite these developments, the total number of Henrys and  
14 Winchesters in the southern states during Reconstruction remained small relative to  
15 firearms in general in the country—no more than 8,000, I would estimate.<sup>68</sup>

16 <sup>65</sup> Testimony of William Murrell, *Report and Testimony of the Select*  
17 *Committee to Investigate the Causes of the Removal of the Negroes from the*  
18 *Southern States to the Northern States* (Washington, D.C.: Government Printing  
Office, 1880), pt. 2, p. 521.

19 <sup>66</sup> During the U.S. Congressional investigations into Klan activities,  
20 investigators tried to ascertain how many Winchesters had actually arrived in South  
21 Carolina for Scott’s militia; they failed to learn what the number was, though one  
22 witness did confirm that the Winchesters that did arrive there were intended for the  
state militia, including the African Americans among them. See 42<sup>nd</sup> Cong., 2<sup>nd</sup>  
23 sess., “Affairs in Insurrectionary States,” vol. 3 (South Carolina), *U.S.*  
*Congressional Serial Set* (1871), p. 467; and *ibid.*, vol. 4 (South Carolina), p. 767.

24 <sup>67</sup> Zuczek, *State of Rebellion*, 140-41, 170-71 (some of the Winchesters were  
referred to as “militia guns”; see *ibid.*, 171).

25 <sup>68</sup> This estimate is based on the assumption that all 6,000 Winchesters that  
26 Governor Scott ordered for the South Carolina state militia were delivered (the  
27 exact number delivered is unknown, and most likely it is lower). When this number  
28 is combined with the roughly 1,000 Winchesters used to arm the Metropolitans in  
Louisiana over a six-year period, along with perhaps another 1,000 stolen from U.S.  
army depots, the sum is 8,000.



1 Equally important, almost all of these high-capacity firearms were in the hands of  
2 law enforcement officers, either U.S. soldiers, pro-Reconstruction militias, or pro-  
3 Redemption militias. These last set of armed bodies were illegitimate, to be sure—  
4 chapters of the KKK were among them—but, importantly, even they regarded it  
5 essential to claim that it was their status as militiamen, and only that status, that  
6 legitimated their possession of high-capacity firearms.

7 96. With only a few exceptions (fewer than five), all reliable reports in  
8 which Henrys or Winchesters were mentioned in accessible records from the  
9 Reconstruction South indicate that they were regarded solely as firearms for  
10 legitimate law enforcement officers.<sup>69</sup> An example of an exception comes from  
11 Marianna, Florida in September 1869. There, a group of about twenty-five Black  
12 Americans, including women and children, were having a barbecue. From the  
13 woods nearby an unseen assailant fired “thirteen or fourteen shots in rapid  
14 succession,” killing and wounding many of the party. The U.S. officer who later  
15 reported on the episode assumed that the assailant had used a Henry rifle because of  
16 the speed and volume of the shots fired. He wrote to his superior asking for a  
17 “first-class detective” to be sent to the town to investigate who the perpetrator or  
18 perpetrators might be. “If detectives can’t be furnished,” he added, “a few Henry  
19 rifles would have an excellent moral effect here.”<sup>70</sup>

20 97. At least some state-level law enforcement officials outside of  
21 Louisiana and South Carolina ended up with Henrys or Winchesters. A pro-  
22 Republican jailer in a sheriff’s office in Alabama was able to use a Winchester to  
23

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24 <sup>69</sup> This Report does not accept as evidence second- or third-hand rumors of  
25 Henrys or Winchesters being present, though even such rumors prior to 1870 were  
infrequent.

26 <sup>70</sup> J. Q. Dickinson to “Hamilton,” in 42<sup>nd</sup> Cong., 2<sup>nd</sup> sess., “Affairs in  
27 Insurrectionary States,” vol. 13 (Florida), *U.S. Congressional Serial Set* (1871), pp.  
28 289-90.



1 fend off attacking Klansmen in January 1871.<sup>71</sup> In 1873, a dozen men in  
2 southwestern Texas deputized to fight Native Americans near the Mexican border  
3 were successful in subduing the Natives and, in reward, were presented by the state  
4 legislature with Winchester rifles (they had not used Winchesters to fight the  
5 Natives, though the Natives that they fought might well have used Winchesters).<sup>72</sup>  
6 The most revealing example comes from 1875 Mississippi, in the testimony of  
7 Sheriff John Milton Brown of Coahoma. Brown was the first Black American  
8 sheriff anywhere in Mississippi. He reported that Black Americans in his region  
9 had no guns and implied that they had been ordered to turn in their arms to the  
10 white insurrectionaries who controlled most of the state. Brown, though, had not  
11 turned in any weapons because he believed that his position as sheriff allowed him  
12 to keep his weapons. As he told an investigator, he had “one Henry rifle” and he  
13 thought that he “was justified in having that, because I was sheriff.”<sup>73</sup>

14 98. Americans have long disputed and no doubt will continue to dispute  
15 the meaning, implications, and correctness of the U.S. Supreme Court’s two earliest  
16 “Second Amendment” opinions, which were offered during or soon after  
17 Reconstruction: *U.S. v. Cruikshank* and *Presser v. Illinois*.<sup>74</sup> But one issue  
18 regarding those cases is beyond dispute: they did not involve high-capacity  
19 firearms. There were no Henrys or Winchesters at Colfax on the tragic day of the  
20 massacre there in 1873. There were none in the hands of the military companies

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22 <sup>71</sup> 42<sup>nd</sup> Cong., 2<sup>nd</sup> sess., “Affairs in Insurrectionary States,” vol. 8 (Alabama),  
23 *U.S. Congressional Serial Set* (1871), pp. 414-15.

24 <sup>72</sup> *Texas Session Laws*, 13th Legislature, Regular Session, General Laws,  
chap. 187 (March 28, 1873), pp. 225-26.

25 <sup>73</sup> 46<sup>th</sup> Cong., 2<sup>nd</sup> sess., S. Rep. 693, pt. 2 “Investigation of Causes of  
26 Migration of Negroes from Southern to Northern States,” *U.S. Congressional Serial*  
*Set* (1879-88), 357.

27 <sup>74</sup> *U.S. v. Cruikshank*, 92 U.S. 542 (1875); *Presser v. Illinois*, 116 U.S. 252  
28 (1886).



1 that marched on that spring day in Chicago in 1879—the episode that would lead to  
2 the 1886 Presser decision (Presser’s men carried single-shot Remington rifles).<sup>75</sup>  
3 On the question of whether the law could treat high-capacity firearms differently  
4 from other types of weapons, the Reconstruction-era Justices had nothing to say.  
5 But the land they lived in, the land they ruled over, was one where high-capacity  
6 firearms were held only by a select few, almost all of whom were U.S. soldiers or  
7 civilian law enforcement officers sworn to uphold the U.S. government. These  
8 gunmen held their distinctive weapons not to defend themselves as individuals from  
9 imagined foes but to defend their state and country against all-too-real criminals  
10 and insurrectionaries.

11 99. Many of these gunmen were Black Americans, specifically the Black  
12 American men who made up the largest contingents of southern state militias.  
13 Serving in these militias was one of many ways that Black Americans demonstrated  
14 their gun-bearing rights. Other ways that this right was demonstrated are well  
15 known to scholars: Black Americans helped make sure that the U.S. government  
16 and state authorities overturned white supremacist efforts to ban blacks from  
17 militias, deny them access to firearms, or seize their firearms (these efforts had been  
18 embodied in the southern state Black Codes of 1865-67, which were overturned by  
19 the Civil Rights Act of 1866 and the Fourteenth Amendment of 1868). It is worth  
20 noting, though, that a Black American who carried a Winchester for a state militia  
21 was different from the much larger population of Black Americans who did not  
22 belong to state militias. The Winchester-toting black militiaman held his gun only  
23 with the authorization of and regulation by the state government. He did not own  
24 his gun. It belonged to the state. It was supposed to be in an armory, not at a  
25 private home, when not in militia-use. Hypothetically, if Black Americans wanted  
26 Henrys or Winchesters at their homes, they might lawfully have been allowed to

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27  
28 <sup>75</sup> “The Reds,” *Chicago Daily Tribune*, March 23, 1879, p. 7.



1 have them there. But this hypothetical scenario is irrelevant. Southern Black  
2 Americans for the most part lacked the means to buy Winchesters. Mostly rural  
3 workers, their wages were notoriously low—sometimes only in the form of shares  
4 of crops—and they would not be inclined to spend \$30 to \$40 on a gun that would  
5 represent perhaps 3 to 6 months wages. There was no necessity for them to do so:  
6 perfectly adequate guns for individual self-defense, even some “repeaters,” would  
7 have been in their price range.

8 100. The Fourteenth Amendment assured Black Americans that they  
9 possess firearms for self-defense but did not assure them that they could possess  
10 any firearm they wanted, including a high-capacity rifle. This same principle of the  
11 Amendment held equally true for whites.

12 101. Americans in the Reconstruction-era South understood perhaps better  
13 than anyone that Henrys and Winchesters were weapons for organized military use  
14 that did not belong in the general population. Except for a small number of  
15 insurrectionary militias, like the Ku Klux Klan, the enemies of the Republican state  
16 administrations in Louisiana and South Carolina that armed their state militias with  
17 high-capacity firearms did not respond by trying to obtain the same weapons for  
18 themselves. Rather, they responded by demanding the removal of the weapons and  
19 the organizations that carried them. When these opposition factions came into  
20 power in 1877, they disbanded the state militias and warehoused the Winchesters.  
21 To be sure, they maintained laws that allowed citizens to possess firearms for their  
22 individual self-defense, but they did not view high-capacity firearms as appropriate  
23 for such a purpose.

24 102. My examination of statutes and state-level court opinions from the  
25 Reconstruction-era South revealed that firearms were sometimes mentioned as  
26 weapons of individual self-defense, but in such instances, the types of firearms  
27  
28



1 mentioned were, with one exception, low-capacity firearms such as pistols,  
2 revolvers, muskets, and rifles.<sup>76</sup>

3 103. The one potential exception comes from a Tennessee state court  
4 opinion of 1871, *Andrews v. State*. The court in *Andrews* ruled that among the  
5 weapons a citizen might possess were rifles “of all descriptions,” including “the  
6 shot gun, the musket, and repeater.”<sup>77</sup> This opinion has been cited by at least one  
7 scholar as evidence that high-capacity firearms were understood to be possible  
8 weapons of individual self-defense.<sup>78</sup> Yet, a “repeater” at the time of the *Andrews*  
9 opinion (1871), and during the whole of Reconstruction, would have been  
10 understood to be a low-capacity repeating rifle, such as a Spencer or Sharps, neither  
11 of which could hold more than ten rounds. The parlance of the day put Henrys and  
12 Winchesters in a separate category from “repeaters.” Again and again during  
13 Reconstruction, from the Western Territories to the northern and southern states,  
14 when a cache of firearms was described, Henrys and Winchesters, though obviously  
15 repeating rifles, were always listed separately from “repeaters.” Furthermore, the  
16 firearms mentioned in Judge Thomas J. Freeman’s majority opinion in *Andrews*—  
17 shotguns, muskets, repeaters—were mentioned exclusively in terms of what a  
18 person might possess in his role as a member of the militia. The chief judge of the  
19 court, Alfred O. P. Nicholson, joined in that opinion. There was one judge on the  
20 court, though, who believed that the *Andrews* opinion should go further—that it  
21 should allow individuals to possess any weapon, regardless of what the militias in  
22 the state did or did not possess. That judge, Thomas A. R. Nelson, expressed his

23 <sup>76</sup> The survey that I conducted was of all state statutes and state-level cases in  
24 the period 1863-1877 from the South relating to regulation of weapons. A list of  
25 state-level cases from all states appears at <https://guncite.com/court/state/> (accessed  
September 25, 2022).

26 <sup>77</sup> *Andrews v. State*, 50 Tenn. (3 Heisk.) 179 (1871).

27 <sup>78</sup> See, for example, Kopel, “The Second Amendment in the 19th Century,”  
28 1418-21.



1 view in a concurring opinion, which he alone signed. The opinion did not mention  
2 Henrys or Winchesters as weapons that he thought that any individual might  
3 possess.<sup>79</sup>

4 104. Even more revealing evidence for Reconstruction-era officials  
5 believing that high-capacity firearms should be regulated comes from Louisiana.  
6 Of the states that had militias that carried Henrys or Winchesters, Louisiana was the  
7 only one that left behind a readily accessible record of how these high-capacity  
8 firearms were to be managed by state authorities. All arms for the state militia were  
9 overseen by the state adjutant general, James Longstreet. A former Confederate  
10 General who joined the Louisiana Republican Party after the Civil War—a move  
11 that forever marked him as a turncoat by his former Confederate comrades—  
12 Longstreet well understood the ongoing insurrectionary intentions of former  
13 Confederates in his state and elsewhere. He thought it crucial to ensure that such  
14 men did not end up with Winchesters, and that they be incited as little as possible  
15 by the sight of Winchesters being carried in public by their organized enemies,  
16 Black-American militiamen foremost among them. For these reasons, he took  
17 extraordinary precautions concerning the Winchesters that were held in the New  
18 Orleans armory. His orders for the armory began with typical provisions such as  
19 putting guards around the building and making sure that all guns inside were racked  
20 when not in authorized use. Then, in the last provision of his orders, he turned  
21 specifically to Winchesters. They were not to “be taken to pieces, or any part of  
22 [them] removed . . . unless authorized by the Division Commander.” The  
23 Winchesters were also not to be used for “parade or drill upon the streets or public  
24 highways” without the Division Commander’s authority. Such restrictions were  
25 not put on the other weapons in the arsenal; they were only for the Winchesters.<sup>80</sup>

26 <sup>79</sup> *Andrews v. State*, 50 Tenn. (3 Heisk.) 193-200 (1871).

27 <sup>80</sup> Adjutant General James Longstreet, General Orders No. 16, New Orleans,  
28 July 19, 1870, in *Annual Report of the Adjutant General of the State of Louisiana*,



**VI. CONCLUSION. RECONSTRUCTION AND TODAY: CONTINUITY AND CHANGE**

105. How does the situation surrounding high-capacity firearms today compare to the Reconstruction era? High-capacity firearms are still being sold under the name Winchester, by companies such as Browning, but the Winchester Repeating Rifle Company ceased to exist long ago. Of course, high-capacity firearms can be found under plenty of other names today. But whereas today the owners of such firearms might be civilians, in the Reconstruction era they would be almost exclusively soldiers or law enforcement officers. There were civilians during Reconstruction who owned high-capacity rifles, to be sure. Yet almost all such civilians were “frontiersmen” of the Western Territories, and the population of the Western Territories was tiny compared to the population of the United States as a whole. Furthermore, Henrys and Winchesters, the only high-capacity firearms of the era, were not the preferred firearms of the “frontiersmen” of the region.

106. By far the largest population possessing Henrys and Winchesters during Reconstruction were members of state-wide militias. These organizations no longer exist under their Reconstruction name of “state militias.” They evolved into the National Guard, a term first used in place of “state militias” in the North in the 1880s but ultimately applied to all state-level forces that were auxiliary to the U.S. army, including those in the South. National Guard units today are not analogues to the Reconstruction-era state militias; they are direct descendants.<sup>81</sup> And they operate in exactly the same way. They are under the command of state governors but can be used as auxiliary forces of the U.S. army—that is, they can be

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for the Year Ending December 31, 1870 (New Orleans, A.L. Lee, 1871), p. 39.

<sup>81</sup> Saul Cornell, *A Well-Regulated Militia: The Founding Fathers and the Origins of Gun Control in America* (New York: Oxford University Press, 2006), 196-97.



1 “federalized.”<sup>82</sup> Membership in the National Guard, like membership in the  
2 Reconstruction-era state militias, is regulated. National Guard units, like  
3 Reconstruction-era state militias, are expected to have proficiency with the weapons  
4 they use and to have unfailing allegiance to the recognized governments of their  
5 state and nation. Their access to high-capacity firearms is regulated. Such weapons  
6 are typically kept under guard in a central location, such as an armory, and  
7 dispensed to their users only for purposes of drilling, training, or actual use on those  
8 occasions when National Guard units are called out. Beside today’s National  
9 Guard, other users of high-capacity firearms at present include civilian law  
10 enforcement officers. As this Report has shown, the analogs of such officials  
11 during the Reconstruction era—urban policemen, sheriffs, or U.S. marshals—also  
12 were known on occasion to carry high-capacity firearms.

13 107. What is distinctly different today compared to Reconstruction is the  
14 ownership of high-capacity firearms by Americans who have no connection to the  
15 military or law enforcement. If such owners along with their weapons were  
16 transported by a time machine back to the Reconstruction-era South, they would  
17 find themselves suspected of being outlaws by law enforcement officers. If they  
18 then gathered together into organized companies, they would be considered  
19 insurrectionary militias, which is precisely how the Ku Klux Klan was regarded

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21 <sup>82</sup> The statutory language that enabled Abraham Lincoln to call up state  
22 militias in 1861, which was then invoked occasionally during Reconstruction to  
23 federalize state militias, now resides in the statute that enables the President to  
24 federalize the National Guard; see 10 U.S.C. 332 (Aug. 10, 1956, ch. 1041, 70A  
25 Stat. 15; Pub. L. 109–163, div. A, title X, §1057(a)(2), Jan. 6, 2006, 119 Stat.  
26 3440). One of the reasons for the rise in significance of the National Guard after  
27 Reconstruction was the federal “Posse Comitatus Act” of 1878, which prohibited  
28 the direct intervention of the U.S. army into states except in extraordinary  
circumstances. After that legislation, the National Guard units were needed not so  
much as auxiliaries to the U.S. army as substitutes for them. On the “Posse  
Comitatus Act” see Gautham Rao, “The Federal “Posse Comitatus” Doctrine:  
Slavery, Compulsion, and Statecraft in Mid-Nineteenth-Century America,” *Law  
and History Review*, 26 (Spring, 2008), 1-56.



1 during Reconstruction by the U.S. army, the state militias, and other legitimate,  
2 pro-Union law enforcement officials.

3  
4 I declare under penalty of perjury that the foregoing is true and correct.

5 Executed on January 6, 2023 at Philadelphia, Pennsylvania.

6  
7  
8   
9 Michael Vorenberg



## **EXHIBIT A**



## **CURRICULUM VITAE**

**Michael Vorenberg**  
Associate Professor of History  
Brown University

**Education**     Ph.D. in History, Harvard University, November 1995 (American History)  
                         A.M. in History, Harvard University, March 1990 (American History)  
                         A.B. in History, Harvard University, June 1986, *summa cum laude* (Ancient History)

### **Professional Appointments**

Associate Professor of History (with tenure), Brown University, 2004-  
Vartan Gregorian Assistant Professor, Brown University, 2002-2004  
Assistant Professor, History Department, Brown University, 1999-  
Assistant Professor, History Department, SUNY at Buffalo, 1996-99  
Post-Doctoral Fellow, W.E.B. Du Bois Center, Harvard University, 1995-96  
Lecturer, History and Literature Program, Harvard University, 1995-96

### **Scholarship**

#### **Books**

*Lincoln's Peace: The Elusive End of the American Civil War* (forthcoming  
with Alfred A. Knopf).  
*The Emancipation Proclamation: A Brief History with Documents* (Bedford/St.  
Martin's, 2010).  
*Final Freedom: The Civil War, the Abolition of Slavery, and the Thirteenth  
Amendment*. Cambridge: Cambridge University Press, 2001.  
(Paperback edition, 2004.)

#### **Chapters in Books**

"The 1866 Civil Rights Act and the Beginning of Military Reconstruction," in Christian  
Samito, ed., *The Greatest and the Grandest Act: The Civil Rights Act of 1866  
from Reconstruction to Today* (Carbondale, Ill.: Southern Illinois University  
Press, 2018), 60-88.  
"The Thirteenth Amendment," in *1865: America Makes War and Peace in Lincoln's  
Final Year* (Carbondale, Ill.: Southern Illinois University Press, 2015), 7-21.  
"Liberté, Égalité, and Lincoln: French Readings of an American President," in Richard  
Carwardine and Jay Sexton, eds., *The Global Lincoln* (New York: Oxford  
University Press, 2011), 95-106.  
"Citizenship and the Thirteenth Amendment: Understanding the Deafening Silence," in  
Alexander Tsesis, ed., *The Promises of Liberty: The History and Contemporary  
Relevance of the Thirteenth Amendment* (New York: Columbia University Press,  
2010).



- “Did Emancipation Create American Citizens?: Abraham Lincoln’s View” (in Russian), in Victoria Zhuravleva, ed., *Abraham Lincoln: Lessons of History and the Contemporary World* (Moscow: Russian State University for the Humanities Press, 2010).
- “Abraham Lincoln’s ‘Fellow Citizens’—Before and After Emancipation,” in William A. Blair and Karen Fisher Younger, eds., *Lincoln’s Proclamation: Emancipation Reconsidered* (Chapel Hill: University of North Carolina Press, 2009), 151-169.
- “The Thirteenth Amendment Enacted,” in Harold Holzer and Sara Vaughn Gabbard, eds., *Lincoln and Freedom: Slavery, Emancipation, and The Thirteenth Amendment* (Carbondale, Ill.: Southern Illinois University Press, 2007).
- “After Emancipation: Abraham Lincoln’s Black Dream,” in John Y. Simon, Harold Holzer, and Dawn Vogel, eds., *Lincoln Revisited* (New York: Fordham University Press, 2007).
- “Slavery Reparations in Theory and Practice: Lincoln’s Approach,” in Brian Dirck, ed., *Lincoln Emancipated: The President and the Politics of Race* (DeKalb: Northern Illinois Univ. Press, 2007).
- “Reconstruction as a Constitutional Crisis,” in Thomas J. Brown, ed., *Reconstructions: New Directions in the History of Postbellum America* (New York: Oxford University Press, 2006).
- “The World Will Forever Applaud: Emancipation,” in Aaron Sheehan-Dean, ed., *The Struggle for a Vast Future: The American Civil War* (Oxford, UK: Osprey, 2006).
- “Emancipating the Constitution: Francis Lieber and the Theory of Amendment,” in Charles R. Mack and Henry H. Lesesne, eds., *Francis Lieber and the Culture of the Mind* (Columbia: Univ. of South Carolina Press, 2005).
- “The Chase Court (1864-1873): Cautious Reconstruction,” in Christopher Tomlins, ed., *The United States Supreme Court: The Pursuit of Justice* (Boston: Houghton Mifflin, 2005).
- “Bringing the Constitution Back In: Amendment, Innovation, and Popular Democracy during the Civil War Era,” in Meg Jacobs, William Novak, and Julian Zelizer, eds., *The Democratic Experiment: The Promise of American Political History* (Princeton: Princeton University Press, 2003).
- “The King’s Cure: Abraham Lincoln and the End of Slavery,” in Charles Hubbard, ed., *Lincoln Reshapes the Presidency* (Mercer, Penn.: Mercer Univ. Press, 2004).
- “Rutherford B. Hayes,” in Alan Brinkley and Davis Dyer, eds., *The Reader’s Companion to the American Presidency*. Boston: Houghton Mifflin, 2000.
- “Abraham Lincoln and the Politics of Black Colonization,” in Thomas F. Schwartz, ed., *“For a Vast Future Also”: Essays from the Journal of the Abraham Lincoln Association*. New York: Fordham University Press, 1999. (Reprint of article listed below.)



### **Refereed Journal Articles**

- “Spielberg’s *Lincoln*: The Great Emancipator Returns,” *Journal of the Civil War Era*, 3 (December 2013), 549-72.
- “Imagining a Different Reconstruction Constitution,” *Civil War History*, 51 (December 2005), 416-26.
- “‘The Deformed Child’: Slavery and the Election of 1864,” *Civil War History*, 47 (September 2001), 240-257.
- “Abraham Lincoln and the Politics of Black Colonization,” *Journal of the Abraham Lincoln Association*, 14 (Summer 1993): 23-46.

### **Non-Refereed Journal Articles**

- “Emancipation—Then What?,” *New York Times*, “Disunion” Blog, January 15, 2013, [http://opinionator.blogs.nytimes.com/2013/01/15/emancipation-then-what/?\\_php=true&\\_type=blogs&\\_r=0](http://opinionator.blogs.nytimes.com/2013/01/15/emancipation-then-what/?_php=true&_type=blogs&_r=0)
- “Hearts of Blackness: Reconsidering the Abolitionists—Again,” *Reviews in American History*, 32 (March 2004), 33-40.
- “The Battle Over Gettysburg: What Lincoln Would Have Said about September 11, 2001,” *Brown Alumni Magazine*, 103 (Jan./Feb. 2003), 27.
- “Recovered Memory of the Civil War,” *Reviews in American History*, 29 (Dec. 2001), 550-58.

### **Invited Lectures**

- “A Righteous Peace: Abraham Lincoln, the Civil War, and the End of Slavery,” The Humanities Forum, Providence College, Oct. 18, 2019.
- “How Wars End--or Don’t: The Civil War as a Case Study,” Henry E. Huntington Society of Fellows Lecture, May 8, 2019.
- “Lincoln’s Peace: The Struggle to End the American Civil War,” Occidental College (Billington Lecture), Feb. 21, 2019.
- “The Fate of Slavery after Emancipation,” The Great Lectures Series (as OAH Distinguished Lecturer), New York City, October 14, 2017.
- “Abraham Lincoln, the Thirteenth Amendment, and the Struggle for American Peace and Freedom,” University of Saint Mary Annual Lincoln Lecture, Topeka, Kansas, February 20, 2017.
- “The 14th Amendment as an Act of War,” Boston College, Clough Center, Newton, Massachusetts, September 20, 2016.
- “Born in the USA—So What?” Worcester Polytechnic Institute, Constitution Day University Speaker, Worcester, Massachusetts, September 19, 2016.
- “The Slave Power on the Gallows: The Deeper Meaning of the Execution of Henry Wirz, Confederate Commandant,” University of California, Berkeley, Legal History Workshop, March 29, 2016.
- Salmon P. Chase Symposium on the Thirteenth Amendment (participant), Georgetown Law Center, Dec. 4-5, 2015, Washington, DC.
- “The Last Surrender: Looking for the End of the Civil War,” presented at The Lincoln Forum, Gettysburg, Pennsylvania, November 17, 2015.



- “Voting Rights and the Meaning of Freedom: The View from the Civil War Era,” Annual Lincoln Legacy Lecture, University of Illinois at Springfield, October 15, 2015.
- “Final Freedom: The Civil War, the Abolition of Slavery, and the Thirteenth Amendment,” Roger Williams University, October 6, 2015.
- “Lincoln and the Jews, Freedom and Discrimination,” Brown Hillel Alumni Association, New York City, May 17, 2015.
- “When Should History Say That Slavery Ended in the United States?,” Center for Slavery and Justice, Brown University, May 8th, 2015.
- “Lincoln, the Constitution, and the Civil War,” Community College of Rhode Island, April 29, 2015.
- “Judgment at Washington: Henry Wirz, Lew Wallace, and the End of the Civil War,” Annual Symposium of Capitol Historical Society, Washington, DC, May 2, 2014.
- “Emancipation, Lincoln, and the Thirteenth Amendment,” Dole Forum, Dole Institute of Politics, University of Kansas, Lawrence, Kansas, November 21, 2013.
- “Spielberg’s Lincoln and the Relation between Film and History,” Department of History, Loyola University, Chicago, Illinois, November 13, 2013.
- “The Appomattox Effect: Struggling to Find the End of the American Civil War,” Newberry Library Colloquium, Chicago, Illinois, November 6, 2013.
- “Reconstruction and the Origins of Civil Rights,” National Endowment for the Humanities Summer Institute on Civil Rights History, Harvard University, Cambridge, Massachusetts, July 1, 2013.
- “The Origins and Process of Emancipation,” Emancipation at 150 Symposium, Boston College Clough Center, Newton, Massachusetts, April 23, 2013.
- “Emancipation—Then What? Citizenship?” Emancipation Proclamation Symposium, University of Michigan, October 26, 2012.
- “Blood, Allegiance, Belief: The Meanings of Citizenship in the Civil War Era,” University of Michigan Law School, January 31, 2012.
- “American by War: The People and Their Nations during the Civil War,” Phillips Andover Academy, Andover, MA, Nov. 17, 2011.
- “Birthright and the Myth of Liberal Citizenship,” JANUS Forum, Brown University, Nov. 15, 2011.
- “American by War: The People and Their Nations during the Civil War,” Western Kentucky University, Bowling Green, KY, Oct. 12, 2011.
- “The Elections of 1860 and 2010 and the Politics of Citizenship,” Colby College Symposium on the American Civil War Sesquicentennial, Waterville, Maine, November 10, 2010.
- “Americans Debate Citizenship—Then and Now,” Brown Club of England, October 12, 2010, London.
- “War Powers, *Ex Parte Merryman*, and the Relevance of the American Civil War,” American Bar Association Workshop for High School Teachers, Washington, D.C., June 19, 2010.
- “Originalism and the Meanings of Freedom,” Georgetown Law School, Washington, D.C., March 30, 2010.
- “Abraham Lincoln, Politician,” Rotary Club of Rhode Island, Warwick, R.I., November 6, 2008.



- “Lincoln the Citizen,” Abraham Lincoln Symposium, National Archives, Washington, D.C., September 20, 2008.
- “Emancipation and its Meaning in Current Scholarship,” National Endowment for the Humanities Summer Institute on “Slavery and Emancipation,” Philadelphia, Pennsylvania, July 28, 2008.
- “Lincoln the Citizen—Or Lincoln the Anti-Citizen?,” Abraham Lincoln Symposium, Springfield, Illinois, February 12, 2008.
- “The Tangled History of Civil Rights and Citizenship in the Civil War Era,” University of Virginia School of Law, November 2007.
- “Civil Liberties and Civil Rights: The Civil War Era,” American Bar Association, Chicago, May 2006.
- “Race, the Supreme Court, and the Retreat from Reconstruction,” Boston College School of Law, April 2007.
- “Forever Free: The Meanings of Emancipation in Lincoln’s Time and Ours,” St. Louis University, December 7, 2006.
- “Slavery Reparations in Historical Context,” Connecticut College, New London, Connecticut, March 2, 2006.
- “Abraham Lincoln, The Civil War and the Conflicting Legacies of Emancipation,” presented as part of the “Forever Free” series, Providence Public Library, Providence, R.I., January 26, 2006.
- “Abraham Lincoln, War Powers, and the Impact of the Civil War on the U.S. Constitution,” presented at symposium on “War Powers and the Constitution,” Dickinson College, Dickinson, Penn., October 3, 2005.
- “Reconsidering Law, the Constitution, and Citizenship,” presented at “New Directions in Reconstruction” symposium, Beaufort, S.C., April 15-18, 2004.
- “Abraham Lincoln, Slavery, and Modern Legacies,” Public History Series, University of Las Vegas, Nevada, February 12, 2004.
- “Oaths, African Americans, and Citizenship,” University of Nevada at Las Vegas Law School, February 12, 2004.
- “Reconsidering the Era of the Oath: African Americans Before Union Military Courts during the American Civil War,” presented to the Law and History symposium, Northwestern University Law School, Chicago, Ill., November 3, 2003.
- “Racial and Written Constitutions in Nineteenth-Century America,” presented to the workshop of the Department of History, Boston College, Newton, Massachusetts, March 2003.
- “Abraham Lincoln, Abolition, and the Impact of the Civil War on the Cult of the Constitution,” presented at the Social Law Library, Suffolk University, Boston, Massachusetts, February 2002.
- “Francis Lieber, Constitutional Amendments, and the Problem of Citizenship,” presented at The Francis Lieber Symposium, University of South Carolina, Columbia, S.C., November 2001.
- “How Black Freedom Changed the Constitution,” presented at the “Writing the Civil War” symposium, Atlanta History Center, Atlanta, Georgia, September 2001.



- “From a Covenant with Death to a Covenant with Life: The Constitution’s Transformation during the American Civil War,” presented as the Annual Constitutional Anniversary Lecture, National Archives, Washington, D.C., September 2001.
- “New Perspectives on Abraham Lincoln, Emancipation, and the Civil War,” presented to the Civil War Round Table of Rhode Island, Cranston, Rhode Island, June 2001.
- “Historical Roots of the Modern Civil Rights Movement: The Constitution,” presented at the Civil Rights Summer Institute, Harvard University, Cambridge, Massachusetts, June 2001.
- “Race, Law, and the Invention of the State Action Doctrine in the Late Nineteenth Century,” presented at the Columbia University Law School, New York City, April 2001.
- “A King’s Cure, a King’s Style: Lincoln, Leadership, and the Thirteenth Amendment,” presented at the “Abraham Lincoln and the Legacy of the Presidency” conference, Lincoln Memorial University, Harrogate, Tennessee, April 2001.
- “The Tangled Tale of Civil War Emancipation,” presented at the University of Richmond, Richmond, Virginia, March 2001.
- “The King’s Cure: Abraham Lincoln, the Thirteenth Amendment, and the Fate of Slavery,” presented at the Abraham Lincoln Institute of the Mid-Atlantic, Washington, D.C., March 2001.
- “Race, the Supreme Court, and the Retreat from Reconstruction,” presented at the Boston College School of Law, Newton, Mass., April 2000.

#### **Papers Read or Discussed**

- “Prisoners of Freedom, Prisoners of War: An Untold Story of Black Incarceration--And How it Might be Told,” Brown Legal History Workshop, Oct. 28, 2019.
- “Bearer of a Cup of Mercy: Lew Wallace’s American Empire,” Henry E. Huntington Library, Research Fellows Meeting, Feb. 6, 2019.
- “Anti-Imperialism and the Elusive End of the American Civil War,” presented at the “Remaking North American Sovereignty” Conference, Banff, Alberta, Canada, July 31, 2015.
- “The Election of 1864: Emancipation Promised, Emancipation Deferred,” presented at The Annual Meeting of the Organization of American Historians, Atlanta, Georgia, April 11, 2014.
- “The Appomattox Effect: Struggling to Find the End of the American Civil War,” Department of History, Northwestern University, Evanston, Ill., Nov. 15, 2013.
- “Birth, Blood, and Belief: Allegiance and the American Civil War,” presented at the Elizabeth Clark Legal History Workshop Series, Boston University School of Law, Nov. 16, 2011.
- “French Readings of Lincoln’s Role in the Creation of American Citizenship,” presented at the conference on European Readings of Abraham Lincoln, His Times and Legacy, American University of Paris, Paris, France, October 18, 2009.



- “Was Lincoln’s Constitution Color-Blind?,” presented at the Abraham Lincoln Bicentennial Symposium, Harvard University, Cambridge, Mass., April 24, 2009.
- “Citizenship and the Thirteenth Amendment: Understanding the Deafening Silence,” presented at conference on Slavery, Abolition, and Human Rights: Interdisciplinary Perspectives on the Thirteenth Amendment, April 17, 2009
- “Did Emancipation Create American Citizens?—Abraham Lincoln’s View,” presented at the conference on Abraham Lincoln: Issues of Democracy and Unity, Russian State University, Moscow, Feb. 8, 2009.
- “The Racial and Written Constitutions of Nineteenth-Century America,” Cogut Center for the Humanities, Brown University, Nov. 4, 2008.
- “Civil War Era State-Building: The Human Cost,” Boston University Political History Workshop, March 19, 2008.
- “Citizenship and the Thirteenth Amendment: Understanding the Deafening Silence,” annual meeting of the *Law and Society Association*, Montreal, May 30, 2008.
- “Claiming Citizenship: Black and White Southerners Make Their Cases During the Civil War,” presented at the annual meeting of the *Southern Historical Association*, Memphis, November 2004.
- “Imagining a Different Reconstruction Constitution,” presented at the annual meeting of the Social Science History Association, Baltimore, November 2003.
- “West of Reconstruction: Resolving Mexican-American Property and Citizenship in the Civil War Era,” presented at the annual meeting of the *American Historical Association*, San Francisco, California, January 2002.
- “The Limits of Free Soil: The Resolution of Mexican Land Claims during the American Civil War,” presented at the annual meeting of the *Organization of American Historians*, St. Louis, Missouri, April 2000.
- “Written Constitutions, Racial Constitutions, and Constitutional Permanence in Nineteenth-Century America,” presented at the annual meeting of the *American Society for Legal History*, Toronto, Ontario, October 1999.
- “Law, Politics, and the Making of California Free Soil during the American Civil War,” presented at the annual meeting of the *Western History Association*, Portland, Oregon, October 1999.
- “Land Law in the Era of Free Soil: The Case of New Almaden,” *American Society for Environmental History*, Tucson, Arizona, April 1999.
- “Written Constitutions, Racial Constitutions, and Constitutional Permanence in Antebellum America,” presented at the annual meeting of the *Society for Historians of the Early American Republic*, Harpers Ferry, W.V., July 1998.
- “The Constitution in African-American Culture: Freedom Celebrations and the Thirteenth Amendment,” presented to the *W.E.B. Du Bois Institute*, Harvard University, Cambridge, Massachusetts, April 1996.
- “Civil War Emancipation and the Sources of Constitutional Freedom,” presented at the annual meeting of the *Organization of American Historians*, Washington, D.C., April 1995.



“The Origins and Original Meanings of the Thirteenth Amendment,” presented at the annual meeting of the *American Society for Legal History*, Washington, D.C., October 1994.

“Civil War Emancipation in Theory and Practice: Debates on Slavery and Race in the Border States, 1862-1865,” presented at the *Southern Labor Studies Conference*, Birmingham, Alabama, October 1993.

## **Service**

### **University**

Anna S. K. Brown Library advisory committee, member, 2016-present.

Co-Organizer (with Faiz Ahmed, Rebecca Nedostup, Emily Owens), Brown Legal History Workshop, 2015-present.

Political Theory Project, Advisory Board, 2010-2019

Organizer and Presenter, “Abraham Lincoln for the 21<sup>st</sup> Century: A Symposium honoring the Abraham Lincoln Bicentennial,” John Hay Library, Brown University, Feb. 27-28, 2009. Plenary lecture by Benjamin Jealous, president of NAACP, and six symposium participants. Funding secured from Rhode Island Foundation, Rhode Island Lincoln Bicentennial Commission, Brown Provost, Brown Dean of Faculty, History Department, Africana Studies Department

### **Profession**

Program Committee, Society of Civil War Historians, 2022 annual conference, 2020-present.

Cromwell Prize Committee, American Society for Legal Historians, 2014-2017.

Board of Editors, *Law and History Review*, 2004-2013 (reappointed 2009).

Advisory Committee, United States Abraham Lincoln Bicentennial Commission, 2002-10.

Board of Advisors, Lincoln Prize, Gettysburg Institute (2000-present).

Co-Chair, Local Arrangements Committee, Annual Meeting of the Society for Historians of the Early American Republic, Providence, Rhode Island, Summer 2004.

Referee for National Endowment for the Humanities

Scholarly Editions, 2002; Summer Grants, 2001-2003.

Committee Member, Local Arrangements Committee, Annual Meeting of the American Society for Environmental History, to be held in Providence, Rhode Island, Spring 2003.

Referee for article manuscripts submitted to the *Journal of American History*, *Law and History Review*, *Law and Social Inquiry*, *Journal of the Civil War Era*, and *Civil War History*.

Referee for book manuscripts submitted to Houghton Mifflin, Harvard University Press, Oxford University Press, New York University Press, University of Chicago Press, University of Illinois Press, and University of North Carolina Press.

Advisory Editor for *Proteus* (special issue devoted to the American Civil War, Fall 2000).



### **Community**

Lecture on American Citizenship and Exclusion, Center for Reconciliation, Providence, R.I., July 2018.

Instructor in co-taught course at the Rhode Island Adult Correctional Institute (ACI) through the Brown University BELLS program, 2013.

Lecture on Reconstruction-Era Constitutional Amendments, Barrington, RI, Open Classroom, April 4, 2013.

Lecture on 150<sup>th</sup> Anniversary of the Emancipation Proclamation, Wheeler School, Providence, Rhode Island, January 17, 2013.

Rhode Island Civil War Sesquicentennial Commission, 2011- .

Rhode Island Abraham Lincoln Bicentennial Commission (appointed by Governor), 2005-2009.

Lecturer on the Brown Steering Committee on Slavery and Justice, The Wheeler School, Providence, Rhode Island, November 2006.

Seminar leader for National Endowment for the Humanities “We the People” initiative at Deerfield Historical Society, Deerfield, Mass., April 2006.

Seminar leader for National Endowment for the Humanities “Teaching American History” initiative at Rhode Island Historical Society, Providence, R.I., September 2005.

Seminar leader for National Endowment for the Humanities “We the People” initiative at Deerfield Historical Society, Deerfield, Mass., March 2005.

Advisor to the Burrillville, Rhode Island, School Department, on securing and administering a “Teaching American History” grant from the United States Department of Education, 2001-2002.

### **Academic Honors and Fellowships**

Ray Allen Billington Professor, Occidental College/Henry E. Huntington Library, 2018-19.

Pembroke Center for the Study of Women and Gender Fellowship, Brown University, 2016-17.

National Endowment for the Humanities Long-Term Fellowship, Massachusetts Historical Society, Boston, Massachusetts, 2014.

National Endowment for the Humanities Long-Term Fellowship, Newberry Library, Chicago, Illinois, 2013.

Finalist, CIES Fulbright Fellowship for University of Rome III (2010-11 competition)

Cogut Center for the Humanities Fellowship, Brown University, Fall 2008.

William McLoughlin Prize for Teaching in the Social Sciences, Brown University, 2007.

Karen Romer Prize for Undergraduate Advising, Brown University, 2007.

History News Network (HNN) “Top Young Historian,” 2005 (1 of 12 named in the U.S.).

Vartan Gregorian Assistant Professorship, Brown University, 2002-2004.

Finalist, Lincoln Prize, 2002 (for *Final Freedom*).

American Council of Learned Societies/Andrew W. Mellon Fellowship, 2002-03.

Kate B. and Hall J. Peterson Fellowship, American Antiquarian Society, 2002-03.

Salomon Research Award, Brown University, 2002-2003.

National Endowment for the Humanities Summer Stipend, 2001.

Julian Park Fund Fellowship, SUNY at Buffalo, 1998.



Research Development Fund Fellowship, SUNY at Buffalo, 1997.  
Harold K. Gross Prize for Best Dissertation at Harvard in History, 1996.  
Delancey Jay Prize for Best Dissertation at Harvard on Human Liberties, 1996.  
W.E.B. Du Bois Fellowship, Harvard University, 1995.  
Whiting Fellowship in the Humanities, 1994.  
Bowdoin Prize for Best Essay at Harvard in the Humanities, 1993.  
Indiana Historical Society Graduate Fellowship, 1993.  
W. M. Keck Fellowship, Henry E. Huntington Library, 1993.  
Everett M. Dirksen Congressional Research Fellowship, 1993.  
Mark DeWolfe Howe Fellowship, Harvard Law School, 1993.  
Charles Warren Center Research Fellowship, Harvard History Dept., 1991-2.  
Derek Bok Award for Distinction in Teaching at Harvard, 1991.  
Philip Washburn Prize for Best Senior Thesis at Harvard in History, 1986.



## **EXHIBIT 64**



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*in his official capacity*<sup>1</sup>

10  
11 IN THE UNITED STATES DISTRICT COURT  
12 FOR THE CENTRAL DISTRICT OF CALIFORNIA  
13 WESTERN DIVISION  
14

15 **STEVEN RUPP; STEVEN**  
16 **DEMBER; CHERYL JOHNSON;**  
17 **MICHAEL JONES;**  
18 **CHRISTOPHER SEIFERT;**  
19 **ALFONSO VALENCIA; TROY**  
20 **WILLIS; and CALIFORNIA RIFLE**  
21 **& PISTOL ASSOCIATION,**  
22 **INCORPORATED,**

23 Plaintiffs,

24 v.

25 **ROB BONTA, in his official capacity**  
26 **as Attorney General of the State of**  
27 **California; and DOES 1-10,**

28 Defendants.

8:17-cv-00746-JLS-JDE

**SUPPLEMENTAL SUR-  
REBUTTAL EXPERT REPORT  
AND DECLARATION OF  
MICHAEL VORENBERG**

Courtroom: 8A  
Judge: The Honorable Josephine  
L. Staton

Action Filed: April 24, 2017

<sup>1</sup> Rob Bonta has succeeded former Attorney General Xavier Becerra as the Attorney General of the State of California. Pursuant to Federal Rule of Civil Procedure 25(d), Attorney General Bonta, in his official capacity, is substituted as the defendant in this case.



**SUPPLEMENTAL SUR-REBUTTAL EXPERT REPORT AND  
DECLARATION OF MICHAEL VORENBERG**

I, Michael Vorenberg, declare under penalty of perjury that the following is true and correct:

1. I offer the following report as a sur-rebuttal report and declaration (“Sur-Rebuttal”) to the rebuttal report of Ashley Hlebinsky dated February 3, 2023 in this case. My background and qualifications already have been detailed in my supplemental expert report and declaration dated January 6, 2023, in this case.

2. This Sur-Rebuttal is based on my own personal knowledge and experience, and, if I am called as a witness, I could and would testify competently to the truth of the matters discussed in it.

**I. SUMMARY OF SUR-REBUTTAL**

3. In her rebuttal, Ashley Hlebinsky has offered no evidence to counter the arguments and conclusions that I made in my report. Her statement does include some assertions that run counter to my report, but as detailed below, these assertions are based on poor methodology or factual error. Indeed, the Hlebinsky rebuttal as a whole employs methods that do not comport with widely accepted professional standards or practices in the field of historical research.

**II. A NOTE ON TERMINOLOGY: “THE SECOND FOUNDING”**

4. Hlebinsky regularly uses the phrase “The Second Founding” to describe the period of U.S. history immediately following the Civil War. By contrast, my report usually refers to this period as “Reconstruction” or “post-Civil War Reconstruction.” (Vorenberg report, ¶ 11, pages 5-6.) Among historians such as myself who specialize in the Civil War and Reconstruction, the use of “The Second Founding” to describe the period in question is unusual but not unheard of. Indeed, Eric Foner, the leading historical expert on Reconstruction and the author of the seminal book on the period, has recently published a book titled *The Second Founding*, which examines the constitutional amendments adopted during



1 Reconstruction (the 13<sup>th</sup>, 14<sup>th</sup>, and 15<sup>th</sup> amendments).<sup>2</sup> For the purposes of my  
2 report and now again for my Sur-Rebuttal, I use Reconstruction in favor of “The  
3 Second Founding” because of the conventions of the discipline, but I accept “The  
4 Second Founding” as a legitimate descriptor of the period. For the purposes of this  
5 Sur-Rebuttal, then, “Reconstruction” and “The Second Founding” should be  
6 regarded as synonymous.

7 **III. THE HLEBINSKY REBUTTAL AND FIREARMS HISTORY EXPERTISE**

8 5. Hlebinsky identifies herself as a “firearms historian” (Hlebinsky  
9 rebuttal, ¶ 1, page 2, line 1.) Yet her rebuttal contains errors regarding firearms  
10 history that are recognizable to even a generalist historian of the United States. For  
11 example, she writes that “it is unfair to assume that a person until recently would  
12 make a clear distinction between capacities under and over ten rounds and is  
13 historically arbitrary, particularly for the time frames being discussed.” (Hlebinsky  
14 rebuttal, ¶ 18, page 12, lines 15-17.) “Ten rounds” may seem an abstract number,  
15 but in the context of Reconstruction, the difference was meaningful. In the abstract,  
16 a repeating rifle holding fourteen rounds should fire those rounds in twice the time  
17 that it takes a repeating rifle holding seven rounds to fire its load. But this abstract  
18 principle does not bear out when applied to Reconstruction-era firearms. A Spencer  
19 rifle held seven rounds.<sup>3</sup> To fire fourteen rounds, the user of the Spencer had to  
20 load the rifle with seven rounds, fire all the rounds, reload with another set of seven  
21 rounds, and fire the load again. Between each round fired, the user had to take  
22 three actions: cock the hammer at the top of the barrel backwards; move the lever at

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23 <sup>2</sup> Eric Foner, *Reconstruction: America’s Unfinished Revolution, 1863-1877*  
24 (rev. ed., New York: HarperCollins, 2014); Eric Foner, *The Second Founding: How*  
25 *the Civil War and Reconstruction Remade the Constitution* (New York: W. W.  
Norton, 2019).

26 <sup>3</sup> Hlebinsky notes that, in a sentence about the number of rounds in Sharps  
27 and Spencer rifles, I misstated the number of rounds in each. (Hlebinsky rebuttal,  
28 page 5, note 2.) This information does not change my ultimate conclusion that  
Henrys and Winchesters were the only guns produced in significant numbers during  
the Reconstruction period that held ten or more rounds.



1 the bottom of the barrel forwards; and move the same lever backwards. By  
2 contrast, the user of a Henry rifle simply had to load fourteen rounds into the  
3 chamber below the barrel of the gun and fire off the whole load. Between each  
4 shot, the user only had two motions to perform: move the lever at the bottom of  
5 barrel forward, then move it backward. Thus, in the case of a Spencer vs. a Henry,  
6 the speed of firing a large number of rounds was not simply inversely proportional  
7 to the number of rounds fired. More to the point: the firearm in this era that held  
8 more than ten rounds (the Henry or Winchester) could shoot a disproportionately  
9 larger number of rounds per minute than the firearm that held fewer than ten rounds  
10 (the Spencer). With the Winchester '66, the speed of delivering high volumes of  
11 rounds became even greater, as reloading could be done by feeding rounds into the  
12 "gate" at the side of the breech rather than waiting for all rounds to be expelled  
13 before reloading, as was the case with the Henry and the Spencer.

14 6. Another statement regarding firearms in the Hlebinsky rebuttal that  
15 strikes even a generalist as odd is the following:

16 Rifling, the boring out of the inside of a barrel with spiral lands and  
17 grooves to spin a projectile, thus making it more accurate, was  
18 developed at the turn of the sixteenth century and appeared  
19 predominantly in civilian arms, with a few military exceptions from  
the American Revolution, until just before the turn of the twentieth  
century when military tactics finally caught up to the technology.

20 (Hlebinsky rebuttal, ¶ 12, page 8, lines 19-24.) The implication of this statement is  
21 that the U.S. military did not use rifled barrels in significant numbers until the late  
22 1800s. Yet rifled weapons such as the Springfield were by far the most common  
23 types of firearms used by U.S. and Confederate military personnel by the end of the  
24 Civil War (1865), roughly thirty years before the point when, according to  
25 Hlebinsky, the U.S. military adopted rifled technology in a widespread way.

26 7. I will note one final controversial statement about firearms history in  
27 the Hlebinsky rebuttal that is problematic even to the generalist historian:  
28



1 There has always been an ebb and flow of civilian and military  
2 firearms for centuries, some with clearer lines than others. However,  
3 the assertion that historically a gun could be completely understood as  
4 only for war in a time when there was such interchangeability, is  
5 presentist at best.

6 (Hlebinsky rebuttal, ¶ 16, page 12, lines 3-6.) It may indeed be historically  
7 inaccurate to suggest that a certain gun was used “only for war.” But it is equally  
8 inaccurate to suggest that all guns were fully interchangeable between military and  
9 civilian use. As my report noted, Winchesters were owned by civilians only in  
10 small numbers, while most of the owners were armies (non-U.S. armies in  
11 particular) and U.S. law enforcement organizations. (Vorenberg report, ¶ 7, page 4,  
12 lines 3-9.) There was no significant “blurring” of the line between government  
13 ownership and civilian ownership when it came to Winchesters. The same was true  
14 of Spencer repeating rifles, incidentally. During the Civil War, Spencers were sold  
15 to the U.S. army and, to a lesser extent, the Confederate army; they had no  
16 meaningful civilian market. When the Civil War ended, U.S. soldiers were allowed  
17 to buy their Spencers, and roughly 10,000 did so. But the company that made  
18 Spencers did not then market their weapons to civilians; it marketed them only to  
19 armies. Eventually, this company was acquired by the Winchester company, which  
20 sold all the surplus Spencers in its inventory to foreign armies rather than  
21 attempting to sell them to civilians.<sup>4</sup> It is not ahistorical or presentist to say that,  
22 circa 1868 (the date of the ratification of the Fourteenth Amendment), Henrys and  
23 Winchesters, as well as lower-capacity repeating rifles like Spencers, were  
24 primarily—and nearly exclusively—for non-civilian use.

#### 24 **IV. HLEBINSKY’S USE, NON-USE, AND MISUSE OF HISTORICAL SOURCES**

25 8. Historians are expected to be adept at finding and appropriately using  
26 materials from the past. This skill requires recognizing that some historical sources

27 <sup>4</sup> Joseph G. Bilby, *A Revolution in Arms: A History of the First Repeating*  
28 *Rifles* (Yardley, Penn.: Westholme, 2006), 195-204.



1 are more reliable than others. It also requires reading sources critically. Rather  
2 than accepting any source purporting to be “history” as accurate, historians are  
3 expected to interrogate sources for errors, biases, and decontextualization (that is,  
4 presenting a fact or series of facts outside of the relevant contexts that give the facts  
5 their correct historical meaning). Repeatedly in her rebuttal, Hlebinsky is  
6 inattentive to the basic standards of source use in historical research.

7 **A. Use of Unreliable Sources**

8 9. Hlebinsky writes that the Cody Firearms Museum (CFM), where she  
9 spent most of her professional career, is “the only accredited firearms museum in  
10 the United States.” (Hlebinsky rebuttal, ¶ 4, page 3, lines 9-10.) Her use of the  
11 word “accredited” indicates that she accepts the principle that there are standards in  
12 the practice of history, or at least in the way that history is displayed to the public.

13 10. Before moving onto the issue of whether Hlebinsky’s work meets the  
14 standards of historical practice, I note that the CFM is not technically the only  
15 accredited firearms museum in the United States. Although Hlebinsky does not  
16 identify the organization that “accredited” the CFM, almost certainly it is the  
17 American Alliance of Museums (AAM), as this is the only commonly known  
18 organization in the U.S. that accredits museums. The AAM has accredited the  
19 Buffalo Bill Center of the West, of which the CFM is a component institution. If  
20 by this definition the CFM is accredited, then other firearms museums that are  
21 components of larger, accredited institutions must be considered accredited. One  
22 such museum is the Smithsonian Institution’s National Firearms Collection, which  
23 is a component of the accredited National Museum of American History.  
24 Hlebinsky knows of the Smithsonian’s National Firearms Collection, as she worked  
25 there early in her career. (Hlebinsky rebuttal, ¶ 3, page 3, lines 7-8.) Yet she  
26 inexplicably excludes the Collection from the category of “accredited firearms  
27 museums,” even though it meets the same standard of accreditation as the CFM.  
28



1           11. The point about accreditation relates to the larger problem in  
2 Hlebinsky's rebuttal of imprecision in general and faulty source use in particular.  
3 The statement about accreditation made by Hlebinsky implies that she believes that  
4 evidence from non-accredited museums is of a lesser or negligible value than  
5 evidence from an accredited museum. That being the case, how can Hlebinsky  
6 account for her decision to use evidence from the NRA National Firearms Museum,  
7 a firearms museum that is not accredited by the AAM?

8           12. The NRA National Firearms Museum is the main source for  
9 Hlebinsky's claim that in Boston around the year 1756, "a Cookson-type twelve-  
10 shot repeater was made by gunmaker John Shaw." (Hlebinsky rebuttal, ¶ 20, page  
11 14, lines 6-7.) Hlebinsky's own standards, indicated by her emphasis on museum  
12 accreditation, should have led her to seek confirmation of information provided by  
13 this unaccredited source. The information about the "Cookson-type twelve-shot  
14 repeater" provided by the NRA National Firearms Museum is used by Hlebinsky to  
15 make the argument that repeating firearms were common at the time of the  
16 founding of the United States. Yet other, more reliable sources question the  
17 authenticity of the gun in question and the validity of using the gun to make the  
18 claim about the commonality of repeaters at the time of the founding.<sup>5</sup> To bolster  
19 her problematic claim about the "Cookson," Hlebinsky also cites, in the same  
20 footnote containing the NRA National Firearms Museum source, a blog containing  
21 a video from the NRA Firearms Museum that shows a person holding and  
22 describing the "Cookson." The narrator in the video makes statements that actually  
23 contradict Hlebinsky's contention about the commonality of repeaters at the time of  
24 the founding. He says of the period when the gun was made: "this was in the day  
25 when a single-shot muzzle-loader was basically all you had." He then says that a  
26

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27           <sup>5</sup> See, for example, David S. Weaver and Brian Goodwin, "John Cookson,  
28 gunmaker," *Arms and Armour*, 19 (June 2022), 43-63, esp. 51-61.



1 gun such as the one he displays, a breech-loading gun that could fire twelve shots  
2 before being re-loaded, was “an unusual gun.”<sup>6</sup>

3 13. Another example of Hlebinsky’s use of inferior sources is found in her  
4 discussion of the “Belton repeating fusil.” (Hlebinsky rebuttal, ¶ 20, page 14, lines  
5 7-16.) According to Hlebinsky, Joseph Belton, the supposed maker of the supposed  
6 gun, successfully persuaded Benjamin Franklin to lobby George Washington, then  
7 General of the Continental Army, to buy Belton’s guns. Washington agreed to  
8 order one hundred of them but then canceled the order because they were too  
9 expensive. The source that Hlebinsky gives for this information includes a website  
10 that tells the history roughly as Hlebinsky has told it.<sup>7</sup> However, this history is  
11 faulty. Franklin’s letter to Washington does not recommend a firearm designed by  
12 Belton but rather a riverine submarine designed by him. Another website cited by  
13 Hlebinsky—in the same footnote containing the erroneous website—contains a  
14 copy of the actual letter by Franklin to Washington indicating that Belton’s pet  
15 project is a submarine, not a gun.<sup>8</sup> Thus, in one footnote, Hlebinsky has cited a  
16 website containing a letter that she does not appear to have read (the one from  
17 Franklin to Washington), along with a website that she *has* read but has not  
18 verified. The gun in question, along with the identity of Joseph Belton, are  
19 questionable, complex matters, but instead of trying to understand and verify these  
20 matters through acceptable historical research, Hlebinsky has simply surfed the web  
21

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22 <sup>6</sup> <http://firearmshistory.blogspot.com/2014/02/the-cookson-repeater.html>  
23 (accessed Feb. 20, 2023). The video displayed at the blog may be found here:  
<https://youtu.be/cs4vjq6sW40> (accessed Feb. 20, 2023).

24 <sup>7</sup> [https://www.rockislandauction.com/riac-blog/assault-weapons-before-the-second-](https://www.rockislandauction.com/riac-blog/assault-weapons-before-the-second-amendment#:~:text=The%20Belton%20%22Roman%20candle%22%20fusil%20is%20the%20first,a%20chained%20charge%20much%20like%20a%20Roman%20candle)  
25 [amendment#:~:text=The%20Belton%20%22Roman%20candle%22%20fusil%20is%20the%20first,a%20chained%20charge%20much%20like%20a%20Roman%20candle](https://www.rockislandauction.com/riac-blog/assault-weapons-before-the-second-amendment#:~:text=The%20Belton%20%22Roman%20candle%22%20fusil%20is%20the%20first,a%20chained%20charge%20much%20like%20a%20Roman%20candle)  
26 (accessed Feb. 20, 2023).

27 <sup>8</sup> <https://founders.archives.gov/documents/Washington/03-05-02-0311>  
28 (accessed Feb. 20, 2023).



1 for information, and has not even done that well. Exemplary, extensive historical  
2 research into Belton and the “Belton repeating fusil” has been conducted by Robert  
3 Held, whose conclusions are at odds with Hlebinsky’s, but Hlebinsky has not  
4 bothered to consult this work—or at least gives no evidence of having done so. If  
5 she had consulted it, she would have learned that almost certainly, Belton had never  
6 produced a single repeating rifle of the sort that he vainly hoped would be  
7 purchased by the Continental Congress.<sup>9</sup>

8 **B. Non-Use of Sources**

9 14. The non-use of Robert Held’s work on Belton firearms is only one  
10 example of Hlebinsky’s failure to use obvious historical sources for information.  
11 Her most glaring non-use of sources is evident in her discussion of the production  
12 and distribution of Henry and Winchester rifles in the Reconstruction era. The  
13 most valuable sources regarding production and distribution of these firearms are  
14 the serial number ledger books of the Winchester Repeating Arms Company. The  
15 Cody Firearms Museum (CFM) possesses only those ledger books for the post-  
16 1875 period—that is, the period that begins *after* the crucial era termed the “Second  
17 Founding Era” by Hlebinsky.

18 15. Fortunately, prior to the Company records being transferred to the  
19 CFM, they were carefully examined by John E. Parsons, sometime in the early  
20 1950s. Parsons, with the help of the curator of the company’s records of the time,  
21 had access to information from the serial number ledger books in the pre-1875  
22 period. This information covered the Henry Rifle and the various models of the  
23 Winchester.<sup>10</sup> For my report, the Parsons research was the primary basis of my  
24 claims involving production and distribution numbers. (Vorenberg report, page 16,  
25 note 17; *ibid.*, page 29, note 29.) Since writing that report, I have conducted further

26 <sup>9</sup> Robert Held, *The Belton Systems, 1758 and 1784-86: America’s First*  
27 *Repeating Firearms* (Lincoln, R.I.: Andrew Mowbray, 1986), 36-39.

28 <sup>10</sup> John E. Parsons, *The First Winchester: The Story of the 1866 Repeating*  
*Rifle* (New York: Morrow, 1955), 102-7.



1 research into production and distribution numbers, using in particular studies  
2 produced by Herbert G. Houze. Among Houze's publications is a book published  
3 in 1994 which was commissioned by the Olin Corporation, then the owner of the  
4 Winchester company; this book largely confirms the numbers published by Parsons  
5 forty years earlier.<sup>11</sup> None of the works by Parsons or Houze was used by  
6 Hlebinsky in her rebuttal. It is evident that she has not consulted the works; she  
7 may not even be aware of them. Had she consulted them, she would have been able  
8 to provide relevant information for the pre-1875 period, and she would not have  
9 made the specious claim that "primary source evidence of foreign contracts are not  
10 well documented and in some cases, questionable." (Hlebinsky rebuttal, ¶ 25, page  
11 19, lines 10-11.) In fact, both Parsons and Houze provide reproductions of  
12 selections of primary-source foreign contracts. Parsons even provides an Appendix  
13 containing transcriptions of contracts made by the Winchester company with the  
14 Ottoman Empire in 1870; these were the most lucrative company contracts of the  
15 Reconstruction era.<sup>12</sup>

16 16. Serial number information in the Hlebinsky rebuttal is drawn from two  
17 scanty websites and from the serial number ledger records at the CFM, which, as  
18 noted above, cover only the period after 1875. (Hlebinsky rebuttal, page 19, note  
19 36.) Hlebinsky objects that my analysis of the numbers of Winchesters produced  
20 and distributed "have not originated in a study of the records" at the CFM.  
21 (Hlebinsky rebuttal, page 19, note 39.) It is true that I have not examined first-hand  
22 the serial number ledger records located at the CFM, but it is also true, as I have  
23 explained, that these original records are not useful for the pre-1875 period, and that  
24

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25 <sup>11</sup> Herbert G. Houze, *Winchester Repeating Arms Company: Its History and*  
26 *Development from 1865 to 1981* (Iola, Wisc.: Krause, 1994). See also, H. G.  
27 Houze, "A Reevaluation of the Henry and Model 1866 Serial Numbering," *Man at*  
28 *Arms*, 13 (July/August 1991), 10-17.

<sup>12</sup> Parsons, *The First Winchester*, 155-69.



1 the work by John E. Parsons that I relied on was in many ways a better source of  
2 information than the records as they exist now in the CFM.

3 17. For all that Hlebinsky emphasizes the importance of the serial number  
4 ledger records at the CFM, it is not clear that she has studied them closely. She  
5 writes that the Winchester records provide “pertinent information” about “when and  
6 where” specific models “left the factory.” (Hlebinsky rebuttal, page 19, note 39.)  
7 This statement implies that the records at the CFM tell us the destination of  
8 shipments of Winchesters. In fact, as is explained in the scholarship of John E.  
9 Parsons, the Winchester company serial number ledger records, with only a few  
10 exceptions, do not divulge the destinations of shipments. Each entry contains the  
11 number of guns shipped, the date shipped, and an order number. No information is  
12 regularly given in the ledgers as to the destination of the shipments. The original  
13 order books may have contained this information, but the order books have not  
14 been preserved.<sup>13</sup>

15 18. Hlebinsky rightly notes that not all Winchesters produced during the  
16 Reconstruction were shipped to foreign governments, but she woefully  
17 underestimates the fraction of sales to foreign governments, saying that these sales  
18 were only 1/3 of total sales. (Hlebinsky rebuttal, ¶ 25, page 19, line 6.) That  
19 fraction is based on production numbers covering the period 1875-1900, but the  
20 relevant period here—what Hlebinsky calls “The Second Founding”—is 1865-  
21 1875. As my report indicated, in the 1865-1875 period, most of the Winchesters  
22 sold went to foreign armies. (Vorenberg report, ¶ 26-28, pages 14-16.)

23 19. For Winchesters that were produced but not sold to foreign armies, we  
24 cannot assume that they were sold domestically. Yet Hlebinsky’s rebuttal suggests  
25 that many if not most of these guns were sold domestically and ended up in the  
26 hands of American civilians. She implies that the number of civilian-held  
27

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28 <sup>13</sup> Parsons, *The First Winchester*, 104-5.



Winchesters in the post-Civil War South was higher than I suggest, arguing that I am being “misleading” in inferring that the Winchesters used by the Louisiana and South Carolina militias represented most of the Winchesters in the South during Reconstruction. (Hlebinsky rebuttal, page 19, note 39.) Later in the rebuttal—and here she distorts the total number of Winchesters in the Reconstruction-era U.S. by including those produced in the 1890s—she writes, “With millions [of Winchesters] produced during this time frame, it begs the question of where those guns went since it wasn’t military service.” (Hlebinsky rebuttal, ¶ 27, page 21, lines 14-15.) It is incorrect to assume that all Winchesters produced were necessarily sold or distributed. For example, it is clear that the Winchester company kept hundreds of firearms warehoused at any given moment. That strategy made good business sense, as a foreign order might have to be fulfilled quickly. Evidence for warehousing of Winchesters comes from Houze’s research. In 1867, for example, the company reported an inventory valuing \$72,447.74. That inventory would have included not only Winchester rifles and carbines but other types of firearms as well as ammunition and accessories. A conservative estimate of the value of the inventory represented by Winchesters might be \$50,000 (roughly two-thirds of the inventory). Winchesters were priced between \$40 and \$50 at the time, so the total number of Winchesters warehoused might have been about just over 1,000.<sup>14</sup> Of course, the number of warehoused Winchesters could have been much greater than that. Again, I mention the warehousing issue only to emphasize the point that we cannot assume that Winchesters not sold to foreign armies were necessarily sold domestically and ended up in civilian hands.

20. The best research available on sales of Winchesters indicates that sales to American civilians were negligible prior to 1868, the year of the adoption of the

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<sup>14</sup> See Houze, *Winchester Repeating Arms Company*, 63-64, for the 1867 financial statement and an 1867 broadside providing prices of goods.



1 Fourteenth Amendment. According to Houze, concerted efforts to market  
2 Winchesters to American civilians began only in January 1869.<sup>15</sup>

3 21. Obviously, the information provided by Parsons in the 1950s and  
4 Houze in the 1990s is essential to any historical analysis that examines numbers of  
5 Henrys and Winchesters produced and distributed, yet Hlebinsky has not used these  
6 works.

7 **C. Misuse of Sources**

8 22. With the sources that she *has* consulted, Hlebinsky often misrepresents  
9 or distorts their content. There are many examples of misuse of sources in the  
10 Hlebinsky rebuttal, but I will note only a few.

11 23. In writing of “repeaters” at the time of “the ratification of the Second  
12 Amendment,” Hlebinsky mentions a “fourteen-barrel double Nock volley gun-style  
13 rifle.” (Hlebinsky rebuttal, ¶ 21, page 15, lines, 9-10.) The source provided for this  
14 weapon is a YouTube video created by Ian McCollum, who Hlebinsky identifies as  
15 “one of the foremost authorities on firearms technology in the United States.”  
16 (Hlebinsky rebuttal, page 15, note 25.) Yet the video cited displays a gun that was  
17 not made at the time of the ratification of the Second Amendment but rather in the  
18 early 1800s. Also, the gun was made in London, another reason why Americans at  
19 the time of the ratification of the Second Amendment would not have known about  
20 it. (Hlebinsky rebuttal, page 16, note 27.)

21 24. In another part of the rebuttal, Hlebinsky distorts the content of an  
22 entry in *Flayderman’s Guide to Antique American Firearms*, an important source  
23 for firearms collectors. She uses the guide to claim that the Evans Repeating Rifle  
24 was a competitive model to the Winchester in the period between 1873 and 1879.  
25 12,200 models of the rifle were made in this period, Hlebinsky reports. (Hlebinsky

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26  
27 <sup>15</sup> Houze, *Winchester Repeating Arms Company*, 360. Houze reports that the  
28 marketing efforts in 1869 and 1870 were successful—demand exceeded supply—  
but after 1870 domestic sales flattened.



1 rebuttal, ¶ 30, page 23, 20-24.) This information is technically accurate. However,  
2 almost all of the Evans rifles in question (10,000 of the 12,200, according to  
3 *Flayderman's Guide*) were produced in the period 1877-79—that is, in the period  
4 after “The Second Founding,” the era that Hlebinsky’s rebuttal statement ostensibly  
5 covers.<sup>16</sup>

6 25. Later in the rebuttal statement, Hlebinsky claims that “government  
7 disarmament” was the cause of the infamous massacre of Lakota at Wounded Knee  
8 in 1890; the source she cites for this claim is a reputable historical monograph,  
9 Robert M. Utley’s *The Last Days of the Sioux Nation*. (Hlebinsky rebuttal, ¶ 50,  
10 page 35, line 7.) Yet Utley’s account of the massacre makes it clear that  
11 “government disarmament” of the Lakota was not the intention of the U.S.  
12 government. Rather, the government sought to stop the “Ghost Dance,” mistakenly  
13 believing that the ceremony was prefatory to an insurgency. On December 29,  
14 1890, the day of the massacre, the Lakota were not concerned about disarmament;  
15 they mistakenly believed that Colonel James Forsyth’s troops meant to murder  
16 them all. Forsyth’s commander, Brigadier General John R. Brooke, was alone  
17 responsible for the order to disarm a band of Lakota that day. The order was not  
18 part of a general policy of “government disarmament.” When Forsyth carried out  
19 his commander’s order, his actions led to the inadvertent firing of a gun that was  
20 being seized, which in turn set off the massacre.<sup>17</sup> In calling the episode an  
21 example of “government disarmament,” Hlebinsky has misused Utley’s book.

## 22 **V. HLEBINSKY’S FALSE HISTORICAL NARRATIVES**

23 26. A historian can be forgiven for the occasional factual error or minor  
24 misrepresentation of a source, but it is unacceptable for historians to create false  
25

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26 <sup>16</sup> Norm Flayderman, *Flayderman’s Guide to Antique American Firearms*,  
27 (9<sup>th</sup> ed., Appleton, Wisc.: Gun Digest Books, 2019), 694-95.

28 <sup>17</sup> Robert M. Utley, *The Last Days of the Sioux Nation* (2<sup>nd</sup> ed., New Haven,  
Conn.: Yale University Press, 2004), 146-47, 204-13.



1 narratives that purport to be authentic histories. Hlebinsky's rebuttal is filled with  
2 such false historical narratives.

3 27. One false narrative given by Hlebinsky, which is the narrative  
4 countered most directly and repeatedly in my initial report and this Sur-Rebuttal, is  
5 that repeating firearms were generally common and also commonly held by  
6 civilians during the Reconstruction era. Yet Winchester repeating rifles, the only  
7 type of high-capacity firearms produced in the era, did not begin to proliferate in  
8 large numbers until the 1890s. Hlebinsky uses the "hundreds of thousands" of  
9 Winchesters produced in the last decade of the nineteenth century to create a false  
10 narrative that a similar proliferation took place twenty to thirty years earlier.  
11 (Hlebinsky rebuttal, page 19, note 39.)

12 28. Another such false narrative is that repeating firearms were common at  
13 the time of creation of the Second Amendment (1791). (Hlebinsky rebuttal, ¶ 19-  
14 22, pages 12-17.) In my report, I challenged certain elements of this narrative.  
15 (Vorenberg report, ¶ 16-18, pages 8-9.) I challenge other elements above, in my  
16 discussions of Hlebinsky's use of evidence relating to the Cookson/Hill and Belton  
17 "repeaters." In a declaration and deposition for a separate, related federal case,  
18 Hlebinsky herself has contradicted the narrative of Second Amendment-era  
19 "repeaters" that she provides in her rebuttal in the current case.<sup>18</sup>

20 29. Other instances of false narratives abound in the Hlebinsky rebuttal,  
21 but for the sake of brevity I will mention only two more.

22 30. Hlebinsky offers a version of events concerning the Kansas Territory  
23 in 1856 that is unrecognizable as legitimate history. In her version, pro-slavery  
24

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25 <sup>18</sup> Declaration of Ashley Hlebinsky, *Oregon Firearms Federation v. Brown*,  
26 Case No. 2:22-cv-01815-IM (D. Or. Jan. 6, 2023) (ECF No. 72), para. 22:  
27 Hlebinsky stating that the examples of "repeaters" that she gives were "one-off  
28 examples"; that they were "unsuccessful by modern and/or historic standards";  
that perhaps fewer than ten such "repeaters" existed at the time of the founding of  
the United States.



1 settlers sacked the city of Lawrence, Kansas in order to disarm “Free Soilers” who  
2 were armed with Sharps rifles. In response, Senator Charles Sumner of  
3 Massachusetts defended gun rights in a speech attacking South Carolina Senator A.  
4 P. Butler, who had advocated disarmament for antislavery settlers in Kansas.  
5 Butler’s response, it appears in Hlebinsky’s account, was to beat Sumner with a  
6 cane on the floor of the Senate. Hlebinsky does not say that Butler himself caned  
7 Sumner, but that is the implication of her statement that Sumner’s speech  
8 “culminated in violence against Sumner, who was beaten with a cane on the Senate  
9 floor for advocating against disarmament.” (Hlebinsky rebuttal, ¶ 49, page 35, lines  
10 5-6.)

11 31. This history told by Hlebinsky is deeply flawed. The leader of the  
12 forces that attacked Lawrence on May 21, 1856 did indeed demand that all  
13 residents of the town give up their arms. But attempted disarmament was only one  
14 part of their action that day. Even after they were given a cannon by a leader of the  
15 Free Soilers—a gesture of disarmament—the attackers burned down the main hotel  
16 of the town as well as other buildings, and they destroyed the printing presses used  
17 by antislavery pamphleteers and newspapermen. All of these actions, one should  
18 note, occurred after, not before, Sumner’s famous speech of May 19-20, 1856.  
19 Thus, in contrast to Hlebinsky’s account, the decision by Sumner to deliver the  
20 speech, as well as the content of that speech, could not have had anything to do  
21 with the sack of Lawrence that followed.

22 32. Also, quite contrary to the implication of Hlebinsky’s account, Sumner  
23 was not a supporter of gun rights. Like most abolitionists, he advocated non-  
24 violent methods. He gave the speech in question only after being convinced by  
25 agents of the New England Emigrant Aid company that it had not provided guns to  
26 antislavery settlers in Kansas (this was a lie, but Sumner believed it). In his speech,  
27 Sumner did not defend gun rights in general but only the possession of a “rifle” by  
28 “the pioneer.” That is, Sumner thought it was reasonable that Americans entering



1 lawless places might carry guns for self-defense.<sup>19</sup> The passage quoted by  
2 Hlebinsky occupies only about 1% of the total text of this very long speech, the  
3 purpose of which was to denounce supporters of slavery in general and to prohibit  
4 slavery from the territory of Kansas in particular. Sumner's speech called for a  
5 peaceful prohibition of slavery in Kansas by legislation. He contrasted this  
6 peaceful approach to the violent methods of pro-slavery militants in or near Kansas,  
7 who the year before had tried and failed to seize Lawrence with an illegitimate,  
8 "shot-gun militia."<sup>20</sup> It is true that Senator Butler had denounced the smuggling of  
9 Sharps rifles to antislavery settlers in Kansas and had suggested that the owners of  
10 the guns might be arrested (he further quipped that Sumner should be drafted to  
11 head the *posse comitatus* that would make the arrests).<sup>21</sup> This statement was indeed  
12 seized upon by Sumner, as Hlebinsky writes. Sumner used the statement as  
13 evidence of the derision of the Constitution by Butler and all other proslavery  
14 advocates. Sumner's only real purpose, in other words, was to denounce slavery's  
15 defenders, not to champion the Second Amendment. Hlebinsky has taken  
16 Sumner's statement out of its historical context, something a historian should  
17 always avoid.

18 33. In suggesting that it was Sumner's comments on the Second  
19 Amendment that provoked the attack on him, Hlebinsky has further distorted the  
20 historical record. Sumner was attacked for two major reasons: his longstanding  
21 position against slavery; and his use of personal insults against Butler during his  
22 speech of May 19-20, 1856 (the insults occur in a different part of the speech than  
23

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24 <sup>19</sup> Sumner's attitude regarding gun rights for "the pioneer" corresponds to  
25 what I wrote in my report about American attitudes toward gun possession in areas  
26 considered lawless, such as the mid-19<sup>th</sup> century West. See Vorenberg report, ¶ 53,  
27 page 30, lines 14-18.

28 <sup>20</sup> Charles Sumner, *The Kansas Question* (Cincinnati: George S. Blanchard,  
1856), 10-11.

<sup>21</sup> Sumner, *The Kansas Question*, 22.



1 the part quoted by Hlebinsky). The actual caning of Sumner was done not by  
2 Butler, who was in South Carolina at the time, but by Butler's cousin, Preston  
3 Brooks, a U.S. Representative.<sup>22</sup>

4 34. Another egregious example of a false narrative in Hlebinsky's rebuttal  
5 appears in her characterization of Ida B. Wells and Wells's allies in the anti-  
6 lynching cause as gun-rights advocates. In this narrative, Hlebinsky makes out  
7 Wells and another anti-lynching activist, James R. Mitchell, Jr., to be, first and  
8 foremost, defenders of gun-owning rights for Black Americans. (Hlebinsky  
9 rebuttal, ¶ 50, pages 35-36.) As part of this narrative, Hlebinsky provides a  
10 quotation from one of Wells's most famous publications, *Southern Horrors* (1892):  
11 "a Winchester rifle should have a place of honor in every black home, and it should  
12 be used for the protection which the law refuses to give." It is worth noting that the  
13 quotation in question, as well as the anti-lynching movement in general, took place  
14 more than twenty years after the ratification of the Fourteenth Amendment and ten  
15 years after the end of Reconstruction. As has been stated earlier in this Sur-  
16 Rebuttal, and also has been documented by Hlebinsky herself, by the 1890s, when  
17 Wells wrote *Southern Horrors*, Winchesters had begun to proliferate in numbers far  
18 greater than they had existed during Reconstruction. The time period invoked by  
19 Hlebinsky (the 1890s) thus makes the events described irrelevant to the question of  
20 the state of high-capacity guns and gun laws circa 1868.

21 35. Hlebinsky's use of the Wells statement also represents a distortion of  
22 history. The top priority for Wells and her allies was the passage of state and  
23 federal anti-lynching laws. Such laws, not gun ownership or anti-gun restrictions,  
24 were their avowed cause.<sup>23</sup> That is why the quotation given by Hlebinsky ends

25 <sup>22</sup> Manisha Sinha, *The Slave's Cause: A History of Abolition* (New Haven,  
26 Conn.: Yale University Press, 2016), 546-48; David Herbert Donald, *Charles*  
27 *Sumner and the Coming of the Civil War* (New York: Alfred A. Knopf, 1960), 278-  
28 95.

<sup>23</sup> Nell Irvin Painter, *Standing at Armageddon: The United States, 1877-1919*



1 with the phrase: “. . . which the law refuses to give.” Blacks in the United States in  
2 the 1890s had the same gun-owning rights as Whites, and, as Hlebinsky notes,  
3 Blacks were able to use those rights to purchase guns, including Winchesters. Yet  
4 these facts had no bearing on the fight by Wells and her allies for anti-lynching  
5 laws, a fight that continued well beyond the 1890s. (Not until 2022 was a federal  
6 anti-lynching law adopted: the Emmett Till Anti-Lynching Act.) It was only  
7 because legislators by the 1890s had failed to adopt anti-lynching legislation, and  
8 because the lynching of Black Americans occurred at unprecedented rates in the  
9 late 1800s, that Wells and some of her allies suggested that Blacks might purchase  
10 guns for self-defense. Had these Black American leaders witnessed the passage of  
11 the legislation they sought, and had that legislation been enforced, then their  
12 statements about guns for self-defense would have been unnecessary, and almost  
13 certainly they would not have made them. For Hlebinsky to turn this episode, a  
14 story of heroic though failed activism on behalf of legislation to combat white  
15 terror, into a history of gun-rights activism, is a crass distortion of the historical  
16 record.

17 36. Had Hlebinsky used standard sources for historical research, such as  
18 articles and monographs written by historians, or even college-level American  
19 history textbooks, she might have avoided producing these faulty narratives.  
20 Instead, her major source for American history, at least for the episodes involving  
21 Charles Sumner and Ida B. Wells, is a firearms law textbook written not by  
22 historians but by attorneys. To the extent that these authors are interested in  
23 history, it is only to cherry-pick incidents and words from history that support their  
24 position in favor of broad gun rights.<sup>24</sup> That Hlebinsky used this volume as her  
25 (New York: W. W. Norton, 1987), 223-24.

26 <sup>24</sup> Nicholas J. Johnson, David B. Kopel, George A. Mocsary, E. Gregory  
27 Wallace, and Donald Kilmer, *Firearms Law and the Second Amendment:  
28 Regulation, Rights, and Policy* (3<sup>rd</sup> ed., New York: Wolters Kluwer, 2022).  
Hlebinsky cites this volume more than she cites any other source: see Hlebinsky



1 main source, rather than using a balanced, more objective history, represents a  
2 disregard for the practice of history as well as indifference toward historical  
3 accuracy.

4 **VI. CONCLUSION**

5 37. In a concurring opinion in the 2010 U.S. Supreme Court case  
6 *McDonald v. Chicago*, Justice Antonin Scalia wrote that historical analysis can  
7 require “making nuanced judgments about which evidence to consult and how to  
8 interpret it.” (561 U.S. 742, 803-804 (2010).) In the 2022 U.S. Supreme Court  
9 case *New York State Rifle and Pistol Association Inc. v. Bruen*, the majority opinion  
10 authored by Justice Clarence Thomas quoted Scalia’s words approvingly. (142 S.  
11 Ct. 2111, 2130 (2022).) The standards of historical analysis that the authors of  
12 these opinions called for have not been met in the rebuttal offered by Ashley  
13 Hlebinsky. The result is a deeply flawed piece of writing by Hlebinsky that should  
14 not be accepted as legitimate historical analysis and that fails to controvert or  
15 disprove my opinions about the existence, usage, and regulation of high-capacity  
16 firearms during Reconstruction.

17  
18 I declare under penalty of perjury that the foregoing is true and correct.

19 Executed on February 24, 2023 at Providence, Rhode Island.

20  
21   
22 Michael Vorenberg

23  
24 purports to consider “arms laws in their broader social context” and to present  
25 material “in conjunction with the culture, technology, and politics of their times”  
26 (xxxi), but the selective use of historical evidence in favor of broad gun rights is  
27 evident throughout the volume. The final paragraph of the hard-copy edition of the  
28 volume here cited contains the following statements: “governments . . . present  
perhaps the greatest threat to liberty”; and “in the most dire circumstances, the  
armed populace is the last line of defense for legitimate government that respects  
human rights” (1292).



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**ADVANCED RESEARCH PROJECTS AGENCY**  
Washington 25, D. C.

20 August 1962

To: Addressees  
From: OSD/ARPA

Subject: Field Test Report, AR-15 Armalite Rifle  
Enclosure: Final Report, OSD/ARPA Research and Development Field 1 1503  
Unit - Vietnam

1. The AR-15 Armalite rifle has been subjected to a comprehensive field evaluation under combat conditions in Vietnam. The results of this evaluation, contained in the attached report, are forwarded for your information.

2. Because of the controversy which has surrounded this weapon, particular care was exercised to insure that the tests were objective, thorough and adequately documented, and to insure that valid data and conclusions were derived therefrom.

3. The suitability of the AR-15 as the basic shoulder weapon for the Vietnamese has been established. For the type of conflict now occurring in Vietnam, the weapon was also found by its users and by MAAG advisors to be superior in virtually all respects to the - a. M-1 rifle, b. M-1 and M-2 Carbines, c. Thompson Sub-machine gun and d. Browning Automatic rifle.

4. Test data derived from recent Service evaluations of the AR-15 in the U.S. support the technical conclusions of the report. The Central Intelligence Agency has conducted similar tests; it is understood that the results of that evaluation are essentially identical to those contained in the report.

5. Photographs 7 and 8, Appendix D, pictures of Viet Cong KIA showing the wound effect of the AR-15 bullet, were deleted from the attached report by this office.

6. The conclusions and recommendations of this report have been made available to COMUSMACV and CINCPAC by the originator and to DOD and CIA by OSD/ARPA.

Downgraded at 3 year intervals; Declassified after 12 years. DOD Dir 5200.10

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*R. C. Phelps*  
R. C. Phelps  
Asst Director, for AGILE



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**RESEARCH & DEVELOPMENT FIELD UNIT  
Advanced Research Projects Agency  
Office of the Secretary of Defense  
APO 143, San Francisco, California**

**MACRD**

**31 July 1962**

**SUBJECT: Report of Task No. 13A, Test of Armalite Rifle, AR-15 (U)**

**THRU. Commander (3)  
U. S. Military Assistance Command, Vietnam  
APO 143, San Francisco, California**

**TO: Commander in Chief, U. S. Pacific (3)  
c/o Fleet Post Office  
San Francisco, California**

**Advanced Research Projects Agency (3)  
Office of the Secretary of Defense  
The Pentagon  
Washington 25, D. C.**

1. (C) Forward herewith is the final report of the test of the Armalite Rifle (AR-15). It should be noted that the report proper in its present form reflects the views of the U. S. element of CDTC only. It is being handled in this fashion to avoid the inference that the Vietnamese, in seeking a newer weapon, might have influenced the recommendations in the report.

2. (C) However, combat evaluations in Vietnam are necessarily joint ventures and the results must be made known to appropriate GVN authorities. This report will now be coordinated with the Vietnamese element in CDTC and will be officially closed out as a combined report. It is thought that this is unlikely to

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result in any substantive change in the report as now written.

1 Incl.  
AR-15 Report w/5 Annexes

**WILLIAM P BROOKS, JR.**  
Colonel, Arty  
Chief

Copies furnished.  
CHMAAG, VIETNAM (4)

**DOWNGRADED AT 3 YEAR INTERVAL  
DECLASSIFIED AFTER 12 YEARS  
DOD DIR 5200.10**

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**RESEARCH & DEVELOPMENT FIELD UNIT  
Advanced Research Projects Agency  
Office of the Secretary of Defense  
APO 143, San Francisco, California**

**REPORT OF TASK NO. 13A**

**TEST OF**

**ARMALITE RIFLE. AR-15 (U)**

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### **REPORT OF TASK NO. 13A TEST OF ARMALITE RIFLE, AR-15 (U)**

#### **1. (U) REFERENCES.**

- a. (U) OSD Message, DEF 907037, DTG 122354Z December 1961.
- b. (U) MACRD Message 367, DTG 050203Z June 1962.
- c. (U) US Army Infantry Board Report of Project 2787, 27 May 1958, Subject: Evaluation of Small Caliber, High Velocity Rifle - Armalite (AR-15).
- d. (U) Final Report, Lightweight High Velocity Rifle Experiment, US Army Combat Development Experimentation Center, Fort Ord, California, dtd 30 May 1959.
- e. (U) Evaluation Report of the Colt Armalite AR-15 Automatic Rifle, US Air Force Marksmanship School, Lackland AFB, Texas, dtd 22 September 1960.
- f. (U) Report No. DPS-96, A Test of Rifle, Caliber .223, AR-15, Aberdeen Proving Ground, Maryland, dtd 9 January 1961.
- g. (U) Fourth Report on the Test of the US Carbine, Cal. .30, M1, ORD Program #4972, Aberdeen Proving Ground, Maryland, dtd 13 Aug 1942.
- h. (U) First Report on Test of Production Models of the Carbine, Cal .30, M2, ORD Program #4972, Aberdeen Proving Ground, dtd 1 Aug 1945.
- i. (U) US Army Infantry Board Supplemental Report of Project No 2787, "Evaluation of Small Caliber, High Velocity Rifles - Armalite (AR-15)", dtd 13 August 1958.

#### **2. (C) PURPOSE.**

The purpose of this test was to determine if the AR-15 Rifle is compatible with the small stature, body configuration and light weight of the Vietnamese Soldier and to evaluate the weapon under actual combat

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conditions in South Vietnam. At the request of MAAG, Vietnam, the scope of the test was expanded to include a comparison between the AR-15 and the M2 Carbine to determine which is a more suitable replacement for other shoulder weapons in selected units of the Republic of Vietnam Armed Forces (RVNAF).

### **3. (U) DESCRIPTION OF MATERIEL:**

The AR-15 Rifle is a lightweight, gas-operated rifle equipped with a 20-round, detachable magazine. It is chambered for Cartridge, Caliber .223. When fired in the rifle, this round gives the 55 grain bullet a muzzle velocity of 3200 feet per second. It has a plastic stock with a rubber butt, assembled in line with the bore. This, in conjunction with its high line of sight and separate hand grip, is designed to minimize rotation about the shoulder during firing. The two piece upper hand guard is made of metal and plastic and is designed for easy disassembly and rapid dissipation of heat. A lever above the grip on the left side of the receiver provides a selector for the trigger safety, semi-automatic and automatic fire. A bolt catch holds the bolt to the rear after the last round has been fired. A cover is provided for the ejection port in the receiver. A three-pronged muzzle attachment, threaded to the barrel, serves as a flash suppressor, grenade launcher, and a front support for a bayonet. The lower part of the front sight is machined to form a bayonet lug. Standard accessories include: Bayonet w/scabbard; bipod w/case; grenade-launching sight; and a cleaning rod. Photographs of the weapon appear in Annex "D".

### **4. (C) BACKGROUND.**

a. (U) The problem of selecting the most suitable basic weapon for the Vietnamese soldier is complicated by his small stature and light weight. The average soldier stands five feet tall and weighs ninety pounds. Principle US weapons presently issued to Vietnamese troops include the M1918A2; the Thompson Sub-Machine Gun, Caliber .45; and the US Carbine, Caliber .30, M1.

b. (U) Because of its availability and the results of extensive studies and previous testing by military agencies, the Colt Armalite AR-15 Rifle was selected in July 1961 as the most suitable weapon for initial tests. This weapon was developed by the Armalite Division of Fairchild Aircraft Corporation to meet the military characteristics for a lightweight rifle utilizing the high velocity small caliber principle. It was first tested by the US Army Infantry Board in 1958 (Ref 1.c.). Since then, the weapon

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and its ammunition have undergone extensive engineering and service tests by: Aberdeen Proving Ground; the Combat Development Experimentation Center, Fort Ord, California; and the US Air Force at Lackland Air Force Base, Texas, (Refs l.d., l.e., l.f.). The rifle, with several modifications resulting from these tests, is presently being manufactured by Colt's Patent Firearms Manufacturing Company, Hartford, Connecticut. (Prior to completion of this report, the U. S. Air Force adopted the AR-15 as its basic shoulder weapon, replacing the M2 Carbine, the Browning Automatic Rifle and the M3 Sub-Machine Gun).

c. (C) Based upon favorable observations of the AR-15 by both US Advisors and RVNAF Commanders following limited firing demonstrations conducted in Vietnam during August 1961, weapons were requested in numbers sufficient to conduct a full scale combat evaluation of the AR-15 by selected units of the RVNAF. In December 1961, the Secretary of Defense approved the procurement of 1000 AR-15 Rifles, necessary ammunition, spare parts and accessories for evaluation.

d. (C) OSD/ARPA negotiated a contract with the firm of Cooper-MacDonald, Inc., Baltimore, Maryland, for procurement and air shipment of all materiel. The first shipment was received on 27 January 1962 and subsequent increments arrived approximately every three weeks until the contract was fulfilled on 15 May 1962. Operational evaluation and testing began on 1 February and terminated on 15 July 1962.

### 5. (C) SUMMARY OF TESTS:

#### a. (C) General.

(1) (C) To accomplish the stated purpose of this test, it was divided into two parts. One part was a combat evaluation of the AR-15 in which the weapons were issued to specially selected ARVN Units for use in their operations against the Viet Cong. Along with the rifles and ammunition, Vietnamese Unit Commanders and US Military Advisors were given weapon preference and operational questionnaires and requested to complete and return them after training and combat use of the AR-15. Samples of these questionnaires appear as Appendices 1, 2, and 3 of Annex "A".

(2) (C) The other part of the test consisted of a comparison between the AR-15 Rifle and the M2 Carbine. Areas in which the two weapons were compared included: physical characteristics; ease of disassembly and assembly; marksmanship ability at known distances, semi-automatic and automatic fire; marksmanship ability at unknown distances, semi-

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automatic and automatic fire; ruggedness and durability; adequacy of safety features; effects of open storage in a tropical environment; ability to penetrate dense brush and heavy foliage; and, the individual Vietnamese soldier's preference between the two weapons.

b. (C) Results, Combat Evaluation.

(1) (C) For detailed report see Annex "A".

(2) (C) Summary. The Vietnamese Unit Commanders and US Advisors who participated in the evaluation consider the AR-15 Rifle to be a more desirable weapon for use in Vietnam than the M1 Rifle, BAR, Thompson Sub-Machine Gun, and M1 Carbine for the following reasons:

(a) (C) It is easier to train the Vietnamese troops to use the AR-15 than the M1 Rifle, BAR, M1 Carbine, or the Sub-Machine Gun.

(b) (C) The AR-15's physical characteristics are well suited to the small stature of the Vietnamese soldier (see photographs 1 and 2, Annex "D").

(c) (C) It is easier to maintain the AR-15 both in the field and in garrison than the M1 Rifle, BAR, Sub-Machine Gun, or the M1 Carbine.

(d) (C) The ruggedness and durability of the AR-15 are comparable to that of the M1 Rifle and superior to that of the BAR, Sub-Machine Gun, and M1 Carbine.

(e) (C) The AR-15 imposes less logistical burden than any of the four principal weapons presently being used by Vietnamese Forces.

(f) (C) The AR-15 is tactically more versatile than any present weapon being used by Vietnamese Forces.

(g) (C) In semi-automatic fire, the accuracy of the AR-15 is considered comparable to that of the M1 Rifle, and superior to that of the M1 Carbine.

(h) (C) In automatic fire, the accuracy of the AR-15 is considered comparable to the Browning Automatic Rifle and superior to the Sub-Machine Gun.

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c. (C) Results, Comparison Test of the AR-15 Rifle and the M2 Carbine.

(1) (C) For detailed report see Annex "B".

(2) (C) Summary:

(a) (C) Test #1, Comparison of physical characteristics

(i) (C) The AR-15 is comparable to the M2 Carbine in size and weight.

(ii) (C) The addition of an integral grenade launcher, telescope mount, and an accessory bipod the AR-15 Rifle capabilities that the M2 Carbine does not possess at present and attainment of which would require modification of the weapon (see photograph 3, Annex "D").

(iii) (C) Both the AR-15 and the M2 Carbine are compatible with the light weight and diminutive stature of the Vietnamese soldier (see photographs 4 and 5, Annex "D").

(b) (C) Test #2, Comparative ease of disassembly and assembly.

(i) (C) The AR-15 is simpler than the M2 Carbine and requires less time to disassemble and re-assemble for normal field cleaning (see photograph 6, Annex "D").

(ii) (C) The average Vietnamese soldier can be trained in the disassembly and assembly of the AR-15 in less time than for the M2 Carbine.

(c) (C) Test #3, Marksmanship ability, known distance.

(i) (C) The ARVN soldier's ability to deliver accurate semi-automatic fire at known distances up to 200 meters with the AR-15 and the M2 Carbine is comparable. (It is noted that a higher percentage of test participants fired qualifying scores with both the AR-15 and the M2 Carbine than with the M1 Rifle.)

(ii) (C) The ARVN soldier can deliver far more accurate automatic fire at known distances up to 200 meters with the AR-15 than he can with the M2 Carbine.

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(d) (C) Test #4, Marksmanship ability, unknown distance.

(i) (C) The ARVN soldier's ability to deliver accurate semi-automatic fire on targets of unknown range using the AR-15 and the M2 Carbine is comparable.

(ii) (C) The ARVN soldier can deliver more accurate automatic fire on targets of unknown range with the AR-15 than he can with the M2 Carbine.

(e) (C) Test #5, Comparative ruggedness and durability

(i) (C) The AR-15 is more durable than the M2 Carbine under conditions that require prolonged firing.

(ii) (C) The AR-15 will stand up to rough handling normally encountered in combat situations better than the M2 Carbine.

(f) (C) Test #6, Comparison of the adequacy of safety features.

(i) (C) The safety features on the AR-15 and the M2 Carbine are comparable with regard to their adequacy and the ARVN soldier's ability to understand how they function.

(ii) (C) The location of a single selector switch, which combines the functions of safety and type of fire selector, on the left side of the AR-15's receiver where it is easily accessible to the thumb, enables the ARVN soldier to get the first round off faster with the AR-15 than he can with the M2 Carbine. He must manipulate the safety selector on the M2 Carbine with his trigger finger, then return it to the trigger to fire. With the AR-15, he can keep his finger on the trigger while manipulating the safety selector with his thumb.

(g) (C) Test #7. Effects of open storage in a tropical environment.

(i) (C) The functioning capability of the AR-15 is less affected by prolonged exposure to tropical weather than that of the M2 Carbine.

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### **(h) (C) Test #8, Brush penetration**

(i) (C) The trajectory of the AR-15 bullet is not significantly affected when fired through dense underbrush at ranges up to 50 meters.

(ii) (C) The AR-15 round will penetrate jungle undergrowth equally as well as the M2 Carbine round at ranges up to 50 meters.

### **(i) (C) Test #9, Troop opinion poll**

(i) (C) The great majority of the ARVN soldiers who participated in the comparison test prefer the AR-15 to the M2 Carbine.

### **6. (C) DISCUSSION:**

a. (C) The extremely mobile type of offensive warfare being stressed by US Advisors in Vietnam and the small stature and light weight of the Vietnamese soldier place a high premium on small, lightweight weapons. In addition, the violent short clashes at close ranges which are characteristic of guerrilla warfare in Vietnam make it highly desirable to have a dependable weapon capable of producing a high rate of accurate and lethal full automatic fire.

b. (C) From the viewpoint of standardisation and simplicity of training and the resultant long range reduction of the logistics burden, characteristics of existing weapons were studied to determine if a single weapon could be found that would meet the requirements for a basic shoulder weapon for Vietnamese troops. It is believed that such a weapon should encompass the following desirable characteristics of individual weapons:

- (1) The effective range of the M1 Rifle.
- (2) The light weight and small size of the M1 Carbine.
- (3) The full automatic capability of the BAR.
- (4) The simplicity of the SMG.

Other highly desirable, if not mandatory, features would include a bayonet, grenade launching and sniper capability.

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c. (C) The AR-15 appeared to more nearly satisfy the above prescribed characteristics than any other US weapon. The import of the AR-15 weapon/ammunition weight for units that conduct extended operations without normal resupply capabilities can be seen in comparing the 24 lb. weight of an M1 with a battle load of 220 rounds of ammunition with the 12 lb. weight of the AR-15 with 220 rounds. This weight difference equals approximately 430 rounds of AR-15 ammunition.

d. (C) The Comparison Test (Annex "B") shows the AR-15 to be distinctly superior to the M2 Carbine. Although the M2 Carbine is sufficiently light for use by the Vietnamese soldier, it does not possess the essential characteristics of a basic weapon for offensive warfare. It lacks the effective range of the M1 Rifle and has a high malfunction rate (Ref l. e. and l. h.). However, it is apparently available and was considered by MAAG as the prime competitor against the AR-15.

e. (C) The Combat Evaluation (Annex "A") shows that all US Advisors and Vietnamese Commanders who participated in the evaluation prefer the AR-15 to any other weapon with which the RVNAF are now armed. The lethality of the AR-15 and its reliability record were particularly impressive. All confirmed casualties inflicted by the AR-15, including extremity hits, were fatal (see photographs 7 and 8, Annex "D"). The high degree of reliability and trouble-free performance of the weapon reflected in previous test reports (Ref l. c., l. d., and l. f.) was also noteworthy during the testing and evaluation here. No parts breakage was encountered while firing approximately 80,000 rounds during the Comparison Test. Only two parts have been issued to date to replace breakage for the entire 1,000 weapons. Stoppages on the AR-15 are easily cleared by the individual soldier through the application of "immediate action".

f. (C) A thorough review of the numerous stateside AR-15 test reports referenced in paragraph 1 reveals nothing which would make the foregoing views unsound. The reported poor performance of the AR-15 under cold weather conditions is of no concern in Vietnam. The widely held view that the AR-15 operates poorly under rainy conditions was disproved in the weapon's second test by Aberdeen Proving Ground (Ref l. f.). Those results were confirmed here during field operations. No deficiencies in the weapon requiring correction prior to adoption were found during the test in Vietnam, although two minor changes are recommended for product improvement. These recommendations appear in Annex "C".

g. (C) The combat evaluation part of this test is somewhat subjective since it is based on the individual judgments of many users. It is

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believed, however, that the professional judgments of the senior US Advisors and Vietnamese Commanders of the units testing the weapon, all of whom are mature, experienced soldiers, does provide for a sound combat appraisal.

h. (C) From an operational viewpoint, it is believed that the tests conducted in Vietnam show the superiority of the AR-15 over the M2 Carbine and over other weapons now issued to RVNAF. It is believed that the decision as to what units might be issued the AR-15 or which weapons the AR-15 might replace is dependent on cost and logistical factors which are beyond the purview of this unit.

7. (C) CONCLUSIONS: It is concluded that:

a. (C) The AR-15 is more compatible with the light weight and small stature of the Vietnamese soldier than the M1 Rifle, the Browning Automatic Rifle, and the Thompson Sub-Machine Gun.

b. (C) The AR-15 is superior to the M2 Carbine.

c. (C) The M2 Carbine lacks the necessary dependability and versatility for consideration as the basic shoulder weapon for Vietnamese troops.

d. (C) The AR-15 is capable of replacing any or all of the shoulder weapons currently being used by the Armed Forces of the Republic of South Vietnam.

e. (C) The AR-15 is considered by both Vietnamese Commanders and U.S. Military Advisors who participated in the tests as the best "all around" shoulder weapon in Vietnam.

8. (C) RECOMMENDATIONS: It is recommended that:

a. (C) The AR-15 be considered for adoption as the basic weapon for all RVNAF with a view toward improving effectiveness and simplifying training and weapons/logistics systems.

b. (C) Priority for adoption of the AR-15 be given to those units which frequently operate in jungle environment for extended periods, because

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of the significant operational and logistical advantages accruing to their having the lightest and most effective weapon/ammunition combination available.

c. (D) The M1 and/or M2 Carbine continue to be issued only to those individuals who, because of their duty or position, can function effectively with a weapon best suited for a defensive role.

### **ANNEXES:**

- A. Combat Evaluation w/3 Appendices
- B. Comparison Test
- C. Suggested Corrective Actions
- D. Photographs 1 through 8

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### ANNEX "A"

#### DETAILS OF THE COMBAT EVALUATION OF THE AR-15

##### I. (C) GENERAL.

Selected Vietnamese Units which had previously been engaged in considerable combat were issued AR-15 Rifles and ammunition for use against the Viet Cong. In addition, each Unit Commander and US Military Advisor with these units was given questionnaires in which he was requested to evaluate the AR-15 in comparison with the other weapons presently used by the RVNAF. (See Appendices 1, 2, and 3 for samples of questionnaires.)

##### II. (C) DISTRIBUTION OF WEAPONS AND AMMUNITION.

<u>Unit</u>	<u>AR-15 Rifles</u>	<u>Ammunition</u>
7th Infantry Division	100	50,000 rds
Rangers	100	50,000 rds
Airborne Brigade	390	195,000 rds
VN Marines	100	50,000 rds
VN Special Forces	100	50,000 rds
Special Battalions	125	120,000 rds
5th Infantry Division	40	25,000 rds
Father Hoa	10	10,000 rds
Total	<u>965</u>	<u>550,000 rds</u>

##### III. (C) DETAILS OF TEST.

A. (C) Purpose: To evaluate the performance of the AR-15 Rifle under actual combat conditions and to compare this performance to that of the weapons presently being used by the RVNAF.

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**B. (C) Method:** Each Unit Commander and US Military Advisor of those units receiving AR-15 Rifles evaluated its performance in combat and compared it to the performance of those weapons presently being used by the RVNAF. Areas in which the AR-15 was evaluated and compared included: training; physical characteristics; ease of maintenance; ruggedness and durability; logistical considerations; accuracy; and tactical versatility. In the questionnaires given them, Commanders and Advisors were instructed to award 5 points to the most desirable weapon, 4 points to the second, 3 points to the third, 2 points to the fourth, and 1 point to the least desirable weapon in each category delineated above.

**C. (C) Results:** The results from the questionnaires are set forth in the table below and reflect the evaluation of the AR-15 by Commanders and Advisors of most of the different types of tactical units in Vietnam (as listed in paragraph II above). The figures indicate the total number of points awarded to each weapon by Vietnamese Unit Commanders and U.S. Military Advisors in their joint responses to the questionnaires.

1. <u>Training.</u>	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>	<u>Max. Poss.</u>
a. Simplest to train the troops to use	59	44	15	37	55	70
b. Simplest to train in functioning	61	50	15	37	47	70
c. Simplest to train in disassembly and assembly	63	48	14	37	48	70
Total	183	142	44	111	150	210
2. <u>Physical Characteristics</u>	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>	<u>Max. Poss.</u>
a. Easiest for soldier to aim and fire	60	29	17	42	62	70
b. Easiest to carry over open terrain	59	29	14	43	64	70
c. Easiest to carry through jungle terrain	59	29	14	45	63	70
d. Easiest to hold on a target while firing several rounds	69	40	24	24	53	70
Total	247	127	69	154	242	280



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<b>3. <u>Maintenance</u></b>		<b><u>AR-15</u></b>	<b><u>M1 Rifle</u></b>	<b><u>BAR</u></b>	<b><u>SMG</u></b>	<b><u>M1 Carbine</u></b>	<b><u>Max. Poss.</u></b>
a. Simplest to disassemble and assemble		65	43	14	39	49	70
b. Easiest to maintain in the field		63	51	16	34	46	70
Total		128	94	30	73	95	140
<b>4. <u>Ruggedness &amp; Durability</u></b>		<b><u>AR-15</u></b>	<b><u>M1 Rifle</u></b>	<b><u>BAR</u></b>	<b><u>SMG</u></b>	<b><u>M1 Carbine</u></b>	<b><u>Max. Poss.</u></b>
a. Most rugged weapon		52	59	33	35	31	70
b. Had fewest stoppages or malfunctions during firing		59	59	20	32	39	70
c. Most reliable under all conditions		57	60	28	30	35	70
Total		168	178	81	97	105	210
<b>5. <u>Logistics</u></b>		<b><u>AR-15</u></b>	<b><u>M1 Rifle</u></b>	<b><u>BAR</u></b>	<b><u>SMG</u></b>	<b><u>M1 Carbine</u></b>	<b><u>Max. Poss.</u></b>
a. Imposes least logistical burden		66	47	17	30	50	70
Total		66	47	17	30	50	70
<b>6. <u>Tactical</u></b>		<b><u>AR-15</u></b>	<b><u>M1 Rifle</u></b>	<b><u>BAR</u></b>	<b><u>SMG</u></b>	<b><u>M1 Carbine</u></b>	<b><u>Max. Poss.</u></b>
a. Easiest to employ		64	40	18	39	49	70
b. Preferred in ambush/counter-ambush situations		69	28	36	48	29	70
c. Preferred against massed troops		65	32	61	33	19	70
d. Tactically most versatile		69	43	38	29	31	70
Total		267	143	153	149	128	280

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7. <u>General</u>	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>	<u>Max. Poss.</u>
a. Preferred by troops	67	28	18	46	51	70
b. Preferred by commanders and advisors	64	33	21	39	43	70
c. Most suited to VN soldier under present tactical conditions	67	30	21	42	50	70
d. Most effective at most common range for engaging VC (0-200 meters)	63	46	49	22	30	70
Total	261	137	109	149	174	280

Recapitulation: In all aspects covered, the total ratings for all weapons were as follows:

<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>	<u>Maximum Possible</u>
<u>1320</u>	<u>868</u>	<u>503</u>	<u>763</u>	<u>894</u>	<u>1470</u>

8. Accuracy. Advisors and Unit Commanders were requested to evaluate the accuracy of the AR-15 and compare it with other present weapons in both automatic fire and semi-automatic fire. Their evaluation is reflected in the following table:

	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>	<u>Max. Poss.</u>
a. Semi-automatic fire	61	62			45	70
b. Automatic fire	65		57	42		70

9. (C) Remarks. Unit Commanders' and Advisors' remarks concerning the value of the AR-15 to Vietnamese Units and its worth as a combat weapon in the war in South Vietnam as opposed to existing weapons were also requested. Generally, the comments were extremely favorable to the AR-15. All of the comments received are presented below in their entirety and in the form in which they were received.

(1) (C) "On 160900 June 62, one platoon from the 340 Ranger Company was on an operation vic. YT260750 and contacted 3 armed VC in heavily forested jungle. Two VC had carbines, grenades, mines, and one had a

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SMG. At a distance of approximately 15 meters, one Ranger fired an AR-15 full automatic hitting one VC with 3 rounds with the first burst. One round in the head-took it completely off. Another in the right arm, took it completely off, too. One round hit him in the right side, causing a hole about five inches in diameter. It cannot be determined which round killed the VC but it can be assumed that any one of the three would have caused death. The other 2 VC ran, leaving the dead VC with 1 carbine, 1 grenade and 2 mines." (Rangers)

(2.) (C) "On 9 June a Ranger Platoon from the 40th Inf Regt was given the mission of ambushing an estimated VC Company. The details are as follows:

- a. Number of VC killed: 5
- b. Number of AR-15's employed: 5
- c. Range of engagement: 30-100 meters
- d. Type wounds:
  1. Back wound, which caused the thoracic cavity to explode.
  2. Stomach wound, which caused the abdominal cavity to explode.
  3. Buttock wound, which destroyed all tissue of both buttocks.
  4. Chest wound from right to left, destroyed the thoracic cavity.
  5. Heel wound, the projectile entered the bottom of the right foot causing the leg to split from the foot to the hip.

These deaths were inflicted by the AR-15 and all were instantaneous except the buttock wound. He lived approximately five minutes.

The following is a list of minor deficiencies noted during this period:

- a. The stock and heat deflector will reflect light. This light is visible for approximately 150 feet at night.
- b. A brass brush is needed to remove carbon from the bolt carrier." (Rangers)

(3.) (C) "72 AR-15 Rifles were carried into this action (airborne assault). The drop zone was barely acceptable and many troops landed in high trees. Several LMG's and BAR's were not operational after the drop. Only one AR-15 was reported slightly damaged (damaged pistol grip) and all were operational. Throughout the entire operation, which lasted 6 days and covered over 40 kilometers of difficult terrain including dense jungle and frequent water crossings, the weapons (AR-15) held up exceptionally well." (Airborne Brigade)



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(4.) (C) "The AR-15 proved to be an effective weapon on this operation for the following reasons:

a. The weapon held up very well on the paradrop which took place on a small drop zone surrounded by dense forests. Landings of the troopers were much rougher than normal. Many troops landed in high trees. This subjected the individual weapons to a much more severe test than usual. Some of the LMG's and BAR's were not operational after the jump. All AR-15's were functional.

b. Field maintenance on this weapon (AR-15) proved to be much simpler than on the other weapons.

c. While no decisive engagement was made so that the striking power of this weapon (AR-15) could be observed, the troops had great confidence in it and it is my belief that it would have greatly increased our overall firepower had it been tested." (Airborne Brigade)

(5.) (C) "During the period from 16 April to 11 May 1962, the 8th Battalion, Airborne Brigade, participated in two (2) operations of five (5) and four (4) days duration.

The AR-15 was carried during both operations. I was not in a position to observe the engagement of Viet Cong with the AR-15 during either operation although it was fired on different occasions.

The following remarks therefore, are confined to other observations and personal opinions on the AR-15:

a. Maintenance requirements for the AR-15 were negligible. I inspected numerous weapons throughout the entire period stated above and always found the weapons in excellent firing condition.

b. A great simplification in the small arms weapons could be effected by the adoption of the AR-15 to replace the BAR, M1, and Carbine. The effectiveness of the weapon (AR-15), however, I cannot attest to at this time.

c. The troopers have a great amount of respect for the AR-15. If the weapon were adopted as TO&E for Airborne Units, there would be a tremendous psychological uplift in the individual soldier's belief in his ability to shoot and kill." (Airborne Brigade)

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(6.) (C) "One company (96 off & EM) completely equipped with the AR-15. Six operations took place prior to any real use of the weapon.

Five VC were hit, all five with body wounds, and all five killed. Four were probably killing wounds with any weapon listed, but the fifth was essentially a flesh wound. The AR-15 made it a fatal wound.

The troops have a great deal of respect for the weapon and prefer it to all others. They take excellent care of it.

One left upper handguard was cracked and broke during routing a stubborn captive from a wooded area. The soldier concerned placed the handguard against a VC head with considerable force." (7th Infantry Division)

(7.) (C) "On 23-24 May 1962, one company completely equipped with AR-15's (87) plus Bn Hq elements was involved in one light and one heavy action. No wounded were captured and all casualties were inflicted with the AR-15. 27 Viet Cong were killed (24 counted by the advisor) and 25 captured. Grenades were used for the first time and were very effectively employed at ranges of 100-500 meters. They served as the real artillery support as we could not get the artillery to fire any closer than 400 meters. About 36 grenades were utilized in the heavy action, all propelled from the AR-15. The troops are very enthusiastic about the weapon and treat it with greater care than usual." (7th Infantry Division)

(8.) (C) "To date, this weapon has been used only for training. The simplicity of construction has reduced training time necessary for maintenance by approximately fifty per-cent. It is believed that this is an ideal weapon for this type weather and terrain." (Special Battalions)

(9.) (C) "On 13 April, 62, a Special Forces team made a raid on a small village. In the raid, seven VC were killed. Two were killed by AR-15 fire. Range was 50 meters. One man was hit in the head; it looked like it exploded. A second man was hit in the chest; his back was one big hole." (VN Special Forces)

(10.) (C) "This weapon is ideal for this country primarily for these reasons:

- a. Durability & ease of maintenance.
- b. Good Accuracy.
- c. Rapid rate of fire.
- d. Light weight (size & shape make it easy for Vietnamese to handle).
- e. Excellent killing or stopping power." (Airborne Brigade)

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**D. (C) Analysis:** Based on the numerical ratings and the comments of US Advisors and VN Unit Commanders, the AR-15 is the most desirable weapon for use in Vietnam for the following reasons:

1. Ease of training.
2. Suitable physical characteristics.
3. It is easy to maintain.
4. It is more rugged and durable than present weapons.
5. It imposes the least logistical burden.
6. It is the best weapon for all-around tactical employment.
7. Its semi-automatic firing accuracy is comparable to that of the M1 Rifle, while its automatic firing accuracy is considered superior to that of the Browning Automatic Rifle.
8. Vietnamese troops, Commanders and US Advisors prefer it to any other weapon presently being used in Vietnam.

### **APPENDICES:**

1. Weapons Questionnaire
2. For the RVNAF Unit Commander
3. Questionnaire for the Senior MAAG Advisor

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### WEAPONS QUESTIONNAIRE

Based upon your experience and observation as the Commander or Advisor of a unit of the RVNAF, rate the weapons on the right side of this questionnaire in order of preference with respect to the characteristics and questions listed. Your answers should reflect your opinion as to the value of the weapons to the Vietnamese, not the US Forces.

Rating Key:    5 - first choice                      2 - fourth choice  
                  4 - second choice                    1 - last choice.  
                  3 - third choice

#### A. TRAINING

	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>
1. Which weapon is easier to train the troops to use?	_____	_____	_____	_____	_____
2. Which weapon is easier to train the troops in functioning?	_____	_____	_____	_____	_____
3. Which weapon is easier to train the troops to disassemble and assemble?	_____	_____	_____	_____	_____

#### B. PHYSICAL CHARACTERISTICS

	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>
1. Which weapon, because of its size and shape, is easiest for the soldier to aim and fire?	_____	_____	_____	_____	_____
2. Which weapon, because of size, shape and weight, is easier for the soldier to carry over open terrain?	_____	_____	_____	_____	_____
3. Which weapon, because of size, shape and weight, is easier for the soldier to carry in the jungle?	_____	_____	_____	_____	_____
4. Which weapon is easiest to hold on a target while firing several rounds?	_____	_____	_____	_____	_____

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	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>
<b>C. <u>MAINTENANCE</u></b>					
1. Which weapon is simplest to disassemble and assemble?	_____	_____	_____	_____	_____
2. Which weapon is easiest for the troops to maintain in the field?	_____	_____	_____	_____	_____
<b>D. <u>RUGGEDNESS &amp; DURABILITY</u></b>					
1. Which weapon is most rugged?	_____	_____	_____	_____	_____
2. Which weapon had the fewest stoppages and malfunctions?	_____	_____	_____	_____	_____
3. Which weapon is the most reliable under all conditions?	_____	_____	_____	_____	_____
<b>E. <u>LOGISTICS</u></b>					
1. Which weapon imposes the smallest logistical burden? (Consider weight, spare parts, ease of repair, etc.)	_____	_____	_____	_____	_____
<b>F. <u>TACTICAL</u></b>					
1. Which weapon is easiest to employ?	_____	_____	_____	_____	_____
Why?					
2. Which weapon would you prefer in ambush/counter-ambush situations?	_____	_____	_____	_____	_____
Why?					
3. Which weapon would you prefer against mass attacks?	_____	_____	_____	_____	_____
Why?					

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	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>
4. Which weapon do you consider most versatile? (Consider all capabilities)	_____	_____	_____	_____	_____

G. <u>ACCURACY</u> (Rate 5, 4 & 3)	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>
1. Which weapon appears most accurate when fired semi-automatically?	_____	_____	_____	_____	_____
2. Which weapon appears most accurate when fired automatically?	_____	_____	_____	_____	_____

H. <u>GENERAL</u>	<u>AR-15</u>	<u>M1 Rifle</u>	<u>BAR</u>	<u>SMG</u>	<u>M1 Carbine</u>
1. Which weapons do the troops prefer?	_____	_____	_____	_____	_____
Why?					
2. Which weapon would you prefer for your personal use?	_____	_____	_____	_____	_____
Why?					
3. Which weapon do you think is most suited to the Vietnamese soldier under present tactical conditions?	_____	_____	_____	_____	_____
Why?					
4. At what range do you think most Viet Cong are engaged?	_____	_____	_____	_____	_____
5. Which weapon do you think is most effective at that range?	_____	_____	_____	_____	_____
6. If the TO&E of your unit only allowed a single weapon, which one would you choose?	_____	_____	_____	_____	_____
Why?					

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I. **REMARKS:** In the space below, please make any pertinent remarks you may have concerning the AR-15 Rifle, its effectiveness in South Vietnam, its assets or its shortcomings (Continue on back of page if necessary).

Unit \_\_\_\_\_

Date \_\_\_\_\_

Signature \_\_\_\_\_

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### FOR THE RVNAF UNIT COMMANDER

#### QUESTION NO. 1:

How many weapons of each of the following types were carried into the combat engagement, how many rounds of ammunition per weapon were carried, and how many rounds fired?

	<u>No. Weapons</u>	<u>Ammo rds/weap.</u>	<u>Ammo rds. fired</u>
BAR	_____	_____	_____
M1	_____	_____	_____
SMG	_____	_____	_____
Carbine	_____	_____	_____
AR-15	_____	_____	_____

#### QUESTION NO. 2:

How many VC were killed? \_\_\_\_\_  
wounded? \_\_\_\_\_

How many of the VC were KIA by the AR-15? \_\_\_\_\_

How many of the VC were wounded by the AR-15? \_\_\_\_\_

#### QUESTION NO. 3:

What percentage of the friendly fire was full automatic? \_\_\_\_\_

What percentage of the AR-15 fire was full automatic? \_\_\_\_\_

What percentage of the AR-15's had the safety device installed that allowed either full or semi-automatic fire? \_\_\_\_\_

#### QUESTION NO. 4:

What was the maximum range at which shots were fired at the VC? \_\_\_\_\_

What was the average range? \_\_\_\_\_

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### QUESTION NO. 5:

Were aimed shots fired through light brush? \_\_\_\_\_

If so, about what percent of the total fire from all weapons (BAR, SMG, M1, Carbine, AR-15) were aimed shots through light brush?

Less than 5% \_\_\_\_\_

Less than 20% \_\_\_\_\_

Less than 50% \_\_\_\_\_

More than 50% \_\_\_\_\_

In your opinion were shots from the AR-15 missed because of brush deflection? \_\_\_\_\_

If your answer to this question is yes, is it your opinion that the full automatic feature of the AR-15 and the extra rounds that can be carried for a given weight allowance do or do not compensate for this brush deflection? Yes \_\_\_\_\_ No \_\_\_\_\_ No Opinion \_\_\_\_\_

### QUESTION NO. 6:

Were any rifle barrels bent in air drops or other rough handling and hard usage? \_\_\_\_\_

Were any barrels damaged by being fired with water in the bore? \_\_\_\_\_

Were there any malfunctions of any type? \_\_\_\_\_

If yes, please elaborate in the remarks section of this questionnaire.

### QUESTION NO. 7:

As a unit commander of the RVNAF, how would you rate the AR-15 Rifle in the guerrilla warfare action you expect to fight as compared with the other types of weapons listed?

In each space use: A - For the AR-15 is better than  
B - For there is no difference  
C - For the AR-15 is worse than  
D - For no opinion

	<u>M1</u>	<u>BAR</u>	<u>SMG</u>	<u>Carbine</u>
Speed of employment	_____	_____	_____	_____
Accuracy	_____	_____	_____	_____

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	<u>M1</u>	<u>BAR</u>	<u>SMG</u>	<u>Carbine</u>
Striking power	_____	_____	_____	_____
Fire power	_____	_____	_____	_____
Reliability	_____	_____	_____	_____
Field maintenance	_____	_____	_____	_____
Weight	_____	_____	_____	_____
Size	_____	_____	_____	_____
Overall	_____	_____	_____	_____
Overall for ambushes only	_____	_____	_____	_____

### QUESTION NO. 8:

If the VC tactics grow into large scale attacks and the "human sea" type tactic is used, how would you rate the AR-15 overall against these other weapons? (Same scale as above: A, B, C, D)

<u>M1</u>	<u>BAR</u>	<u>SMG</u>	<u>Carbine</u>
_____	_____	_____	_____

### QUESTION NO. 9:

Would the soldier who carried the AR-15 into this engagement choose it again over the weapon he formerly carried?

	<u>% would choose AR-15</u>	<u>% would choose other</u>
Formerly carried the BAR	_____	_____
Formerly carried the M1	_____	_____
Formerly carried the SMG	_____	_____
Formerly carried the Carbine	_____	_____

### QUESTION NO. 10:

As an RVNAF unit commander, if you had your choice of weapons consisting of all four of the following: BAR, M1, SMG, Carbine or the AR-15, which would be your choice?

OPTION A: BAR, M1, SMG, Carbine \_\_\_\_\_.

OPTION B: AR-15 \_\_\_\_\_.

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### QUESTIONNAIRE FOR THE SENIOR MAAG ADVISOR

1. In the engagement with the VC covered by this questionnaire, how many of each of the following weapons were carried by your unit?

BAR \_\_\_\_\_ SMG \_\_\_\_\_ M1 \_\_\_\_\_ Carbine \_\_\_\_\_ AR-15 \_\_\_\_\_

2. If the AR-15 had not been used, how many of each would have been carried?

BAR \_\_\_\_\_ SMG \_\_\_\_\_ M1 \_\_\_\_\_ Carbine \_\_\_\_\_

3. As a MAAG Advisor to the RVNAF you obtain insight into the combat situation in SVN not available to the CDTG or to other US Government officials. These questionnaires can only gain a little part of the whole individual weapons problem. Some of the questions asked of the RVNAF unit commander are, therefore, repeated here because they are considered of prime importance.

QUESTION: How do you as a MAAG Advisor rate the AR-15 Rifle in the SVN guerrilla war as compared to the following weapons?

	<u>BAR</u>	<u>M1</u>	<u>SMG</u>	<u>Carbine</u>
A. The AR-15 is better.	_____	_____	_____	_____
B. No difference.	_____	_____	_____	_____
C. The AR-15 is worse.	_____	_____	_____	_____
D. No opinion.	_____	_____	_____	_____

How would you rate the AR-15 against these weapons for ambushes only?

\_\_\_\_\_

How would you rate the AR-15 in a "human sea" attack against these weapons?

\_\_\_\_\_

As a MAAG Advisor to RVNAF, if you were to recommend the TO&E of the above weapons or the AR-15 only which would you recommend? \_\_\_\_\_.

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4. If you would not recommend completely replacing all four of the above weapons with the AR-15, would you recommend completely replacing any one of the four?

Would recommend completely replacing BAR \_\_\_\_\_.  
Would recommend completely replacing M1 \_\_\_\_\_.  
Would recommend completely replacing SMG \_\_\_\_\_.  
Would not completely replace any of these weapons \_\_\_\_\_.

5. Remarks: In the space below or on additional sheets please elaborate on any points not adequately covered above.

\_\_\_\_\_  
(Signature)

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### **ANNEX "B"**

#### **DETAILS OF COMPARISON TEST BETWEEN THE AR-15 AND M2 CARBINE**

##### **I. (C) GENERAL.**

Personnel from a Vietnamese company that had just completed advanced individual training were used as test subjects for most of this comparison. The unit of 180 men was divided into two groups of 90 men each. Group A received one M2 Carbine per man, while Group B received an AR-15 for each man. Each group was then given a course of instruction on their respective weapon. The instruction for each was identical in time and scope of material covered. Following this, both groups underwent an identical test program which consisted of: assembly and disassembly; known distance firing, both semi-automatic and automatic fire; unknown distance firing, semi-automatic and automatic fire; bayonet course; and, infiltration course. This phase lasted for one week (44 hours). At the end of the first week, the two groups traded weapons and the course of instruction and the tests were repeated.

##### **II.(C) SUMMARY OF TESTS.**

To arrive at a valid conclusion concerning the relative suitability of the AR-15 as opposed to the M2 Carbine for possible use by selected units of the Armed Forces of the Republic of Vietnam, a total of nine tests were conducted. They were:

1. Comparison of Physical Characteristics.
2. Comparative Ease of Disassembly and Assembly.
3. Marksmanship Ability - Known Distance (semi-automatic and automatic fire).
4. Marksmanship Ability - Unknown Distance (semi-automatic and automatic fire).
5. Comparative Ruggedness and Durability.
6. Adequacy of Safety Features.
7. Effects of Open Storage in a Tropical Environment.
8. Comparative Ability to Penetrate Dense Foliage.
9. Troop Preference Poll.

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### III. (C) DETAILS OF TESTS.

#### Test No. 1. Comparison of Physical Characteristics.

Purpose: To compare the physical characteristics of the AR-15 Rifle and the M2 Carbine.

Method: Both weapons were weighted and measured and the resulting data recorded.

#### Results:

a. Weights (lbs.):	<u>AR-15</u>	<u>M2 Carbine</u>
Weapon (less sling, magazine and accessories)	6.24	5.98
Magazine (empty)	0.18*	0.25*
Magazine (loaded - 20 rds)	0.68	-
Magazine (loaded - 30 rds)	-	1.02
Bayonet	0.62	0.72
Bipod	0.50	(No Bipod)
Sling	<u>0.19</u>	<u>0.07</u>
Totals: w/20 rd mag loaded	8.23	
w/30 rd mag loaded		7.79

\*Figure not included in totals.

Relative Battle Load (lbs.) - including accessories of sling, bayonet, bipod.

Weapon w/12 magazines (240 rds)	15.71	
Weapon w/8 magazines (240 rds)		14.93

b. Dimensions (inches):	<u>AR-15</u>	<u>M2 Carbine</u>
Length of barrel	20.00	18.00
Overall length	37.50	35.58
Overall length w/bayonet	42.98	42.26

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**Analysis:** The AR-15 and the M2 Carbine are comparable in size and weight and both are compatible with the light weight and small stature of the VN soldier. An integral grenade launcher and telescope mount and an accessory bipod are included in the weapon weight of the AR-15. These are not standard items for the M2 Carbine.

### Test No. 2. Comparative Ease of Disassembly and Assembly.

**Purpose:** To compare the ease of disassembly and assembly of the AR-15 Rifle and the M2 Carbine and the difficulties of training encountered therein.

#### Method:

a. Each group of test subjects received a two hour period of instruction in the disassembly and assembly of their respective weapons. After completing this instruction, test personnel selected random samples of 10 men and had them disassemble and reassemble their weapons. This procedure was repeated with each group until 100 men had been tested with each weapon. Times were recorded by Non-Commissioned Officers and the weapons were inspected for proper assembly by Test Committee Cadre.

b. For the purpose of this test, both weapons were disassembled only as far as was necessary for field cleaning, i. e., "field stripped".

#### Results:

	<u>AR-15</u>	<u>M2 Carbine</u>
a. Average time required for disassembly & assembly.	1 min. 17 sec.	3 min. 17 sec.
b. Could not reassemble (percent)	0%	19%
c. Reassembled improperly (percent)	4%	10%
d. Number of parts handled by soldier in field stripping	7	11

#### Analysis:

a. The AR-15 is simpler and requires less time to disassemble and assemble for normal field cleaning.

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b. The average Vietnamese soldier can be trained in the disassembly and assembly for field cleaning of the AR-15 in a shorter time than for the M2 Carbine. This is further emphasized by the fact that all test subjects had previously received 12 hours of instruction on the M1 Carbine while undergoing basic combat training.

### Test No. 3. Marksmanship Ability, Known Distance.

Purpose: To compare the ability of ARVN soldiers to deliver accurate semi-automatic and automatic fire on targets at known ranges using the AR-15 and the M2 Carbine.

#### Method:

a. Each group of test subjects received 10 hours of preliminary marksmanship training on their respective weapon. Upon completion of formal instruction, zeroing of weapons and practice firing at 26, 100 and 200 meters, each group fired a qualification course for test purposes. Each test participant completed this qualification course with both the AR-15 and M2 Carbine.

b. In semi-automatic fire, the course fired for the test was the standard ARVN M1 rifle qualification course. The scores obtained by the test subject with both weapons in this firing were compared with each other and with previous scores fired by the test subjects in qualifying with the M1 Rifle while undergoing Basic and Advanced Individual Training.

c. In automatic fire, the test subjects engaged the standard ARVN silhouette target at ranges of 75, 100 and 200 meters. Each individual fired a total of 40 rounds from each range. Scores were computed on the basis of 5 points per target hit and an average of 50% hits was used as the basis for qualification.

d. Throughout all firing, stoppages or malfunctions due to mechanical failures were noted and recorded.

e. Throughout all firing, observations concerning the adequacy of safety features and the ARVN soldier's ability to understand them were recorded.

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### Results:

	<u>AR-15</u>	<u>M2 Carbine</u>	<u>M1 Rifle</u>
Semi-automatic:			
Percent qualified	26%	27%	15%
Automatic:			
Percent qualified	71%	7%	

### Analysis:

a. The ability of the ARVN soldier to deliver accurate semi-automatic fire on targets of known range with the AR-15 and the M2 Carbine is comparable. Test participants, as a group, fired a higher percentage of qualifying scores with both the AR-15 and M2 Carbine than they had previously fired with the M1 Rifle.

b. The ARVN soldier's ability to deliver accurate automatic fire on targets of known range is far greater with the AR-15 rifle than with the M2 Carbine.

### Test No. 4. Marksmanship Ability, Unknown Distance.

Purpose: To compare the ARVN soldier's ability to deliver accurate semi-automatic and automatic fire on targets of unknown range using the AR-15 Rifle and the M2 Carbine.

### Method:

a. The standard ARVN Transition firing course was used for this test.

b. Semi-automatic fire. Each man received 40 rounds to engage 20 targets at varying ranges from 50 to 250 meters. For a first round hit, he was awarded 10 points. For a second round hit, he was awarded 5 points. Qualification score for the course was 100 points.

c. Automatic Fire. Each man received 80 rounds to engage 20 targets in short bursts. Targets were located at varying ranges from 50 to 250 meters. Scores were computed on the basis of 5 points per target hit. Qualification score for the course was 100 points.

d. Throughout all firing, stoppages or malfunctions due to mechanical failures were noted and recorded.



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e. Throughout all firing, observations concerning the adequacy of safety features and the ARVN soldier's ability to understand them were recorded.

### Results:

	<u>AR-15</u>	<u>M2 Carbine</u>
Semi-automatic run:		
Percent qualified	23%	22%
Automatic run:		
Percent qualified	23%	15%

### Analysis:

a. The ARVN soldier's ability to deliver accurate semi-automatic fire on targets of unknown range using the AR-15 and the M2 Carbine is comparable.

b. The ARVN soldier's ability to deliver accurate automatic fire on targets of unknown range is greater with the AR-15 than with the M2 Carbine.

### Test No. 5. Comparative Ruggedness and Durability.

Purpose: To compare the ruggedness and durability of the AR-15 Rifle and the M2 Carbine.

### Method:

a. Concurrent with all other testing, observations concerning the ruggedness and durability of each weapon were recorded. During all firing exercises, any stoppage or malfunction of either weapon caused by mechanical failure was noted and recorded.

b. Fifty AR-15 Rifles and fifty M2 Carbines were each run through the standard ARVN Bayonet Assault Course twice. At the completion of the course, the weapons were inspected and "dry fired". Any deficiencies noted were recorded.

c. Fifty AR-15 Rifles and fifty M2 Carbines were each run through the standard ARVN Infiltration Course twice. At the completion of the course, the weapons were inspected and "dry fired". Any deficiencies noted were recorded.



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### **Results:**

a. After the first week of firing, seven M2 Carbines were eliminated from the test. Six of these would not fire automatically because of defective disconnecter springs; the other would not fire at all because of a broken disconnecter pin. In contrast, all AR-15's functioned properly throughout the entire test period.

b. After negotiating the Bayonet Assault Course the second time, two M2 Carbines were eliminated from the test because of broken stocks. No AR-15 Rifles were damaged.

c. Both the M2 Carbine and the AR-15 were carried through the Infiltration Course twice without adverse effect.

### **Analysis:**

a. The AR-15 is considered to be more rugged and durable than the M2 Carbine under conditions which require prolonged firing.

b. The AR-15 will stand up to rough handling normally encountered in combat situations better than the M2 Carbine.

### **Test No. 6. Comparison of the Adequacy of Safety Features.**

**Purpose:** To compare the adequacy of the safety features of the AR-15 Rifle and the M2 Carbine with respect to their function and location and the ARVN soldier's ability to understand them.

### **Method:**

a. Concurrent with all firing and tests in which ARVN soldiers handled the AR-15 and M2 Carbine, test committee cadre made observations concerning the adequacy of the safety features with respect to their function and location and the soldier's ability to understand them.

### **Results:**

a. No misfires occurred throughout the firing that were attributable to improper functioning of the safety mechanism on either the AR-15 or the M2 Carbine.

b. The ARVN soldiers had no difficulty in understanding the function and operation of the safety mechanisms on either weapon.



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### Analysis:

a. The safety features on the AR-15 and the M2 Carbine are considered comparable with regard to function and the ARVN soldier's ability to understand them.

b. The location of a single selector switch which combines the functions of safety selector and rate of fire selector, on the left side of the receiver where it is easily accessible to the thumb, enables the ARVN soldier to get the first round off faster with the AR-15 than he can with the M2 Carbine. With the M2 Carbine, he must manipulate the safety selector with his trigger finger, then return it to the trigger to fire. With the AR-15 he can keep his finger on the trigger while manipulating the safety selector with his thumb.

### Test No. 7. Effects of Open Storage in a Tropical Environment.

Purpose: To determine the effects of open storage in a tropical climate on the AR-15 Rifle and the M2 Carbine and compare the results of such storage on each weapon.

### Method:

a. Two AR-15 Rifles and two M2 Carbines were stored in the open for a period of two weeks without any care or maintenance. At the end of the storage, the weapons were examined and pertinent observations recorded.

### Results:

#### a. M2 Carbines:

1. Because of rust and sand which had collected in the receivers, operating handles on both weapons could not be operated manually and force was required to open the bolts.
2. The operating slide stops would not function properly because sand and grit had fouled the operating slide stop springs.
3. Both magazines were rusty and had collected enough sand to prevent them from operating properly without first being thoroughly cleaned.
4. The chambers and bores of both weapons were rusty.



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5. The rear sights on both weapons could not be adjusted for windage due to the collection of rust and grit on the windage screws.

6. Approximately twenty minutes were required to clean each weapon before test personnel considered it safe to fire.

**b. AR-15 Rifles:**

1. The charging handles on both weapons were difficult to operate because sand had collected within the receiver.

2. The bolt and bolt carriers of both weapons were rusty.

3. The chambers and bores of both weapons were rusty.

4. Approximately five minutes were required to clean each weapon before test personnel considered them safe to fire.

Analysis: The AR-15 Rifle, because it has fewer moving parts, will function more readily than the M2 Carbine after extended periods of storage in the open under tropical conditions.

**Test No. 8. Brush Penetration.**

Purpose: To determine whether dense brush and undergrowth affects the trajectory of the AR-15 bullet and to compare its ability to penetrate heavy foliage with that of the M2 Carbine.

**Method:**

a. Silhouette targets were positioned behind dense underbrush which generally consisted of bamboo saplings, bush, grass and vines. From a distance of 15 meters, both the AR-15 Rifle and the M2 Carbine were fired at the targets.

b. The distance was then increased to 50 meters and the targets were fired upon again. (Beyond 50 meters it was impossible to distinguish a target, so this was considered an acceptable maximum distance for the test).

c. Procedures a and b above were repeated several times with foliage of varying density.

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<u>Results:</u>			<u>No. of hits</u>	
<u>Type of Underbrush</u>	<u>Range</u>	<u>No. of rounds fired</u>	<u>AR-15</u>	<u>M2</u>
Light underbrush	15 meters	6	6	6
Moderate underbrush & bamboo thicket	15 meters	6	6	6
Heavy underbrush & bamboo thicket interwoven with vines	15 meters	6	6	6
Light underbrush	50 meters	6	6	6
Moderate underbrush & bamboo thicket	50 meters	6	6	6
Heavy underbrush & bamboo thicket interwoven with vines	50 meters	6	6	5

### Analysis:

a. The trajectory of the AR-15 bullet is not significantly affected when fired through dense underbrush at ranges up to 50 meters.

b. The AR-15 round will penetrate jungle undergrowth equally as well as the M2 Carbine round at ranges up to 50 meters.

### Test No. 9. Troop Preference Poll.

Purpose: To obtain subjective data concerning the ARVN soldier's individual preference between the AR-15 Rifle and the M2 Carbine.

Method: Upon completion of all tests by participating personnel, each individual present for duty (158) was questioned with regard to preference between the two weapons.

### Results:

a. Thought the AR-15 had the best "feel"	129	
Thought the M2 Carbine had the best "feel"		29



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b.	Thought the AR-15 had the best sight Thought the M2 Carbine had the best sight	66	92
c.	Thought the AR-15 would stand up best under combat conditions Thought the M2 Carbine would stand up best under combat conditions	107	51
d.	Preferred the AR-15 grip Preferred M2 Carbine grip	129	29
e.	Thought AR-15 easier to load Thought M2 Carbine easier to load	120	38
f.	Thought AR-15 easier to get ready to use Thought M2 Carbine easier to get ready to use	81	77
g.	Thought AR-15 easier to disassemble Thought M2 Carbine easier to disassemble	140	18
h.	Liked the AR-15 better from recoil standpoint Liked M2 Carbine better from recoil standpoint	106	52
i.	Thought AR-15 easier to get back on target after firing a round Thought M2 Carbine easier to get back on target after firing a round	117	41
j.	Thought AR-15 more dependable Thought M2 Carbine more dependable	107	51
k.	Thought AR-15 best all around weapon for Infantry use Thought M2 Carbine best all around weapon for Infantry use	100	58
l.	Thought AR-15 climbed least when fired auto- matically Thought M2 Carbine climbed least when fired automatically	117	41

ANNEX "B"

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m.	Thought AR-15 more accurate when fired full automatic	136	
	Thought M2 Carbine more accurate when fired full automatic		22
n.	Would prefer AR-15 in combat	130	
	Would prefer M2 Carbine in combat		28

### Analysis:

a. The majority of test subjects preferred the AR-15 Rifle to the M2 Carbine in all aspects covered by the poll, except for the sights. Further questioning of the subjects by test committee personnel disclosed that this preference was due to greater familiarity with carbine-type sights, not because of an inability to understand the AR-15 sights. This is not considered a shortcoming of the weapon but a matter of training and familiarization.



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### ANNEX "C"

#### SUGGESTED CORRECTIVE ACTIONS

<u>DEFICIENCY / SHORTCOMING</u>	<u>SUGGESTED CORRECTIVE ACTION</u>	<u>REMARKS</u>
-------------------------------------	--	----------------

#### SECTION I

This section contains deficiencies requiring elimination in order to make the item acceptable for use on a minimum basis.

None

None

None

#### SECTION II

This section lists those deficiencies and shortcomings in the item which were discovered during test and satisfactorily corrected prior to completion of the test. They no longer represent a defect in the item tested. The correction must be applied to the production model of this item.

None

None

None

#### SECTION III

This section contains shortcomings which are desired to be corrected as practicable, either concurrent with elimination of deficiencies in Section I, or in production engineering or by product improvement.

1. The upper hand guard is hard to grip when hands are sweaty.

Roughen surface.

Ltr. from OSD/ARPA on 11 Jul 62 states that manufacturer is now moulding "checkering" on upper hand guards.

2. The weapon cleaning rod is of minimum length and hard to grip.

Add one (1) additional section and provide "T" shaped handle.

ANNEX "C"

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## **ANNEX "D"**

### **PHOTOGRAPHS**

**This Annex contains miscellaneous photographs which visually depict pertinent aspects of the evaluation of the AR-15 conducted in South Vietnam.**

#### **PHOTOGRAPHS:**

- 1. VN Soldier with AR-15 and M1 Rifle**
- 2. VN Soldier with AR-15 and BAR**
- 3. M2 Carbine and AR-15 Rifle with Accessories**
- 4. VN Soldier with AR-15 and M2 Carbine**
- 5. M2 Carbine and AR-15 Rifle**
- 6. M2 Carbine and AR-15 Rifle "Field Stripped"**
- 7. VC Casualty by AR-15 - 150 Meters**
- 8. VC Casualty By AR-15 - 15 Meters**

## **ANNEX "D"**

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VN Soldier with M1 rifle.

VN Soldier with AR-15.









Handgun, Colt, .30, 15, w/standard accessories



Colt, Armalite Rifle, AR-15, w/standard accessories.

PHOTOGRAPH 3, AGC & 17



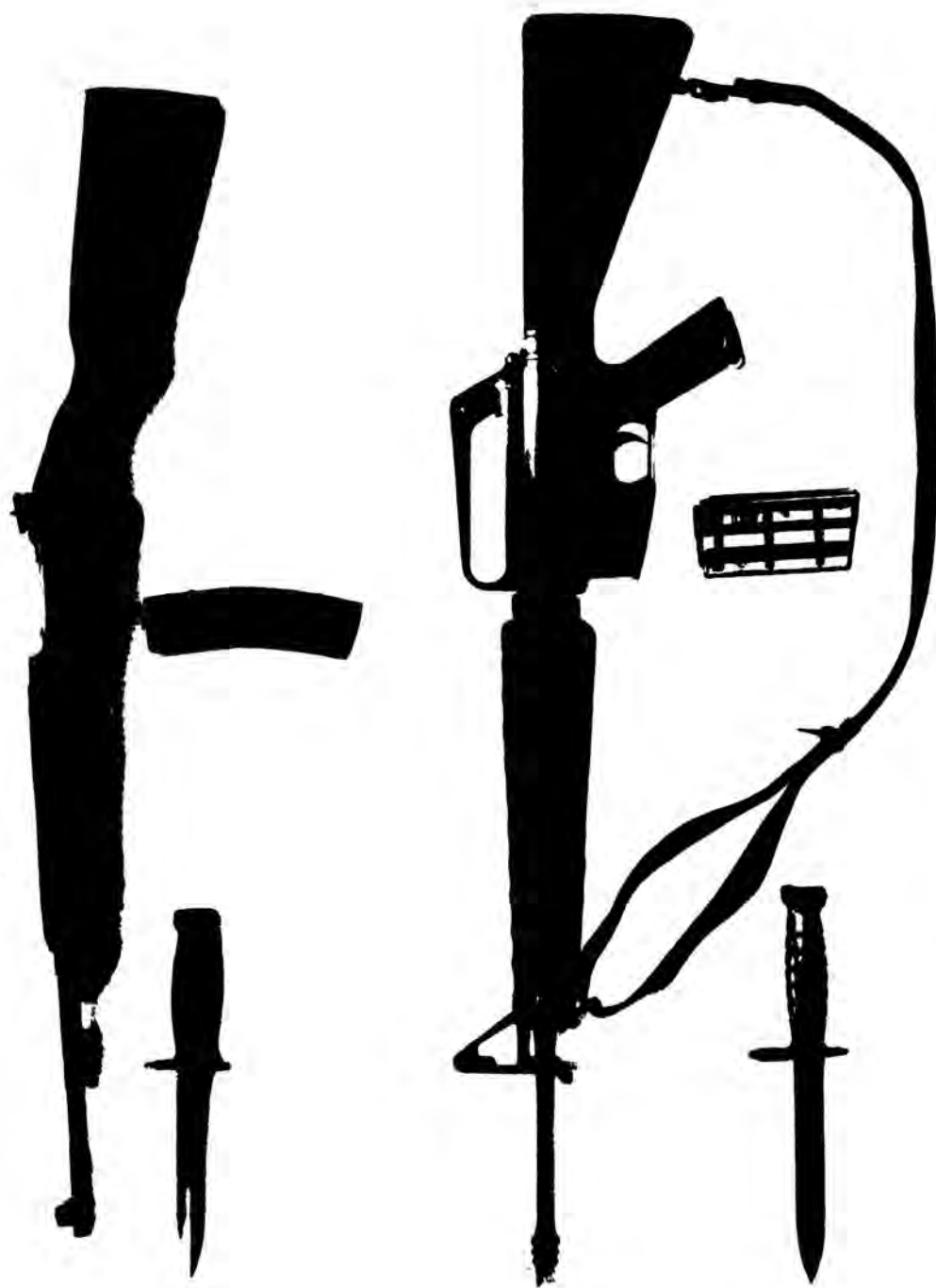


Assault Position with Carbine.



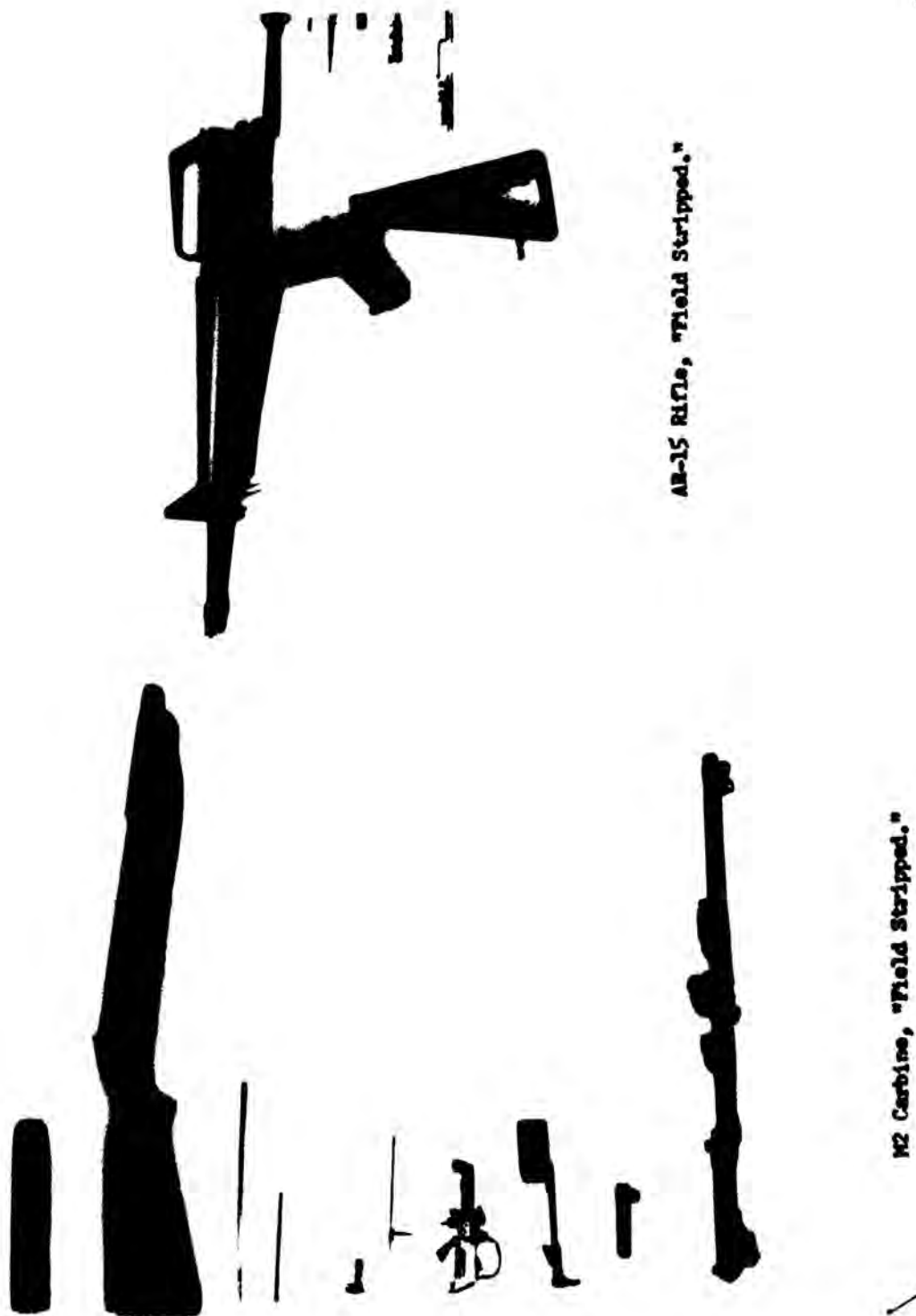
Assault Position with AR-15.





TOP: M2 CARBINE w/ BAYONET, 30 RD MAGAZINE  
BOTTOM: AR-15 w/ 30 RD MAGAZINE





PHOTOGRAPH 6, ANNEX "D"



## **EXHIBIT 66**



**TC 3-22.9**

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## **Rifle and Carbine**

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**MAY 2016**

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**TC 3-22.9, C3**

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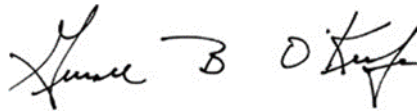


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No. 3-22.9

Headquarters  
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Washington, DC, 13 May 2016

# Rifle and Carbine

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## Preface

Training Circular (TC) 3-22.9 provides Soldiers with the critical information for their rifle or carbine and how it functions, its capabilities, the capabilities of the optics and ammunition, and the application of the functional elements of the shot process.

TC 3-22.9 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. Terms for which TC 3-22.9 is the proponent publication (the authority) are italicized in the text and are marked with an asterisk (\*) in the glossary. Terms and definitions for which TC 3-22.9 is the proponent publication are boldfaced in the text. For other definitions shown in the text, the term is italicized and the number of the proponent publication follows the definition.

The principal audience for TC 3-22.9 is all members of the profession of arms. Commanders and staffs of Army headquarters serving as joint task force or multinational headquarters should also refer to applicable joint or multinational doctrine concerning the range of military operations and joint or multinational forces. Trainers and educators throughout the Army will also use this publication.



Commanders, staffs, and subordinates ensure that their decisions and actions comply with applicable United States, international, and in some cases host-nation laws and regulations. Commanders at all levels ensure that their Soldiers operate in accordance with the law of war and the rules of engagement. (See FM 6-27/MCTP 11-10C.)

This publication applies to the active Army, the Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the United States Army Reserve (USAR). Unless otherwise stated in this publication, masculine nouns and pronouns do not refer exclusively to men.

Uniforms depicted in this manual were drawn without camouflage for clarity of the illustration.

The proponent of this publication is United States (U.S.) Army Maneuver Center of Excellence (MCoE). The preparing agency is the MCoE, Fort Benning, Georgia. You may submit comments and recommended changes in any of several ways—U.S. mail, e-mail, fax, or telephone—as long as you use or follow the format of DA Form 2028, (*Recommended Changes to Publications and Blank Forms*). Contact information is as follows:

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## **Introduction**

This manual is comprised of nine chapters and five appendices, and is specifically tailored to the individual Soldier's use of the M4- or M16-series weapon. This TC provides specific information about the weapon, aiming devices, attachments, followed by sequential chapters on the tactical employment of the weapon system.

The training circular itself is purposely organized in a progressive manner, each chapter or appendix building on the information from the previous section. This organization provides a logical sequence of information which directly supports the Army's training strategy for the weapon at the individual level.

Chapters 1 through 4 describe the weapon, aiming devices, mountable weapons, and accessories associated with the rifle and carbine. General information is provided in the chapters of the manual, with more advanced information placed in appendix A, Ammunition, and appendix B, Ballistics.

Chapters 5 through 9 provide the employment, stability, aiming, control and movement information. This portion focuses on the Soldier skills needed to produce well aimed shots. Advanced engagement concepts are provided in appendix C of this publication. Appendix D of this publication provides common tactical drills that are used in training and combat that directly support tactical engagements. Finally, appendix E of this publication, is provided at a common location in this and future weapons publications to provide a common location for reference.

This manual does not cover the specific rifle or carbine training strategy, ammunition requirements for the training strategy, or range operations. These areas will be covered in separate training circulars.

## **Conclusion**

TC 3-22.9 applies to all Soldiers, regardless of experience or position. This publication is designed specifically for the Soldier's use on the range during training, and as a reference while deployed.



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## Chapter 1

# Overview

This TC is designed to provide Soldiers the critical information on their rifle or carbine to properly and effectively engage and destroy threats in a direct fire engagement. It relies on the Soldier's understanding of the weapon, how it functions, its capabilities, the capabilities of the optics and ammunition, and how to properly employ those capabilities to achieve mastery through the application of the functional elements of the shot process.

This chapter describes the principles of proper weapons handling, tactical applications and control measures for handling the weapons, and an overview of the concepts of overmatch as it pertains to a Soldier's individual weapon.

1-1. Each Soldier is responsible for placing accurate and effective fires on threat targets with their individual weapon. This manual defines the functional elements of the shot process, the principles of operation of the weapon, the characteristics and description of ballistics and ammunition, and the various engagement techniques that are essential to build Soldier proficiency with their weapon. It includes standard drills and techniques that assist the Soldier to build, improve, and sustain their skills to achieve accurate and precise shots consistently during combat operations (see figure 1-1).

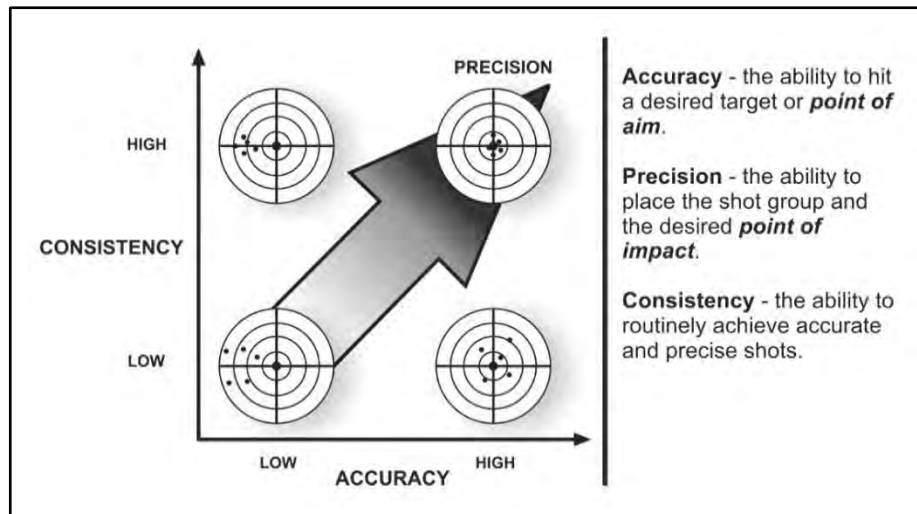


Figure 1-1. Employment skills



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**Chapter 1**

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## **SAFE WEAPONS HANDLING**

1-2. Safe weapons handling procedures are a consistent and standardized way for Soldiers to handle, operate, and employ the weapon safely and effectively. Weapons handling is built on three components; the Soldier, the weapon, and the environment:

- The **Soldier** must maintain situational understanding of friendly forces, the status of the weapon, and the ability to evaluate the environment to properly handle any weapon. The smart, adaptive, and disciplined Soldier is the primary safety mechanism for all weapons under his control.
- The **weapon** is the primary tool of the Soldier to defeat threats in combat. The Soldier must know of and how to operate the mechanical safeties built into the weapons they employ, as well as the principles of operation for those weapons.
- The **environment** is the Soldier's surroundings. The Soldier must be aware of muzzle discipline, the nature of the target, and what is behind it.

1-3. To safely and effectively handle weapons, Soldiers must be cognitively aware of three distinct weapons handling measures:

- **The rules of firearms safety.**
- **Weapons safety status.**
- **Weapons control status.**

1-4. These measures directly support the components of safe weapons handling. They are designed to provide redundant safety measures when handling any weapon or weapon system, not just rifles and carbines.

1-5. This redundancy allows for multiple fail-safe measures to provide the maximum level of safety in both training and operational environments. A Soldier would have to violate two of the rules of firearms safety or violate a weapon safety status in order to have a negligent discharge.

---

**Note.** Unit standard operating procedures (SOPs), range SOPs, or the operational environment may dictate additional safety protocols; however, the rules of firearms safety are always applied. If a unit requires Soldiers to violate these safety rules for any reason, such as for the use of blank rounds or other similar training munitions during training, the unit commander must take appropriate risk mitigation actions.

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## **RULES OF FIREARMS SAFETY**

1-6. The Rules of Firearms Safety are standardized for any weapon a Soldier may employ. Soldiers must adhere to these precepts during training and combat operations, regardless of the type of ammunition employed, except as noted above.



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Overview

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**Rule 1: Treat Every Weapon as if it is Loaded**

1-7. Any weapon handled by a Soldier must be treated as if it is loaded and prepared to fire. Whether or not a weapon is loaded should not affect how a Soldier handles the weapon in any instance.

1-8. Soldiers must take the appropriate actions to ensure the proper weapon status is applied during operations, whether in combat or training.

**Rule 2: Never Point the Weapon at Anything You Do Not Intend to Destroy**

1-9. Soldiers must be aware of the orientation of their weapon's muzzle and what is in the path of the projectile if the weapon fires. Soldiers must ensure the path between the muzzle and target is clear of friendly forces, noncombatants, or anything the Soldier does not want to strike.

1-10. When this is unavoidable, the Soldier must minimize the amount of time the muzzle is oriented toward people or objects they do not intend to shoot, while simultaneously applying the other three rules of fire arms safety.

**Rule 3: Keep Finger Straight and Off the Trigger Until Ready to Fire**

1-11. Soldiers must not place their finger on the trigger unless they intend to fire the weapon. The Soldier is the most important safety feature on any weapon. Mechanical safety devices are not available on all types of weapons. When mechanical safeties are present, Soldiers must not solely rely upon them for safe operation knowing that mechanical measures may fail.

1-12. Whenever possible, Soldiers should move the weapon to mechanical safe when a target is not present. If the weapon does not have a traditional mechanical safe, the trigger finger acts as the primary safety.

**Rule 4: Ensure Positive Identification of the Target and its Surroundings**

1-13. The disciplined Soldier can positively identify the target and knows what is in front of and what is beyond it. The Soldier is responsible for all bullets fired from their weapon, including the projectile's final destination.

1-14. Application of this rule minimizes the possibility of fratricide, collateral damage, or damage to infrastructure or equipment. It also prepares the Soldier for any follow-on shots that may be required.



## Chapter 1

### WEAPON SAFETY STATUS

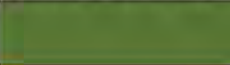



△ 1-15. The readiness of a Soldier's weapon is termed as its *weapon safety status (WSS)*. It is a standard code that uses common colors (green, amber, red, and black) to represent the level of readiness for a given weapon.

1-16. Each color represents a specific series of actions that are applied to a weapon. They are used in training and combat to place or maintain a level of safety relevant to the current task or action of a Soldier, small unit, or group.

△ 1-17. The WSS ratings are evaluated by the level of safety measures applied to the weapon itself. Table 1-1 describes the general safe condition of the weapon for each WSS, based on the standard color scheme found in ADP 1-02.

*Note.* If the component, assembly, or part described is unclear, refer to the weapon's technical manual (TM) or chapter 2 of this publication.

△ **Table 1-1. General safe condition of the weapon for each weapon safety status**

Weapon Safety Status	General Description	Color Amplifier
GREEN	Fully Safe	
AMBER	Substantially Safe	
RED	Marginally Safe	
BLACK	Not Safe	

△ 1-18. All firers and leaders must be fluent in the general meaning of each WSS, how it pertains to the weapon being employed, and the responsibilities of the firer to own each shot or burst. The following are the basic definitions for each WSS:

- Green, "Fully Safe" – the weapon is clear, no ammunition is present the chamber is empty, and the fire selector switch is set to SAFE.
- △ Amber, "Substantially Safe" – a leader must clear and verify that the weapon's bolt is forward, the chamber is empty, and ammunition is introduced to the weapon. This is an administrative or preparatory WSS. Leaders use amber primarily for mounted operations and during combat operations when directed to maintain a substantially safe weapon with the ability to rapidly transition and escalate to red or black, based on the situation.

△ *Note.* WSS amber is not used in the live-fire events described in this publication.



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Overview

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- △ ● Red, “Marginally Safe” – the fire selector switch is set to SAFE, the magazine is locked in the magazine well, a round is in the chamber, and the bolt is locked in the forward position.
- △ ● Black, “Not Safe” – Indicates when the weapon is fully prepared to fire, the firer has positively identified the target, the fire selector switch is set to FIRE, and the firer’s finger is on the trigger, and the fire is in the process of engaging the target.

△ *Note.* WSS black is used to describe the actions of the firer when in a red status and entering an engagement sequence. WSS black describes the distinct difference between red and actively and deliberately engaging a threat.

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- △ 1-19. Figures 1-2 through 1-5 on pages 1-6 through 1-9 describe the standard color code for the M4-series/M16-series rifle and carbine. The Soldier performs actions described in figures 1-2 through 1-5 to move from one color code to the next.



Chapter 1

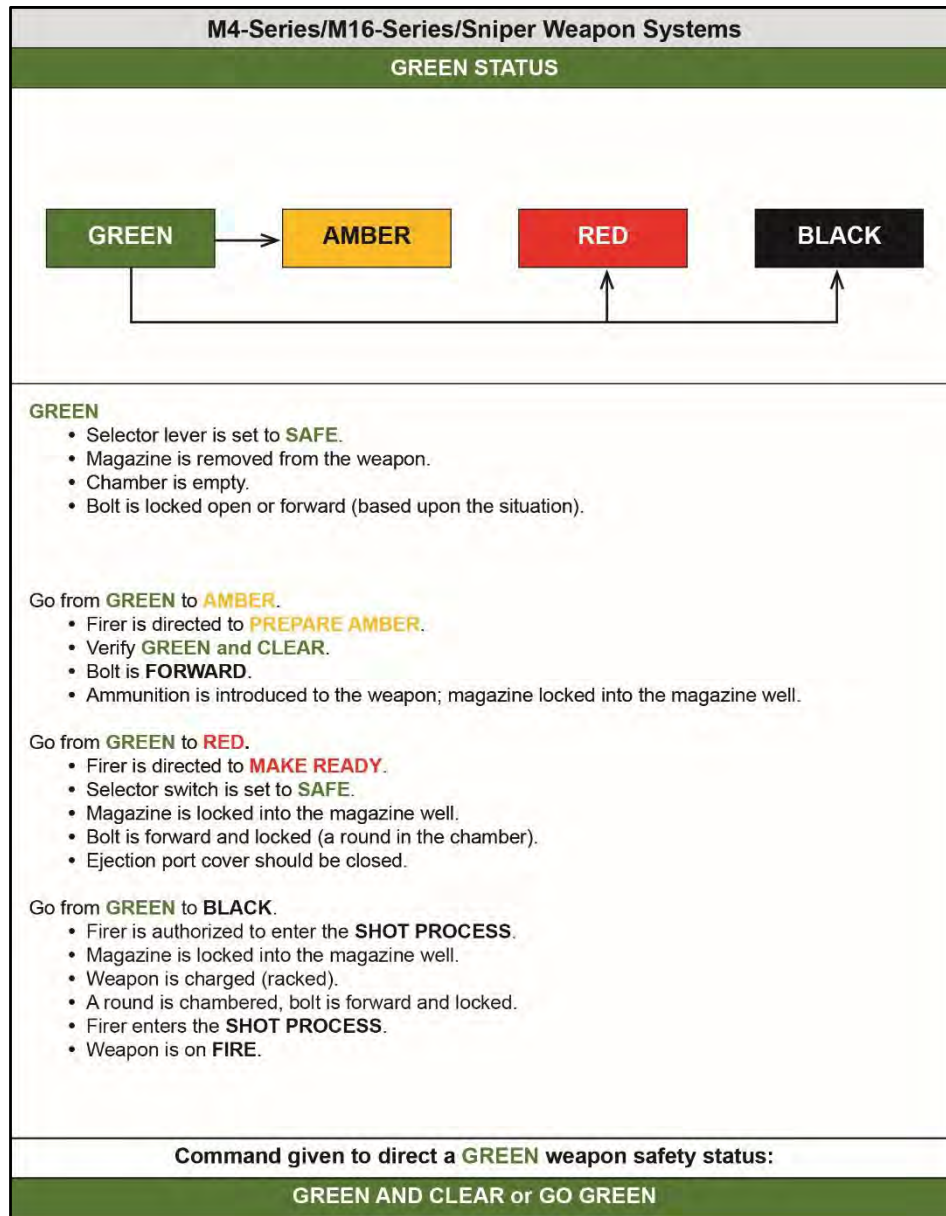


Figure 1-2. M4-/M16-series weapons, green weapon safety status



Overview

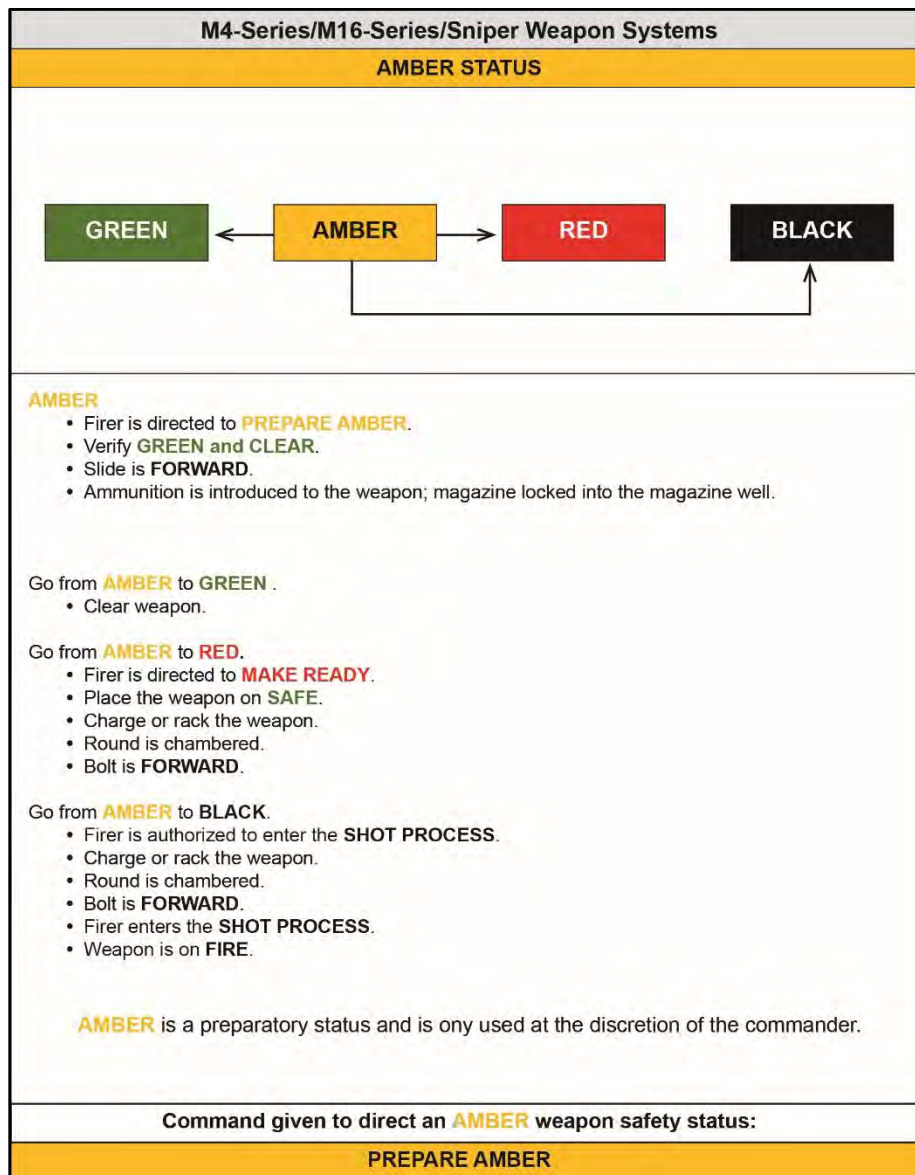


Figure 1-3. M4-/M16-series weapons, amber weapon safety status



Chapter 1

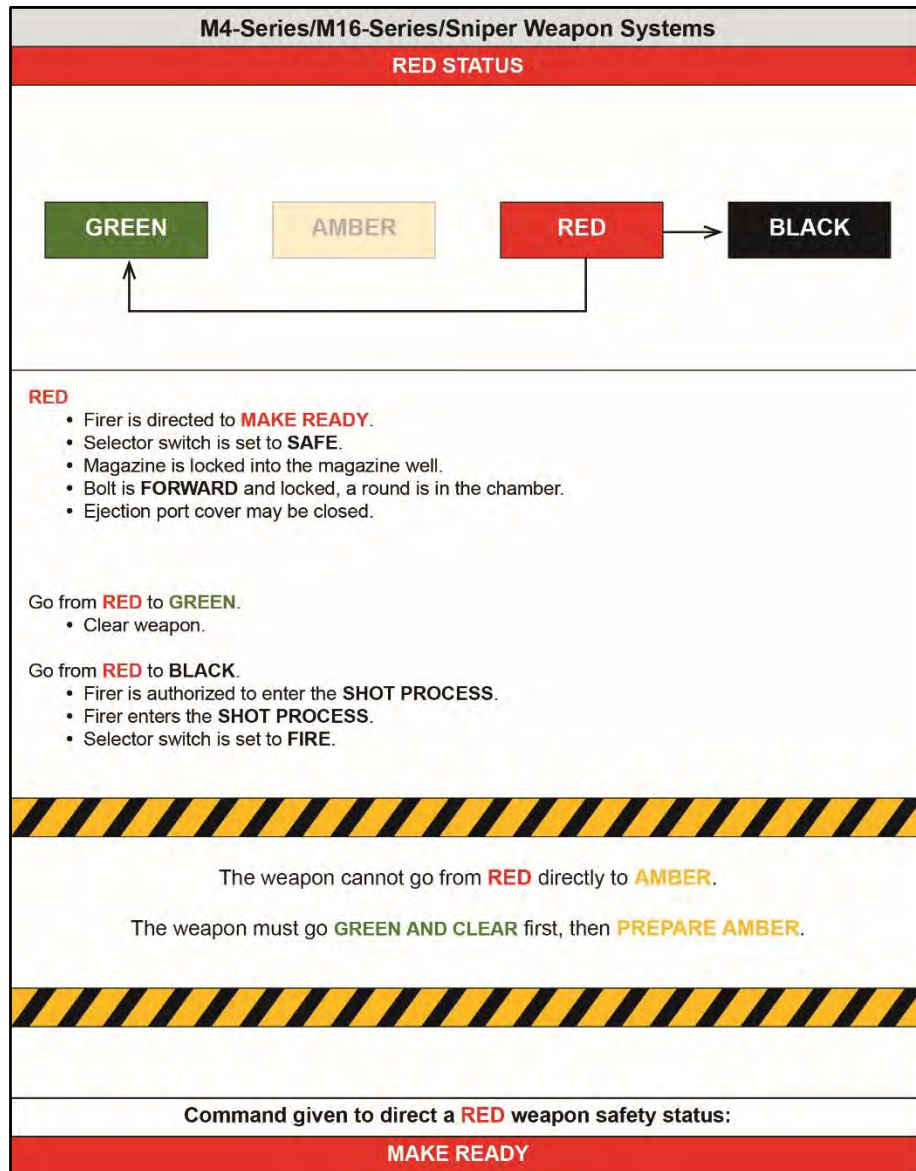


Figure 1-4. M4-/M16-series weapons, red weapon safety status



Overview

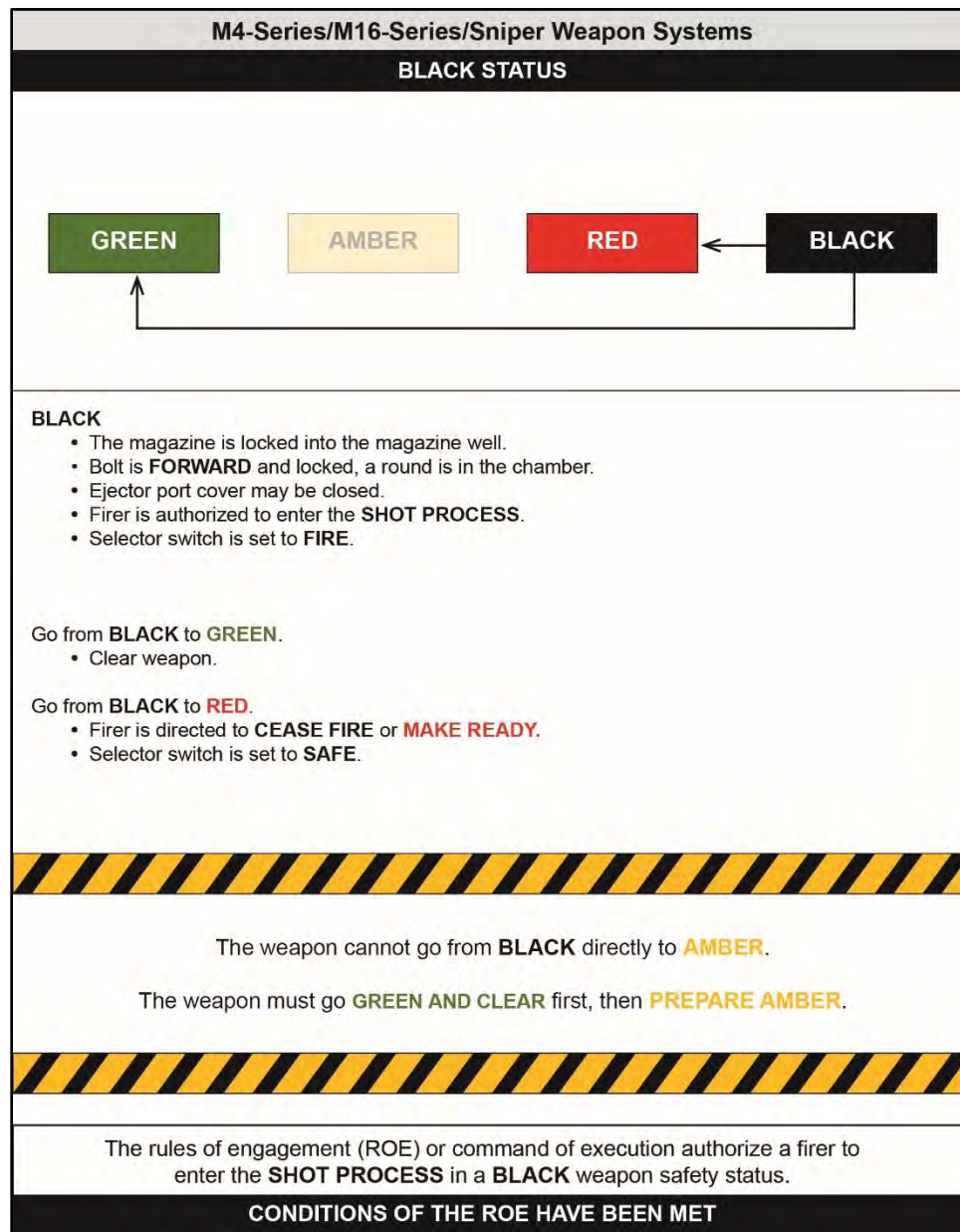


Figure 1-5. M4-/M16-series weapons, black weapons safety status





## WEAPONS CONTROL STATUS

1-20. A *weapons control status (WCS)* is a tactical method of fire control given by a leader that incorporates the tactical situation, rules of engagement for the area of operations, and expected or anticipated enemy contact. The WCS outlines the target identification conditions under which friendly elements may engage a perceived threat with direct fire.

1-21. Table 1-2 provides a description of the standard WCS used during tactical operations, both in training and combat. They describe when the firer is authorized to engage a threat target once the threat conditions have been met.

**Table 1-2. Weapons Control Status**

WEAPONS CONTROL STATUS	DESCRIPTION
WEAPONS HOLD	Engage only if engaged or ordered to engage.
WEAPONS TIGHT	Engage only if target <i>is positively identified</i> as <i>enemy</i> .
WEAPONS FREE	Engage targets <i>not positively identified</i> as <i>friendly</i> .

1-22. A weapon control status and a weapons safety status are both implemented and available to leaders to prevent fratricide and limit collateral damage. These postures or statuses are typically suited to the area of operation or type of mission and should always be clearly outlined to all Soldiers, typically in the operations order (OPORD), warning order (WARNORD), or fragmentary order (FRAGORD).

## OVERMATCH

1-23. Overmatch is the Soldier applying their learned skills, employing their equipment, leveraging technology, and applying the proper force to create an unfair fight in favor of the Soldier. To achieve and maintain overmatch against any threat, this publication focuses on providing information that develops the Soldier's direct fire engagement skills using the following attributes:

- **Smart** – the ability to routinely generate understanding through changing conditions.
- **Fast** – the ability to physically and cognitively outmaneuver adversaries.
- **Lethal** – deadly in the application of force.
- **Precise** – consistently accurate in the application of power to ensure deliver of the right effects in time, space, and purpose.

1-24. This requires the Soldier to understand the key elements that build the unfair advantage and exploit them at every opportunity during tactical operations. The components of overmatch are:



## Overview



- **Target detection, acquisition, and identification** – the ability of the Soldier to detect and positively identify any suspected target as hostile at greater distances than their adversary. This relies upon Soldier training and their ability to leverage the capabilities of their optics, thermals, and sensors.
- **Engagement range** – provide the Soldier with weapons, aiming devices, and ammunition capable of striking and defeating a threat at a greater range than the adversary can detect or engage the friendly force with effective fires.
- **Limited visibility** – provide the Soldier to make operations during limited visibility an advantage through technology and techniques, and compound their adversary's disadvantages during those conditions.
- **Precision** – provide a weapon and ammunition package that enhances the Soldier's consistent application of shots with a level of precision greater than the adversary's.
- **Speed** – the weapon, aiming devices, and accessories a Soldier employs must seamlessly work in unison, be intuitive to use, and leverage natural motion and manipulations to facilitate rapid initial and subsequent shots during an engagement at close quarters, mid-, and extended ranges.
- **Terminal performance** – ensures that precise shots delivered at extended ranges provide the highest probability to defeat the threat through exceptional ballistic performance.

1-25. Although not a component of overmatch, exceptional training is critical to create smart, fast, lethal, and precise Soldiers. Training builds proficiency in a progressive, logical, and structured manner and provides Soldiers the skills necessary to achieve overmatch against any adversary. This requires the training program to provide experience to the Soldier in all the components of overmatch to their fullest extent possible in the shortest amount of time.

## TARGET DETECTION, ACQUISITION, AND IDENTIFICATION

1-26. The first component of overmatch at the Soldier level is the ability to detect targets as far away as possible during limited and low visibility conditions. This manual describes the aiming devices for the service rifle that enhance the Soldier's target detection and acquisition skills. The Soldier must be able to detect, acquire, and identify targets *at ranges beyond* the maximum effective range of their weapon and ammunition.

1-27. This publication also provides key recognition information to build the Soldier's skills in correctly identifying potential targets as friend, foe, or noncombatant (neutral) once detected.

## ENGAGEMENT RANGE

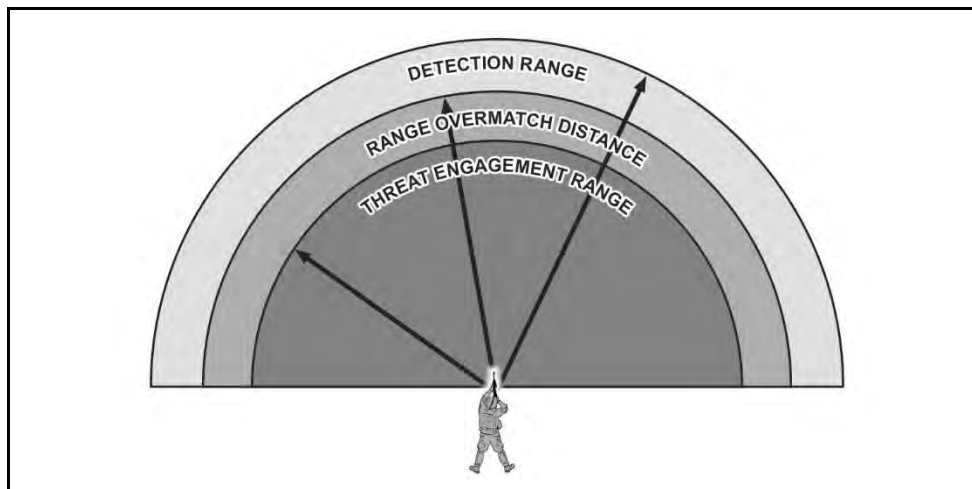
1-28. To ensure small unit success, the Soldier requires weapon systems that can effectively engage threats at ranges greater than those of their adversaries. This creates a standoff distance advantage that allows friendly forces to destroy the target outside the threat's maximum effective range.



## Chapter 1

1-29. Range overmatch provides a tactical engagement buffer that accommodates the Soldier's time to engage with precision fires. For example, a Soldier that has the capability to effectively engage personnel targets at a range of 500 meters will have range overmatch of 10 to 20 percent over a threat rifleman. That 10 to 20 percent range difference is equivalent to a distance of 40 to 80 meters, which is approximately the distance a maneuvering threat can traverse in 15 to 40 seconds.

- △ 1-30. Figure 1-6 portrays the battlefield from the Soldier's perspective. With mobile, maneuvering threats, the target acquisition capabilities must compliment the engagement of those threats at the maximum effective range of the weapon, optic, and ammunition.



△ **Figure 1-6. Small unit range overmatch**

### LIMITED VISIBILITY

1-31. Soldiers must be able to detect, acquire, identify, and engage threats in all light conditions, regardless of the tactical situation. To provide that capability, aiming devices are provided that minimize the effects of limited visibility, but not completely.

1-32. Image intensifiers and thermal optics provide a significant overmatch capability, but they also have limitations and disadvantages. A general discussion of their capabilities, particularly what those systems can view within the spectrum of light is provided. Soldiers must understand what can be "seen" or viewed and what cannot when using their assigned equipment. Understanding the advantages and limitations of their equipment has a direct impact on force protection, fratricide and collateral damage prevention, and maintaining overmatch during tactical operations.

### PRECISION

1-33. The Army standard service rifle is designed with a specific level of accuracy out to its maximum effective range. This level of accuracy is more consistent and reliable



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**Overview**

through the use of magnified aiming devices and superior ammunition. The Soldier must build the skills to use them effectively to deliver precision fires during tactical engagements.

**SPEED**

1-34. The close fight requires rapid manipulations, a balance of speed and accuracy, and very little environmental concerns. Soldiers must move quickly and efficiently through their manipulations of the fire control to maintain the maximum amount of muzzle orientation on the threat through the shot process. This second-nature efficiency of movement only comes from regular practice, drills, and repetition.

1-35. The foundation of speed of action is built through understanding the weapon, ammunition, ballistics, and principles of operation of the associated aiming devices. It is reinforced during drills (appendix D), and the training program of the unit.

1-36. The goal of training to overmatch is to increase the speed at which the Soldier detects a threat, identifies it as hostile, and executes the shot process with the desired target effect. This manual is constructed to provide the requisite information in a progressive manner to build and reinforce Soldier understanding, confidence, and ability to execute tactical operations with speed and smooth fluidity of motion.

**TERMINAL BALLISTIC PERFORMANCE**

1-37. Terminal ballistic performance is the actions of a projectile from the time it strikes an object downrange until it comes to rest. The ammunition used with the service rifle performs exceptionally well out to its maximum effective range and beyond. This manual provides information on the various munition types available for training and combat, their capabilities and purpose, and the service (combat) round's terminal ballistic performance (see appendix A, Ammunition, and appendix B, Ballistics).

1-38. Soldiers must understand the capabilities of their ammunition, whether designed for training or combat use. That understanding creates a respect for the weapon and ammunition, reinforces the precepts of safe weapons handling, and an understanding of the appropriate skills necessary to deliver lethal fires.

1-39. Soldiers that understand the "how" and "why" of their weapon system, aiming devices, ammunition, and procedures work or function develops a more comprehensive understanding. That level of understanding, coupled with a rigorous training program that builds and strengthens their skills create more proficient Soldiers. The proficiencies and skills displayed during training translate into smart, fast, lethal and precise Soldiers for the small unit during decisive action combat operations.



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## Chapter 2

# Rifle and Carbine Principles of Operation

This chapter provides the general characteristics, description, available components, and principles of operation for the M4- and M16-series weapons. It provides a general overview of the mechanics and theory of how weapons operate, key terms and definitions related to their functioning, and the physical relationship between the Soldier, the weapon, and the optics/equipment attached to the weapon.

## ARMY STANDARD SERVICE RIFLE

2-1. The Army standard service rifle is either the M16-series rifle or M4-series carbine. These weapons are described as a lightweight, 5.56-mm, magazine-fed, gas-operated, air-cooled, shoulder-fired rifle or carbine. They fire in semiautomatic (single-shot), three-round burst, or in automatic mode using a selector lever, depending on the variant. The weapon system has a standardized mounting surface for various optics, pointers, illuminators, and equipment, to secure those items with common mounting and adjustment hardware.

2-2. Each service rifle weapon system consists of components, assemblies, subassemblies, and individual parts. Soldiers must be familiar with these items and how they interact during operation.

- **Components** are uniquely identifiable group of fitted parts, pieces, assemblies or subassemblies that are required and necessary to perform a distinctive function in the operation of the weapon. Components are usually removable in one piece and are considered indivisible for a particular purpose or use.
- **Assemblies** are a group of subassemblies and parts that are fitted to perform specific set of functions during operation, and cannot be used independently for any other purpose.
- **Subassemblies** are a group of parts that are fitted to perform a specific set of functions during operation. Subassemblies are compartmentalized to complete a single specific task. They may be grouped with other assemblies, subassemblies and parts to create a component.
- **Parts** are the individual items that perform a function when attached to a subassembly, assembly, or component that serves a specific purpose.

2-3. Each weapon consists of two major components: the upper receiver and the lower receiver. These components are described below including their associated assemblies, subassemblies, and parts.



## Chapter 2

### UPPER RECEIVER

2-4. An aluminum receiver helps reduce the overall weight of the rifle/carbine and allows for mounting of equipment and accessories. The upper receiver consists of the following (see figure 2-1):

- Barrel assembly.
  - **Barrel.** The bore and chamber of the barrel are chrome-plated to reduce wear and fouling over the life of the weapon.
  - **Flash hider or compensator.** Located at the end of the barrel, is provided to reduce the signature of the weapon during firing and reduce barrel movement off target during firing.
  - **Sling swivel.** The attachment hardware for the sling system used to properly carry the weapon.
  - **Front sight assembly.** Includes an adjustable front sight post that facilitates zeroing the weapon, serves as the forward portion of the iron sight or back up iron sight, and assists with range determination.
  - **Adapter rail system (ARS).** Provided in varying lengths, depending on the variant applied. Used to attach common aiming devices or accessories.
  - **Slip ring.** Provides a spring loaded locking mechanism for the weapon's hand guards.
  - **Ejection port.** Provides an opening in the upper receiver to allow ammunition or spent casing ejection from the weapon.
  - **Ejection port cover.** Provides a dust cover for the ejection port, protecting the upper receiver and bolt assembly from foreign objects.
  - **Forward assist assembly.** Provides a Soldier applied mechanical assist to the bolt assembly during operations.

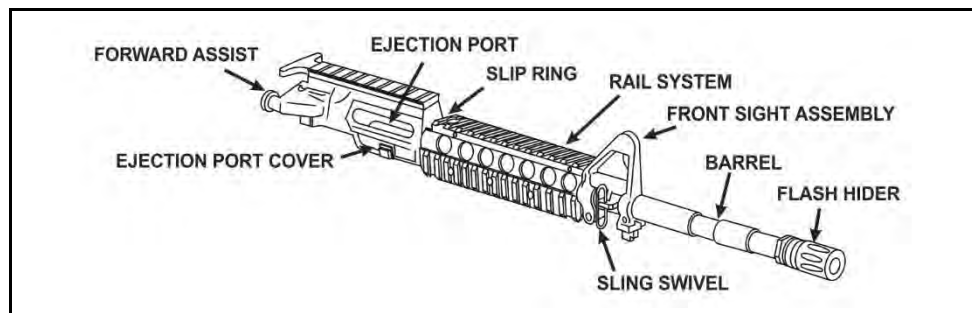


Figure 2-1. Upper receiver



## Rifle and Carbine Principles of Operation

### LOWER RECEIVER

2-5. The lower receiver shown in figure 2-2, on page 2-3, consists of the following components, assemblies, and parts:

- **Trigger assembly.** Provides the trigger, pins, springs, and other mechanical components necessary to fire the weapon.
- **Bolt catch.** A mechanical lever that can be applied to lock the bolt to the rear by the Soldier, or automatically during the cycle of function when the magazine is empty (see page 2-4).
- **Rifle grip.** An ambidextrous pistol-type handle that assists in recoil absorption during firing.
- **Magazine catch assembly.** Provides a simple, spring-loaded locking mechanism to secure the magazine within the magazine well. Provides the operator an easy to manipulate, push-to-release textured button to release the magazine from the magazine well during operation.
- **Buttstock assembly.** Contains the components necessary for proper shoulder placement of the weapon during all firing positions, returning the bolt assembly to battery, and managing the forces of recoil during operation.
  - The M4-/M4A1-series carbine has a four position collapsible buttstock assembly: Closed,  $\frac{1}{2}$  open,  $\frac{3}{4}$  open, and fully-open.
  - M16-series rifles have a fixed buttstock with cleaning kit compartment or an applied modified work order (MWO) collapsible buttstock.
- **Action spring.** Provides the stored energy to return the bolt carrier assembly back into battery during operation.
- **Lower receiver extension.** Provides space for the action spring and buffer assembly during operation.

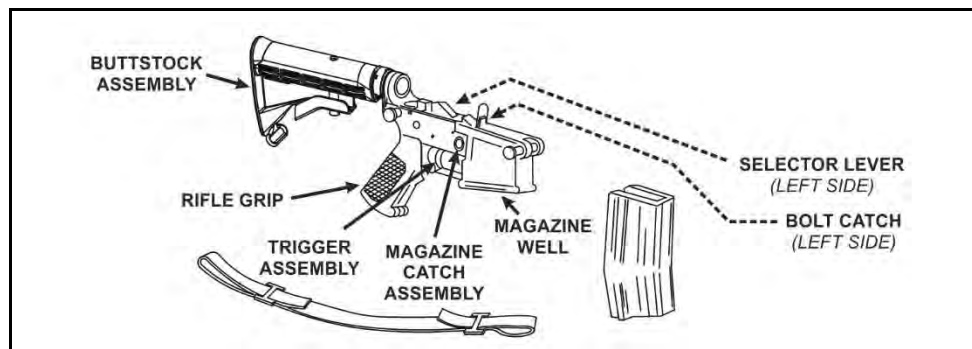


Figure 2-2. Lower receiver

2-6. Additional information on the characteristics and components of the M4-/M4A1-/M16-series weapons can be found in technical manual (TM) 9-1005-319-10. Soldiers will use the technical manual for preventative maintenance checks and services (PMCS),



## Chapter 2

and operation under normal conditions, as well as more detailed information on the principles of operation.

2-7. Each variant of the rifle and carbine have subtle capabilities differences. The primary differences are shown in table 2-1, and are specific to the weapon's selector switch, buttstock, and barrel length.

**Table 2-1. Model Version Firing Methods Comparison**

<b>Weapon</b>	<b>Selector Switch Position</b>			<b>Buttstock</b>	<b>Barrel Length</b>
M16A2	SAFE	SEMI	BURST	Full	20 inches
M16A3	SAFE	SEMI	AUTO	Full	20 inches
M16A4	SAFE	SEMI	BURST	Full	20 inches
M4	SAFE	SEMI	BURST	Collapsible	14.5 inches
M4A1	SAFE	SEMI	AUTO	Collapsible	14.5 inches
<b>Legend:</b> SEMI: semi-automatic firing selection AUTO: fully automatic firing selection BURST: three-round burst firing selection					

## CYCLE OF FUNCTION

2-8. The *cycle of function* is the mechanical process a weapon follows during operation. The information provided below is specific to the cycle of function as it pertains specifically to the M4- and M16-series weapons.

2-9. The cycle starts when the rifle is ready with the bolt locked to the rear, the chamber is clear, and a magazine inserted into the magazine well with at least one cartridge. From this state, the cycle executes the sequential phases of the cycle of functioning to fire a round and prepare the weapon for the next round. The phases of the cycle of function in order are—

- Feeding.
- Chambering.
- Locking.
- Firing.
- Unlocking.
- Extracting.
- Ejecting.
- Cocking.

2-10. For the weapon to operate correctly, semiautomatic and automatic weapons require a *system of operation* to complete the cycle of functioning. The M4- and M16-series weapons use a direct impingement gas operating system. This system uses a portion of the high pressure gas from the cartridge being fired to physically move the assemblies and subassemblies in order to complete the cycle of function.



## Rifle and Carbine Principles of Operation

### FEEDING

2-11. Feeding is the process of mechanically providing a cartridge of ammunition to the entrance of the chamber (see figure 2-3).

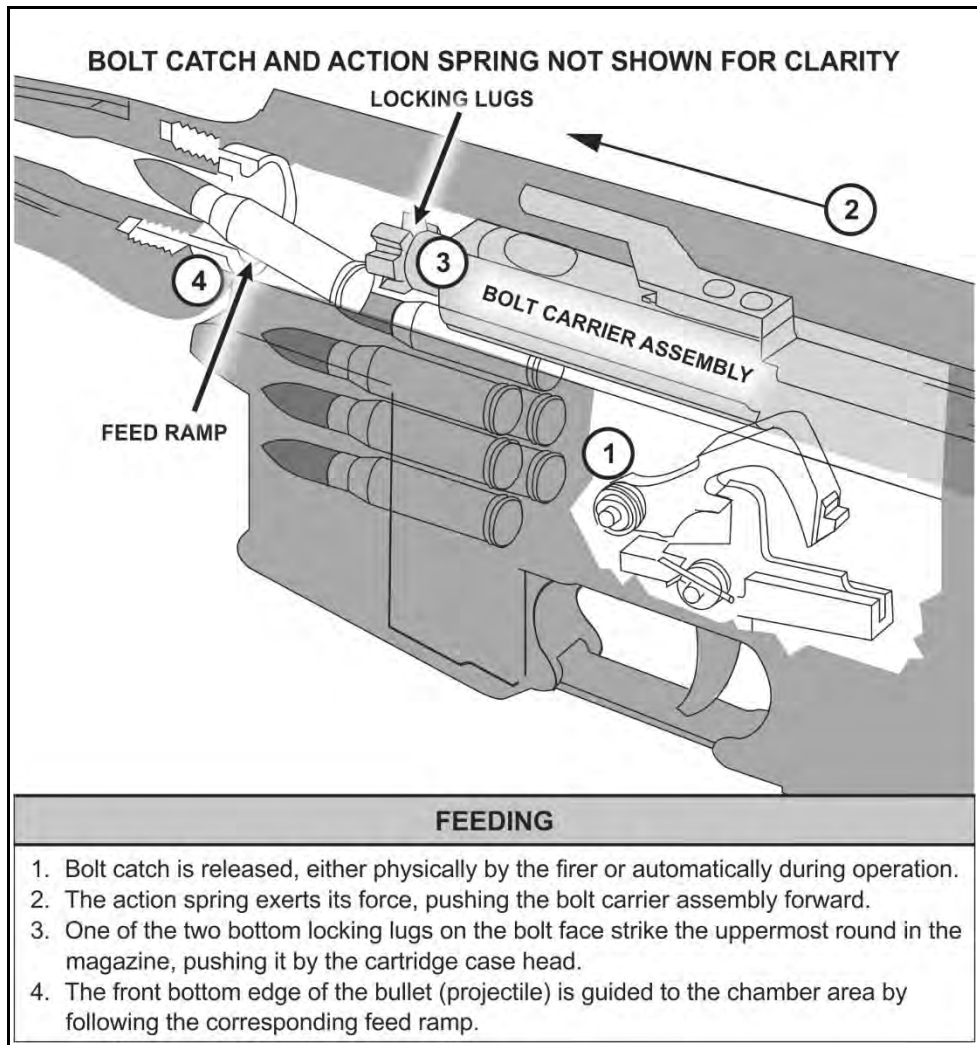


Figure 2-3. Feeding example



## Chapter 2

### CHAMBERING

2-12. Chambering is the continuing action of the feeding round into the chamber of the weapon (see figure 2-4).

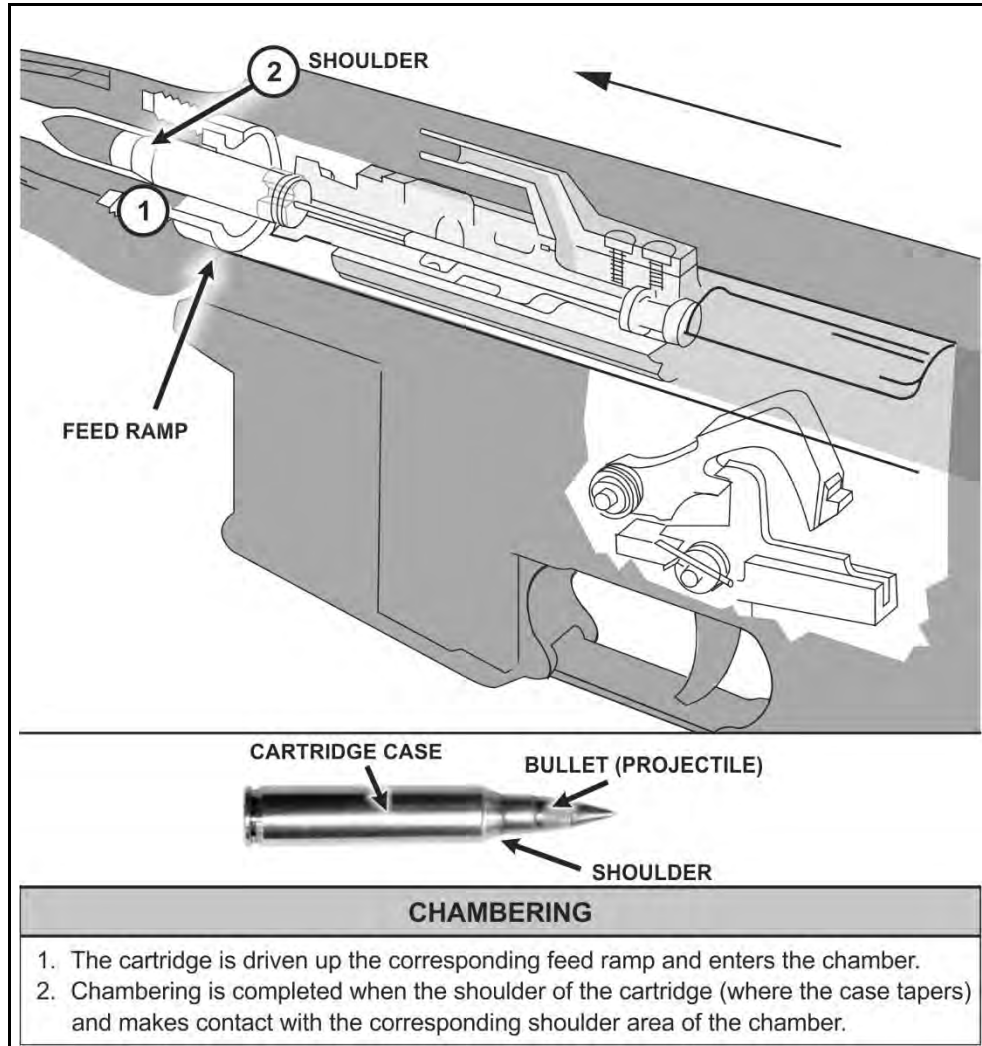


Figure 2-4. Chambering example



## Rifle and Carbine Principles of Operation

### LOCKING

2-13. Locking is the process of creating a mechanical grip between the bolt assembly and chamber with the appropriate amount of headspace (clearance) for safe firing (see figure 2-5). With the M4- and M16-series weapons, locking takes place simultaneously with the final actions of chambering.

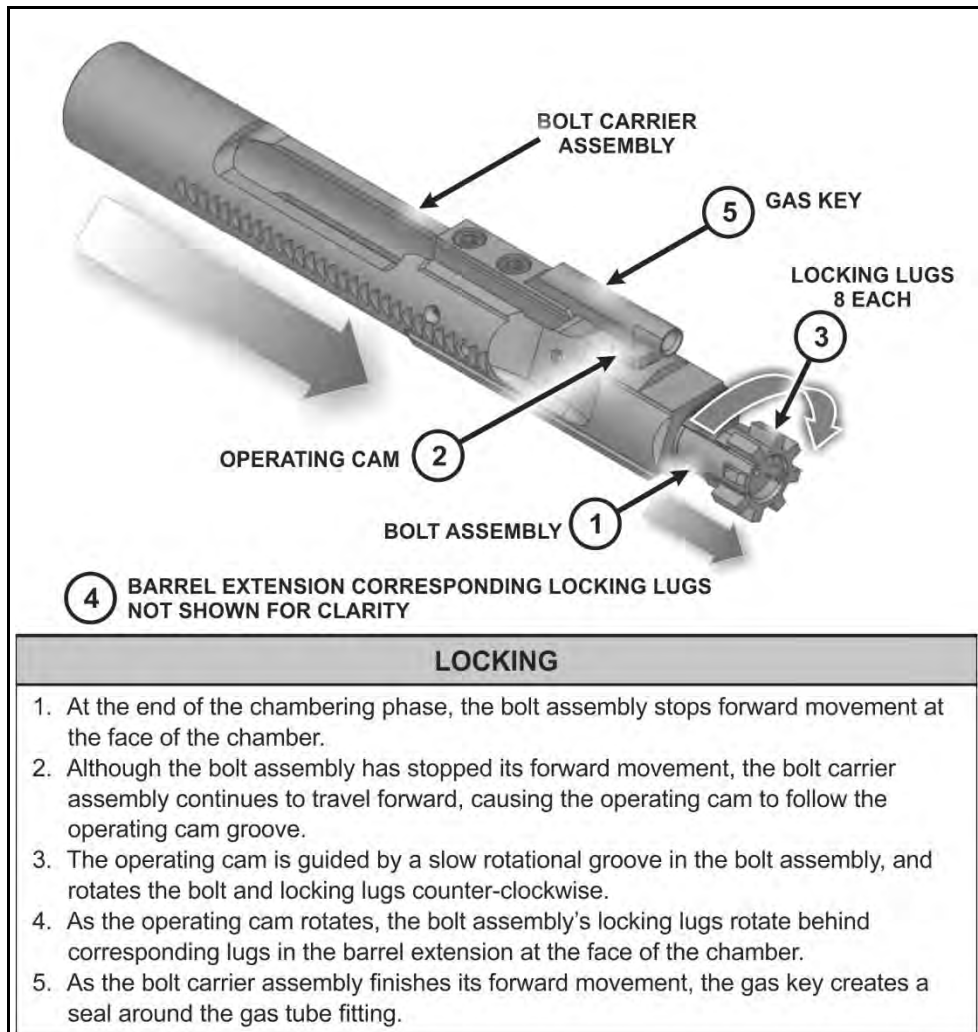


Figure 2-5. Locking example



## Chapter 2

### FIRING

2-14. Firing is the finite process of initiating the primer detonation of the cartridge and continues through shot-exit of the projectile from the muzzle (see figure 2-6).

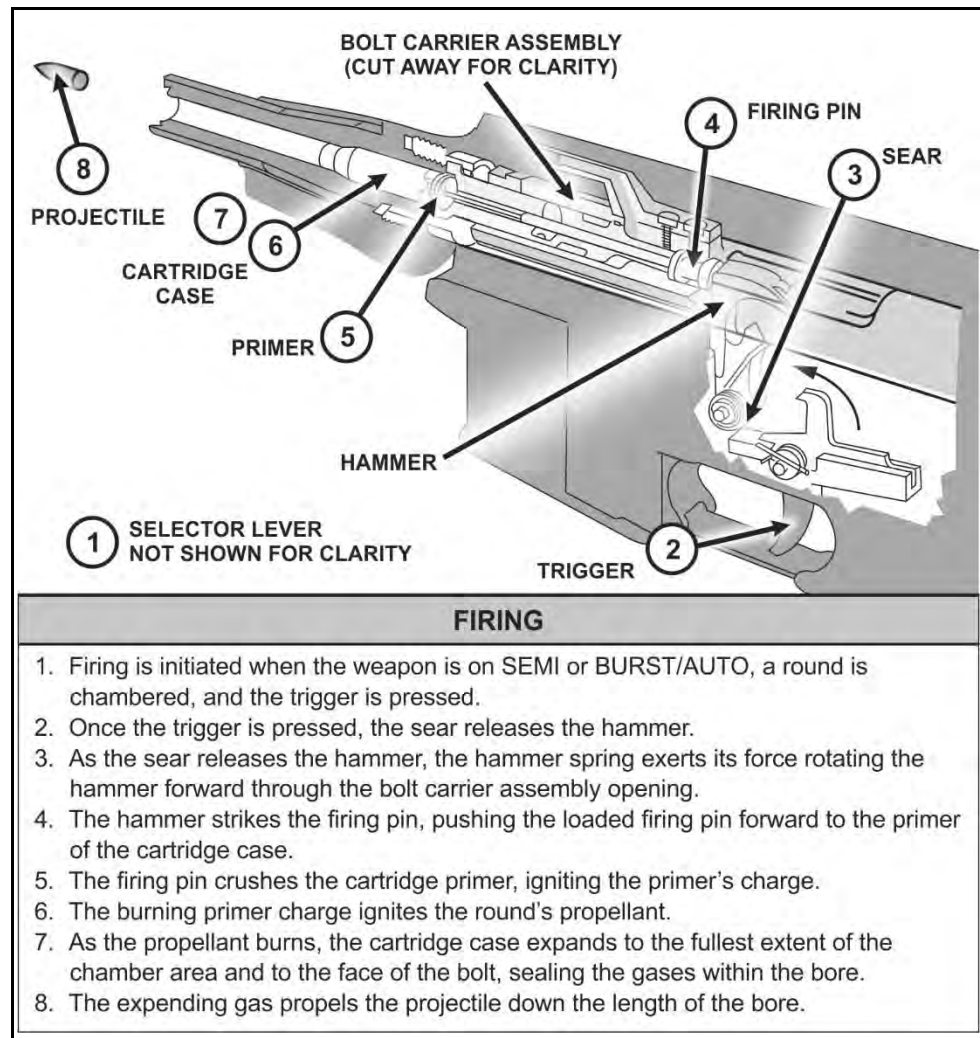


Figure 2-6. Firing example



## Rifle and Carbine Principles of Operation

### UNLOCKING

2-15. Unlocking is the process of releasing the locking lugs on the bolt face from the corresponding recesses on the barrel extension surrounding the chamber area (see figure 2-7).

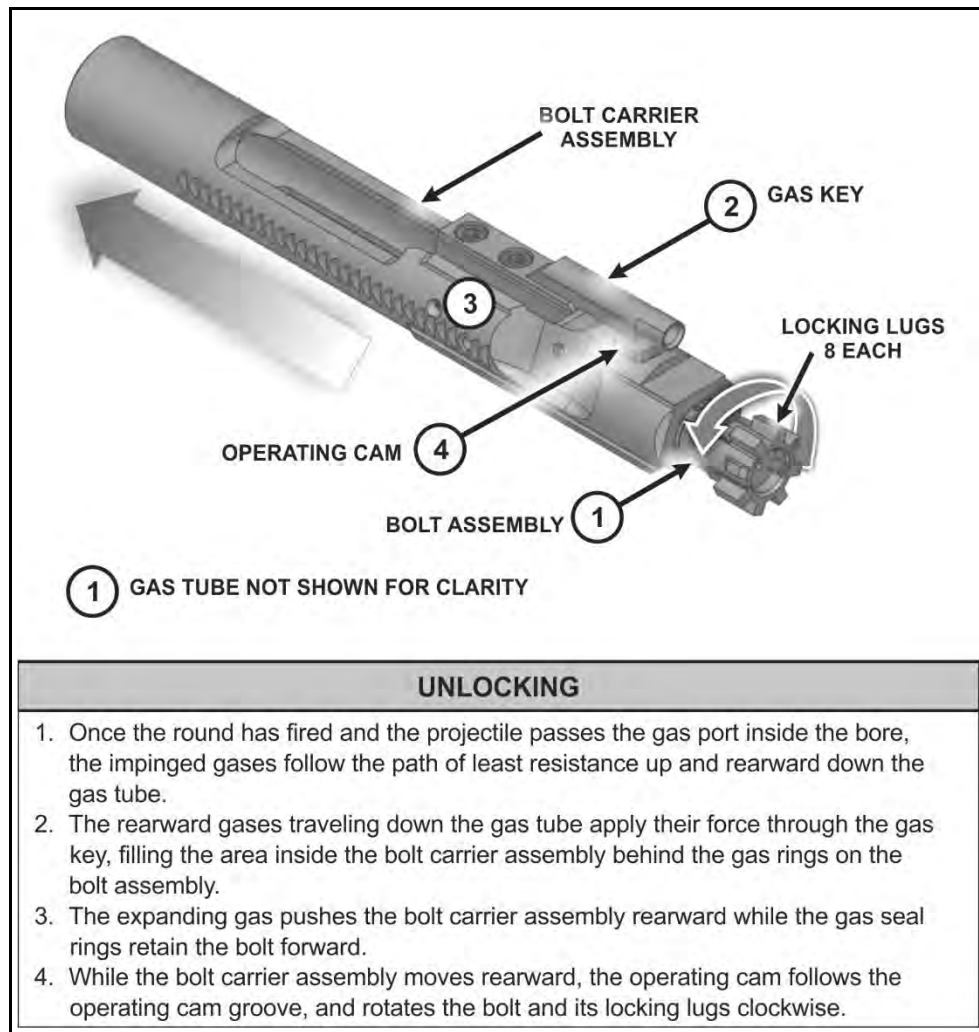


Figure 2-7. Unlocking example



## Chapter 2

### EXTRACTING

2-16. Extracting is the removal of the expended cartridge case from the chamber by means of the extractor (see figure 2-8).

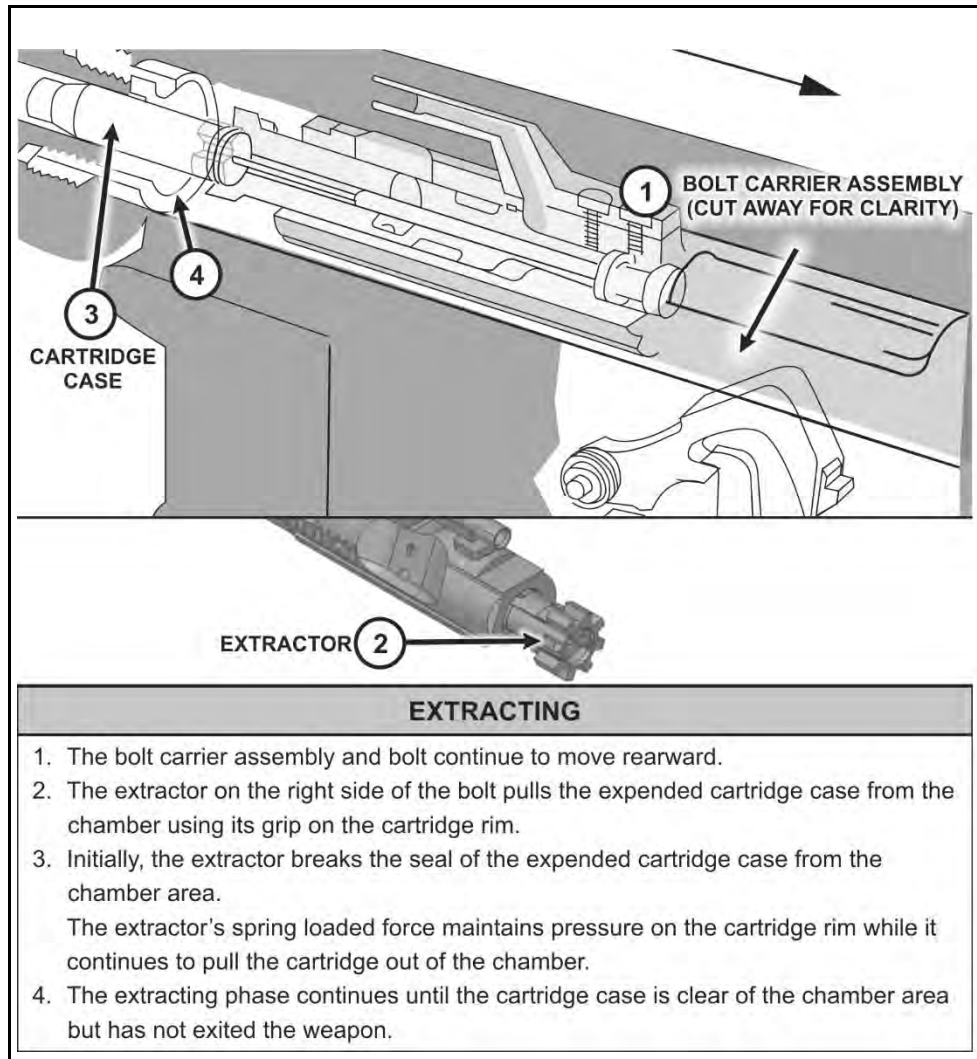


Figure 2-8. Extraction example



## Rifle and Carbine Principles of Operation

### EJECTING

2-17. Ejecting is the removal of the spent cartridge case from the weapon itself (see figure 2-9.)

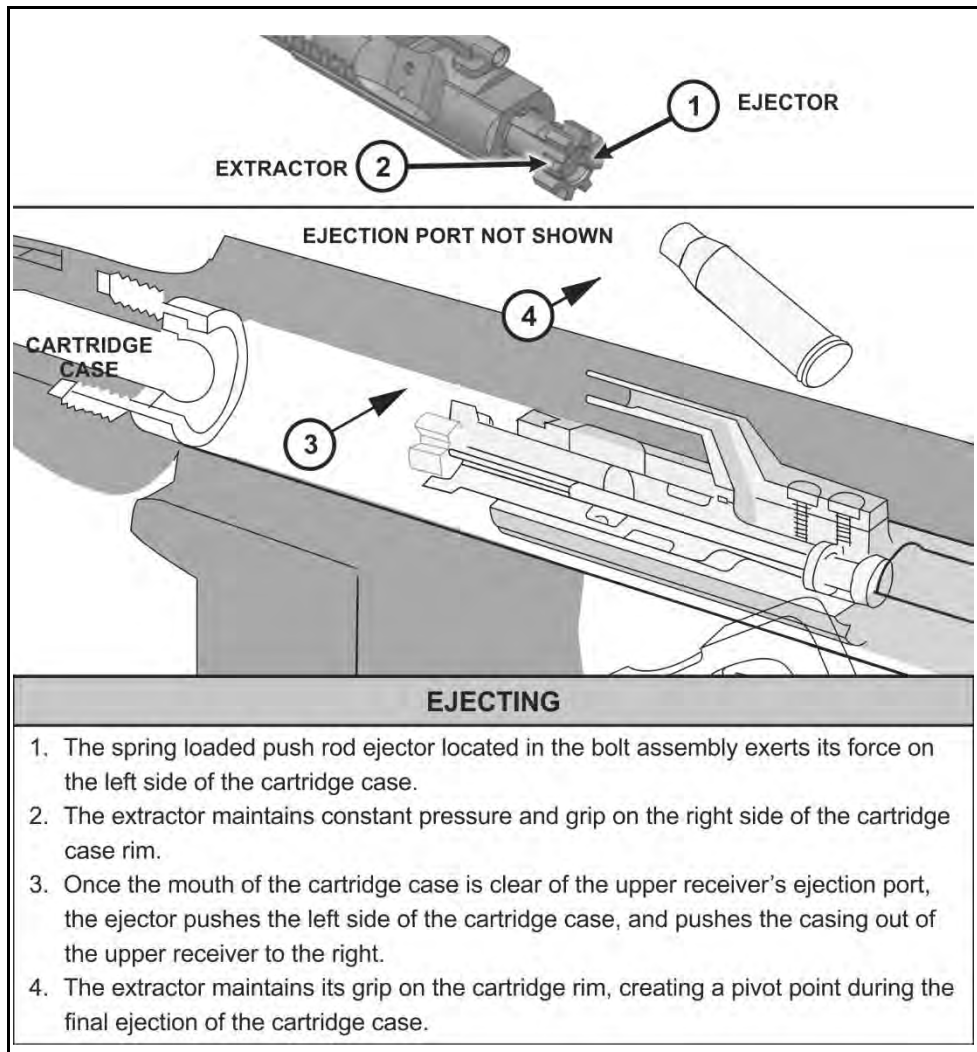


Figure 2-9. Ejection example



## Chapter 2

### COCKING

2-18. Cocking is the process of mechanically positioning the trigger assembly's parts for firing (see figure 2-10). The cocking phase completes the full cycle of functioning.

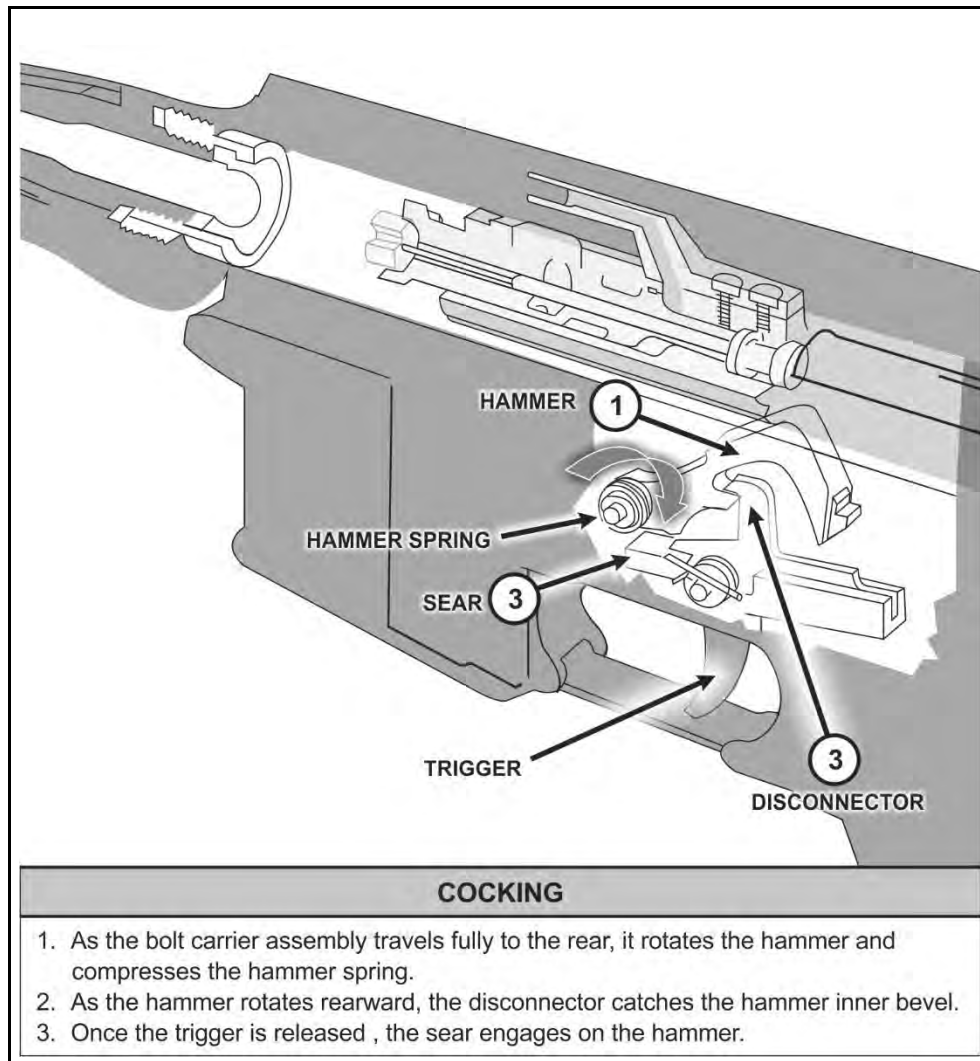


Figure 2-10. Cocking example



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**Rifle and Carbine Principles of Operation**

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## **COOLING**

2-19. Cooling is the process of dissipating heat from the weapon during firing. Although not part of the cycle of functioning, cooling the weapon during firing is critical to ensure the weapon continues to operate efficiently. Firing a round generates heat and pressure within the chamber and bore, which radiates outward through the metal of the barrel.

2-20. The temperature generated by the burning of propellant powders is over one thousand degrees Fahrenheit. Some of the heat produced during firing is retained in the chamber, bore, and barrel during firing and poses a significant hazard to the firer.

2-21. How this heat is absorbed by the weapon and dissipated or removed, is a function of engineering and design. Lightweight weapons like the M4 and M16 do not have sufficient mass to withstand thermal stress efficiently. The weapon system must have a means to radiate the heat outward, away from the barrel to allow continuous firing.

2-22. There are three methods to reduce the thermal stress on a weapon. The M4- and M16-series of weapons use all three of these methods to varying degrees to cool the chamber, bore, and barrel to facilitate continuous operation. These methods of cooling are—

- **Radiational cooling** – allows for the dissipation of heat into the surrounding cooler air. This is the least efficient means of cooling, but is common to most small arms weapons, including the rifle and carbine.
- **Conduction cooling** – occurs when a heated object is in direct physical contact with a cooler object. Conduction cooling on a weapon usually results from high chamber operating temperatures being transferred into surrounding surfaces such as the barrel and receiver of the weapon. The transfer from the chamber to the cooler metals has the net effect of cooling the chamber. Thermal energy is then carried away by other means, such as radiant cooling, from these newly heated surfaces.
- **Convection cooling** – requires the presence of a moving air current. The moving air has greater potential to carry away heat. The hand guards and ARS of the rifle and carbine are designed to facilitate air movement. The heat shield reflects heat energy away from the hand guard and back towards the barrel. The net effect is an updraft that brings the cooler air in from the bottom. This process establishes a convection cycle as heated air is continually replaced by cooler air.

2-23. Soldiers should be aware of the principles of the weapon's cooling methods' direct effects on their line of sight when viewing a target through an aiming device. Dissipating heat along the length of the barrel can create a mirage effect within the line of sight which can cause a significant error to the true point of aim when using magnified optics.



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## Chapter 3

# Aiming Devices

Every weapon has a method of aiming, that is either fixed or attached to operate the weapon effectively. Soldiers must be familiar with the various aiming devices, how they operate, and how to employ them correctly to maximize their effectiveness. This chapter provides the principles of operation of the most widely available aiming devices, and provides general information concerning their capabilities, function and use.

3-1. An aiming device is used to align the Soldier, the weapon, and the target to make an accurate and precise shot. Each aiming device functions in a different manner. To employ the weapon system to its fullest capability, the Soldier must understand how their aiming devices function.

3-2. The following aiming devices are described within this chapter:

- **Iron.** Iron represent the various types of mechanical sighting systems available on the weapon. They are available in two distinct types:
  - Iron sights (rear aperture and front sight post).
  - Back up iron sights (BUIS).
- **Optics.** These are optics predominantly for day firing, with limited night capability. The optics found within this manual come in two types:
  - Close Combat Optic (CCO).
  - Rifle Combat Optic (RCO, previously referred to as the Advanced Combat Optic Gunsight or ACOG).
- **Thermal.** These are electronic sighting systems that provide a view of the field of view (FOV) based on temperature variations. There are numerous variants of thermal optics, but are grouped into one type:
  - Thermal Weapon Sight (TWS).
- **Pointer/Illuminator/Laser.** These aiming devices use either a laser beam, flood light, or other light to aim the weapon at the target. There are three types of pointers, illuminators, and lasers used by the service rifle:
  - Advanced Target Pointer Illuminator Aiming Light (ATPIAL).
  - Dual Beam Aiming Laser–Advanced (DBAL-A2).
  - Illuminator, Integrated, Small Arms (STORM).



## Chapter 3

### UNITS OF ANGULAR MEASUREMENT

3-3. There are two major units of angular measurement the Army uses: mils and minutes of angle (MOA). These two different units are commonly used terms to describe a measurement of accuracy when firing a weapon, system, or munition. They typically include the accuracy of a specific weapon, the performance of ammunition, and the ability of a shooter as it relates to firing the weapon.

#### MINUTE OF ANGLE

3-4. A minute of angle (MOA) is an angular unit of measurement equal to  $1/60^{\text{th}}$  of a degree (see figure 3-1). The most common use of MOA is when describing the distance of change required when zeroing a weapon.

3-5. One MOA equals 1.047 inches per 100 yards. For most applications, a Soldier can round this to 1 inch at 100 yards or 1.1 inches at 100 meters to simplify their arithmetic.

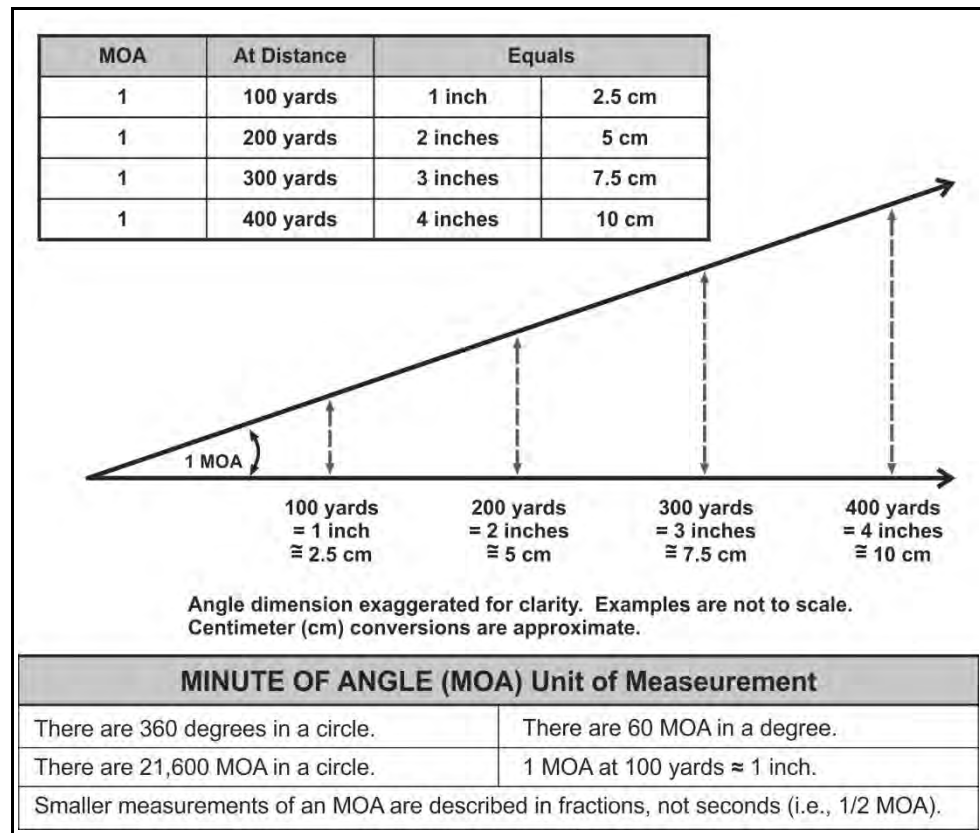


Figure 3-1. Minute of angle example



## Aiming Devices

### MILS

3-6. The mil is a common unit of angular measurement that is used in direct fire and indirect fire applications. (see figure 3-2)

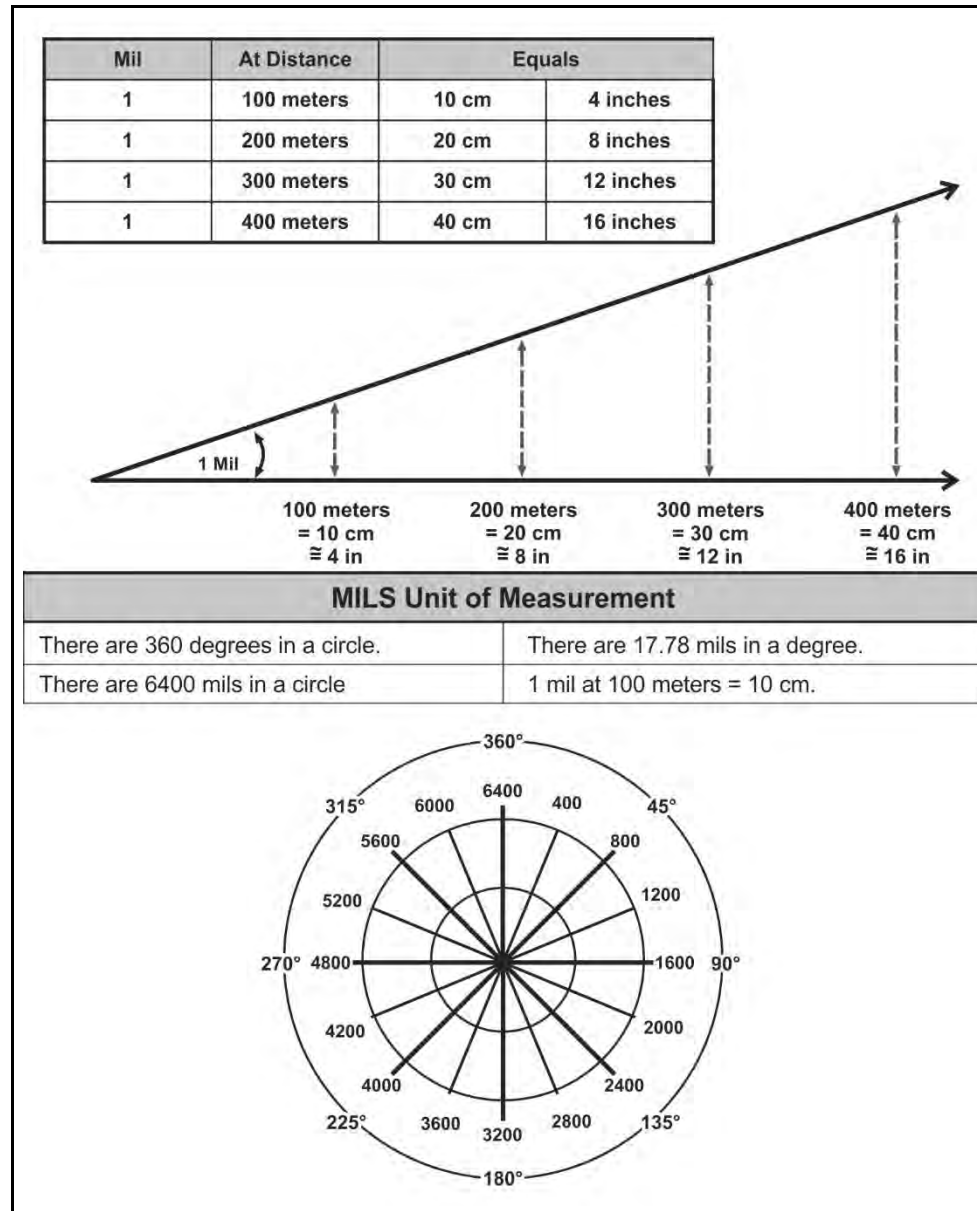


Figure 3-2. Mil example



### Chapter 3

3-7. This mil to degree relationship is used when describing military reticles, ballistic relationships, aiming devices, and on a larger scale, map reading and for indirect fire.

#### RETICLE

3-8. A reticle is a series of fine lines in the eyepiece of an optic, such as a CCO, TWS, or RCO (see figure 3-3) used as a measuring scale with included aiming or alignment points. Reticles use either mils or minute of angle for their unit of measurement.

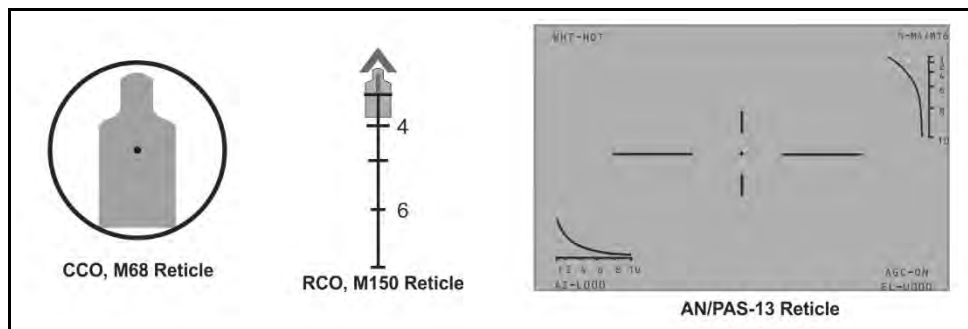


Figure 3-3. Close combat optic / Rifle combat optic reticle / Thermal reticle examples



## Aiming Devices

### STADIA RETICLE (STADIAMETRIC RETICLE)

3-9. Commonly used in the thermal weapon sight, a stadia reticle provides a means of rapidly determining the approximate range to target of a viewed threat, based on its standard dimensions. The stadia reticle (sometimes referred to as “stadia metric” or “choke sight”) can provide approximate range to target information using width or height of a viewed dismounted target using standard threat dimensions (see figure 3-4).

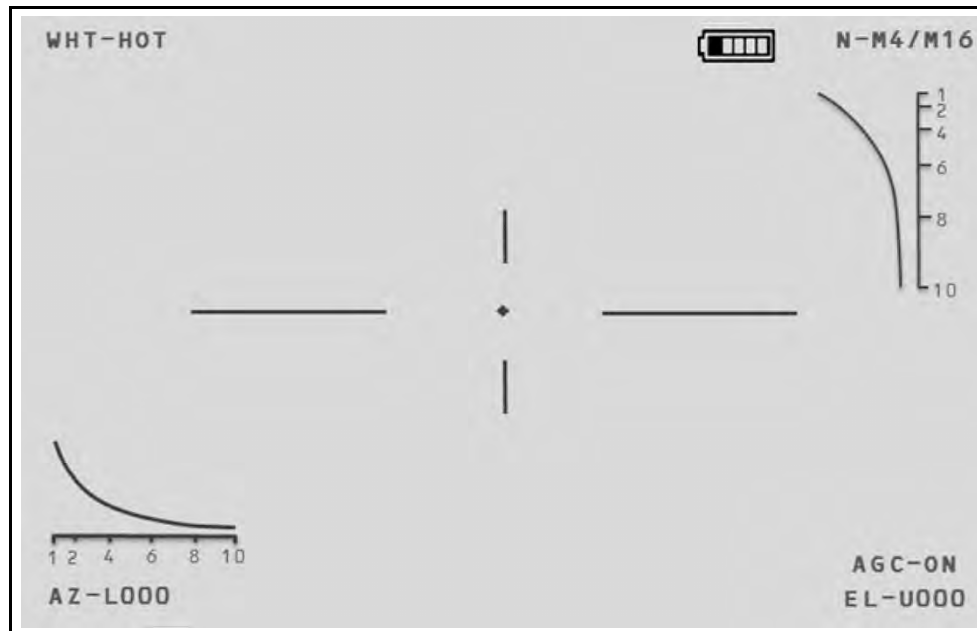


Figure 3-4. Stadia reticle example

3-10. There are two stadia reticles found on the rifle / carbine reticle within the thermal weapons sight; vertical and horizontal.

- **Vertical stadia.** At the lower left of the sight picture, Soldiers can evaluate the range to target of a standing dismounted threat.
- **Horizontal stadia.** In the upper right portion of the sight picture, Soldiers can evaluate the range to target of an exposed dismounted threat based on the width of the target.



## Chapter 3

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### ELECTROMAGNETIC SPECTRUM

3-11. A major concern for the planning and use of thermal and other optics to aid in the detection process is understanding *how they function*, but more appropriately, what they can “see”. Each device develops a digital representation of the scene or view it is observing based on what frequencies or wavelengths it can detect within the electromagnetic spectrum. (Note: Thermal devices see differences in heat.)

- **Thermal optics.** This equipment operates in the mid- and far-wavelength of the infrared band, which is the farthest of the infrared wavelengths from visible light. Thermal optics cannot translate (“see”) visible light. Thermal optics cannot “see” infrared equipment such as infrared (IR) strobe lights, IR chemical lights, illuminators, or laser pointers. They can only identify emitted radiation in the form of heat (see figure 3-5 on page 3-7).
- **Image intensifiers (I2).** This equipment, such as night vision devices, use the near area of the infrared spectrum closest to the frequencies of visible light, as well as visible light to create a digital picture of the scene. These systems cannot “see” or detect heat or heat sources.

3-12. These sights generally operate on the principles of convection, conduction, and radiation (mentioned in chapter 2 of this publication). The sight “picks up” or translates the IR wavelength (or light) that is emitted from a target scene through one of those three methods.

3-13. Things to be aware of (planning considerations) with these optics are that they have difficulty imaging through the following:

- **Rain** – absorbs the IR emitted by the target, makes it difficult to see.
- **Water** – acts as a mirror and generally reflects IR, providing a false thermal scene.
- **Glass** – acts similar to water, interfering with the sensor’s ability to accurately detect emitted radiation behind the glass.

3-14. Situations where IR can see better are the following:

- **Smoke** – will not obscure a target unless the chemical obscurant is extremely hot and dense, or if the target is sitting on top of the smoke source.
- **Dust** – may interfere with the accurate detection of the emitted thermal signature due to dust and debris density between the sensor and the target scene. Dust typically does not obscure the IR signature unless its temperature is similar to the target’s.

3-15. Figure 3-5 depicts the areas of the electromagnetic spectrum. It details the various wavelengths within the spectrum where the aiming devices, night vision devices, and equipment operate. It illustrates where these items can and cannot “see” the others, respectively, within their operating range.



Aiming Devices

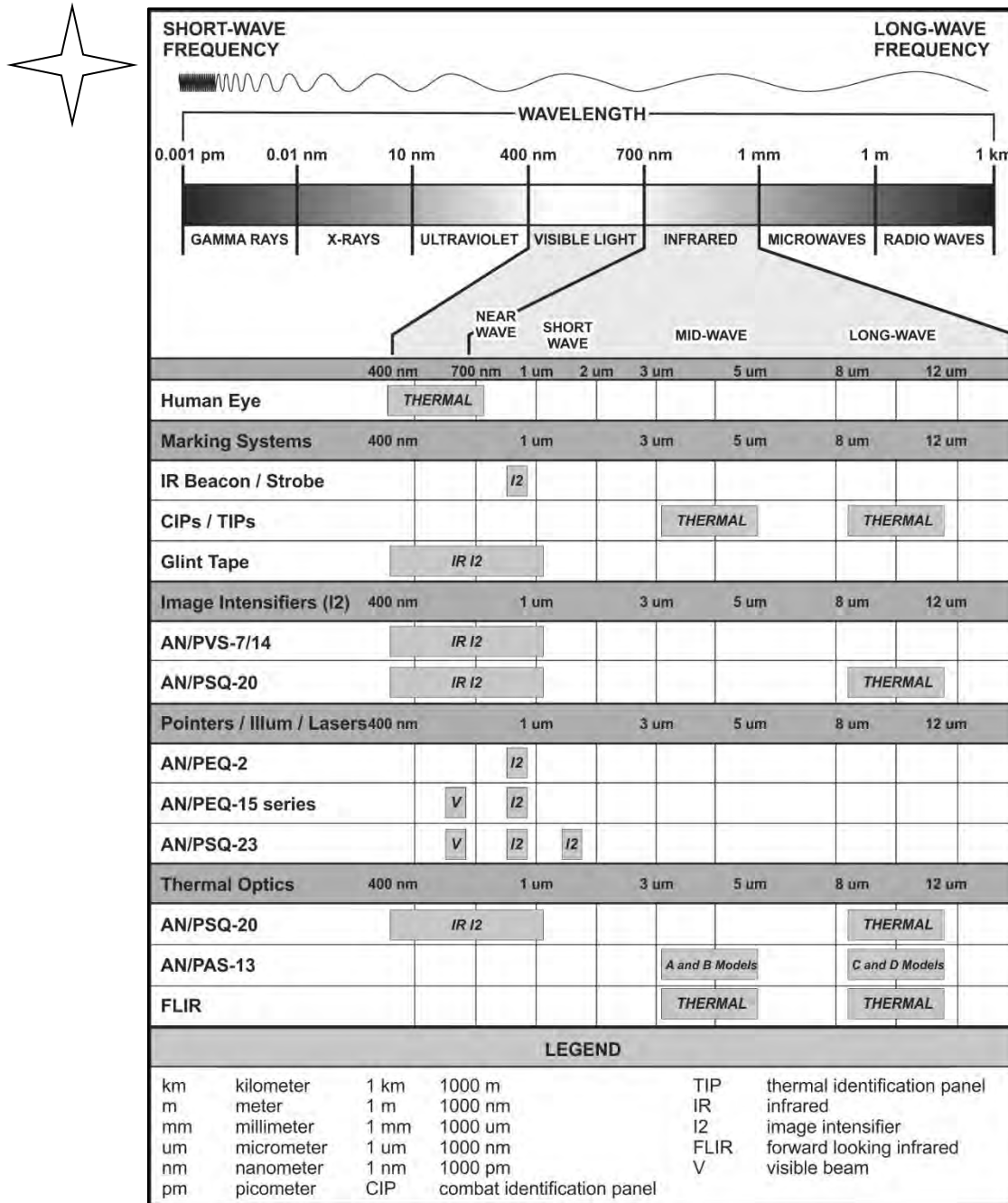


Figure 3-5. Electromagnetic spectrum



## **Chapter 3**

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### **OPTICS**

3-16. Optics are sighting aids for rifles and carbines that provide enhanced aim point reticles, and may include magnified fields of view. Optics are specific to day operations, although may be used during limited visibility or night operations. They do not have any method of enhancing low light conditions.

3-17. Optics enhance the Soldier's ability to engage targets accurately and at extended ranges (see figure 3-6 on page 3-9). The available optics for mounting on the M4- and M16-series modular weapon system are:

- Iron Sight.
- Back Up Iron Sight (BUIS).
- CCO, M68.
- RCO, M150.

### **IRON SIGHT**

3-18. Some versions of the M4 and M16 come with a carrying handle with an integrated rear aperture. The carrying handle may or may not be removable, depending on the version of the service rifle.

3-19. The integrated rear aperture includes adjustments for both azimuth (wind) and elevation. Specific instructions for zeroing these aiming devices are found in the respective weapon's technical manual.


3-20. The carrying handle has two selectable apertures for the engagement situation:

- Small aperture. Used for zeroing procedures and for mid- and extended-range engagements.
- Large aperture. Used during limited visibility, close quarters, and for moving targets at close or mid-range.

3-21. The iron sight uses the fixed front sight post to create the proper aim. Soldiers use the front sight post centered in the rear aperture. The following information is extracted from the weapon's technical manual.



**Aiming Devices**

		CARRYING HANDLE			
		DIMENSIONS			
		LENGTH	7.3 in	18.5 cm	
		WIDTH	3.5 in	9.0 cm	
		HEIGHT	1.9 in	4.8 cm	
		WEIGHT	20.8 oz	590 g	
FUNCTION	RIFLE	ADJUSTMENTS			
ZERO WINDAGE	M16A2	Center rear sight aperture for mechanical zero windage			
	M16A4				
	M4				
	M4A1				
ZERO ELEVATION	M16A2	300 meter mark +1 click up for 25 m zeroing			
	M16A4	Once zeroing is complete, rotate elevation knob -1 click down to apply 300 m zero			
	M4				
	M4A1				
WINDAGE	M16A2	1/2 MOA			
	M16A4	1/2 MOA			
	M4	1 MOA			
	M4A1	1 MOA			
ELEVATION (RANGE) FRONT SIGHT POST	M16A2	1 1/2 MOA			
	M16A4	1 1/2 MOA			
	M4	1 7/8 MOA			
	M4A1	1 7/8 MOA			
LEGEND					
BDC	bullet drop compensator	g	grams	MOA	minute of angle
cm	centimeters	in	inches	oz	ounces

**Figure 3-6. Carrying handle with iron sight example**



**Chapter 3****BACK UP IRON SIGHT**

3-22. The BUIS is a semi-permanent flip-up sight equipped with a rail-grabbing base. The BUIS provides a backup capability effective out to 600 meters and can be installed on M16A4 rifles and M4-series carbines. (See figure 3-7.)

3-23. The BUIS on the first notch of the integrated rail, nearest to the charging handle. The BUIS remains on the modular weapon system (MWS) unless the carrying handle/sight is installed. The following information is extracted from the weapon's technical manual.

		BACK UP IRON SIGHT (BUIS)			
		DIMENSIONS			
		LENGTH	2.1 in	5.3 cm	
		WIDTH	1.3 in	3.3 cm	
		HEIGHT	1.5 in	3.8 cm	
		WEIGHT	4.3 oz	122 g	
FUNCTION	SINGLE CLICK				
ZERO WINDAGE	M16A4	White Line			
	M4	White Line			
	M4A1	White Line			
ZERO ELEVATION	M16A4	White Line			
	M4	300 meter setting			
	M4A1	300 meter setting			
WINDAGE	M16A4	1/2 MOA			
	M4	3/4 MOA			
	M4A1	3/4 MOA			
ELEVATION (RANGE) FRONT SIGHT POST	M16A4	1 1/2 MOA			
	M4	2 MOA			
	M4A1	2 MOA			
LEGEND					
cm	centimeters	in	inches	oz	ounces
g	grams	MOA	minute of angle		

**Figure 3-7. Back up iron sight**



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## Aiming Devices

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### CLOSE COMBAT OPTIC, M68

3-24. The close combat optic (CCO), M68 is a non-telescopic (unmagnified) reflex sight that is designed for the “eyes-open” method of sighting (see figure 3-8). It provides Soldiers the ability to fire with one or two eyes open, as needed for the engagement sequence in the shot process.

3-25. The CCO provides a red-dot aiming point using a 2 or 4 MOA diameter reticle, depending on the variant. The red dot aiming point follows the horizontal and vertical movement of the firer’s eye, allowing the firer to remain fixed on the target. No centering or focusing on the front sight post is required. There are three versions of the CCO available in the force.

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**Note.** Re-tighten the torque-limiting knob after firing the first three to five rounds to fully seat the M68.

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3-26. The CCO is zeroed to the weapon. It must remain matched with the same weapon, attached at the same slot in the attached rail system or be re-zeroed. If the CCO must be removed for storage, Soldiers must record the serial number and the rail slot to retain zero.

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**Note.** The weapon must be re-zeroed if the CCO is not returned to the same rail slot on the adaptive rail system.

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### Advantages

3-27. The CCO offers a distinct speed advantage over iron sights in most if not all engagements. The adjustments on brightness allow the Soldier to have the desired brightness from full daylight to blackout conditions.

3-28. The CCO is the preferred optic for close quarter’s engagements.

### Disadvantages

3-29. The CCO lacks a bullet drop compensator or other means to determine accurate range to target beyond 200m.

3-30. The following information is an extract from the equipment’s technical manual for Soldier reference.



### Chapter 3

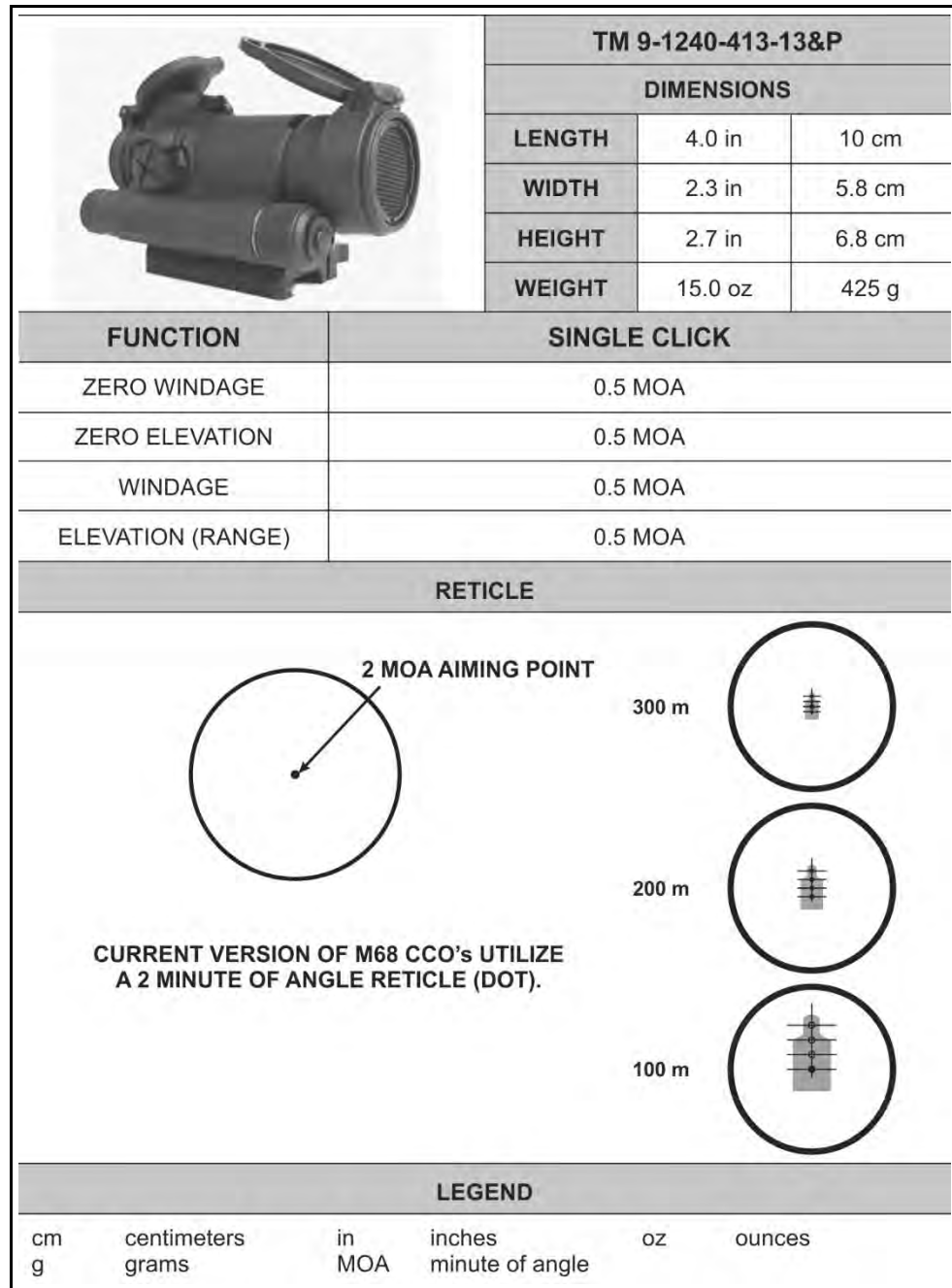


Figure 3-8. CCO Reticle, Comp M2 examples



## Aiming Devices

### RIFLE COMBAT OPTIC

3-31. The RCO (see figure 3-9) is designed to provide enhanced target identification and hit probability for the M4-/M4A1- or M16-series weapon.

3-32. There are several versions of the RCO available for use across the force. Soldiers must be familiar with their specific version of their assigned RCO, and be knowledgeable on the specific procedures for alignment and operation (see figure 3-9 for RCO azimuth and elevation adjustments).

3-33. The reticle pattern provides quick target acquisition at close combat ranges to 800 meters using the bullet drop compensator (BDC) (see figure 3-10 on page 3-15). It is designed with dual illuminated technology, using fiber optics for daytime employment and tritium for nighttime and low-light use.

3-34. The RCO is a lightweight, rugged, fast, and accurate 4x power optic scope specifically designed to allow the Soldier to keep both eyes open while engaging targets and maintain maximum situational awareness.

#### Advantages

3-35. The bullet drop compensator (BDC) is accurate for extended range engagements using either M855 or M855A1 ball ammunition. The ballistic difference between the two rounds is negligible under 400 meters and requires no hold determinations.

3-36. This is a widely fielded optic that is rugged, durable, and operates in limited light conditions. The self-illuminating reticle allows for continuous operations through end evening nautical twilight (EENT).

#### Disadvantages

3-37. This optic's ocular view is limited when engaging targets in close quarters engagements. This requires additional training to master the close quarter's skills while employing the RCO to achieve overmatch against the threat.

3-38. The RCO reticle does not include stadia lines. Windage must be applied by the shooter from a determined estimate. The RCO has a specific eye relief of 70-mm (millimeter) or 1.5 inches. If the eye relief is not correct, the image size will be reduced.

3-39. The fiber optic illuminator element can provide excessive light to the reticle during certain conditions that produce a glare. The RCO does not have a mechanical or built in method to reduce the effects of the glare created. The increased lighting may interfere with the shooter's point of aim and hold determinations. Soldiers may use alternate methods to reduce the glare by reducing the amount of fiber optic exposed to direct sunlight during operating conditions.

3-40. The following information is an extract from the equipment's technical manual for Soldier reference.



### Chapter 3

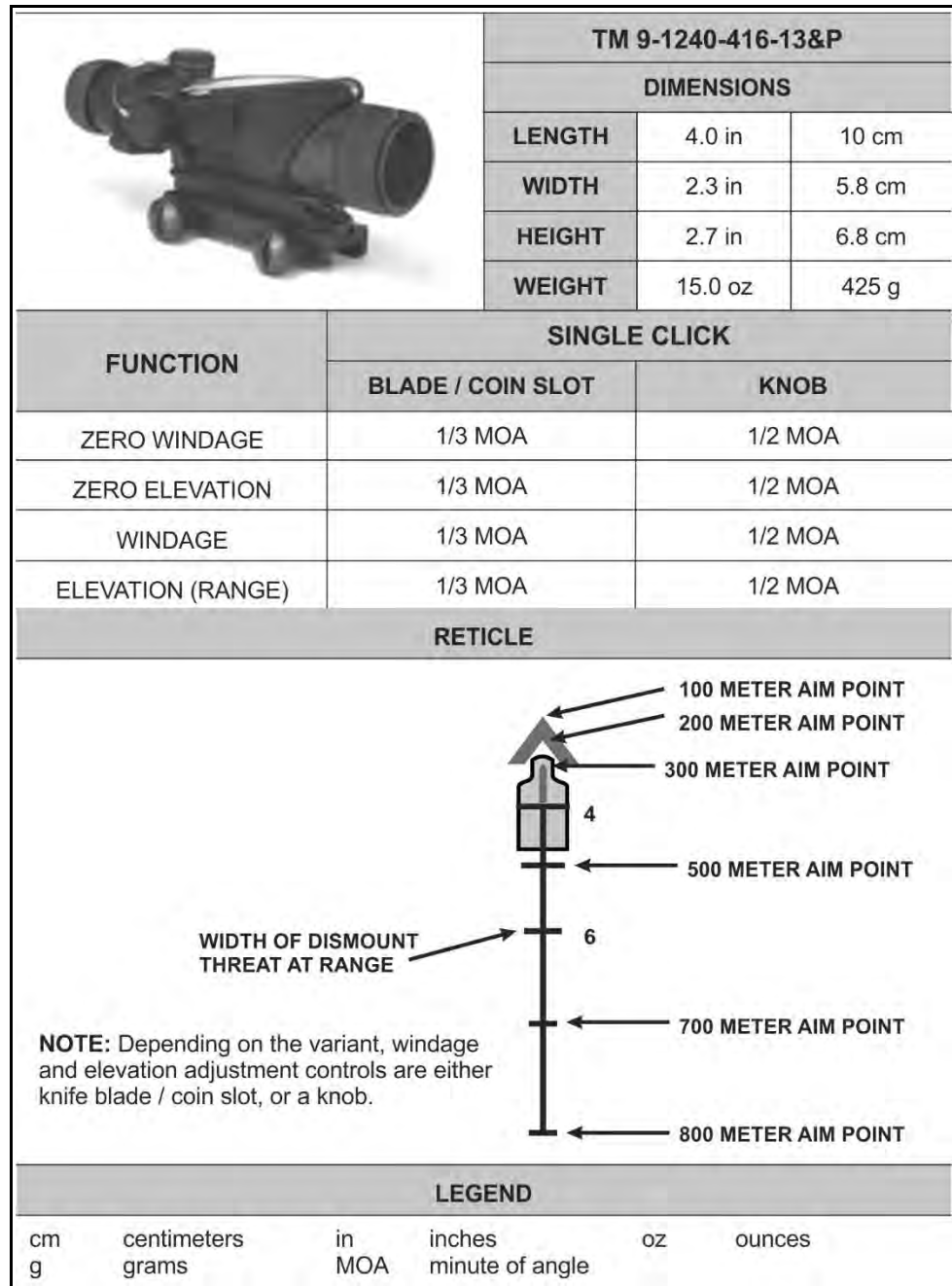


Figure 3-9. RCO reticle example



Aiming Devices

## THERMAL SIGHTS

3-41. Thermal sights are target acquisition and aiming sensors that digitally replicate the field of view based on an estimation of the temperature. They use advanced forward-looking infrared technology that identify the infrared emitted radiation (heat) of a field of view, and translate those temperatures into a gray- or color-scaled image. The TWS is capable of target acquisition under conditions of limited visibility, such as darkness, smoke, fog, dust, and haze, and operates effectively during the day and night.

3-42. The TWS is composed of five functional groups: (See figure 3-10.)

- **Objective lens** – receives IR light emitting from an object and its surroundings. The objective lens magnifies and projects the IR light.
- **Detector assembly** – senses the IR light and converts it to a video signal.
- **Sensor assembly** – the sensor electronics processes the video for display on the liquid crystal display (LCD) array in the field of view.
- **LCD array/eyepiece** – the LCD array provides the IR image along with the reticle selected. The light from the LCD array is at the eyepiece.
- **User controls** – the control electronics allows the user to interface with the device to adjust contrast, thermal gain, sensitivity, reticle display, and magnification.

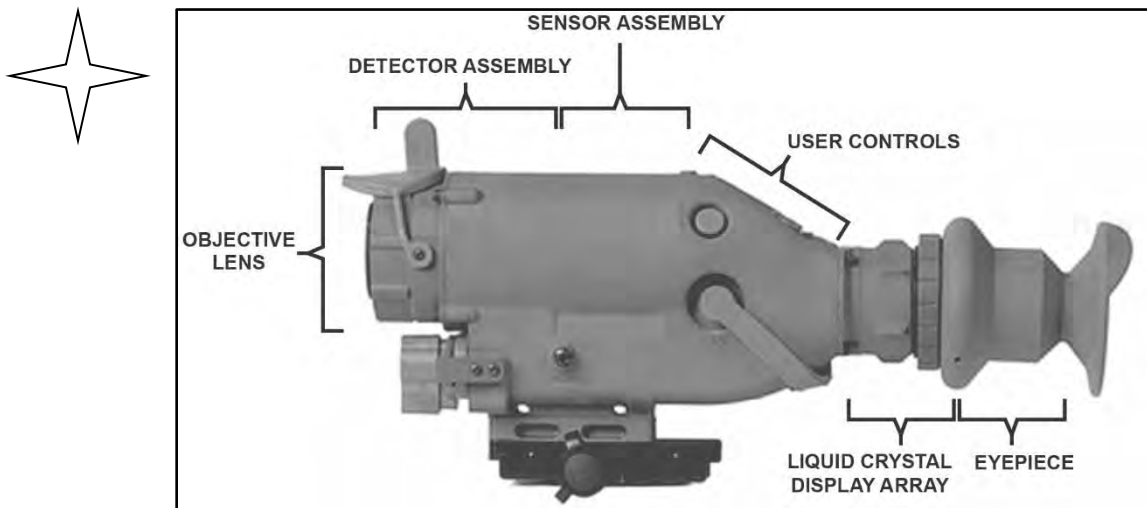


Figure 3-10. Thermal weapon sight example

3-43. A small detector used in thermal sensors or optics to identify IR radiation with wavelengths between 3 and 30  $\mu\text{m}$  (micrometer). The thermal optic calculates and processes the thermal scene into a correlating video image signal based on the temperature identified. These optics can differentiate thermal variations of 1 degree Celsius of the viewable scene. These variations generate a corresponding contrasting gradient that develops a thermal representation on the LCD screen in the eyepiece.



## Chapter 3

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### AN/PAS-13 SERIES OF WEAPON THERMAL SIGHTS

3-44. There are several versions of weapons thermal sights (WTS) available for use across the force. Soldiers must be familiar with their specific model and version of their assigned weapon thermal sight, and be knowledgeable on the specific procedures for alignment and operation. The various models and versions are identified in their official model nomenclature:

- **Version 1 (v1)** – Light Weapons Thermal Sight (LWTS).
- **Version 2 (v2)** – Medium Weapons Thermal Sight (MWTS).
- **Version 3 (v3)** – Heavy Weapons Thermal Sight (HWTs).

3-45. Weapons thermal sights are silent, lightweight, and compact, and have durable battery-powered IR imaging sensors that operate with low battery consumption. (See figure 3-11.)

#### Advantages

3-46. Military grade weapon thermal weapon sights are designed with the following advantages:

- Small and lightweight.
- Real-time imagery. Devices provide real-time video of the thermal scene immediately after power on.
- Long-lasting battery life. Low power consumption over time.
- Reliable. Long mean time between failures (MTBF).
- Quiet. The lack of a cooling element allows for a very low operating noise level.
- One optic fits on multiple weapons. The use of the ARS rail mounting bracket allows for the same optic to be used on other weapons.
- The F- and G-models attach in front of other aiming devices to improve their capabilities and eliminate the zeroing procedures for the device.

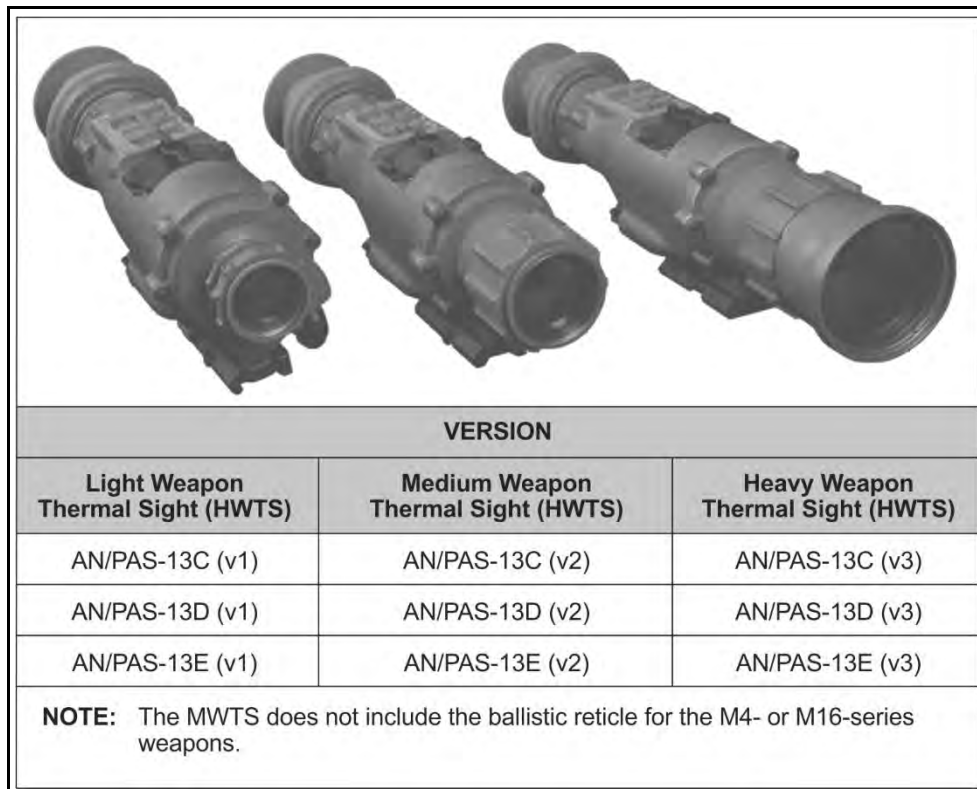
#### Disadvantages

3-47. These devices have limitations that Soldiers should take into consideration, particularly during combat operations. The primary disadvantages are:

- Cannot interpret (“see”) multispectral infrared. These systems view a specific wavelength for emitted radiation (heat variations), and do not allow viewing of all aiming and marking devices at night.
- Reliance on rechargeable batteries and charging stations. Although the batteries are common and have a relatively long battery life, additional equipment is required to charge them. If common nonrechargeable (alkaline) batteries are used, a separate battery adapter is typically required.
- Cannot interpret thermal signatures behind glass or water effectively.
- Thermal systems cannot always detect friendly marking systems worn by dismounts.



**Aiming Devices**



**Figure 3-11. Weapon thermal sights by version**

3-48. Thermal sight has a wide field of view and a narrow field of view (see figures 3-12 and 3-13).



### Chapter 3

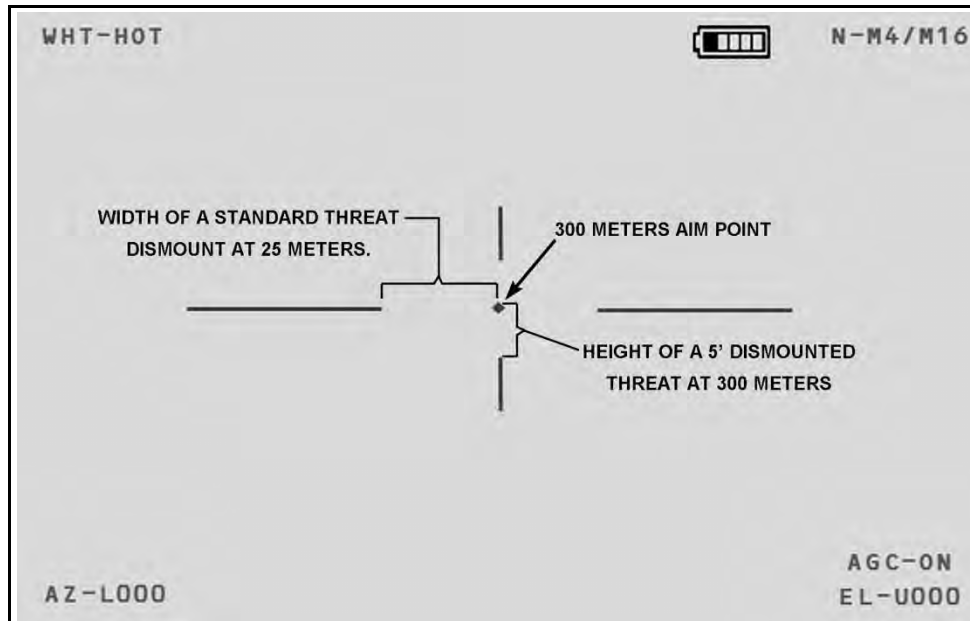


Figure 3-12. Thermal weapons sight, narrow field of view reticle example

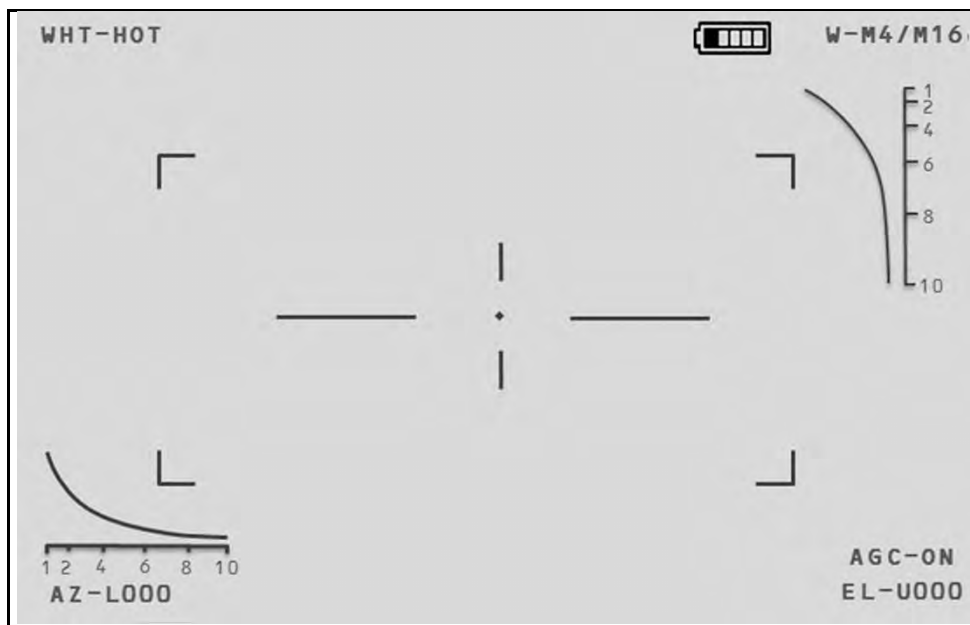


Figure 3-13. Thermal weapons sight, wide field of view reticle example



## Aiming Devices

### POINTERS / ILLUMINATORS / LASERS

3-49. Pointers, illuminators, and laser devices for small arms weapons emit a collimated beam of IR light for precise aiming and a separate IR beam for illumination. These devices operate in one single mode at a time, as selected by the user. The laser is activated by a selector switch on the device or by a remote mechanism installed on the weapon. The basic two modes or functions are:

- **Pointer.** When used as a pointer or aiming device, a small, pin-point beam is emitted from the device. The IR beam provides an infrared visible point when it strikes an object or target. The IR beam operates in the 400 to 800 nanometer wavelength and can only be seen by I2 optics, such as the AN-PVS-7 or -14 night vision devices.
- **Illuminator.** Typically used to illuminate a close quarters area as an infrared flood light. The illuminator provides a flood-light effect for the Soldier when used in conjunction with I2 night vision devices.

*Note.* Laser is an acronym for light amplified stimulated emitted radiation, but is predominantly used as a proper noun.

3-50. The following devices (see table 3-1) are the most common laser pointing devices available for use on the M4- and M16-weapons.

**Table 3-1. Laser Aiming Devices for the M4 and M16**

Laser Aiming Device	Device Name	Reference
AN/PEQ-2	Target Pointer/Illuminator/Aiming Light (TPIAL)	TM 9-5855-1915-13&P
AN/PEQ-15	Advanced Target Pointer/Illuminator/Aiming Light (ATPIAL)	TM 9-5855-1914-13&P
AN/PEQ-15A	Dual Beam Aiming Laser – Advanced2 (DBAL-A2)	TM 9-5855-1912-13&P
AN/PSQ-23	Illuminator, Integrated, Small Arms (STORM)	TM 9-5855-1913-13&P

*Note.* The ATPIAL, DBAL-A2, and STORM have collocated IR and visible aiming lasers. A single set of adjusters move both aiming beams. Although the aiming lasers are collocated, Soldiers should zero the laser they intend to use as their primary pointer to ensure accuracy and consistency during operation.



### Chapter 3

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#### AN/PEQ-2 TARGET POINTER/ILLUMINATOR AIMING LIGHT (TPIAL)

3-51. AN/PEQ-2 aiming devices are Class IIb laser devices that emit a collimated beam of IR light for precise aiming and a separate IR beam for illumination of the target or target area (see figure 3-14 on page 3-21). Both beams can be independently zeroed to the weapon and to each other. The beams can be operated individually or in combination in both high and low power settings.

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**Note.** The IR illuminator is equipped with an adjustable bezel to vary the size of the illumination beam based on the size and distance of the target.

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3-52. The aiming devices are used with night observation devices (NODs) and can be used as handheld illuminators/pointers or mounted on the weapon with the included brackets and accessory mounts. In the weapon-mounted mode, the aiming devices can be used to direct fire and to illuminate and designate targets.

3-53. The aiming light is activated by pressing on either the ON/OFF switch lever, or the button on the optional cable switch. Either switch connects power from two AA batteries to an internal electronic circuit which produces the infrared laser. Internal lenses focus the infrared light into a narrow beam. The direction of the beam is controlled by rotating the mechanical Adjusters with click detents. These adjusters are used to zero the aiming light to the weapon.

3-54. Once zeroed to the weapon, the aiming light projects the beam along the line of fire of the weapon. The optical baffle prevents off-axis viewing of the aiming light beam by the enemy.

#### CAUTION

A safety block is provided for training purposes to limit the operator from selecting high power modes of operation.

3-55. The following information is an extract from the equipment's technical manual for Soldier reference.



**Aiming Devices**

	TM 9-5855-1915-13&P				
	DIMENSIONS				
	LENGTH	6.4 in	16.3 cm		
	WIDTH	2.8 in	7.1 cm		
	HEIGHT	1.2 in	3 cm		
	WEIGHT	9.5 oz	269 g		
POWER					
BATTERY LIFE		100 hours >32°			
		36 hours <32°			
POWER SOURCE		2 each AA batteries			
MODE OF OPERATION					
MODE	MARKINGS	TGT LASER	ILLUM LASER		
0	OFF	OFF	OFF		
1	AIM LO	LOW POWER	OFF		
2	DUAL LO	LOW POWER	LOW POWER		
3	AIM HI	HIGH POWER	OFF		
4	DUAL LO/HI	HIGH POWER	LOW POWER		
5	DUAL HI	HIGH POWER	HIGH POWER		
LASER		DIVERGENCE	WAVELENGTH		
IR BEAM		0.3 mRad	820-850 nm		
IR ILLUMINATOR		3.0 mRad	820-850 nm		
LEGEND					
cm	centimeters	IR	infrared	oz	ounces
g	grams	mRad	milliradians		
in	inches	nm	nanometers		

**Figure 3-14. AN/PEQ-2**



### Chapter 3

#### AN/PEQ-15 ADVANCED TARGET POINTER/ILLUMINATOR/AIMING LIGHT

3-56. The AN/PEQ-15 ATPIAL is a multifunctional laser that emits both a visible and IR light for precise weapon aiming and target/area illumination. This ruggedized system can be used as a handheld illuminator/pointer or can be mounted to weapons equipped with an M4- or M5-ARS (Military Standard [MIL STD] 1913).

- **Visible light** – can be used to boresight the device to a weapon without the need of night vision goggles. A visible red-dot aiming laser can also be selected to provide precise aiming of a weapon during daylight or night operations.
- **Infrared laser** – emit a highly collimated beam of IR light for precise weapon aiming. A separate IR-illuminating laser can be adjusted from a flood light mode to a single point spot-divergence mode.

3-57. The lasers can be used as handheld illuminator pointers, or can be weapon-mounted with included hardware. The co-aligned visible and IR aiming lasers emit through laser ports in the front of the housing. These highly capable aiming lasers allow for accurate nighttime aiming and system boresighting.

3-58. The AN/PEQ-15 has an integrated rail grabber molded into the body to reduce weight and additional mounting hardware. (Refer to TM 9-5855-1914-13&P for more information.)

#### CAUTION

The AN/PEQ-15 can be used during force-on-force training in the low power modes only. High power modes can be used on live-fire ranges exceeding 220 meters only.

3-59. The AN/PEQ-15, ATPIAL's (see figure 3-15 on page 3-23) visible aiming laser provides for active target acquisition in low light conditions and close-quarters combat situations, and allows users to zero using the borelight without using NOD. When used in conjunction with NODs, its IR aiming and illumination lasers provide for active, covert target acquisition in low light or complete darkness.

3-60. The ATPIAL visible and IR aiming lasers are co-aligned. A single set of adjusters moves both aiming beams, and the user can boresight/zero using either aiming laser. The following information is an extract from the equipment's technical manual for Soldier reference.



**Aiming Devices**

	<b>TM 9-5855-1914-13&amp;P</b>				
	<b>DIMENSIONS</b>				
	<b>LENGTH</b>	4.6 in	11.7 cm		
	<b>WIDTH</b>	2.8 in	7.1 cm		
	<b>HEIGHT</b>	1.9 in	4.1 cm		
	<b>WEIGHT</b>	7.5 oz	213 g		
<b>POWER</b>					
<b>BATTERY LIFE</b>		>6 hours in DUAL HIGH (DH) mode			
<b>POWER SOURCE</b>		1 each DL-123A, 3 volt			
<b>MODE OF OPERATION</b>					
<b>POSITION</b>	<b>MODE</b>	<b>REMARKS</b>			
VIS AL	Vis Aiming Laser	Visible Aim Laser ON			
O	OFF	Prevents inadvertent laser burst			
P	Program	Sets the desired IR pulse rate			
AL	AIM LOW	Low power of Aiming Laser			
DL	DUAL LOW	Aiming Laser and Illuminator on LOW			
AH	AIM HIGH	Aiming Laser set to HIGH			
IH	ILLUM HIGH	IR Illuminator set to HIGH			
DH	DUAL HIGH	IR Aim and Illuminator set to HIGH			
<b>LASER</b>		<b>DIVERGENCE</b>	<b>WAVELENGTH</b>		
IR BEAM		0.5 mRad	820-850 nm		
IR ILLUMINATOR		1.0 to 105 mRad	820-850 nm		
VISIBLE AIMING		0.5 mRad	605-665 nm		
<b>LEGEND</b>					
cm	centimeters	IR	infrared	oz	ounces
g	grams	mRad	milliradians		
in	inches	nm	nanometers		

**Figure 3-15. AN/PEQ-15, ATPIAL**

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### Chapter 3

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#### AN/PEQ-15A, DUAL BEAM AIMING LASER – ADVANCED2

3-61. The AN/PEQ-15A DBAL-A2 is a multifunctional laser device that emits IR pointing and illumination light, as well as a visible laser for precise weapon aiming and target/area illumination. The visible and IR aiming lasers are co-aligned enabling the visible laser to be used to boresight both aiming lasers to a weapon without the need for night vision devices. This ruggedized system can be used as a handheld illuminator/pointer or can be mounted to weapons equipped with an M4 or M5 adapter rail system (MIL-STD-1913).

- **Visible light** – can be used to boresight the device to a weapon without the need of night vision goggles. A visible red-dot aiming laser can also be selected to provide precise aiming of a weapon during daylight or night operations.
- **Infrared laser** – emits a tightly focused beam of IR light for precise aiming of the weapon. A separate IR illumination provides supplemental IR illumination of the target or target area. The IR illuminator is equipped with an adjustable bezel to vary the size of the illumination beam on the size and distance to the target (flood to point divergence).

3-62. The lasers can be used as hand-held illuminator pointers, or can be weapon-mounted with included hardware. These highly capable aiming lasers allow for accurate nighttime aiming and system boresighting.

3-63. The AN/PEQ-15A, DBAL-A2 (see figure 3-16 on page 3-25) visible aiming laser provides for active target acquisition in low light conditions and close quarters combat situations, and allows users to zero using the borelight without using NODs. When used in conjunction with NODs, its IR aiming and illumination lasers provide for active, covert target acquisition in low light or complete darkness.

3-64. The DBAL-A2 visible and IR aiming lasers are co-aligned. A single set of adjusters moves both aiming beams, and the user can boresight/zero using either aiming laser. The following information is an extract from the equipment's technical manual for Soldier reference.



**Aiming Devices**

	<b>TM 9-5855-1912-13&amp;P</b>				
	<b>DIMENSIONS</b>				
	<b>LENGTH</b>	3.5 in	8.7 cm		
	<b>WIDTH</b>	2.9 in	7.4 cm		
	<b>HEIGHT</b>	1.9 in	4.8 cm		
			<b>WEIGHT</b>	8 oz	224 g
<b>POWER</b>					
<b>BATTERY LIFE</b>			>5.5 hours in IR DUAL HIGH mode		
<b>POWER SOURCE</b>			1 each DL-123A, 3 volt		
<b>MODE OF OPERATION</b>					
<b>POSITION</b>	<b>MODE</b>		<b>REMARKS</b>		
AL	LOW POWER		Low power for aim laser		
AH	HIGH POWER		High power for aim laser		
VIS A	VIS AIM RED		Aiming or marking laser for daylight		
VIS A	VIS AIM GREEN		Aiming or marking laser for daylight		
<b>LASER</b>		<b>DIVERGENCE</b>		<b>WAVELENGTH</b>	
IR BEAM		0.3 mRad		840 nm	
IR ILLUMINATOR		0.5 to 75 mRad		840 nm	
VISIBLE AIM, RED		0.3 mRad		635 nm	
VISIBLE AIM, GREEN		0.5 mRad		532 nm	
<b>LEGEND</b>					
cm	centimeters	IR	infrared	oz	ounces
g	grams	mRad	milliradians		
in	inches	nm	nanometers		

**Figure 3-16. AN/PEQ-15A, DBAL-A2**



### Chapter 3

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#### AN/PSQ-23, ILLUMINATOR, INTEGRATED, SMALL ARMS

3-65. The AN/PSQ-23 is a battery operated laser range finder (LRF) and digital magnetic compass (DMC) with integrated multifunctional lasers. The illuminator, integrated, small arms device is commonly referred to as the STORM laser. The visible and IR aiming lasers are co-aligned enabling the visible laser to be used to boresight both aiming lasers to a weapon without the need for night vision devices. This ruggedized system can be used as a handheld illuminator/pointer or can be mounted to weapons equipped with an M4 or M5 adapter rail system (MIL-STD-1913).

- **Laser range finder** – provides range to target information from 20 meters to 10,000 meters with an accuracy of +/- 1.5 meters.
- **Digital magnetic compass** – provides azimuth information and limited elevation information to the operator. The azimuth accuracy is +/- 0.5 degrees to +/- 1.5 degrees. The elevation accuracy is +/- 0.2 degrees. The DMC can identify bank or slopes up to 45 degrees with an accuracy of +/- 0.2 degrees.
- **Visible light** – provides for active target acquisition in low light and close quarters combat situations without the need for night vision devices. It can be used to boresight the device to a weapon without the need of night vision devices. A visible red-dot aiming laser can also be selected to provide precise aiming of a weapon during daylight or night operations.
- **Infrared laser** – emits a tightly focused beam of IR light for precise aiming of the weapon. A separate IR illumination provides supplemental IR illumination of the target or target area. The IR illuminator is equipped with an adjustable bezel to vary the size of the illumination beam on the size and distance to the target (flood to point divergence).
- **Infrared illuminator** – the STORM features a separately adjustable IR illuminator with adjustable divergence. It is fixed in the device housing and is set parallel to the rail mount.

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**Note.** The STORM's LRF and DMC may be used in combination to obtain accurate positioning information for targeting purposes and other tactical applications.

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3-66. The integrated visible aim laser (VAL) and illumination lasers provide for active, covert target acquisition in low light or complete darkness when used in conjunction with night vision devices. The STORM is also equipped with a tactical engagement simulation (TES) laser allowing it to be used in a laser-based training environment.

3-67. The AN/PEQ-15A, DBAL-A2 visible aiming laser provides for active target acquisition in low light conditions and close-quarters combat situations, and allows users to zero using the borelight without using NODs. When used in conjunction with NODs, its IR aiming and illumination lasers provide for active, covert target acquisition in low light or complete darkness. The following information is an extract from the equipment's technical manual for Soldier reference (see figure 3-17 on page 3-27).



**Aiming Devices**

	TM 9-5855-1913-13&P				
	DIMENSIONS				
	LENGTH	7.3 in	18.5 cm		
	WIDTH	3.5 in	9.0 cm		
	HEIGHT	1.9 in	4.8 cm		
	WEIGHT	20.8 oz	590 g		
POWER					
BATTERY LIFE		>5.5 hours in IR DUAL HIGH mode			
POWER SOURCE		2 each DL-123A, 3 volt			
MODE OF OPERATION					
POSITION	MODE	REMARKS			
VH	VIS HIGH	Aiming or marking in daylight/indoor			
AH	AIM HIGH	IR operates on high power			
IH	ILLUM HIGH	IR illum operates on high power			
DH	DUAL HIGH	IR/Illum both operate on high power			
BUTTON	MODE	REMARKS			
L	Laser activate	Activates aiming laser			
R	Range/Compass	Press/Hold 3 sec to enter menu power			
LASER		DIVERGENCE	WAVELENGTH		
IR BEAM		0.5 mRad	820-850 nm		
IR ILLUMINATOR		1.0 to 100 mRad	820-850 nm		
VISIBLE AIM, RED		0.5 mRad	605-665 nm		
LASER RANGE FINDER		1.0 mRad	1570 nm		
LEGEND					
cm	centimeters	IR	infrared	oz	ounces
g	grams	mRad	milliradians		
in	inches	nm	nanometers		

**Figure 3-17. AN/PSQ-23, STORM**



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## Chapter 4

# Mountable Equipment

Both the M4- and M16-series of weapons have a wide variety of attachments to increase Soldier lethality, situational awareness, and overmatch. The attachments can be applied in various locations on the weapon system. Soldiers must understand what the attachments are, how they are correctly positioned, how to align them with the weapon system, and how to integrate them into use to maximize the system's capabilities.

This chapter explains how the ARS is used to mount the various attachments. It describes the weapons, aiming devices, and accessories available for mounting, and includes general information on the proper mounting location as well as their basic capabilities.

## ADAPTIVE RAIL SYSTEM

4-1. The ARS and rail grabbers are designed for M16- and M4-/M4A1-series weapons to mount:

- Weapons.
- Aiming devices.
- Accessories.

4-2. The ARS provides a secure mounting point for various accessories that may be mounted on the weapon's top, bottom, left, and right. Each rail groove has an incremental number identifying the slot location, starting from the rear of the weapon.

4-3. Soldiers should record the attachment or equipment's serial number (if applicable), the location of the attachment (for example, markings between lugs), and any boresight or alignment settings specific to the equipment at that location.

4-4. Once complete, the Soldier should mark the mounting bracket to identify the tightened position with a permanent marker. Marking the mounting bracket allows for rapid identification of loosening hardware during firing. Soldiers must periodically verify the mounting hardware does not loosen during operation. During zeroing or zero confirmation operations, Soldiers should retighten the mounting hardware after the first five rounds.

4-5. Soldiers must ensure the equipment is firmly affixed to the ARS before tie down is complete. If the attachments are loose, their accuracy and effectiveness will be degraded.



## Chapter 4

### MOUNTABLE WEAPONS

4-6. There are two types of weapons that can be physically attached to the M16-/M4-series rifles; grenade launchers and shotguns. These weapons are standard components of the unit's organizational equipment and serve specific purposes during combat operations.

4-7. These weapons are mounted under the barrel of the service rifle at specific locations. They may be removed by a qualified armorer only.

#### GRENADE LAUNCHERS

4-8. The M320/M320A1 grenade launcher is a lightweight grenade launcher that can operate in a stand-alone or attached configuration. The M320/M320A1 grenade launcher uses an integrated double-action-only trigger system. The M320 series is the replacement weapon for the M203. (See figure 4-1.)



**Figure 4-1. M320 attached to M4 series carbine example**

4-9. The M203 is a breach loaded attachable grenade launcher that is affixed to the bottom of the barrel of the M16-/M4-series rifle. The M203 cannot be used in a stand-alone configuration. (See figure 4-2)



**Figure 4-2. M203 grenade launcher example**



## Mountable Equipment

4-10. Each mountable 40mm grenade launcher provides the following capabilities to the small unit (see the appropriate TM for authorized use):

- Pyrotechnic signal and spotting rounds:
  - Star cluster, white.
  - Star parachute, white.
  - Star parachute, green.
  - Star parachute, red.
  - Smoke, yellow.
  - Smoke, green.
  - Smoke, red.
  - Illumination, infrared.
- High explosive (HE).
- High explosive, dual purpose (HEDP).
- Nonlethal.
- Training practice (TP).

## SHOTGUN SYSTEM

4-11. The M26 Modular Accessory Shotgun System (MASS) is an under-barrel shotgun attachment for the M16/M4/M4A1. The M26 uses a 3- or 5-round detachable box magazine and provides Soldiers with additional tactical capabilities. (Refer to TC 3-22.12 for more information). (See figure 4-3.)



**Figure 4-3. M26 shotgun example**

4-12. The M26 provides specific tactical capabilities to the Soldier using the following ammunition:

- Slug. Door breaching.
- Shot range, 00 buckshot.
- Nonlethal, rubber slug, buckshot, and riot control.



## Chapter 4

### MOUNTABLE AIMING DEVICES

4-13. Aiming devices mounted to the weapon system should be placed in a specific location on the weapon to maximize their capabilities. Table 4-1 provides the preferred mounting locations of the most common attachments.

**Table 4-1. Attachment Related Technical Manuals and Mounting**

Attachment	Technical Manual	M4/M4A1, M16A4	M4/M4A1	M16A2/A3
BUIS		UR	UR	
CCO, M68	TM 9-1240-413-13&P	UR*	UR*	MT
RCO, M150	TM 9-1240-416-13&P	UR	UR	MT
AN/PVS-14	TM 11-5855-306-10	UR***		
AN/PEQ-15A	TM 9-5855-1912-13&P	RG**	BA	BA
AN/PEQ-15	TM 9-5855-1914-13&P	RG**	BA	BA
AN/PAS-13B(V1), LWTS	TM 11-5855-312-10	UR	UR	MT
AN/PAS-13B(V3), HWTS	TM 11-5855-312-10	UR	UR	MT
AN/PAS-13C(V1), LWTS	TM 11-5855-316-10	UR	UR	MT
AN/PAS-13C(V3), HWTS	TM 11-5855-316-10	UR	UR	MT
AN/PAS-13D(V)1 LWTS	TM 11-5855-324-10	UR	UR	MT
AN/PAS-13D(V2), MWTS	TM 11-5855-317-10	UR	UR	MT
AN/PAS-13D(V3), HWTS	TM 11-5855-317-10	UR	UR	MT
AN/PSQ-23	TM 9-5855-1913-13&P	RG**	BA	BA
<b>Legend:</b> BA – Bracket Assembly BUIS – Back up Iron Sight CCO – Close Combat Optic HTWS – Heavy Thermal Weapons Sight LTWS – Light Thermal Sight MWTS – Medium Thermal Sight MT – M16 Mount RCO – Rifle Combat Optic RG – Rail Grabber UR – Upper Receiver * With a half-moon spacer installed. ** Picatinny or Insight rail grabbers may be used. *** If used in conjunction with the CCO, the CCO will mount on the top rail of the ARS.				



## **Mountable Equipment**

### **MOUNTABLE ACCESSORIES**

4-14. Mountable accessories are items that may be attached to a weapon but are not required for operation. They provide assistance stabilizing the weapon or provide white-light illumination for specific tactical operations.

4-15. These devices are authorized as needed by the small unit. Some mountable accessories are aftermarket (commercial-off-the-shelf, or COTS) items that use the ARS for semipermanent attachment.

### **BIPOD**

4-16. Bipods are highly adjustable that enhance stability within the battle space environment. They are secured by the front sling swivel or the advanced rail system on the foregrip of the weapon. They can be used in combination with a sand sock or other buttstock support to provide an extremely stable firing platform. (See figure 4-4.)

4-17. The bipod is an additional means to stabilize the weapon in various shooting positions. Despite primarily being used in prone position, bipods can be used for additional support in alternate shooting positions while using barricade supports. The bipod provides additional support which facilitates acquisition of muscle relaxation and natural point of aim. The use of bipods in barricade shooting can increase the Soldier's efficiency and probability of a first round hit while engaging targets.



**Figure 4-4. Bipod example**



## **Chapter 4**

### **VERTICAL FOREGRIP**

4-18. Vertical foregrips (VFGs) assist in transitioning from target to target in close quarter combat. (See figure 4-5.)

4-19. The further out the Soldier mounts the VFG, the smoother and quicker his transitions between multiple targets will be, however he should not mount it so far forward that using the VFG is uncomfortable.



**Figure 4-5. Vertical foregrip example**

### **FOREGRIP WITH INTEGRATED BIPODS**

4-20. VFGs with integrated bipods are acceptable for common use. They combine the VFG capability with a small, limited adjustment bipod. They typically lack the full adjustment capabilities of full bipods, but provide a compact stable extrusion for the firer.

### **MOUNTED LIGHTS**

4-21. The weapon-mounted lights are commonly issued throughout the Army. The purpose of the weapon mounted lights is to provide illumination and assist in target acquisition and identification during limited visibility operations.

4-22. Most weapon mounted lights provide selection between white light and infrared capabilities. Employment of the weapon mounted light is based upon mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC) and unit SOP. The weapon mounted lights should be mounted in such a manner that the Soldier can activate and deactivate them efficiently and their placement does not hinder the use of any other attachment or accessory. They must be attached in such a manner as to prevent negligent or unintentional discharge of white light illumination during movement or climbing.



## Chapter 5

# EMPLOYMENT

The rifleman's primary role is to engage the enemy with well-aimed shots. (Refer to ATP 3-21.8 for more information.) In this capacity, the rate of fire for the M4 rifle is not based on how fast the Soldier can pull the trigger. Rather, it is based on how fast the Soldier can consistently acquire and engage the enemy with accuracy and precision.

Consistently hitting a target with precision is a complex interaction of factors immediately before, during, and after the round fires. These interactions include maintaining postural steadiness, establishing and maintaining the proper aim on the target, stabilization of the weapon while pressing the trigger, and adjusting for environmental and battlefield conditions.

5-1. Every Soldier must adapt to the firing situation, integrate the rules of firearms safety, manipulate the fire control, and instinctively know when, how, and where to shoot. It is directly influenced by the Soldier's ability to hit the target under conditions of extreme stress:

- Accurately interpret and act upon perceptual cues related to the target, front and rear sights, rifle movement, and body movement.
- Execute minute movements of the hands, elbows, legs, feet, and cheek.
- Coordinate gross-motor control of their body positioning with fine-motor control of the trigger finger.

5-2. Regardless of the weapon system, the goal of shooting remains constant: well-aimed shots. To achieve this end state there are two truths. Soldier's must—

- Properly point the weapon (sight alignment *and* sight picture).
- Fire the weapon without disturbing the aim.

5-3. To accomplish this, Soldiers must master sight alignment, sight picture, and trigger control.

- **Sight alignment** – sight alignment is the relationship between the aiming device and the firer's eye. To achieve proper and effective aim, the focus of the firer's eye needs to be on the front sight post or reticle. The Soldier must maintain sight alignment throughout the aiming process.
- **Sight picture** – the sight picture is the placement of the aligned sights on the target.
- **Trigger control** – the skillful manipulation of the trigger that causes the rifle to fire without disturbing the aim.



## Chapter 5

### SHOT PROCESS

5-4. The **shot process** is the basic outline of an individual engagement sequence all firers consider during an engagement, regardless of the weapon employed. The shot process formulates all decisions, calculations, and actions that lead to taking the shot. The shot process may be interrupted at any point before the sear disengaging and firing the weapon should the situation change.

5-5. The shot process has three distinct phases:

- **Pre-shot.**
- **Shot.**
- **Post-shot.**

5-6. To achieve consistent, accurate, well-aimed shots, Soldiers must understand and correctly apply the shot process. The sequence of the shot process does not change, however, the application of each element vary based on the conditions of the engagement.

5-7. Every shot that the Soldier takes has a complete shot process. Grouping, for example, is simply moving through the shot process several times in rapid succession.

5-8. The shot process allows the Soldier to focus on one cognitive task at a time. The Soldier must maintain the ability to mentally organize the shot process's tasks and actions into a disciplined mental checklist, and focus their attention on activities which produce the desired outcome; a well-aimed shot.

5-9. The level of attention allocated to each element during the shot process is proportional to the conditions of each individual shot. Table 5-1 provides an example of a shot process.

**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



## FUNCTIONAL ELEMENTS OF THE SHOT PROCESS

5-10. Functional elements of the shot process are the linkage between the Soldier, the weapon system, the environment, and the target that directly impact the shot process and ultimately the consistency, accuracy, and precision of the shot. When used appropriately, they build a greater understanding of any engagement.

5-11. The functional elements are interdependent. A accurate shot, regardless of weapon system, requires the Soldier to establish, maintain, and sustain—

- **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.

5-12. These elements define the tactical engagement that require the Soldier to make adjustments to determine appropriate actions, and compensate for external influences on their shot process. When all elements are applied to the fullest extent, Soldiers will be able to rapidly engage targets with the highest level of precision.

5-13. Time, target size, target distance, and the Soldier's skills and capabilities determine the amount of effort required of each of the functional elements to minimize induced errors of the shot.

5-14. Each weapon, tactical situation, and sight system will have preferred techniques for each step in the shot process and within the functional elements to produce precision and accuracy in a timely manner. How fast or slow the shooter progresses through the process is based on target size, target distance, and shooter capability.

5-15. The most complex form of shooting is under combat conditions when the Soldier is moving, the enemy is moving, under limited visibility conditions. Soldiers and leaders must continue to refine skills and move training from the simplest shot to the most complex. Applying the functional elements during the shot process builds a firer's speed while maintaining consistency, accuracy, and precision during complex engagements.

5-16. Each of the functional elements and the Soldier actions to consider during the shot process are described later in this manual.



## Chapter 5

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### TARGET ACQUISITION

5-17. Target acquisition is the ability of a Soldier to rapidly recognize threats to the friendly unit or formation. It is a critical Soldier function before any shot process begins. It includes the Soldier's ability to use all available optics, sensors, and information to detect potential threats as quickly as possible.

5-18. Target acquisition requires the Soldier to apply an acute attention to detail in a continuous process based on the tactical situation. The target acquisition process includes all the actions a Soldier must execute rapidly:

- **Detect** potential threats (target detection).
- **Identify** the threat as friend, foe, or noncombatant (target identification).
- **Prioritize** the threat(s) based on the level of danger they present (target prioritization).

### TARGET DETECTION

5-19. Effective target detection requires a series of skills that Soldiers must master. Detection is an active process during combat operations with or without a clear or known threat presence. All engagements are enabled by the Soldier's detection skills, and are built upon three skill sets:

- **Scan and search** – a rapid sequence of various techniques to identify potential threats. Soldier scanning skills determine potential areas where threats are most likely to appear.
- **Acquire** – a refinement of the initial scan and search, based on irregularities in the environment.
- **Locate** – the ability to determine the general location of a threat to engage with accuracy or inform the small unit leader of contact with a potential threat.

### Scan and Search

5-20. Scanning and searching is the art of observing an assigned sector. The goal of the scan and search is a deliberate detection of potential threats based on irregularities in the surrounding environment. This includes irregular shapes, colors, heat sources, movement, or actions the Soldier perceives as being "out of place," as compared to the surrounding area.

5-21. Soldiers use five basic search and scan techniques to detect potential threats in combat situations:

- **Rapid scan** – used to detect obvious signs of threat activity quickly. It is usually the first method used, whether on the offense or fighting in the defense.
- **Slow scan** – if no threats are detected during the rapid scan, Soldiers conduct the more deliberate scan using various optics, aiming devices, or sensors. The slow scan is best conducted in the defense or during slow movement or tactical halts.



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## Employment

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- **Horizontal scan** – are used when operating in restricted or urban terrain. It is a horizontal sweeping scan that focuses on key areas where potential threats may be over watching their movement or position.
- **Vertical scan** – an up and down scan in restricted or urban environments to identify potential threats that may be observing the unit from an elevated position.
- **Detailed search** – used when no threats are detected using other scanning methods. The detailed search uses aiming devices, thermal weapon systems, magnified optics, or other sensors to slowly and methodically review locations of interest where the Soldier would be positioned if they were the threat (where would I be if I were them?)

### Acquire

5-22. Target acquisition is the discovery of any object in the operational environment such as personnel, vehicles, equipment, or objects of potential military significance. Target acquisition occurs during target scan and search as a direct result of observation and the detection process.

5-23. During the scan and search, Soldiers are looking for “target signatures,” which are signs or evidence of a threat. Tactically, Soldiers will be looking for threat personnel, obstacles or mines (including possible improvised explosive devices [IEDs]), vehicles, or anti-tank missile systems. These target signatures can be identified with sight, sound, or smell.

### Detection Best Practices

5-24. Threat detection is a critical skill that requires thoughtful application of the sensors, optics, and systems at the Soldier’s disposal. Finding potential threats as quickly and effectively as possible provides the maximum amount of time to defeat the threat. Soldiers should be familiar with the following best practices to increase target detection:

- Scan with the unaided eye first, then with a magnified optic.
- Practice using I2 and thermal optics in tandem during limited visibility.
- Understand the difference between I2 and thermal optics; what they can “see” and what they can’t. (See chapter 4 of this publication.)
- Thermal optics are the preferred sight for target acquisition and engagement, day or night.
- Don’t search in the same area as others in the small unit. Overlap, but do not focus on the same sector.
- Practice extreme light discipline during limited visibility including IR light discipline.
- Think as the threat. Search in areas that would be most advantageous from their perspective.
- Detecting threats is exponentially more difficult when operating in a chemical, biological, radiological, nuclear (CBRN) environment. Practice detection skills with personal protective equipment (PPE)/individual



## Chapter 5

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protective equipment (IPE) and understand the increased constraints and limitations, day and night.

### Locate

5-25. Target location is the determination of where a target is in your operational environment in relation to the shooter, small unit, or element. Locating a target or series of targets occurs as a result of the search and acquisition actions of each Soldier in the small unit.

5-26. Once a target is located, the threat location can be rapidly and efficiently communicated to the rest of the unit. Methods used to announce a located target depend on the individual's specific position, graphic control measures for the operation, unit SOP, and time available.

### TARGET IDENTIFICATION

5-27. Identifying (or discriminating) a target as friend, foe, or noncombatant (neutral) is the second step in the target acquisition process. The Soldier must be able to positively identify the threat into one of three classifications:

- **Friend.** Any force, U.S. or allied, that is jointly engaged in combat operations with an enemy in a theater of operation.
- **Foe (enemy combatant).** Any individual who has engaged acts against the U.S. or its coalition partners in violation of the laws and customs of war during an armed conflict.
- **Noncombatants.** Personnel, organizations, or agencies that are not taking a direct part in hostilities. This includes individuals such as medical personnel, chaplains, United Nations observers, or media representatives or those out of combat such as the wounded or sick. Organizations like the Red Cross or Red Crescent can be classified as noncombatants.

5-28. The identification process is complicated by the increasing likelihood of having to discriminate between friend/foe and combatant/noncombatant in urban settings or restricted terrain. To mitigate fratricide and unnecessary collateral damage, Soldiers use all of the situational understanding tools available and develop tactics, techniques, and procedures for performing target discrimination.

### Fratricide Prevention

5-29. Units have other means of designating friendly vehicles from the enemy. Typically, these marking systems are derived from the unit tactical standard operating procedure (TACSOP) or other standardization publications, and applied to the personnel, small units, or vehicles as required:

- **Markings.** Unit markings are defined within the unit SOP. They distinctly identify a vehicle as friendly in a standardized manner.
- **Panels.** VS-17 panels provide a bright recognition feature that allows Soldiers to identify friendly vehicles through the day sight during unlimited visibility. Panels do not provide a thermal signature.



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## Employment

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- **Lighting.** Chemical or light emitting diode lights provide a means of marking vehicles at night. However, chemical lights are not visible through a thermal sight. An IR variant is available for use with night vision devices. Lighting systems do not provide for thermal identification during day or limited visibility operations.
- **Beacons and Strobes.** Beacons and strobes are unit-procured, small-scale, compact, battery-operated flashing devices that operate in the near infrared wavelength. They are clearly visibly through night vision optics, but cannot be viewed through thermal optics.

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*Note.* Beacons and strobes generate illumination signals that can only be viewed by I2 optics. The signal *cannot be viewed* by thermal optics. Leaders and Soldiers are required to be aware of which optic can effectively view these systems when developing their SOPs and when using them in training or combat.

Beacons and strobes have the potential to be viewed by enemy elements with night vision capabilities. Units should tailor use of the beacon based on METT-TC.

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- **Symbols.** Unit symbols may be used to mark friendly vehicles. An inverted V, for example, painted on the flanks, rear, and fronts of a vehicle, aid in identifying a target as friendly. These are typically applied in an area of operations and not during training. Symbol marking systems do not provide for thermal identification during day or limited visibility operations.

## TARGET PRIORITIZATION

5-30. When faced with multiple targets, the Soldier must prioritize each target and carefully plan his shots to ensure successful target engagement. Mental preparedness and the ability to make split-second decisions are the keys to a successful engagement of multiple targets. The proper mindset will allow the Soldier to react instinctively and control the pace of the battle, rather than reacting to the adversary threat.

5-31. Targets are prioritized into three threat levels—

- **Most dangerous.** A threat that has the capability to defeat the friendly force and is preparing to do so. These targets must be defeated immediately.
- **Dangerous.** A threat that has the capability to defeat the friendly force, but is not prepared to do so. These targets are defeated after all most dangerous targets are eliminated.
- **Least dangerous.** Any threat that does not have the ability to defeat the friendly force, but has the ability to coordinate with other threats that are more prepared. These targets are defeated after all threats of a higher threat level are defeated.



## **Chapter 5**

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5-32. When multiple targets of the same threat level are encountered, the targets are prioritized according to the threat they represent. The standard prioritization of targets establishes the order of engagement. Firers engage similar threats by the following guide:

- **Near before far.**
- **Frontal before flank.**
- **Stationary before moving.**

5-33. The prioritization of targets provides a control mechanism for the shooter, and facilitates maintaining overmatch over the presented threats. Firers should be prepared deviate from the prioritization guide based on the situation, collective fire command, or changes to the target's activities.



## Chapter 6

# Stability

Stability is the ability of the Soldier to create a stable firing platform for the engagement. The Soldier stabilizes the weapon to provide a consistent base from which to fire from and maintain through the shot process until the recoil impulse 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. A stable firing platform is essential during the shot process, whether the Soldier is stationary or moving.

This chapter provides the principles of developing a stable firing platform, describes the interaction between the Soldier, weapon, the surroundings, and the methods to achieve the greatest amount of stability in various positions. It explains how the stability functional element supports the shot process and interacts and integrates the other three elements. Stability provides a window of opportunity to maintain sight alignment and sight picture for the most accurate shot.

## SUPPORT

- 6-1. Stability is provided through four functions: support, muscle relaxation, natural point of aim, and recoil management. These functions provide the Soldier the means to best stabilize their weapon system during the engagement process.
- 6-2. The placement or arrangement of sandbags, equipment, or structures that directly provide support to the upper receiver of the weapon to provide increased stability. This includes the use of a bipod or vertical foregrip, bone and muscle support provided by the shooter to stabilize the rifle.
- 6-3. Support can be natural or artificial or a combination of both. Natural support comes from a combination of the shooter's bones and muscles. Artificial support comes from objects outside the shooter's body. The more support a particular position provides, the more stable the weapon.
  - **Leg Position.** The position of the legs varies greatly depending on the firing position used. The position may require the legs to support the weight of the Soldier's body, support the firing elbow, or to meet other requirements for the firing position. When standing unsupported, the body is upright with the legs staggered and knees slightly bent. In the prone, the firer's legs may be spread apart flat on the ground or bent at the knee. In the sitting position, the legs may also serve an intricate part of the firing position.



## Chapter 6

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- **Stance/Center of Gravity.** The physical position of a Soldier before, during, and after the shot that relates to the firer's balance and posture. The position/center of gravity does not apply when firing from the prone position. The position/center of gravity specifically relates to the Soldier's ability to maintain the stable firing platform during firing, absorbing the recoil impulses, and the ability to aggressively lean toward the target area during the shot process.
- **Firing Elbow.** The placement of the firing elbow during the shot process. Proper elbow placement provides consistent firing hand grip while standing, sitting, or kneeling, and provides support stability in the prone position.
- **Nonfiring Elbow.** The Soldier's placement of the nonfiring elbow during the shot process supports the rifle in the all positions.
- **Firing Hand.** Proper placement of the firing hand will aid in trigger control. Place the pistol grip in the 'V' formed between the thumb and index finger. The pressure applied is similar to a firm handshake grip. Different Soldiers have different size hands and lengths of fingers, so there is no set position of the finger on the trigger. To grip the weapon, the Soldier places the back strap of the weapon's pistol grip high in the web of his firing side hand between his thumb and index (trigger) finger. The Soldier's trigger finger is indexed on the lower receiver, well outside the trigger guard and off the magazine release to prevent inadvertent release of the magazine. The firing hand thumb (or trigger finger for left-handed firers) is indexed on top of the safety selector switch. The Soldier grasps the pistol grip with his remaining three fingers ensuring there is no gap between his middle finger and the trigger guard.
- **Nonfiring Hand.** Proper placement of the non-firing hand is based on the firing position and placement of the non-firing elbow to provide the stability of the weapon. Placement is adjusted during supported and unsupported firing to maximize stability. The non-firing hand is placed as far forward as comfortable without compromising the other elements of the position or inducing extreme shooter-gun angle.
  - The nonfiring hand supports the weight of the rifle by grasping the fore arm. It should be a firm but relaxed grip. In all positions it should be as close to the handguard as naturally possible to aid in recoil management.
  - If possible, the firer should strive to have the thumb of the nonfiring hand provide downward force on the handguard. The pressure will provide the necessary force to assist in the management of the muzzle rise from recoil.
  - In all positions it should be as close to the end of the handguard as naturally possible to aid in recoil management.
  - Due to limited space on current MWS rails the above may not be possible but consideration should be given while mounting lasers to achieve an extended grip.
- **Butt Stock.** Correct placement of the butt stock in the firing shoulder will aid in achieving a solid stock weld. Side to side placement will vary



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**Stability**

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depending on equipment worn while firing. The butt stock is placed high enough in the shoulder to allow for an upright head position.

- The vertical placement of the butt stock will vary from firing position to firing position. A general guideline to follow is: the higher the position from the ground, the higher the butt stock will be in the shoulder.
- The term “butt stock” refers to both the butt stock (M16-series) and collapsible butt stock (M4-series) for clarity.
- **Stock Weld.** Stock weld is the placement of the firer’s head on the stock of the weapon. Correct stock weld is critical to sight alignment. The firer rests the full weight of the head on the stock. The head position is as upright as possible to give the best vision through the aiming device. It allows for scanning additional targets not seen through the aiming device.
  - When establishing the stock weld, bring the rifle up to your head, not your head down to the rifle. The firer’s head will remain in the same location on the stock while firing, but the location may change when positions are changed. The bony portion of the cheek placed on the stock is the basic starting point. Soldiers adapt to their facial structure to find the optimal placement that allows for both sight alignment and repetitive placement.
  - Figure 6-1 shows the differences in head placement, which effects sight alignment. The firer on the right is NOT resting the full weight of their head on the stock. The picture on the left shows the skin of the firer’s head being pushed down by the full weight of their head. This technique can be quickly observed and corrected by a peer coach.

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**Note.** Soldiers’ bodies vary with the amount of flesh and the bone structure of the face. Firers who apply downward force simply to achieve the appearance in the correct (left) image in figure 6-1, on page 6-4, will not have relaxation and will not have a repeatable placement. The goal is to have alignment with consistent placement.

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## Chapter 6

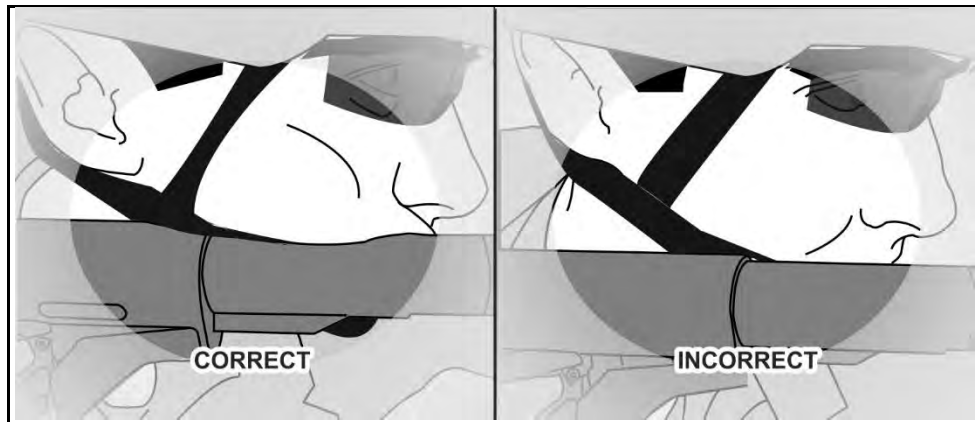


Figure 6-1. Stock weld

### MUSCLE RELAXATION

6-4. Muscle relaxation is the ability of the Soldier to maintain orientation of the weapon appropriately during the shot process while keeping the major muscle groups from straining to maintain the weapon system's position. Relaxed muscles contribute to stability provided by support.

- Strained or fatigued muscles detract from stability.
- As a rule, the more support from the shooter's bones the less he requires from his muscles.
- The more skeletal support, the more stable the position, as bones do not fatigue or strain.
- As a rule, the less muscle support required, the longer the shooter can stay in position.

### NATURAL POINT OF AIM

6-5. The natural point of aim is the point where the barrel naturally orients when the shooter's muscles are relaxed and support is achieved. The natural point of aim is built upon the following principles:

- The closer the natural point of aim is to the target, the less muscle support required.
- The more stable the position, the more resistant to recoil it is.
- More of the shooter's body on the ground equals a more stable position.
- More of the shooter's body on the ground equals less mobility for the shooter.

6-6. When a Soldier aims at a target, the lack of stability creates a wobble area, where the sights oscillate slightly around and through the point of aim. If the wobble area is larger than the target, the Soldier requires a steadier position or a refinement to their position to decrease the size of his wobble area before trigger squeeze.



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## Stability

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*Note.* The steadier the position, the smaller the wobble area. The smaller the wobble area, the more precise the shot.

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6-7. To check a shooter's natural point of aim, the Soldier should assume a good steady position and get to the natural pause. Close their eyes, go through one cycle, and then open their eyes on the natural pause. Where the sights are laying at this time, is the natural point of aim for that position. If it is not on their point of aim for their target, they should make small adjustments to their position to get the reticle or front sight post back on their point of aim. The Soldier will repeat this process until the natural point of aim is on the point of aim on their target.

## RECOIL MANAGEMENT

6-8. Recoil management is the result of a Soldier assuming and maintaining a stable firing position which mitigates the disturbance of one's sight picture during the cycle of function of the weapon.

6-9. The Soldier's firing position manages recoil using support of the weapon system, the weight of their body, and the placement of the weapon during the shot process. Proper recoil management allows the sights to rapidly return to the target and allows for faster follow up shots.

## SHOOTER-GUN ANGLE

6-10. The shooter gun-angle is the relationship between the shooters upper body and the direction of the weapon. This angle is typically different from firing position to firing position, and directly relates to the Soldier's ability to control recoil. Significant changes in the shooter-gun angle can result in eye relief and stock weld changes.

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*Note.* Units with a mix of left and right handed shooters can take advantage of each Soldiers' natural carry positions, and place left-handed shooters on the right flanks, and right-handed shooters on the left flanks, as their natural carry alignment places the muzzle away from the core element, and outward toward potential threats, and reduces the challenges of firing when moving laterally.

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## FIELD OF VIEW

6-11. The field of view is the extent that the human eye can see at any given moment. The field of view is based on the Soldier's view *without* using magnification, optics, or thermal devices. The field of view is what the Soldier sees, and includes the areas where the Soldier can detect potential threats.



## **Chapter 6**

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### **CARRY POSITIONS**

6-12. There are six primary carry positions. These positions may be directed by the leader, or assumed by the Soldier based on the tactical situation. The primary positions are—

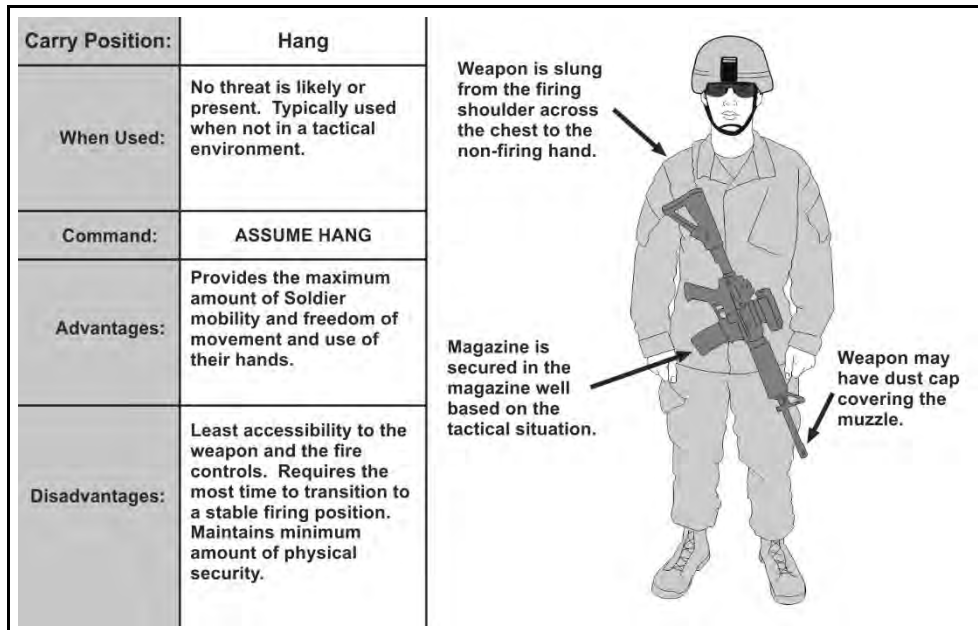
- Hang.
- Safe hang.
- Collapsed low ready.
- Low ready.
- High ready.
- Ready (or ready-up).



**Stability**

**HANG**

6-13. Soldiers use the hang when they need their hands for other tasks and no threat is present or likely (see figure 6-2). The weapon is slung and the safety is engaged. The hang carry should not be used when the weapon control status is RED. The reduced security of the weapon may cause the mechanical safety select lever to unintentionally move to SEMI or BURST/AUTO.



**Figure 6-2. Hang carry example**



## Chapter 6

### SAFE HANG

6-14. The safe hang is used when no immediate threat is present and the hands are not necessary (see figure 6-3). In the safe hang carry, the weapon is slung, the safety is engaged, and the Soldier has gripped the rifle's pistol grip. The Soldier sustains Rule 3, keeping the finger off the trigger until ready to engage when transitioning to the ready or ready up position.

6-15. In this position, the Soldier can move in any direction while simultaneously maintaining his muzzle oriented at the ground by using his firing hand. This carry provides control of the weapon, flexibility in movement, and positive control of the weapon's fire controls.

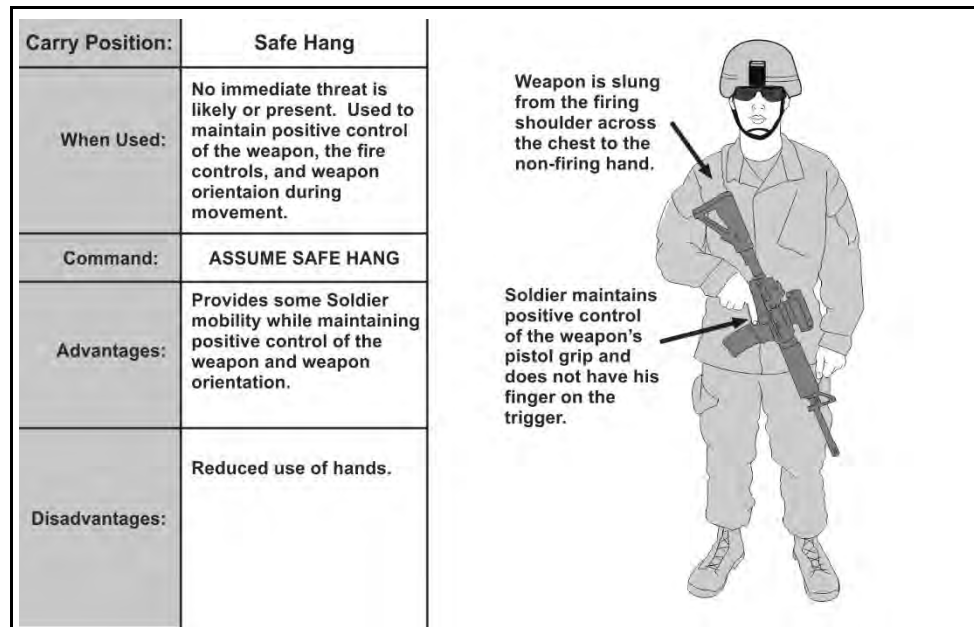


Figure 6-3. Safe hang example

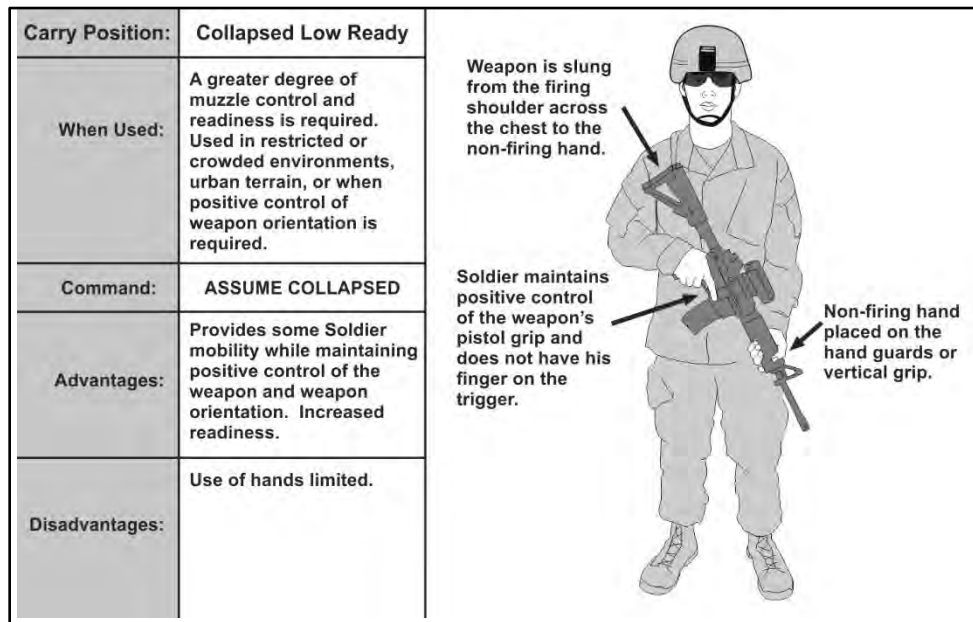


**Stability**

**COLLAPSED LOW READY**

6-16. The collapsed low ready is used when a greater degree of muzzle control and readiness to respond to threats or weapon retention is necessary (such as crowded environments). In the collapsed low ready, the firing hand is secure on the weapon's pistol grip. The non-firing hand is placed on the hand guards or vertical foregrip (see figure 6-4).

6-17. This carry allows a Soldier to navigate crowded or restrictive environments while simultaneously minimizing or eliminating his muzzle covering (flagging) by maintaining positive control of the muzzle orientation.



**Figure 6-4. Collapsed low ready example**



## Chapter 6

### LOW READY

6-18. The low ready provides the highest level of readiness and with the maximum amount of observable area for target acquisition purposes

6-19. In the low ready position, the weapon is slung, the butt stock is in the Soldier's shoulder, and the muzzle is angled down at a 30- to 45-degree angle and oriented towards the Soldier's sector of fire.

6-20. Firing hand is positioned on the pistol grip with the index finger straight and out of the trigger guard. The thumb is placed on the selector lever with the lever placed on safe. From this carry, the Soldier is ready to engage threats within a very short amount of time with minimal movement. (See figure 6-5).

6-21. Observation is maintained to the sector of fire. The Soldier looks over the top of his optics or sights to maintain situation awareness of his sector. The Soldier's head remains upright.

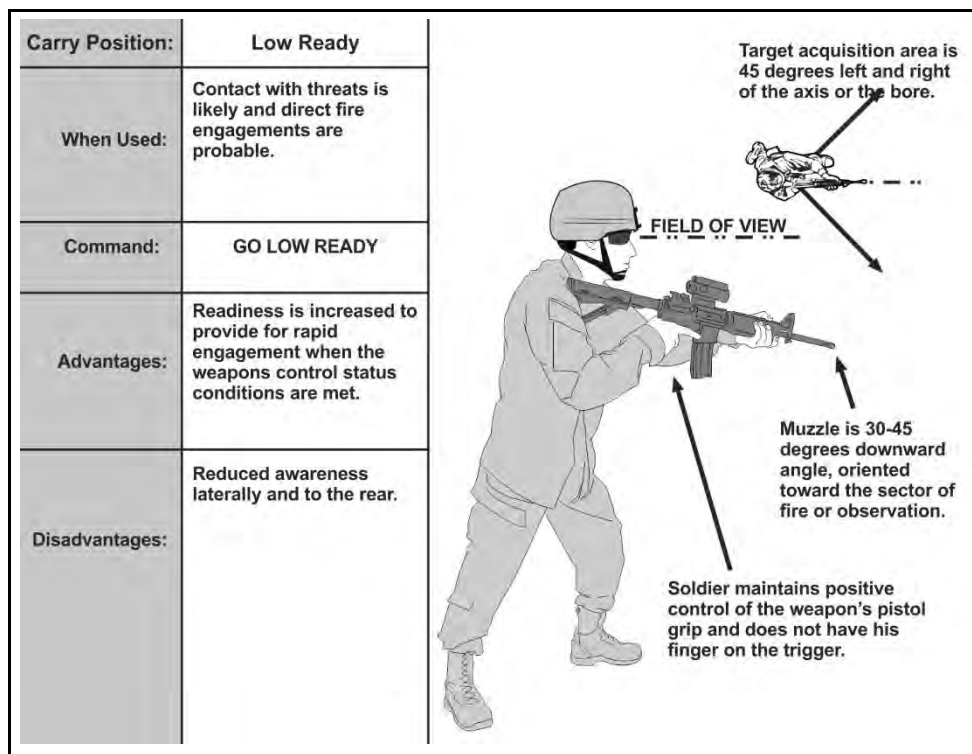


Figure 6-5. Low ready position



**Stability**

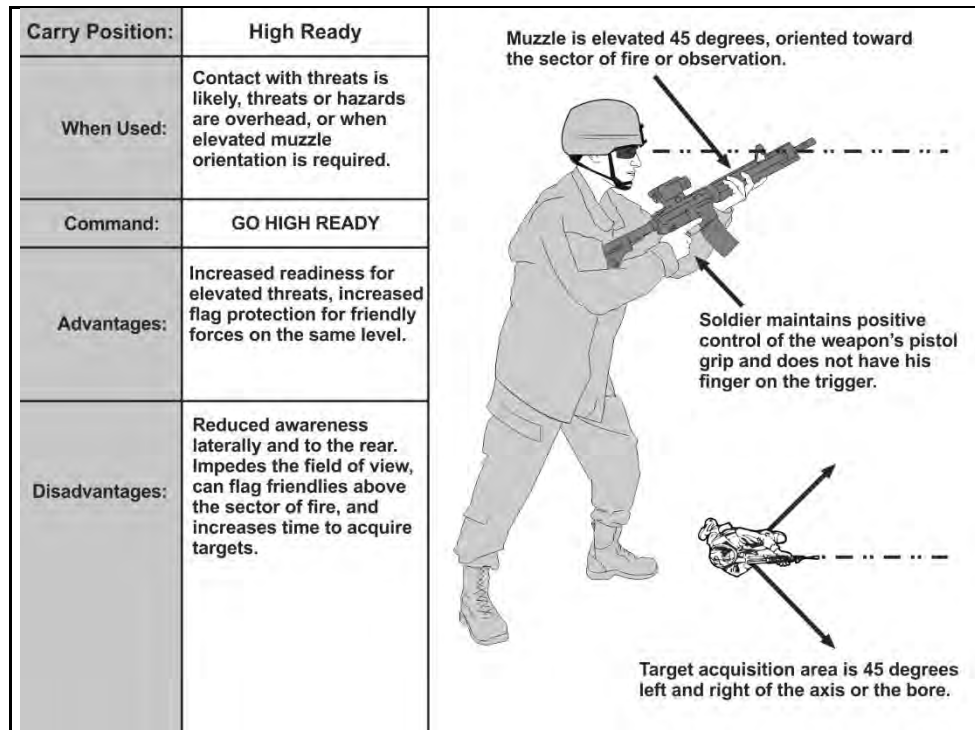
**HIGH READY**

6-22. The high ready is used when the Soldier's sector of fire includes areas overhead or when an elevated muzzle orientation is appropriate for safety (see figure 6-6). The high ready carry is used when contact is likely.

6-23. In the high ready, the weapon is slung, butt stock is in the armpit, the muzzle angled up to at least a 45-degree angle and oriented toward the Soldier's sector of fire—ensuring no other Soldiers are flagged.

6-24. The firing hand remains in the same position as the low ready. The non-firing side hand can be free as the weapon is supported by the firing side hand and armpit.

6-25. This position is not as effective as the low ready for several reasons: it impedes the field of view, flags friendlies above the sector of fire, and typically takes longer to acquire the target.



**Figure 6-6. High ready position**



## Chapter 6

### READY OR READY-UP

6-26. The ready is used when enemy contact is imminent (see figure 6-7). This carry is used when the Soldier is preparing or prepared to engage a threat.

6-27. In the ready, the weapon is slung, the toe of the butt stock is in the Soldier's shoulder, and muzzle is oriented toward a threat or most likely direction of enemy contact. The Soldier is looking through his optics or sights. His non-firing side hand remains on the hand guards or the vertical foregrip.

6-28. The firing hand remains on the pistol grip with the firing finger off the trigger until the decision to engage a target is made.

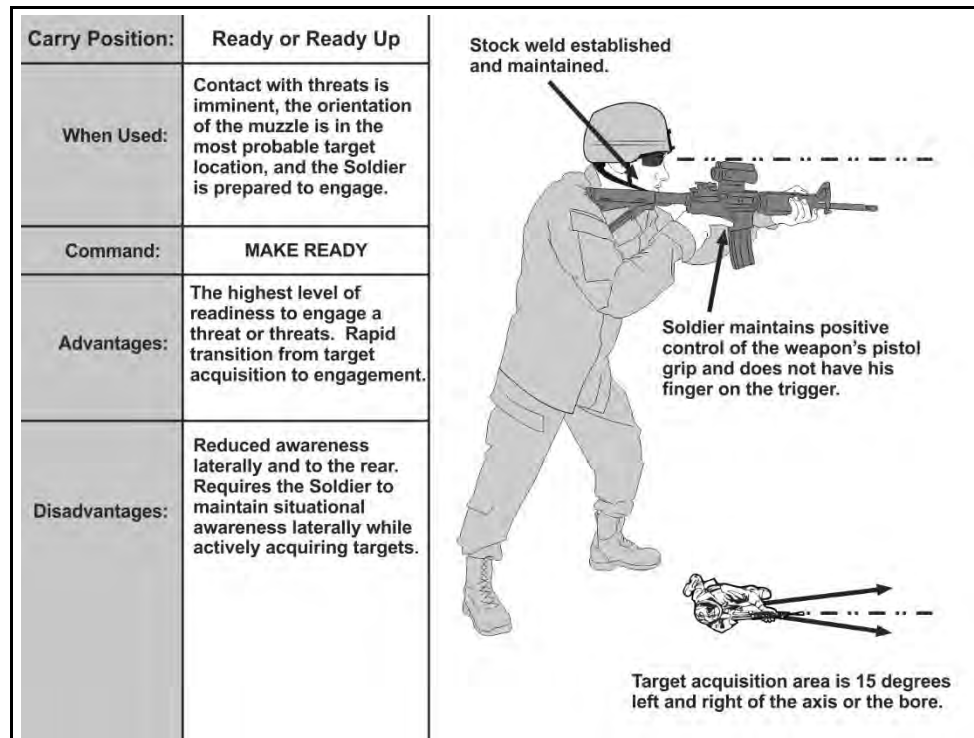


Figure 6-7. Ready position or up position



**Stability**

## **STABILIZED FIRING**

6-29. The Soldier must stabilize their weapon, whether firing from a stationary position or while on the move. To create a stabilized platform, Soldiers must understand the physical relationship between the weapon system, the shooter's body, the ground, and any other objects touching the weapon or shooter's body. The more contact the shooter has to the ground will determine how stable and effective the position is. The situation and tactics will determine the actual position used.

6-30. When a shooter assumes a stable firing position, movement from muscle tension, breathing, and other natural activities within the body will be transferred to the weapon and must be compensated for by the shooter.

6-31. Failing to create an effective platform to fire from is termed a ***stabilization failure***. A stabilization failure occurs when a Soldier fails to:

- Control the movement of the barrel during the arc of movement
- Adequately support the weapon system
- Achieve their natural point of aim.

6-32. These failures compound the firing occasion's errors, which directly correlate to the accuracy of the shot taken. To maximize the Soldier's stability during the shot process, they correctly assume various firing positions when stationary, or offset the induced errors with other firing skills during tactical movement.

6-33. As a rule, positions that are lower to the ground provide a higher level of stability. When the center of gravity elevates the level of stability decreases as shown in figure°6-8.



Chapter 6

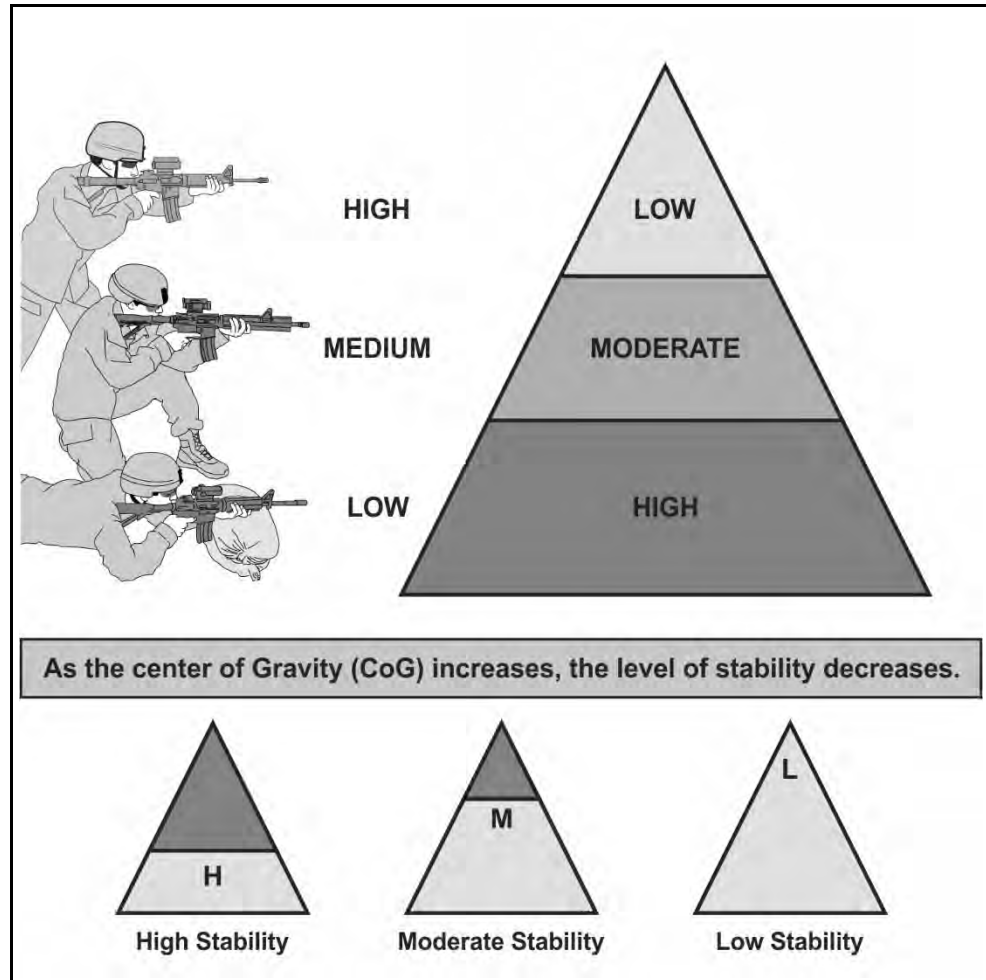


Figure 6-8. Firing position stability example



## FIRING POSITIONS

6-34. The nature of combat will not always allow time for a Soldier to get into a particular position. Soldiers need to practice firing in a variety of positions, including appropriate variations. There are 12 firing positions with variations that are common to all Soldiers. The positions are listed highest to lowest. The primary position is listed in bold, with the position variations in italics:

- **Standing** –
  - *Standing, unsupported.*
  - *Standing, supported.*
- **Squatting** – This position allows for rapid engagement of targets when an obstruction blocks the firer from using standard positions. It provides the firer a fairly well supported position by simply squatting down to engage, then returning to a standing position once the engagement is complete. The squatting position is generally unsupported.
- **Kneeling** – The kneeling position is very common and useful in most combat situations. The kneeling position can be supported or unsupported.
  - *Kneeling, unsupported.*
  - *Kneeling, supported.*
- **Sitting** – There are three types of sitting positions: crossed-ankle, crossed-leg, and open-leg. All positions are easy to assume, present a medium silhouette, provide some body contact with the ground, and form a stable firing position. These positions allow easy access to the sights for zeroing.
  - *Sitting, crossed ankle.*
  - *Sitting, crossed leg.*
  - *Sitting, open leg.*
- **Prone** – The prone position is the most stable firing position due to the amount of the Soldier's body is in contact with the ground. The majority of the firer's frame is behind the rifle to assist with recoil management.
  - *Prone, unsupported.*
  - *Prone, supported.*
  - *Prone, roll-over.*
  - *Prone, reverse roll-over.*

6-35. Soldiers must practice the positions dry frequently to establish their natural point of aim for each position, and develop an understanding of the restrictive nature of their equipment during execution. With each dry repetition, the Soldier's ability to change positions rapidly and correctly are developed, translating into efficient movement and consistent stable firing positions.

6-36. Each of these firing positions is described using in a standard format using the terms defined earlier.



## Chapter 6

### STANDING, UNSUPPORTED

6-37. This position should be used for closer targets or when time is not available to assume a steadier position such as short range employment. The upper body should be leaned slightly forward to aid in recoil management. The key focus areas for the standing supported position are applied as described in figure 6-9 below:

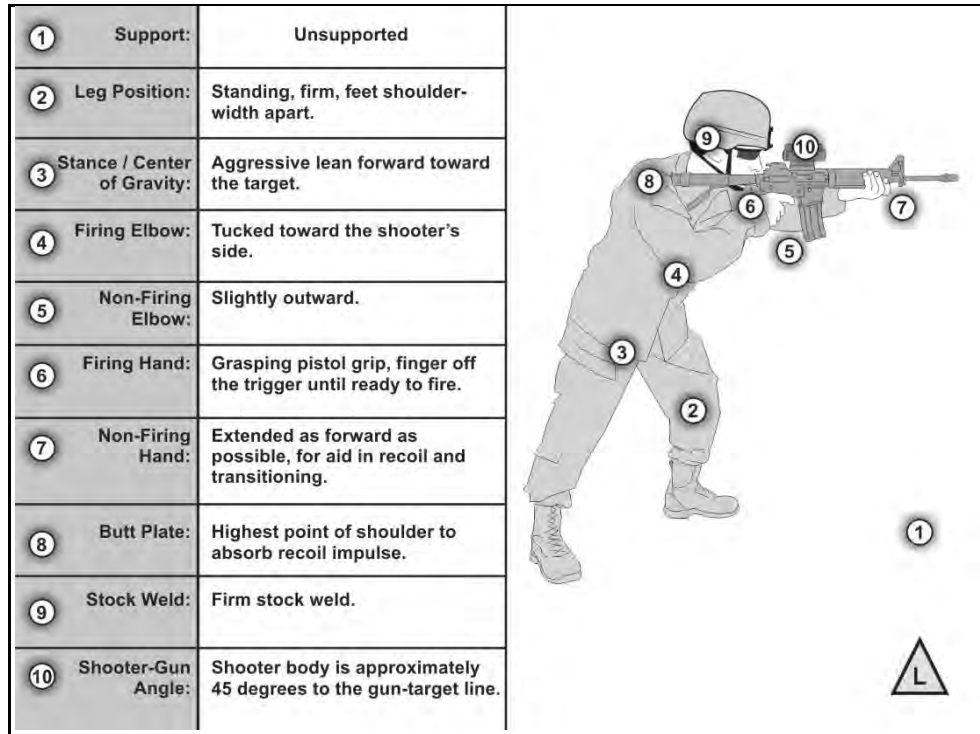


Figure 6-9. Standing, unsupported example

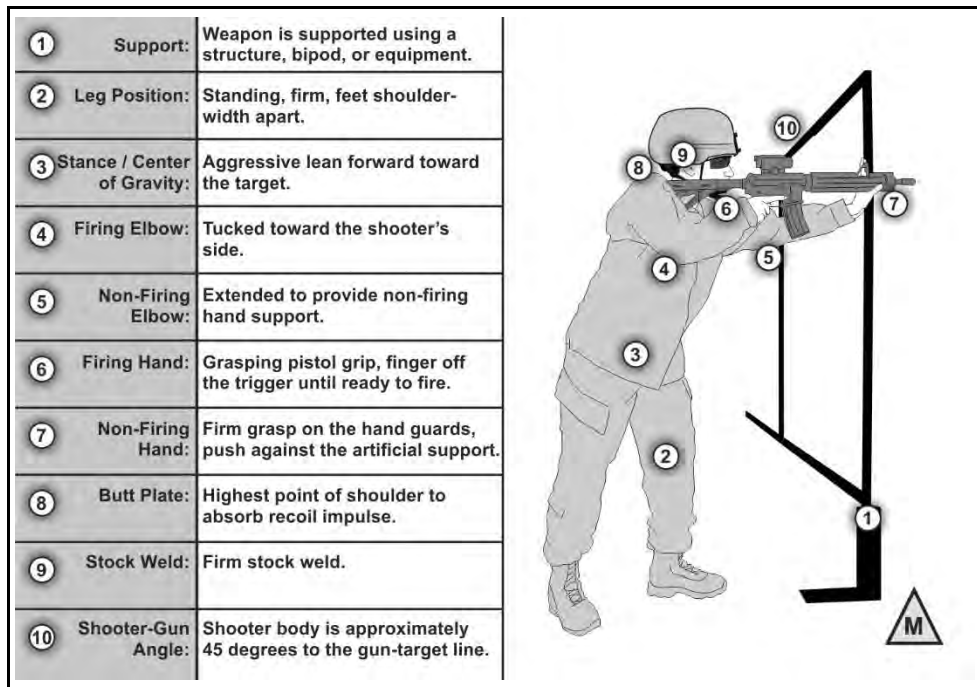


**Stability**

**STANDING, SUPPORTED**

6-38. Soldier should ensure it is the handguard of the weapon NOT the barrel that is in contact with the artificial support. Barrels being in direct contact with artificial support will result in erratic shots. The standing supported position uses artificial support to steady the position (see figure 6-10.) Forward pressure should be applied by the rear leg and upper body to aid in recoil management. The key focus area for the standing supported position are applied in the following ways:

**Nonfiring hand.** The nonfiring hand will hold the hand guards firmly and push against the artificial support. Hand positioning will vary depending on the type of support used.



**Figure 6-10. Standing, supported example**



## Chapter 6

### SQUATTING

6-39. This position allows for rapid engagement of targets when an obstruction blocks the firer from using standard positions. It allows the firer a fairly stable position by simply squatting down to engage, then returning to a standing position after completing the engagement (see figure 6-11.)

6-40. Perform the following to assume a good squatting firing position:

- Face the target.
- Place the feet shoulder-width apart.
- Squat down as far as possible.
- Place the back of triceps on the knees ensuring there is no bone on bone contact.
- Place the firing hand on the pistol grip and the nonfiring hand on the upper hand guards.
- Place the weapon's butt stock high in the firer's shoulder pocket.

*Note.* The firer may opt to use pressure from firing hand to rotate weapon to place the magazine against the opposite forearm to aid in stabilization.

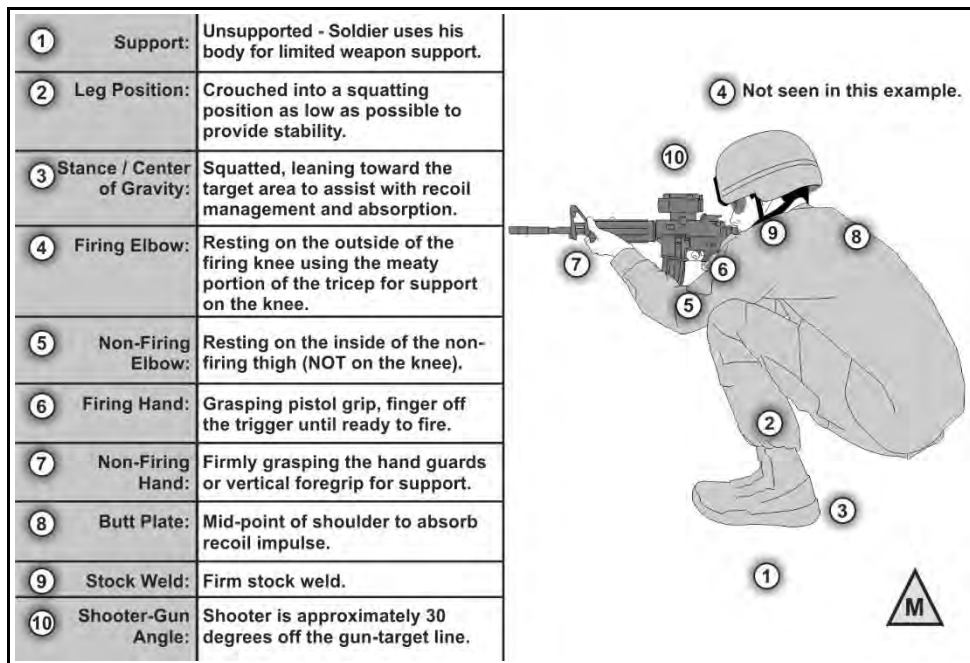


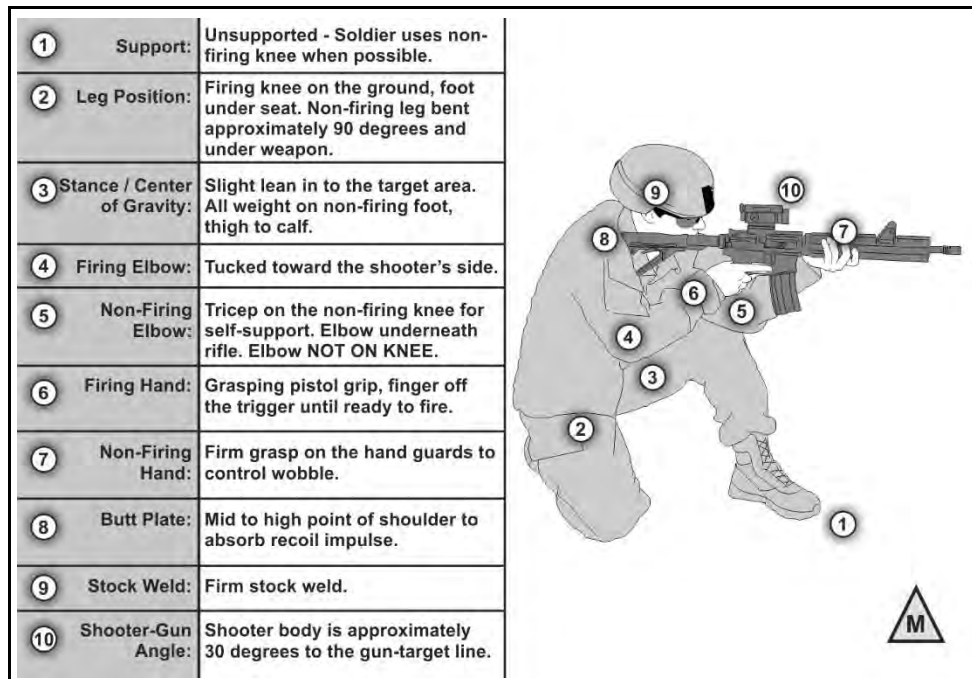
Figure 6-11. Squatting position



**Stability****KNEELING, UNSUPPORTED**

6-41. The kneeling unsupported position does not use artificial support. Figure 6-12 shows the optimum unsupported kneeling position. The firer should be leaning slightly forward into the position to allow for recoil management and quicker follow-up shots. The primary goal of this firing position is to establish the smallest wobble area possible. Key focus areas for kneeling, unsupported are:

- **Nonfiring elbow.** Place the non-firing elbow directly underneath the rifle as much as possible. The elbow should be placed either in front of or behind the kneecap. Placing the elbow directly on the kneecap will cause it to roll and increases the wobble area.
- **Leg position.** The non-firing leg should be bent approximately 90 degrees at the knee and be directly under the rifle. The firing-side leg should be perpendicular to the nonfiring leg. The firer may rest their body weight on the heel. Some firers lack the flexibility to do this and may have a gap between their buttocks and the heel.
- **Aggressive (stretch) kneeling.** All weight on non-firing foot, thigh to calf, upper body leaning forward, nonfiring triceps on non-firing knee, firing leg stretched behind for support. Highly effective for rapid fire and movement.



**Figure 6-12. Kneeling, unsupported example**



## Chapter 6

### KNEELING, SUPPORTED

6-42. The kneeling supported position uses artificial support to steady the position (see figure 6-13). Contact by the nonfiring hand and elbow with the artificial support is the primary difference between the kneeling supported and unsupported positions since it assists in the stability of the weapon. Body contact is good, but the barrel of the rifle must not touch the artificial support. Forward pressure is applied to aid in recoil management. The key focus areas for the kneeling supported position are applied in the following ways:

- **Nonfiring hand.** The nonfiring hand will hold the hand guards firmly and will also be pushed against the artificial support. Hand positioning will vary depending on the type of support used.
- **Nonfiring elbow.** The nonfiring elbow and forearm may be used to assist with the weapon's stability by pushing against the artificial support. The contact of the nonfiring elbow and forearm with the structure will vary depending on the support used and the angle to the target.

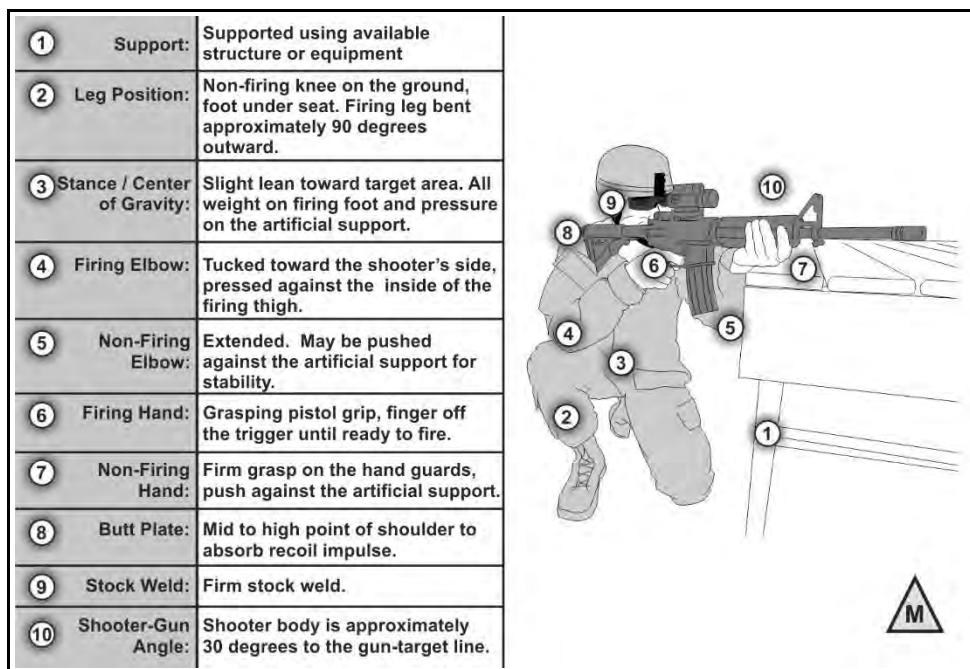


Figure 6-13. Kneeling, supported example

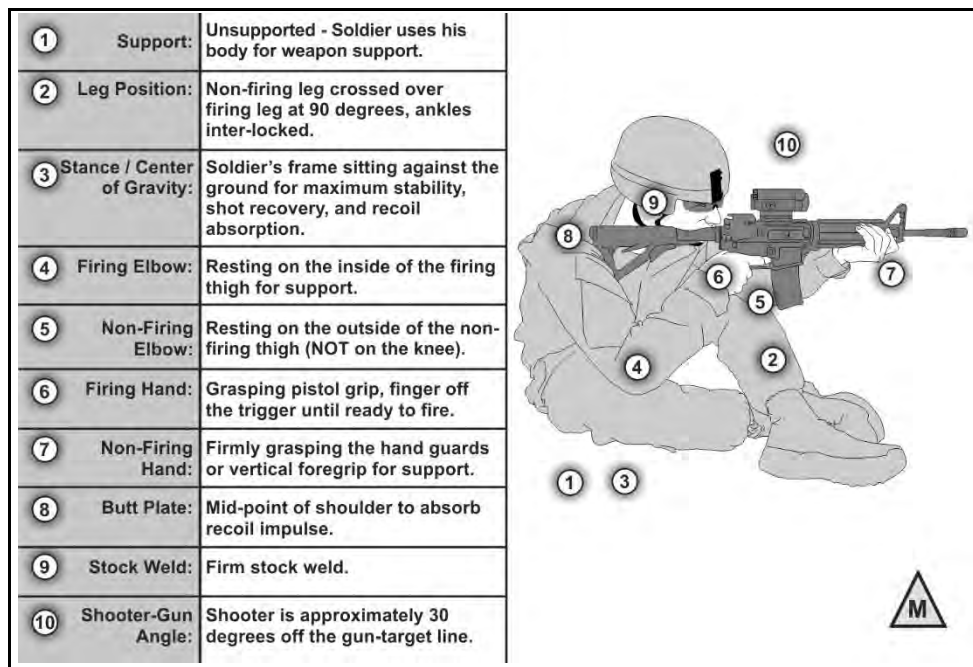


**Stability**

**SITTING, CROSSED-ANKLE**

6-43. The sitting, crossed-ankle position provides a broad base of support and places most of the body weight behind the weapon (see figure 6-14). This allows quick shot recovery and recoil impulse absorption. Perform the following to assume a good crossed-ankle position:

- Face the target at a 10- to 30-degree angle.
- Place the nonfiring hand under the hand guard.
- Bend at knees and break fall with the firing hand.
- Push backward with feet to extend legs and place the buttocks to ground.
- Cross the non-firing ankle over the firing ankle.
- Bend forward at the waist.
- Place the non-firing elbow on the nonfiring leg below knee.
- Grasp the rifle butt with the firing hand and place into the firing shoulder pocket.
- Grasp the pistol grip with the firing hand.
- Lower the firing elbow to the inside of the firing knee.
- Place the cheek firmly against the stock to obtain a firm stock weld.
- Move the nonfiring hand to a location under the hand guard that provides the maximum bone support and stability for the weapon.



**Figure 6-14. Sitting position—crossed ankle**



## Chapter 6

### SITTING, CROSSED-LEG

6-44. The crossed-leg sitting position provides a base of support and places most of the body weight behind the weapon for quick shot recovery (see figure 6-15). Soldiers may experience a strong pulse beat in this position due to restricted blood flow in the legs and abdomen. An increased pulse causes a larger wobble area.

6-45. Perform the following to assume a good crossed-leg position:

- Place the nonfiring hand under the hand guard.
- Cross the nonfiring leg over the firing leg.
- Bend at the knees and break the fall with the firing hand.
- Place the buttocks to the ground close to the crossed legs.
- Bend forward at the waist.
- Place the nonfiring elbow on the nonfiring leg at the bend of the knee.
- Establish solid butt stock position in the firing shoulder pocket.
- Grasp the pistol grip with the firing hand.
- Lower the firing elbow to the inside of the firing knee.
- Place the cheek firmly against the stock to obtain a firm stock weld.
- Place the non-firing hand under the hand guard to provide support.

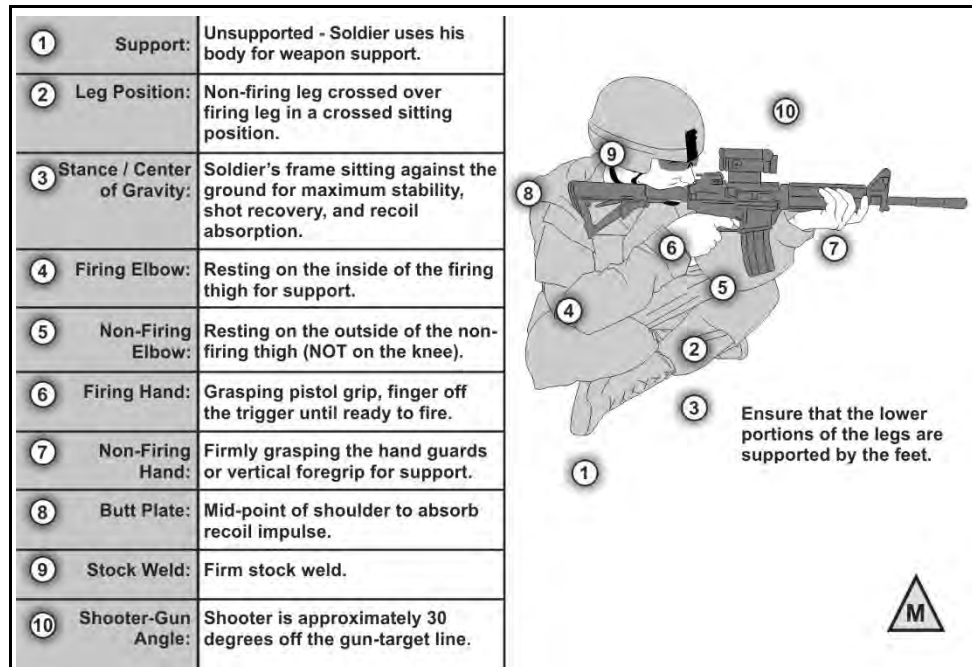


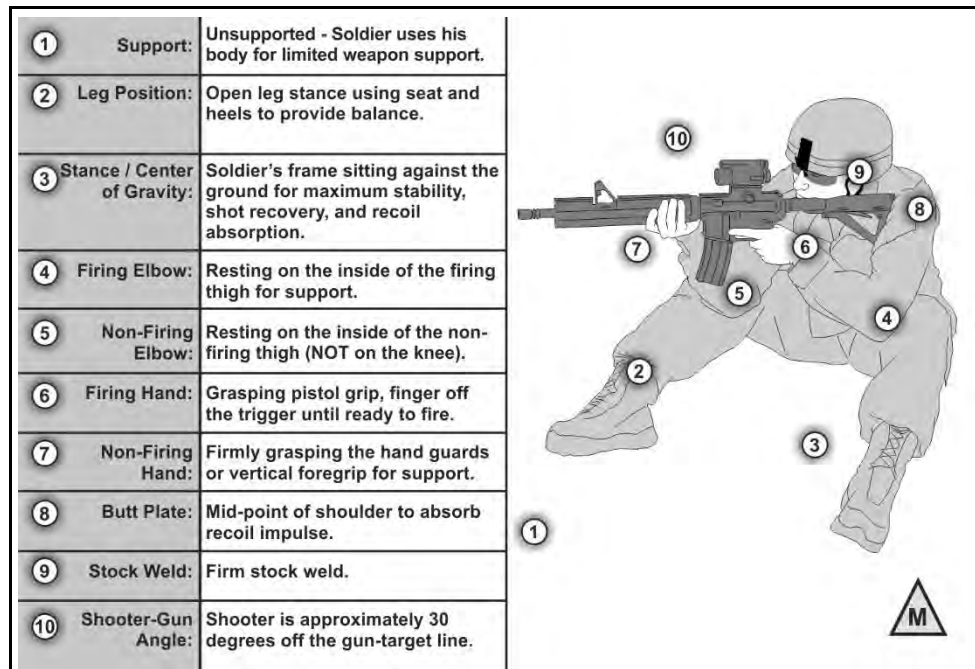
Figure 6-15. Sitting position—crossed-leg



**Stability****SITTING, OPEN-LEG**

6-46. The open-leg sitting position is the preferred sitting position when shooting with combat equipment (see figure 6-16). It places less of the body weight behind the weapon than the other sitting positions. Perform the following to assume a good open-leg position:

- Face the target at a 10 to 30 degree angle to the firing of the line of fire.
- Place the feet approximately shoulder width apart.
- Place the nonfiring hand under the hand guard.
- Bend at the knees while breaking the fall with the firing hand. Push backward with the feet to extend the legs and place the buttocks on ground.
- Place the both the firing and non-firing elbow inside the knees.
- Grasp the rifle butt with the firing hand and place into the firing shoulder pocket.
- Grasp the pistol grip with the firing hand.
- Lower the firing elbow to the inside of the firing knee.
- Place the cheek firmly against the stock to obtain a firm stock weld.
- Move nonfiring hand to a location under the hand guard that provides maximum bone support and stability for the weapon.



**Figure 6-16. Sitting position—open leg**

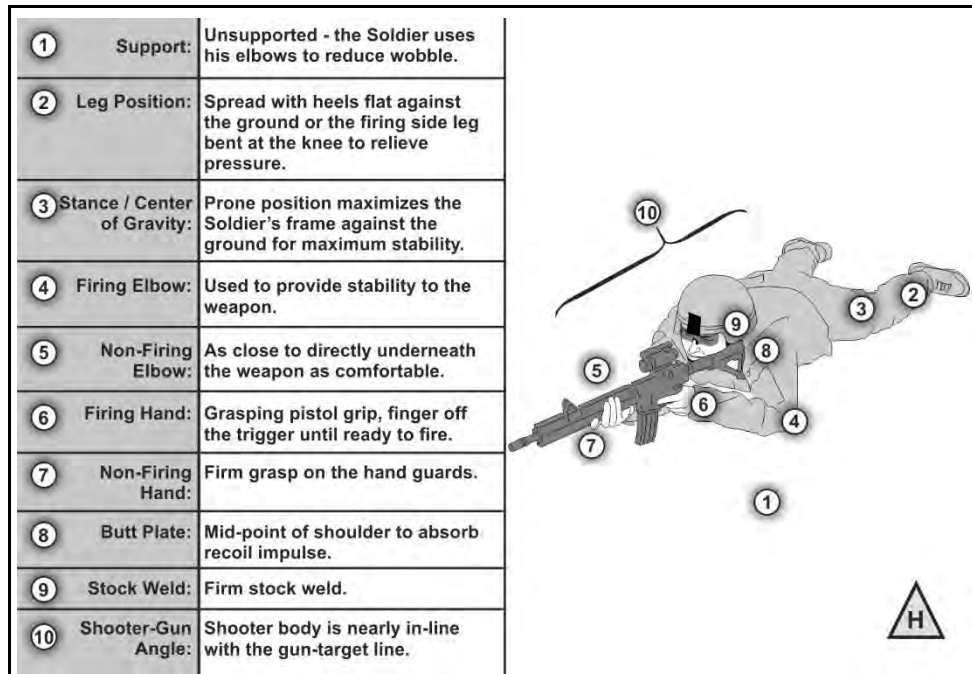


## Chapter 6

### PRONE, UNSUPPORTED

6-47. The prone unsupported position is not as stable as the prone supported position (see figure 6-17). Soldiers must build a stable, consistent position that focuses on the following key areas:

- **Firing hand.** The firer should have a firm handshake grip on the pistol grip and place their finger on the trigger where it naturally falls.
- **Nonfiring hand.** The nonfiring hand is placed to control the weapon and is comfortable.
- **Leg position.** The firer's legs may be either spread with heels as flat as possible on ground or the firing side leg may be bent at the knee to relieve pressure on the stomach.



**Figure 6-17. Prone, unsupported example**

**Note.** The magazine can be rested on the ground while using the prone unsupported position. Firing with the magazine on the ground will NOT induce a malfunction.

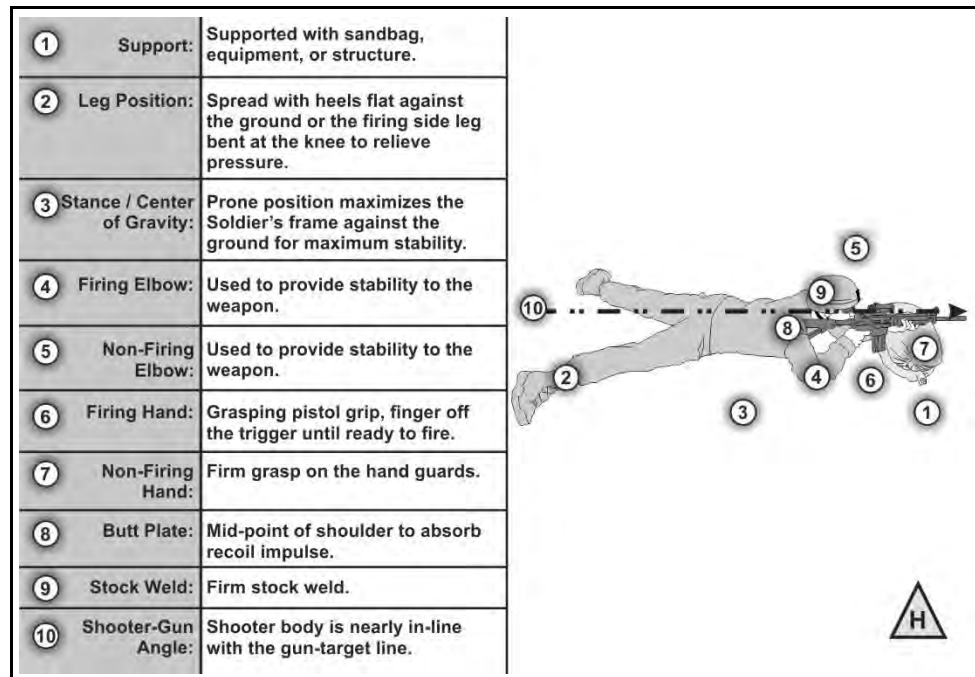


**Stability**

**PRONE, SUPPORTED**

6-48. The prone supported position allows for the use of support, such as sandbags (see figure 6-18). Soldiers must build a stable, consistent position that focuses on the following key areas:

- **Firing hand.** The firer should have a firm handshake grip on the pistol grip and place their finger on the trigger where it naturally falls.
- **Nonfiring hand.** The nonfiring hand is placed to maximize control the weapon and where it is comfortable on the artificial support.
- **Leg position.** The firer's legs may be either spread with heels as flat as possible on ground or the firing side leg may be bent at the knee to relieve pressure on the stomach.
- **Artificial support.** The artificial support should be at a height that allows for stability without interfering with the other elements of the position.



**Figure 6-18. Prone, supported example**



## Chapter 6

### PRONE, ROLL-OVER

6-49. This position allows the firer to shoot under obstacles or cover that would not normally be attainable from the standard conventional prone position (see figure 6-19). With this position, the bullet trajectory will be off compared to the line of sight and increase with distance from the firer.

For example, in the figure below the sights are rotated to the right. The trajectory of the bullet will be lower than and to the right of point of aim. This error will increase with range.

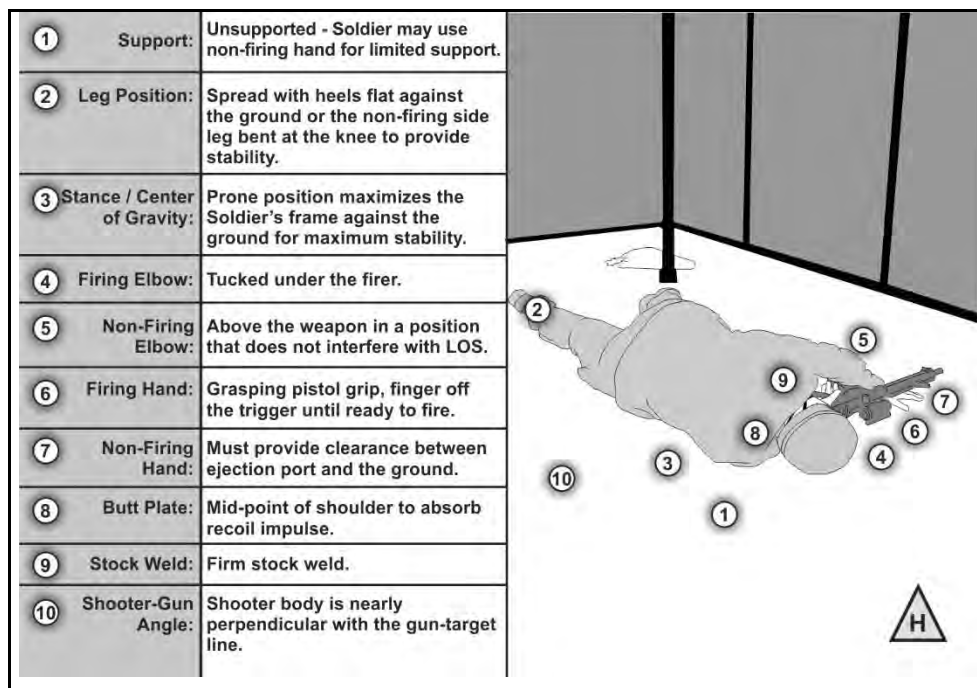


Figure 6-19. Prone, roll-over example

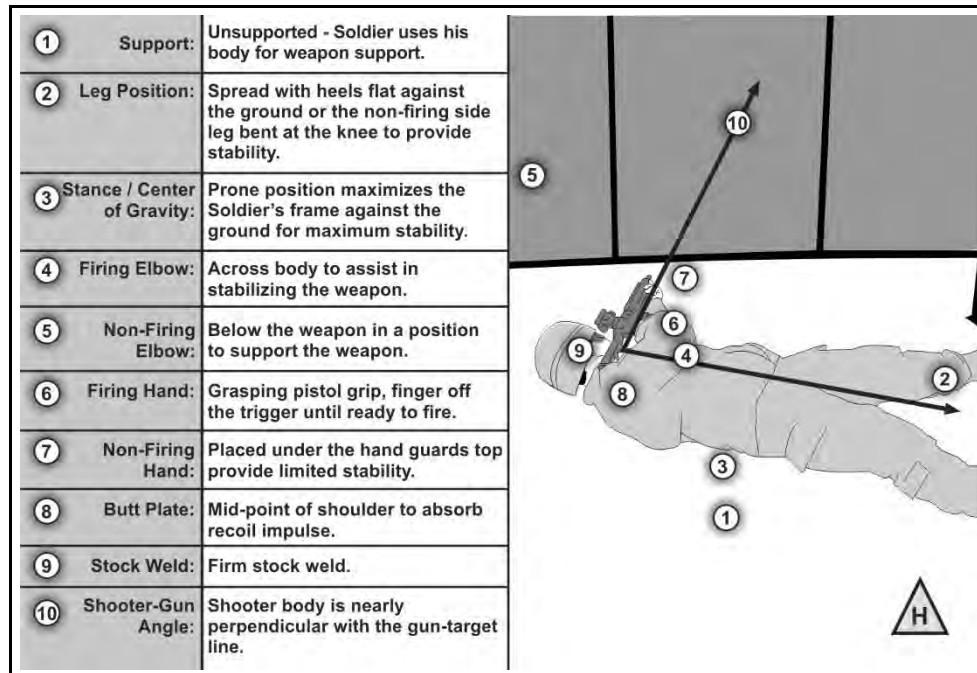


**Stability**

**PRONE, REVERSE ROLL-OVER**

6-50. This position is primarily used when the firer needs to keep behind cover that is too low to use while in a traditional prone position (see figure 6-20). The bullet's trajectory will be off considerably at long distances while in this position.

6-51. This position is the most effective way to support the weapon when the traditional prone is too low to be effective and where a kneeling position is too high to gain cover or a solid base for support.



**Figure 6-20. Reverse roll-over prone firing position**



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## Chapter 7

# Aim

The functional element aim of the shot process is the continuous process of orienting the weapon correctly, aligning the sights, aligning on the target, and the application of the appropriate lead and elevation during a target engagement. Aiming is a continuous process conducted through pre-shot, shot, and post-shot, to effectively apply lethal fires in a responsible manner with accuracy and precision.

Aiming is the application of perfectly aligned sights on a specific part of a target. Sight alignment is the first and most important part of this process.

## COMMON ENGAGEMENTS

7-1. The aiming process for engaging stationary targets consist of the following Soldier actions, regardless of the optic, sight, or magnification used by the aiming device:

- **Weapon orientation** – the direction of the weapon as it is held in a stabilized manner.
- **Sight alignment** – the physical alignment of the aiming device:
  - Iron sight/back-up iron sight and the front sight post.
  - Optic reticle.
  - Ballistic reticle (day or thermal).
- **Sight picture** – the target as viewed through the line of sight.
- **Point of aim (POA)** – the specific location where the line of sight intersects the target.
- **Desired point of impact (POI)**–the desired location of the strike of the round to achieve the desired outcome (incapacitation or lethal strike).

7-2. The aim of the weapon is typically applied to the largest, most lethal area of any target presented. Sights can be placed on target by using battlesight zero (BZ), **center of visible mass (CoVM)**. The center of visible mass is the initial point of aim on a target of what can be seen by the Soldier. It does not include what the target size is expected or anticipated to be. For example, a target located behind a car exposes its head. The center of visible mass is in the center of the head, not the estimated location of the center of the overall target behind the car.



## Chapter 7

### WEAPON ORIENTATION

7-3. The Soldier orients the weapon in the direction of the detected threat. Weapon orientation includes both the horizontal plane (azimuth) and the vertical plane (elevation). Weapon orientation is complete once the sight and threat are in the Soldier's field of view.

- **Horizontal weapons orientation** covers the frontal arc of the Soldier, spanning the area from the left shoulder, across the Soldier's front, to the area across the right shoulder (see figure 7-1).

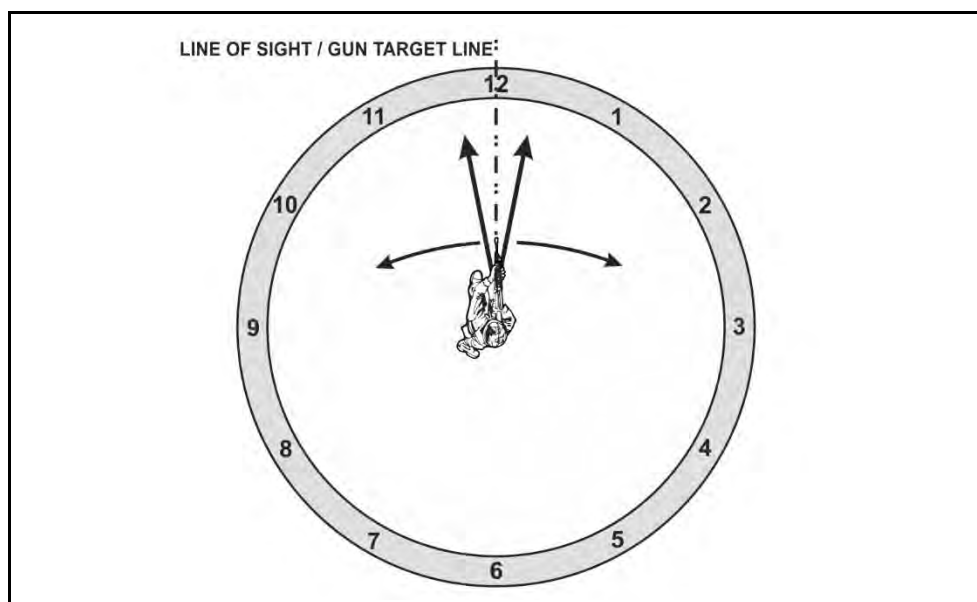
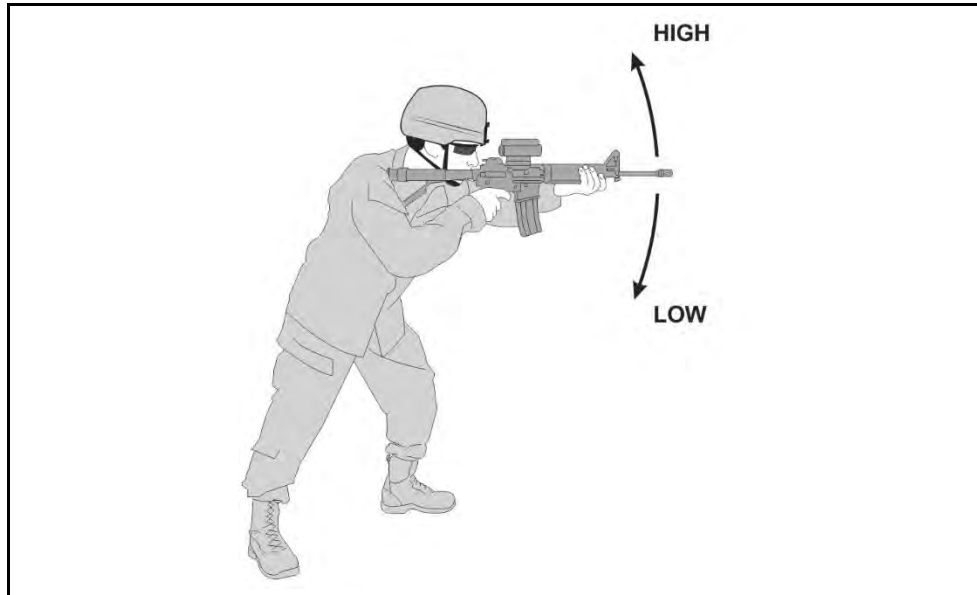


Figure 7-1. Horizontal weapon orientation example



## Aim

- **Vertical weapons orientation** includes all the aspects of orienting the weapon at a potential or confirmed threat in elevation. This is most commonly applied in restricted, mountainous, or urban terrain where threats present themselves in elevated or depressed firing positions (see figure 7-2).



**Figure 7-2. Vertical weapons orientation example**

## SIGHT ALIGNMENT

7-4. Sight alignment is the relationship between the aiming device and the firer's eye. The process used by a Soldier depends on the aiming device employed with the weapon.

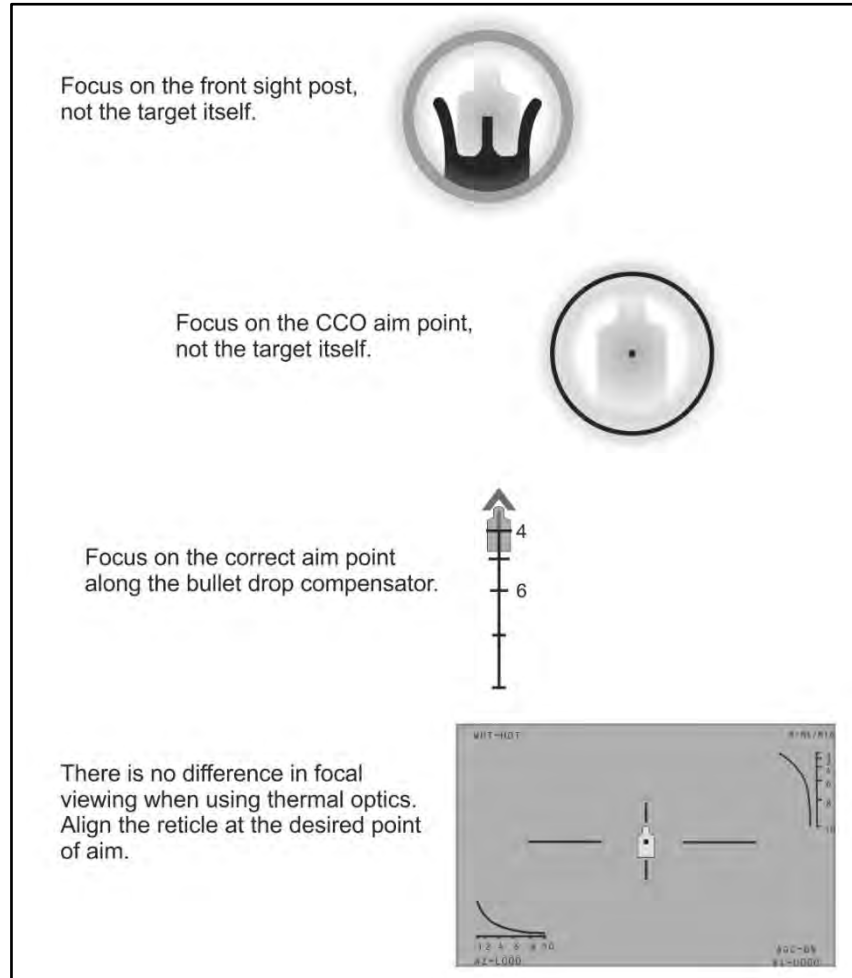
- **Iron sight** – the relationship between the front sight post, rear sight aperture, and the firer's eye. The firer aligns the tip of the front sight post in the center of the rear aperture and his/or her eye. The firer will maintain focus on the front sight post, simultaneously centering it in the rear aperture.
- **Optics** – the relationship between the reticle and the firer's eye and includes the appropriate eye relief, or distance of the Soldier's eye from the optic itself. Ensure the red dot is visible in the CCO, or a full centered field of view is achieved with no shadow on magnified optics
- **Thermal** – the relationship between the firer's eye, the eyepiece, and the reticle.
- **Pointers / Illuminators / Lasers** – the relationship between the firer's eye, the night vision device placement and focus, and the laser aiming point on the target.



## Chapter 7

**Note.** Small changes matter - 1/1000 of an inch deviation at the weapon can result in up to an 18 inch deviation at 300 meters.

7-5. The human eye can only focus clearly on one object at a time. To achieve proper and effective aim, the focus of the firer's eye needs to be on the front sight post or reticle (see figure 7-3). This provides the most accurate sight alignment for the shot process.



**Figure 7-3. Front sight post/reticle aim focus**

7-6. Firers achieve consistent sight alignment by resting the full weight of their head on the stock in a manner that allows their dominant eye to look through the center of the aiming or sighting device. If the firer's head placement is subjected to change during the firing process or between shots, the Soldier will experience difficulty achieving accurate shot groups.



## SIGHT PICTURE

7-7. The sight picture is the placement of the aligned sights on the target itself. The Soldier must maintain sight alignment throughout the positioning of the sights. This is not the same as sight alignment.

7-8. There are two sight pictures used during the shot process; pre-shot and post-shot. Soldiers must remember the sight pictures of the shot to complete the overall shot process.

- Pre-shot sight picture – encompasses the original point of aim, sight picture, and any holds for target or environmental conditions.
- Post-shot sight picture – is what the Soldier must use as the point of reference for any sight adjustments for any subsequent shot.

## POINT OF AIM

7-9. The point on the target that is the continuation of the line created by sight alignment. The point of aim is a point of reference used to calculate any hold the Soldier deems necessary to achieve the desired results of the round's impact.

7-10. For engagements against stationary targets, under 300 meters, with negligible wind, and a weapon that has a 200 meter or 300 meter confirmed zero, the point of aim should be the center of visible mass of the target. The point of aim does not include ANY hold-off or lead changes necessary.

## DESIRED POINT OF IMPACT

7-11. The desired point of impact is the location where the Soldier wants the projectile to strike the target. Typically, this is the center of visible mass. At any range different from the weapon's zero distance, the Soldier's desired point of impact and their point of aim will not align. This requires the Soldier to determine the necessary hold-off to achieve the desired point of impact.

## COMMON AIMING ERRORS

7-12. Orienting and aiming a weapon correctly is a practiced skill. Through drills and repetitions, Soldiers build the ability to repeat proper weapons orientation, sight alignment, and sight picture as a function of muscle memory.

7-13. The most common aiming errors include:

- **Non-dominant eye use** – The Soldier gets the greatest amount of visual input from their dominant eye. Eye dominance varies Soldier to Soldier. Some Soldier's dominant eye will be the opposite of the dominant hand. For example, a Soldier who writes with his right hand and learns to shoot rifles right handed might learn that his dominant eye is the left eye. This is called cross-dominant. Soldiers with strong cross-dominant eyes should consider firing using their dominant eye side while firing from their non-dominant hand side. Soldiers can be trained to fire from either side of the weapon, but may not be able to shoot effectively using their nondominant eye.



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- **Incorrect zero** – regardless of how well a Soldier aims, if the zero is incorrect, the round will not travel to the desired point of impact without adjustment with subsequent rounds (see appendix C of this publication).
- **Light conditions** – limited visibility conditions contribute to errors aligning the sight, selecting the correct point of aim, or determining the appropriate hold. Soldiers may offset the effects of low light engagements with image intensifier (I2) optics, use of thermal optics, or the use of laser pointing devices with I2 optics.
- **Battlefield obscurants** – smoke, debris, and haze are common conditions on the battlefield that will disrupt the Soldier's ability to correctly align their sights, select the proper point of aim, or determine the correct hold for a specific target.
- **Incorrect sight alignment** – Soldiers may experience this error when failing to focus on the front sight post or reticle.
- **Incorrect sight picture** – occurs typically when the threat is in a concealed location, is moving, or sufficient winds between the shooter and target exist that are not accounted for during the hold determination process. This failure directly impacts the Soldier's ability to create and sustain the proper sight picture during the shot process.
- **Improper range determination** – will result in an improper hold at ranges greater than the zeroed range for the weapon.

## COMPLEX ENGAGEMENTS

7-14. A complex engagement includes any shot that cannot use the *CoVM* as the point of aim to ensure a target hit. Complex engagements require a Soldier to apply various points of aim to successfully defeat the threat.

7-15. These engagements have an increased level of difficulty due to environmental, target, or shooter conditions that create a need for the firer to rapidly determine a ballistic solution and apply that solution to the point of aim. Increased engagement difficulty is typically characterized by one or more of the following conditions:

- **Target conditions:**
  - Range to target.
  - Moving targets.
  - Oblique targets.
  - Evasive targets.
  - Limited exposure targets.
- **Environmental conditions:**
  - Wind.
  - Angled firing.
  - Limited visibility.
- **Shooter conditions:**
  - Moving firing position.



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**Aim**

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- Canted weapon engagements.
- CBRN operations engagements.

7-16. Each of these firing conditions may require the Soldier to determine an appropriate aim point that is not the CoVM. This Soldier calculated aim point is called the **hold**. During any complex engagement, the Soldier serves as the ballistic computer during the shot process. The hold represents a refinement or alteration of the center of visible mass point of aim at the target to counteract certain conditions during a complex engagement for—

- Range to target.
- Lead for targets based on their direction and speed of movement.
- Counter-rotation lead required when the Soldier is moving in the opposite direction of the moving target.
- Wind speed, direction, and duration between the shooter and the target at ranges greater than 300 meters.
- Greatest lethal zone presented by the target to provide the most probable point of impact to achieve immediate incapacitation.

7-17. The Soldier will apply the appropriate aim (hold) based on the firing instances presented. Hold determinations will be discussed in two formats; immediate and deliberate.

7-18. All Soldiers must be familiar with the immediate hold determination methods. They should be naturally applied when the engagement conditions require. These determinations are provided in “target form” measurements, based on a standard E-type silhouette dimension, approximately 20 inches wide by 40 inches tall.

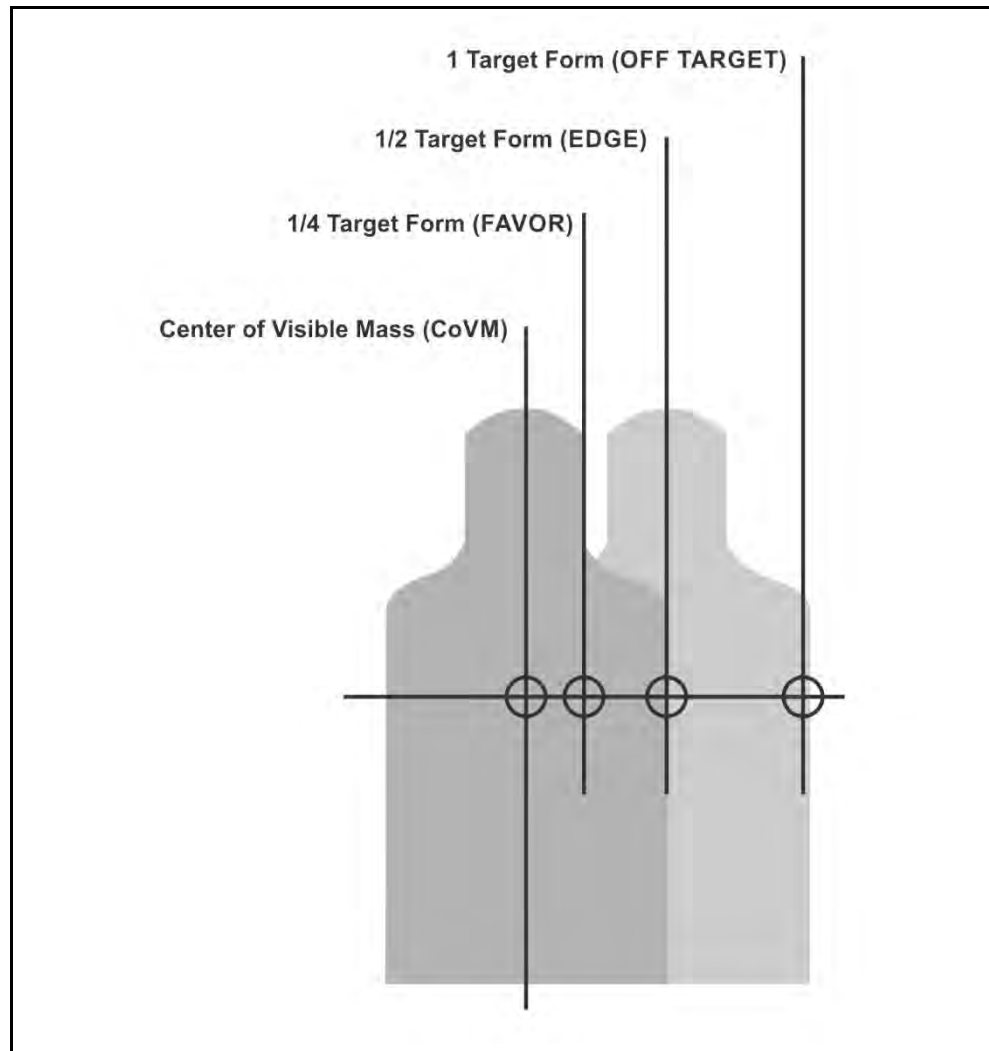
#### **IMMEDIATE HOLD DETERMINATION**

7-19. Immediate holds are based on the values of a “target form,” where the increments shown *are sufficient* for rapid target hits without ballistic computations. The immediate hold determinations are not as accurate as the deliberate method, and are used for complex target engagements at less than 300 meters.

7-20. Immediate hold locations for azimuth (wind or lead): (See figure 7-4.)



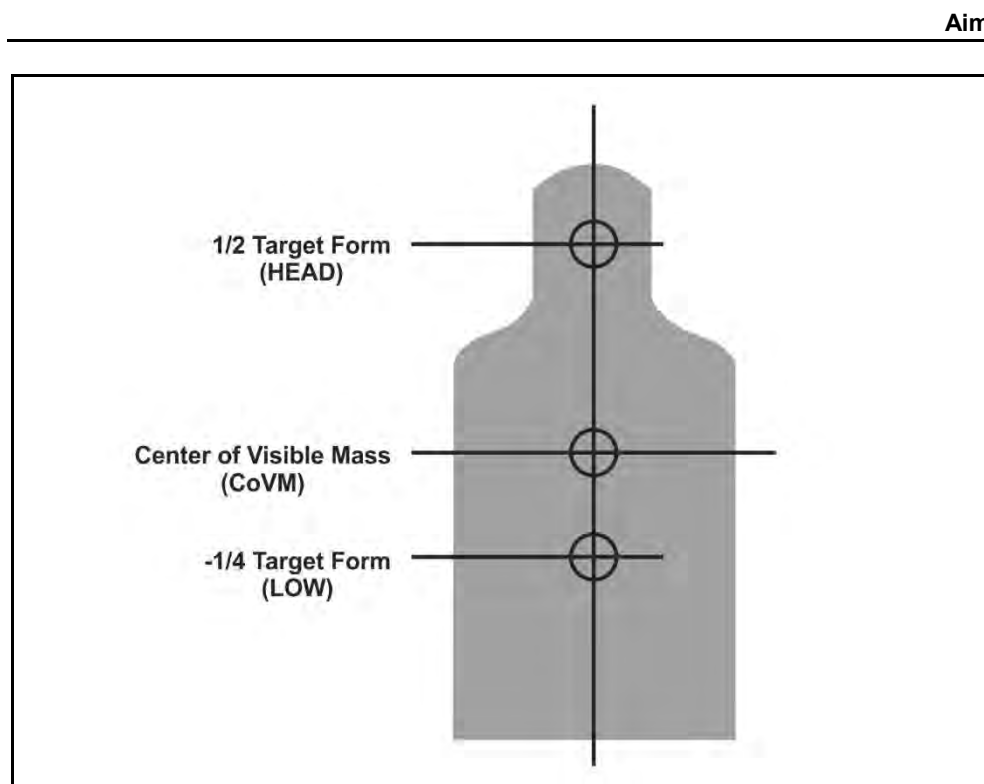
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**Figure 7-4. Immediate hold locations for windage and lead example**

7-21. Immediate hold locations for elevation (range to target): (See figure 7-5.)





**Figure 7-5. Immediate hold locations for elevation (range) example**

**DELIBERATE HOLD DETERMINATION**

7-22. Deliberate hold points of aim are derived from applying the appropriate ballistic math computation. Deliberate hold determinations are required for precise shots beyond 300 meters for wind, extended range, moving, oblique, or evasive targets.

7-23. Deliberate holds for complex engagements are discussed in detail in appendix C, Complex Engagements. The deliberate math calculations are for advanced shooters within the formation and are not discussed within this chapter.



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### TARGET CONDITIONS

7-24. Soldiers must consider several aspects of the target to apply the proper point of aim on the target. The target's posture, or how it is presenting itself to the shooter, consists of—

- Range to target.
- Nature of the target.
- Nature of the terrain (surrounding the target).

### RANGE TO TARGET

7-25. Rapidly determining an accurate range to target is critical to the success of the Soldier at mid and extended ranges. There are several range determination methods shooters should be confident in applying to determine the proper hold-off for pending engagements. There are two types of range determination methods, immediate and deliberate.

#### Immediate Range Determination

7-26. Immediate methods of range determination afford the shooter the most reliable means of determining the most accurate range to a given target. The immediate methods include—

- Close quarters engagements.
- Laser range finder.
- Front sight post method.
- Recognition method.
- 100-meter unit-of-measure method.

#### *Close Quarters Engagements*

7-27. Short-range engagements are probable in close terrain (such as urban or jungle) with engagement ranges typically less than 50 meters. Soldiers must be confident in their equipment, zero, and capabilities to defeat the threats encountered.

7-28. Employment skills include swift presentation and application of the shot process (such as quick acquisition of sight picture) to maintain overmatch. At close ranges, perfect sight alignment is not as critical to the accurate engagement of targets. The weapon is presented rapidly and the shot is fired with the front sight post placed roughly center mass on the desired target area. The front sight post must be in the rear sight aperture.

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**Note.** If using iron sights when this type of engagement is anticipated, the large rear sight aperture (0-2) should be used to provide a wider field of view and detection of targets.

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Aim

### ***Laser Range Finder***

7-29. Equipment like the AN/PSQ-23, STORM have an on-board laser range finder that is accurate to within +/- 5 meters. Soldiers with the STORM attached can rapidly determine the most accurate range to target and apply the necessary hold-offs to ensure the highest probability of incapacitation, particularly at extended ranges.

### ***Front Sight Post Method***

7-30. The area of the target that is covered by the front sight post of the rifle can be used to estimate range to the target. By comparing the appearance of the rifle front sight post on a target at known distances, your shooters can establish a mental reference point for determining range at unknown distances. Because the apparent size of the target changes as the distance to the target changes, the amount of the target that is covered by the front sight post will vary depending upon its range. In addition, your shooter's eye relief and perception of the front sight post will also affect the amount of the target that is visible (see figure 7-6).

- Less Than 300 Meters. If the target is wider than the front sight post, you can assume that the target is less than 300 meters and can be engaged point of aim/point of impact using your battle sight zero (BZO).
- Greater Than 300 Meters. The service rifle front sight post covers the width of a man's chest or body at approximately 300 meters. If the target is less than the width of the front sight post, you should assume the target is in excess of 300 meters. Therefore, your BZO cannot be used effectively.



**Figure 7-6. Front sight post method example**

### ***Recognition Method***

7-31. When observing a target, the amount of detail seen at various ranges gives the shooter a solid indication of the range to target. Shooters should study and remember the appearance of a person when they are standing at 100 meters increments. During

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training, Soldiers should note the details of size and the characteristics of uniform and equipment for targets at those increments.

7-32. Once Soldiers are familiar and memorize the characteristics of standing threats at 100 meter increments out to 500 meters, they should study the targets in a kneeling and then in the prone position. By comparing the appearance of these positions at known ranges from 100 meters to 500 meters, shooters can establish a series of mental images that will help determine range on unfamiliar terrain. They should also study the appearance of other familiar objects such as weapons and vehicles.

- **100 meters** – the target can be clearly observed in detail, and facial features can be distinguished.
- **200 meters** – the target can be clearly observed, although there is a loss of facial detail. The color of the skin and equipment is still identifiable.
- **300 meters** – the target has a clear body outline, face color usually remains accurate, but remaining details are blurred.
- **400 meters** – the body outline is clear, but remaining detail is blurred.
- **500 meters** – the body shape begins to taper at the ends. The head becomes indistinct from the shoulders.

### *100-meter Unit-of-Measure Method*

7-33. To determine the total distance to the target using the 100 meter unit of measure method, shooters must visualize a distance of 100 meters (generally visualizing the length of a football field) on the ground. Soldiers then estimate how many of these units can fit between the shooter and the target.

7-34. The greatest limitation of the unit of measure method is that its accuracy is directly related to how much of the terrain is visible. This is particularly true at greater ranges. If a target appears at a range of 500 meters or more and only a portion of the ground between your shooter and the target can be seen, it becomes difficult to use the unit of measure method of range estimation with accuracy.

7-35. Proficiency in the unit of measure method requires constant practice. Throughout training, comparisons should be continually made between the range estimated by your shooter and the actual range as determined by pacing or other, more accurate measurement.

### *Immediate hold for Range to Target*

7-36. Immediate range determination holds are based on the zero applied to the weapon. The 300 meter zero is the Army standard and works in all tactical situations, including close quarters combat. Figure 7-7, on page 7-13, shows the appropriate immediate holds for range to target based on the weapon's respective zero:



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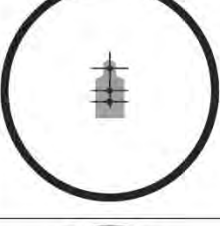

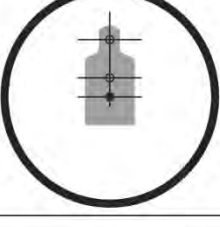
RANGE	HOLD	IRON SIGHT	CCO, M68
500 m	1 FORM OVER	USE BDC	
400 m	1/2 HEAD	USE BDC	
300 m	CoVM		
200 m	-1/4 LOW		
100 m	-1/4 LOW		
BDC - Bullet Drop Compensator			

Figure 7-7. Immediate holds for range to target

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### MOVING TARGETS

7-37. Moving targets are those threats that appear to have a consistent pace and direction. Targets on any battlefield will not remain stationary for long periods of time, particularly once a firefight begins. Soldiers must have the ability to deliver lethal fires at a variety of moving target types and be comfortable and confident in the engagement techniques. There are two methods for defeating moving targets; tracking and trapping.

#### Immediate hold for moving targets.

7-38. The immediate hold for moving targets includes an estimation of the speed of the moving target and an estimation of the range to that target. The immediate holds for all moving targets are shown below. (See figure 7-8.)

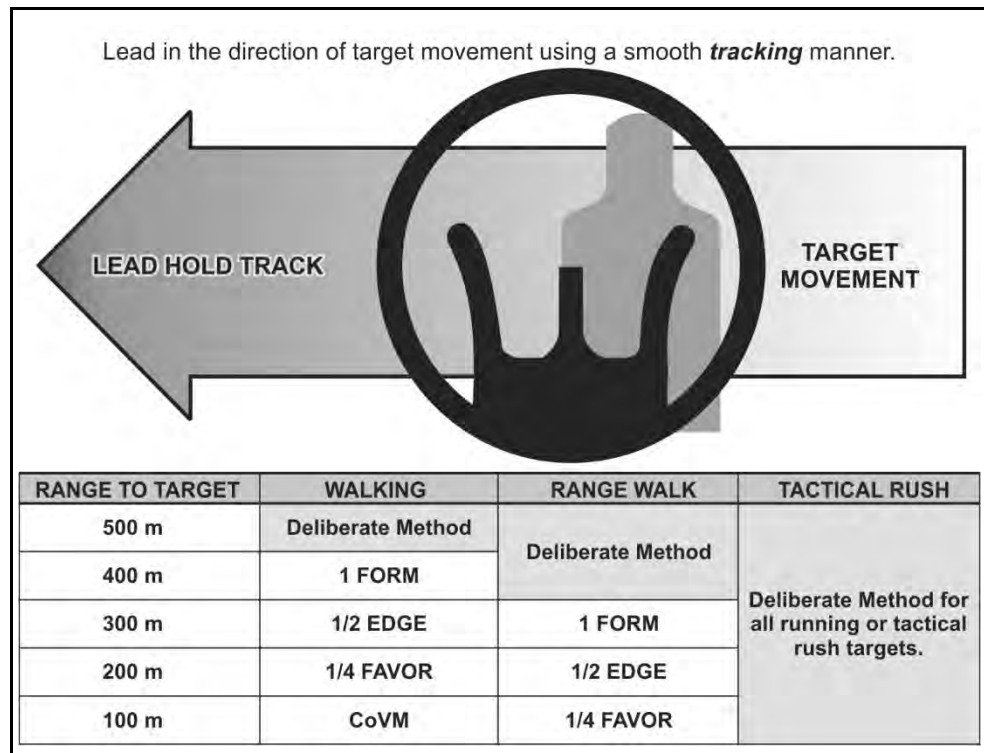


Figure 7-8. Immediate holds for moving targets example



Aim

## OBLIQUE TARGETS

7-39. Threats that are moving diagonally toward or away from the shooter are called **oblique targets**. They offer a unique problem set to shooters where the target may be moving at a steady pace and direction; however, their oblique direction of travel makes them appear to move slower.

7-40. Soldiers should adjust their hold based on the angle of the target's movement from the gun-target line. The following guide will help Soldiers determine the appropriate change to the moving target hold to apply to engage the moving oblique threats (see figure 7-9).

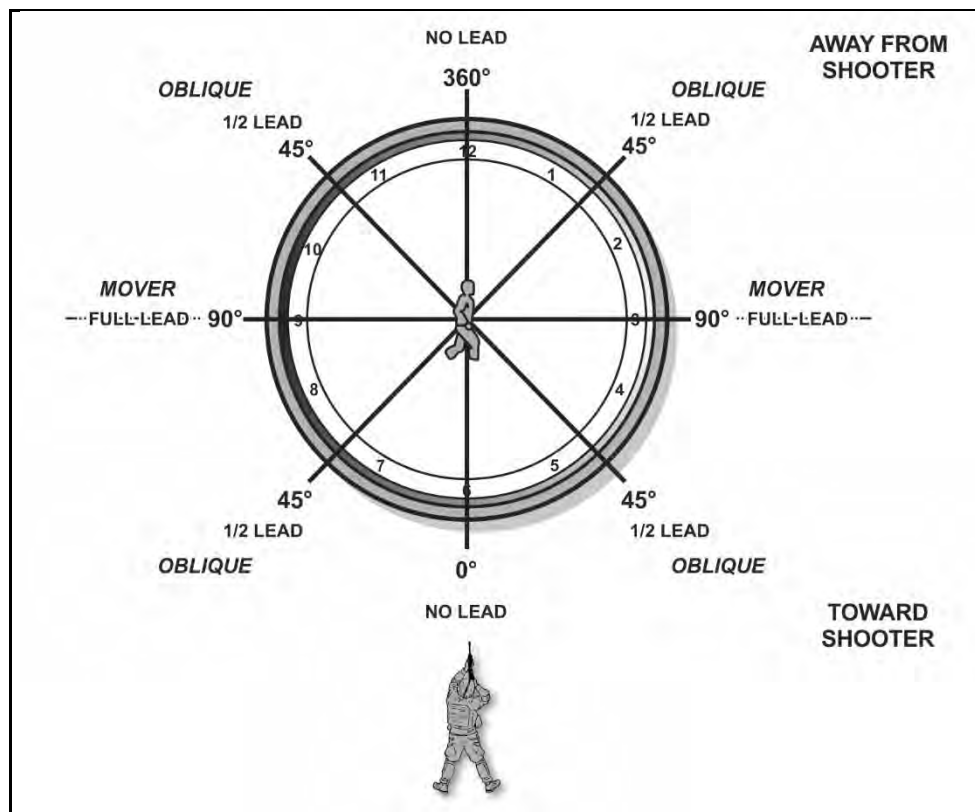


Figure 7-9. Oblique target example



## **Chapter 7**

### **ENVIRONMENTAL CONDITIONS**

7-41. The environment can complicate the shooter's actions during the shot process with excessive wind or requiring angled firing limited visibility conditions. Soldiers must understand the methods to offset or compensate for these firing occasions, and be prepared to apply these skills to the shot process. This includes when multiple complex conditions compound the ballistic solution during the firing occasion.

#### **WIND**

7-42. Wind is the most common variable and has the greatest effect on ballistic trajectories, where it physically pushes the projectile during flight off the desired trajectory (see appendix B of this publication). The effects of wind can be compensated for by the shooter provided they understand how wind effects the projectile and the terminal point of impact. The elements of wind effects are—

- The time the projectile is exposed to the wind (range).
- The direction from which the wind is blowing.
- The velocity of the wind on the projectile during flight.

#### **Wind Direction and Value**

7-43. Winds from the left blow the projectile to the right, and winds from the right blow the projectile to the left. The amount of the effect depends on the time of (projectile's exposure) the wind speed and direction. To compensate for the wind, the firer must first determine the wind's direction and value.

7-44. The clock system can be used to determine the direction and value of the wind (See figure 7-10 on page 7-17). Picture a clock with the firer oriented downrange towards 12 o'clock.

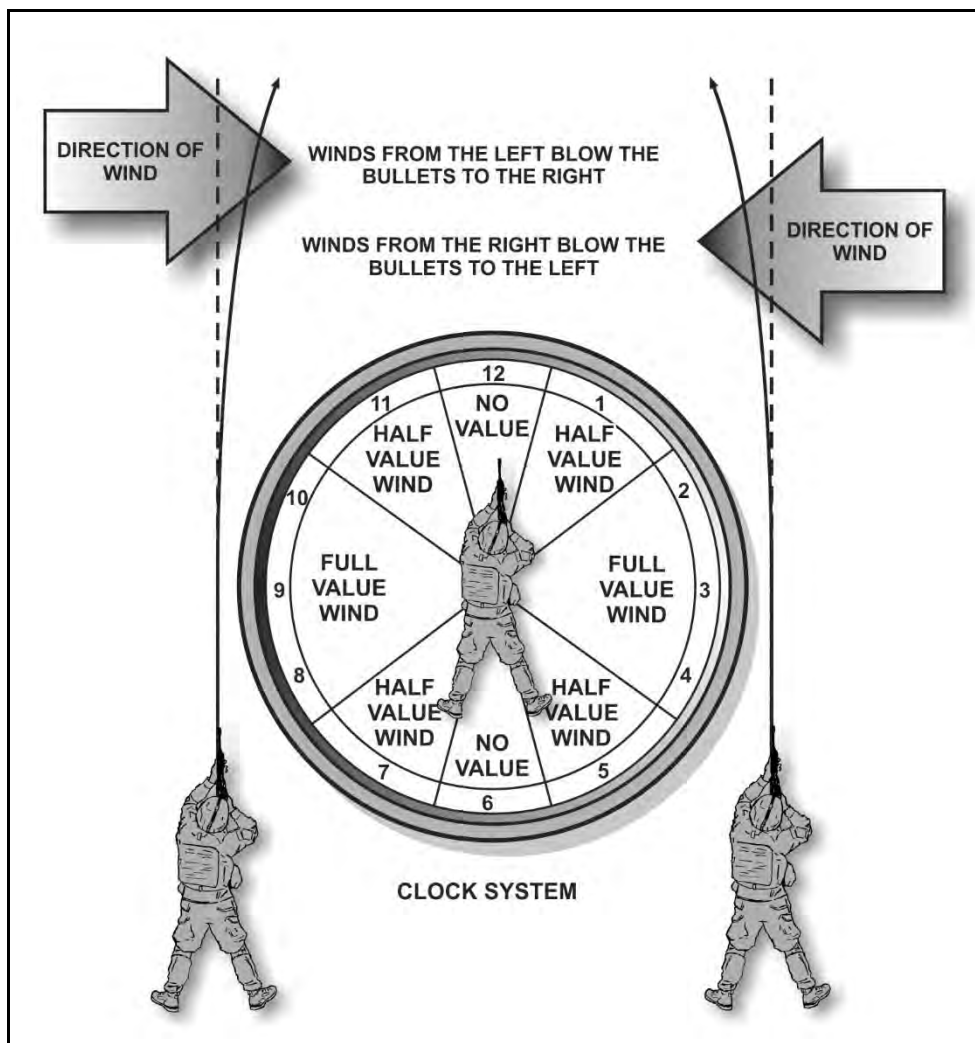
7-45. Once the direction is determined, the value of the wind is next. The value of the wind is how much effect the wind will have on the projectile. Winds from certain directions have less effect on projectiles. The chart below shows that winds from 2 to 4 o'clock and 8 to 10 o'clock are considered full-value winds and will have the most effect on the projectile. Winds from 1, 5, 7, and 11 o'clock are considered half-value winds and will have roughly half the effect of a full-value wind. Winds from 6 and 12 o'clock are considered no-value winds and little or no effect on the projectile.

#### **EXAMPLE**

A 10-mph (miles per hour) wind blowing from the 1 o'clock direction would be a half-value wind and has the same effect as a 5 mph, full-value wind on the projectile.



Aim



**Figure 7-10. Wind value**

7-46. The wind will push the projectile in the direction the wind is blowing (see figure 7-11). The amount of effects on the projectile will depend on the time of exposure, direction of the wind, and speed of the wind. To compensate for wind the Soldier uses a hold *in the direction of the wind (into the wind)*.

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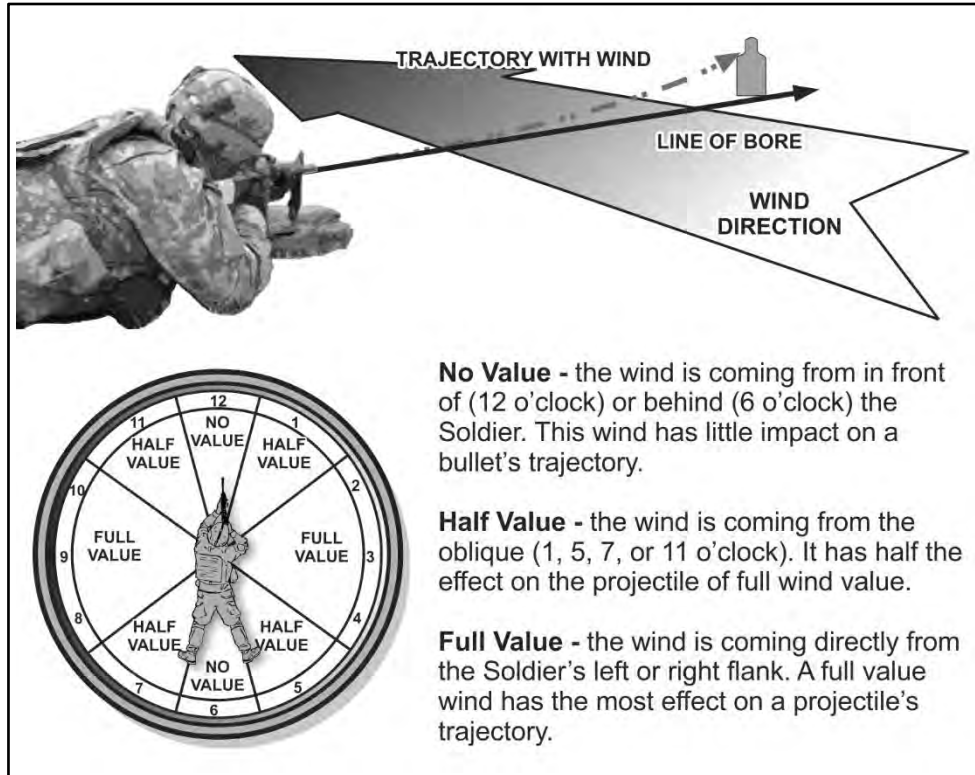


Figure 7-11. Wind effects

### Wind Speed

7-47. Wind speeds can vary from the firing line to the target. Wind speed can be determined by taking an average of the winds blowing on the range. The firer's focus should be on the winds between the midrange point and the target. The wind at the one half to two thirds mark will have the most effect on the projectile since that is the point where most projectiles have lost a large portion of their velocity and are beginning to destabilize.

7-48. The Soldier can observe the movement of items in the environment downrange to determine the speed. Each environment will have different vegetation that reacts differently.

7-49. Downrange wind indicators include the following:

- 0 to 3 mph = Hardly felt, but smoke drifts.
- 3 to 5 mph = Felt lightly on the face.
- 5 to 8 mph = Keeps leaves in constant movement.



## Chapter 7

- 8 to 12 mph = Raises dust and loose paper.
- 12 to 15 mph = Causes small trees to sway.

7-50. The wind blowing at the Soldiers location may not be the same as the wind blowing on the way to the target.

### Wind Estimation

7-51. Soldiers must be comfortable and confident in their ability to judge the effects of the wind to consistently make accurate and precise shots. Soldiers will use wind indicators between the Soldier and the target that provide windage information to develop the proper compensation or hold-off.

7-52. To estimate the effects of the wind on the shot, Soldiers need to determine three windage factors:

- Velocity (speed).
- Direction.
- Value.

### Immediate Wind Hold

7-53. Using a hold involves changing the point of aim to compensate for the wind drift. For example, if wind causes the bullet to drift 1/2 form to the left, the aiming point must be moved 1/2 form to the right. (See figure 7-12, page 7-20.)

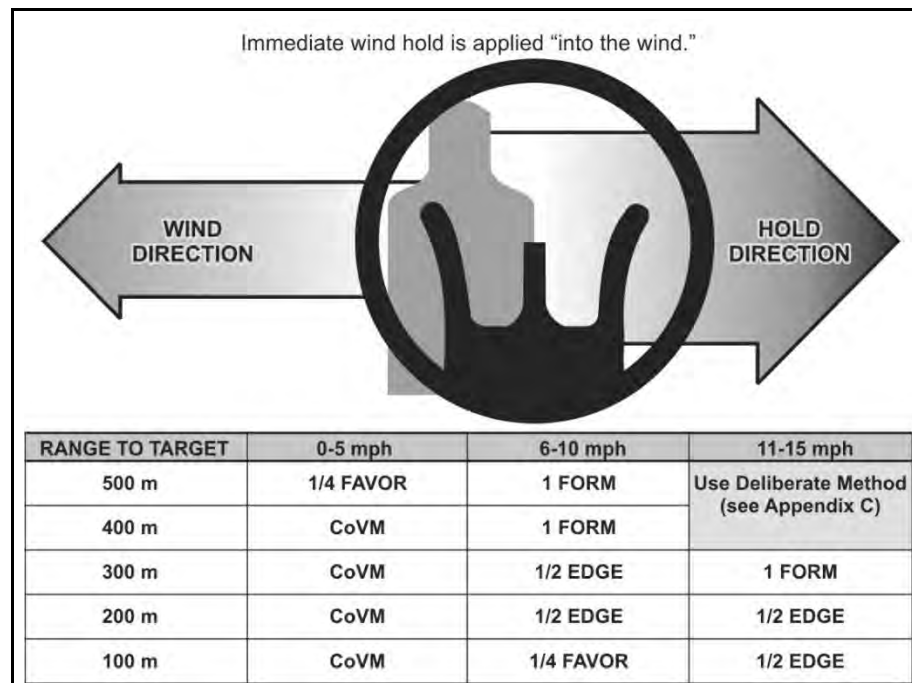


Figure 7-12. Wind hold example



## Chapter 7

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7-54. Firers must adjust their points of aim into the wind to compensate for its effects. If they miss a distant target and wind is blowing from the right, they should aim to the right for the next shot. A guide for the initial adjustment is to split the front sight post on the edge of the target facing the wind.

7-55. Newly assigned Soldiers should aim at the target's center of visible mass for the first shot, and then adjust for wind when they are confident that wind caused the miss. Experienced firers should apply the appropriate hold for the first shot, but should follow the basic rule—when in doubt, aim at the center of mass.

### LIMITED VISIBILITY

7-56. Soldiers must be lethal at night and in limited visibility conditions, as well as during the day. That lethality depends largely on whether Soldier can fire effectively with today's technology: night vision devices (NVDs), IR aiming devices, and TWSs.

7-57. Limited visibility conditions may limit the viewable size of a threat, or cause targets to be lost after acquisition. In these situations, Soldiers may choose to apply a hold for where a target is *expected* to be rather than wait for the target to present itself for a more refined reticle lay or sight picture.

7-58. Soldiers may switch between optics, thermals, and pointers to refine their point of aim. To rapidly switch between aiming devices during operations in limited visibility, the Soldier must ensure accurate alignment, boresighting, and zeroing of all associated equipment. Confidence in the equipment is achieved through drills related to changing the aiming device during engagements, executing repetitions with multiple pieces of equipment, and practicing nonstandard engagement techniques using multiple aiming devices in tandem (IR pointer with NVDs, for example).



## **Chapter 8**

# **Control**

The control element of employment considers all the conscious actions of the Soldier before, during, and after the shot process that the Soldier's specifically in control of. It incorporates the Soldier as a function of safety, as well as the ultimate responsibility of firing the weapon.

Proper trigger control, without disturbing the sights, is the most important aspect of control and the most difficult to master.

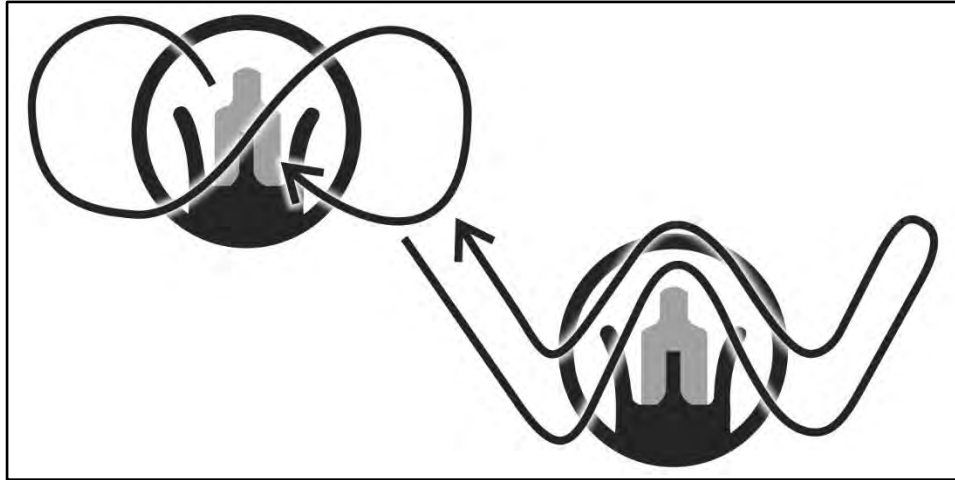
Combat is the ultimate test of a Soldier's ability to apply the functional elements of the shot process and firing skills. Soldiers must apply the employment skills mastered during training to all combat situations (for example, attack, assault, ambush, or urban operations). Although these tactical situations present problems, the application of the functional elements of the shot process require two additions: changes to the rate of fire and alterations in weapon/target alignment. This chapter discusses the engagement techniques Soldiers must adapt to the continuously changing combat engagements.

8-1. When firing individual weapons, the Soldier is the weapon's fire control system, ballistic computer, stabilization system, and means of mobility. Control refers to the Soldier's ability to regulate these functions and maintain the discipline to execute the shot process at the appropriate time.

8-2. Regardless of how well trained or physically strong a Soldier is, a wobble area (or arc of movement) is present, even when sufficient physical support of the weapon is provided. The arc of movement (AM) may be observed as the sights moving in a W shape, vertical (up and down) pulses, circular, or horizontal arcs depending on the individual Soldier, regardless of their proficiency in applying the functional elements. The wobble area or arc of movement is the extent of lateral horizontal and front-to-back variance in the movement that occurs in the sight picture (see figure 8-1).



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**Figure 8-1. Arc of movement example**

8-3. The control element consists of several supporting Soldier functions, and include all the actions to minimize the Soldier's induced arc of movement. Executed correctly, it provides for the best engagement window of opportunity to the firer. The Soldier physically maintains positive control of the shot process by managing—

- Trigger control.
- Breathing control.
- Workspace.
- Calling the shot (firing or shot execution).
- Follow-through.

## TRIGGER CONTROL

8-4. Trigger control is the act of firing the weapon while maintaining proper aim and adequate stabilization until the bullet leaves the muzzle. Trigger control and the shooter's position work together to allow the sights to stay on the target long enough for the shooter to fire the weapon and bullet to exit the barrel.

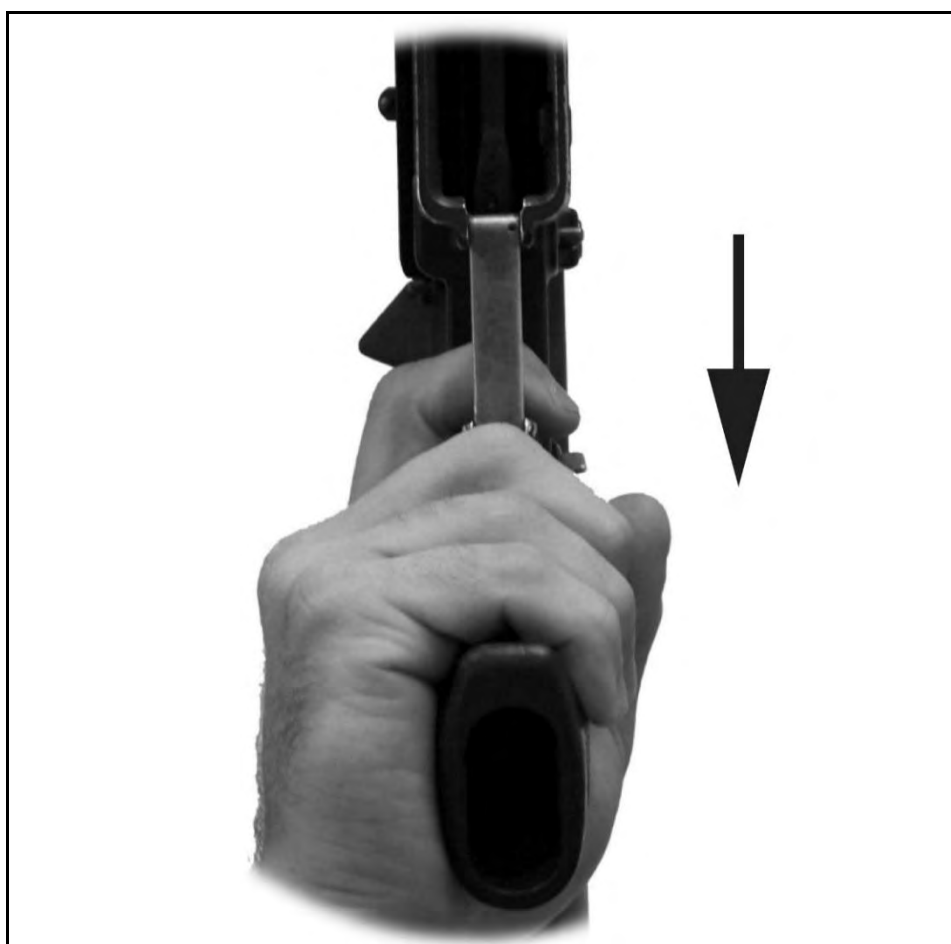
8-5. Stability and trigger control complement each other and are integrated during the shot process. A stable position assists in aiming and reduces unwanted movements during trigger squeeze without inducing unnecessary movement or disturbing the sight picture. A smooth, consistent trigger squeeze, regardless of speed, allows the shot to fire at the Soldier's moment of choosing. When both a solid position and a good trigger squeeze are achieved, any induced shooting errors can be attributed to the aiming process for refinement.

8-6. Smooth trigger control is facilitated by placing the finger where it naturally lays on the trigger. Natural placement of the finger on the trigger will allow for the best mechanical advantage when applying rearward pressure to the trigger.



### **Control**

- **Trigger finger placement** – the trigger finger will lay naturally across the trigger after achieving proper grip (see figure 8-2). There is no specified point on the trigger finger that must be used. It will not be the same for all Soldiers due to different size hands. This allows the Soldier to engage the trigger in the most effective manner
- **Trigger squeeze** – The Soldier pulls the trigger in a smooth consistent manner adding pressure until the weapon fires. Regardless of the speed at which the Soldier is firing the trigger control will always be smooth.
- **Trigger reset** – It is important the Soldier retains focus on the sights while resetting the trigger.



**Figure 8-2. Natural trigger finger placement**



## Chapter 8

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### BREATHING CONTROL

8-7. During the shot process, the shooter controls their breathing to reduce the amount of movement of the weapon. During training, the Soldier will learn a method of breathing control that best suits their shooting style and preference. Breathing control is the relationship of the respiratory process (free or under stress) and the decision to execute the shot with trigger squeeze.

8-8. Breathing induces unavoidable body movement that contribute to wobble or the arc of movement (AM) during the shot process. Soldiers cannot completely eliminate all motion during the shot process, but they can significantly reduce its effects through practice and technique. Firing on the natural pause is a common technique used during grouping and zeroing.

8-9. Vertical dispersion during grouping is most likely not caused by breathing but by failure to maintain proper aiming and trigger control. Refer to appendix E of this publication for proper target analysis techniques.

### WORKSPACE MANAGEMENT

8-10. The workspace is a spherical area, 12 to 18 inches in diameter centered on the Soldier's chin and approximately 12 inches in front of their chin. The workspace is where the majority of weapons manipulations take place. (See figure 8-3 on page 8-5.)

8-11. Conducting manipulations in the workspace allows the Soldier to keep his eyes oriented towards a threat or his individual sector of fire while conducting critical weapons tasks that require hand and eye coordination. Use of the workspace creates efficiency of motion by minimizing the distance the weapon has to move between the firing position to the workspace and return to the firing position.

8-12. Location of the workspace will change slightly in different firing positions. There are various techniques to use the workspace. Some examples are leaving the butt stock in the shoulder, tucking the butt stock under the armpit for added control of the weapon, or placing the butt stock in the crook of the elbow.

8-13. Workspace management includes the Soldier's ability to perform the following functions:

- **Selector lever** – to change the weapon's status from safe to semiautomatic, to burst/automatic from any position.

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*Note.* Some models will have ambidextrous selectors.

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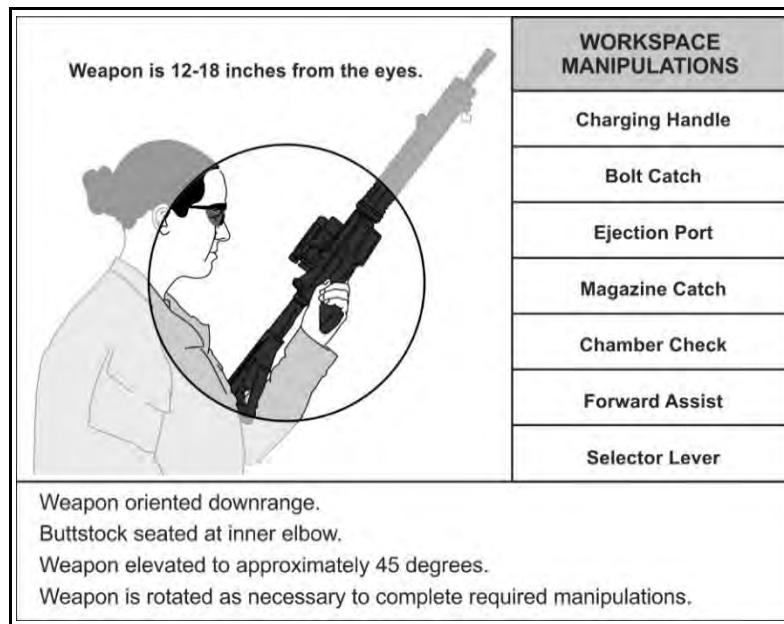
- **Charging handle** – to smoothly use the charging handle during operation. This includes any corrective actions to overcome malfunctions, loading, unloading, or clearing procedures.
- **Bolt catch** – to operate the bolt catch mechanism on the weapon during operations.
- **Ejection port** – closing the ejection port cover to protect the bolt carrier assembly, ammunition, and chamber from external debris upon completion



## Control

of an engagement. This includes observation of the ejection port area during malfunctions and clearing procedures.

- **Magazine catch** – the smooth functioning of the magazine catch during reloading procedures, clearing procedures, or malfunction corrective actions.
- **Chamber check** – the sequence used to verify the status of the weapon's chamber.
- **Forward assist** – the routine use of the forward assist assembly of the weapon during loading procedures or when correcting malfunctions.



**Figure 8-3. Workspace example**

## CALLING THE SHOT

8-14. Knowing precisely where the sights are when the weapon discharges is critical for shot analysis. Errors such as flinching or jerking of the trigger can be seen in the sights before discharge.

8-15. Calling a shot refers to a firer stating exactly where he thinks a single shot strikes by recalling the sights relationship to the target when the weapon fired. This is normally expressed in clock direction and inches from the desired point of aim.

8-16. The shooter is responsible for the point of impact of every round fired from their weapon. This requires the Soldier to ensure the target area is clear of friendly and neutral actors, in front of and behind the target. Soldiers must also be aware of the environment the target is positioned in, particularly in urban settings—friendly or neutral actors may be present in other areas of a structure that the projectile can pass through.



## **Chapter 8**

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### **RATE OF FIRE**

8-17. The shooter must determine *how* to engage the threat with the weapon, on the current shot as well as subsequent shots. Following the direction of the team leader, the Soldier controls the rate of fire to deliver consistent, lethal, and precise fires against the threat.

### **SLOW SEMIAUTOMATIC FIRE**

8-18. Slow semiautomatic fire is moderately paced at the discretion of the Soldier, typically used in a training environment or a secure defensive position at approximately 12 to 15 rounds per minute. All Soldiers learn the techniques of slow semiautomatic fire during their introduction to the service rifle during initial entry training. This type of firing provides the Soldier the most time to focus on the functional elements in the shot process and reinforces all previous training.

### **RAPID SEMIAUTOMATIC FIRE**

8-19. Rapid semiautomatic fire is approximately 45 rounds per minute and is typically used for multiple targets or combat scenarios where the Soldier does not have overmatch of the threat. Soldiers should be well-trained in all aspects of slow semiautomatic firing before attempting any rapid semiautomatic fire training.

8-20. Those who display a lack of knowledge of employment skills should not advance to rapid semiautomatic fire training until these skills are learned and mastered.

### **AUTOMATIC OR BURST FIRE**

8-21. Automatic or burst fire is when the Soldier is required to provide suppressive fires with accuracy, and the need for precise fires, although desired, is not as important. Automatic or burst fires drastically decrease the probability of hit due to the rapid succession of recoil impulses and the inability of the Soldier to maintain proper sight alignment and sight picture on the target.

8-22. Soldiers should be well-trained in all aspects of slow semiautomatic firing before attempting any automatic training.



## FOLLOW-THROUGH

8-23. Follow-through is the continued mental and physical application of the functional elements of the shot process after the shot has been fired. The firer's head stays in contact with the stock, the firing eye remains open, the trigger finger holds the trigger back through recoil and then lets off enough to reset the trigger, and the body position and breathing remain steady.

8-24. Follow-through consists of all actions controlled by the shooter after the bullet leaves the muzzle. It is required to complete the shot process. These actions are executed in a general sequence:

- **Recoil management.** This includes the bolt carrier group recoiling completely and returning to battery.
- **Recoil recovery.** Returning to the same pre-shot position and reacquiring the sight picture. The shooter should have a good sight picture before and after the shot.
- **Trigger/Sear reset.** Once the ejection phase of the cycle of function is complete, the weapon initiates and completes the cocking phase. As part of the cocking phase, all mechanical components associated with the trigger, disconnect, and sear are reset. Any failures in the cocking phase indicate a weapon malfunction and require the shooter to take the appropriate action. The shooter maintains trigger finger placement and releases pressure on the trigger until the sear is reset, demonstrated by a metallic click. At this point the sear is reset and the trigger pre-staged for a subsequent or supplemental engagement if needed.
- **Sight picture adjustment.** Counteracting the physical changes in the sight picture caused by recoil impulses and returning the sight picture onto the target aiming point.
- **Engagement assessment.** Once the sight picture returns to the original point of aim, the firer confirms the strike of the round, assesses the target's state, and immediately selects one of the following courses of action:
  - **Subsequent engagement.** The target requires additional (subsequent) rounds to achieve the desired target effect. The shooter starts the pre-shot process.
  - **Supplemental engagement.** The shooter determines the desired target effect is achieved and another target may require servicing. The shooter starts the pre-shot process.
  - **Sector check.** All threats have been adequately serviced to the desired effect. The shooter then checks his sector of responsibility for additional threats as the tactical situation dictates. The unit's SOP will dictate any vocal announcements required during the post-shot sequence.
  - **Correct Malfunction.** If the firer determines during the follow-through that the weapon failed during one of the phases of the cycle of function, they make the appropriate announcement to their team and immediately execute corrective action.



## Chapter 8

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### MALFUNCTIONS

8-25. When any weapon fails to complete any phase of the cycle of function correctly, a malfunction has occurred. When a malfunction occurs, the Soldier's priority remains to defeat the target as quickly as possible. The malfunction, Soldier capability, and secondary weapon capability determine if, when, and how to transition to a secondary weapon system.

8-26. The Soldier controls which actions must be taken to ensure the target is defeated as quickly as possible based on secondary weapon availability and capability, and the level of threat presented by the range to target and its capability:

- **Secondary weapon can defeat the threat.** Soldier transitions to secondary weapon for the engagement. If no secondary weapon is available, announce their status to the small team, and move to a covered position to correct the malfunction.
- **Secondary weapon cannot defeat the threat.** Soldiers quickly move to a covered position, announce their status to the small team, and execute corrective action.
- **No secondary weapon.** Soldiers quickly move to a covered position, announce their status to the small team, and execute corrective action.

8-27. The end state of any of corrective action is a properly functioning weapon. Typically, the phase where the malfunction occurred within the cycle of function identifies the general problem that must be corrected. From a practical, combat perspective, malfunctions are recognized by their symptoms. Although some symptoms do not specifically identify a single point of failure, they provide the best indication on which corrective action to apply.

8-28. To overcome the malfunction, the Soldier must first avoid over analyzing the issue. The Soldier must train to execute corrective actions immediately without hesitation or investigation during combat conditions.

8-29. There are two general types of corrective action:

- **Immediate action** – simple, rapid actions or motions taken by the Soldier to correct basic disruptions in the cycle of function of the weapon. Immediate action is taken when a malfunction occurs such that the trigger is squeeze and the hammer falls with an audible “click.”
- **Remedial action** – a skilled, technique that must be applied to a specific problem or issue with the weapon that will not be corrected by taking immediate action. Remedial action is taken when the cycle of function is interrupted where the trigger is squeezed and either has little resistance during the squeeze (“mush”) or the trigger cannot be squeezed.

8-30. No single corrective action solution will resolve *all* or *every* malfunction. Soldiers need to understand what failed to occur, as well as any specific sounds or actions of the weapon in order to apply the appropriate correction measures.



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**Control**

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8-31. Immediate action can correct rudimentary failures during the cycle of function:

- **Failure to fire** – is when a round is locked into the chamber, the weapon is ready to fire, the select switch is placed on SEMI or BURST / AUTO, and the trigger is squeezed, the hammer falls (audible click), and the weapon does not fire.
- **Failure to feed** – is when the bolt carrier assembly is expected to move return back into battery but *is prevented from moving all the way forward*. A clear gap can be seen between the bolt carrier assembly and the forward edge of the ejection port. This failure may cause a stove pipe or a double feed (see below).
- **Failure to chamber** – when the round is being fed into the chamber, but the bolt carrier assembly does not fully seat forward, failing to chamber the round and lock the bolt locking lugs with the barrel extension's corresponding lugs.
- **Failure to extract** – when either automatically or manually, the extractor loses its grip on the cartridge case or the bolt seizes movement rearward during extraction that leaves the cartridge case partially removed or fully seated.
- **Failure to eject** – occurs when, either automatically or manually, a cartridge case is extracted from the chamber fully, but does not leave the upper receiver through the ejection port.

8-32. Remedial action requires the Soldier to quickly identify one of four issues and apply a specific technique to correct the malfunction. Remedial action is required to correct the following types of malfunctions or symptoms:

- **Immediate action fails to correct symptom** – when a malfunction occurred that initiated the Soldier to execute immediate action and multiple attempts failed to correct the malfunction. A minimum of two cycles of immediate action should have been completed; first, without a magazine change, and the second with a magazine change.
- **Stove pipe** – can occur when either a feeding cartridge or an expended cartridge case is pushed sideways during the cycle of function causing that casing to stop the forward movement of the bolt carrier assembly and lodge itself between the face of the bolt and the ejection port.
- **Double feed** – occurs when a round is chambered and not fired and a subsequent round is being fed without the chamber being clear.
- **Bolt override** – is when the bolt fails to push a new cartridge out of the magazine during feeding or chambering, causing the bolt to ride on top of the cartridge.
- **Charging handle impingement** – when a round becomes stuck between the bolt assembly and the charging handle where the charging handle is not in the forward, locked position.

8-33. Although there are other types of malfunctions or disruptions to the cycle of function, those listed above are the most common. Any other malfunction will require additional time to determine the true point of failure and an appropriate remedy.



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*Note.* When malfunctions occur in combat, the Soldier must announce STOPPAGE or another similar term to their small unit, quickly move to a covered location, and correct the malfunction as rapidly as possible. If the threat is too close to the Soldier or friendly forces, and the Soldier has a secondary weapon, the Soldier should immediately transition to secondary to defeat the target prior to correcting the malfunction.

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### RULES FOR CORRECTING A MALFUNCTION

8-34. To clear a malfunction, the Soldier must—

- **Apply Rule #1.** Soldiers must remain coherent of their weapon and continue to treat their weapon as if it is loaded when correcting malfunctions.
- **Apply Rule #2.** Soldiers must ensure the weapon's orientation is appropriate for the tactical situation and not flag other friendly forces when correcting malfunctions.
- **Apply Rule #3.** Take the trigger finger off the trigger, keep it straight along the lower receiver placed outside of the trigger guard.
- **Do not attempt to place the weapon on SAFE** (unless otherwise noted). Most stoppages will not allow the weapon to be placed on safe because the sear has been released or the weapon is out of battery. Attempting to place the weapon on SAFE will waste time and potentially damage the weapon.
- **Treat the symptom.** Each problem will have its own specific symptoms. By reacting to what the weapon is “telling” the Soldier, they will be able to quickly correct the malfunction.
- **Maintain focus on the threat.** The Soldier must keep their head and eyes looking downrange at the threat, not at the weapon. If the initial corrective action fails to correct the malfunction, the Soldier must be able to quickly move to the next most probable corrective action.
- **Look last.** Do not look and analyze the weapon to determine the cause of the malfunction. Execute the drill that has the highest probability of correcting the malfunction.
- **Check the weapon.** Once the malfunction is clear and the threat is eliminated, deliberately check the weapon when in a covered location for any potential issues or contributing factors that caused the malfunction and correct them.



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**Control**

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**Perform Immediate Action**

8-35. To perform immediate action, the Soldier instinctively:

- Hears the hammer fall with an audible “click.”
- Taps the bottom of the magazine firmly.
- Rapidly pulls the charging handle and releases to extract / eject the previous cartridge and feed, chamber, and lock a new round.
- Reassess by continuing the shot process.

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*Note.* If a malfunction continues to occur with the same symptoms, the Soldier will remove the magazine and insert a new loaded magazine, then repeat the steps above.

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**Perform Remedial Action**

8-36. To perform remedial action, the Soldier must have a clear understanding of where the weapon failed during the cycle of function. Remedial action executed when one of the following conditions exist:

- Immediate action does not work after two attempts.
- The trigger refuses to be squeezed.
- The trigger feels like “mush” when squeezed.

8-37. When one of these three symptoms exist, the Soldier looks into the chamber area through the ejection port to quickly assess the type of malfunction. Once identified, the Soldier executes actions to “reduce” the symptom by removing the magazine and attempting to clear the weapon. Once complete, visually inspect the chamber area, bolt face, and charging handle. Then, complete the actions for the identified symptom:

- **Stove pipe** – Grasp case and attempt to remove, cycle weapon and attempt to fire. If this fails, pull charging handle to the rear while holding case.
- **Double-feed** - the Soldier must remove the magazine, clear the weapon, confirm the chamber area is clear, secure a new loaded magazine into the magazine well, and chamber and lock a round.
- **Bolt override** – Remove magazine. Pull charging handle as far rearward as possible. Strike charging handle forward. If this fails, pull charging handle to the rear a second time, use tool or finger to hold the bolt to the rear, sharply send charging handle forward.



## Chapter 8

### CORRECTING MALFUNCTIONS

8-38. Figure 8-4 below provides a simple mental flow chart to rapidly overcome malfunctions experienced during the shot process.

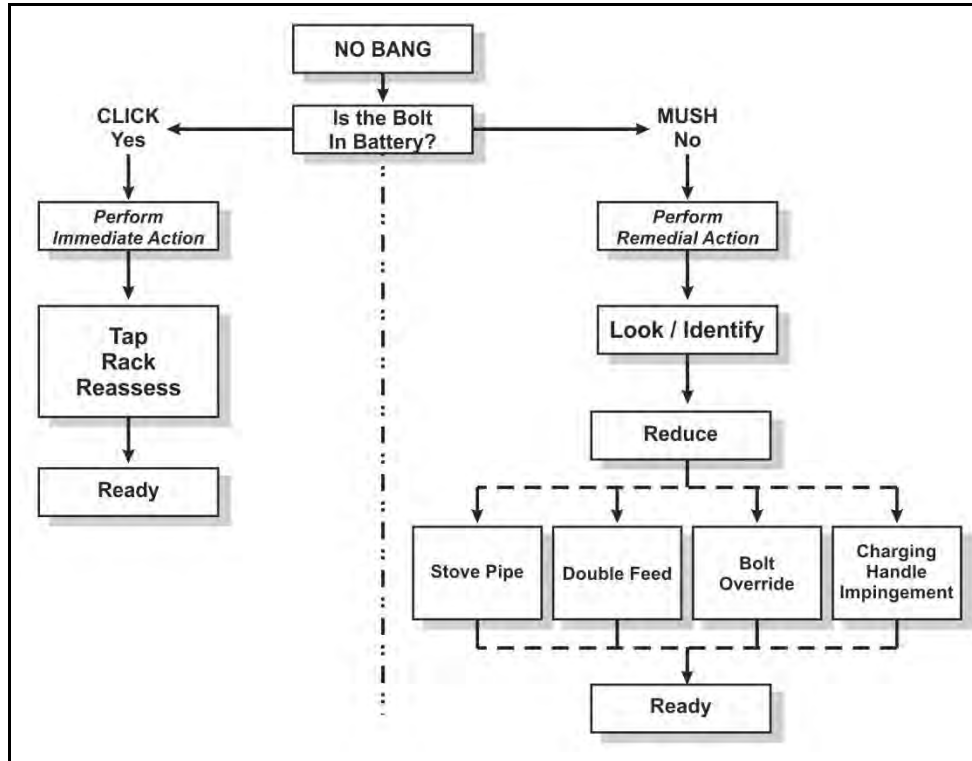


Figure 8-4. Malfunction corrective action flow chart



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**Control**

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**COOK-OFF**

8-39. Rapid and continuous firing of several magazines in sequence without cooling, will severely elevate chamber temperatures. While unlikely this elevated temperature may cause a malfunction known as a "cook-off". A "cook-off" may occur while the round is locked in the chamber, due to excessive heating of the ammunition. Or the rapid exposure to the cooler air outside of the chamber, due in part to the change in pressure.

8-40. If the Soldier determines that he has a potential "cook-off" situation he should leave the weapon directed at the target, or in a known safe direction, and follow proper weapons handling procedures, until the barrel of the weapon has had time to cool. If the chambered round has not been locked in the chamber for 10 seconds, it should be ejected as quickly as possible. If the length of time is questionable or known to be longer than 10 seconds and it is tactically sound, the Soldier should follow the above procedures until the weapon is cooled. If it is necessary to remove the round before the weapon has time to cool, the Soldier should do so with care as the ejected round may detonate due to rapid cooling in open air.

**WARNING**

**Ammunition "cook-off" is not likely in well maintained weapons used within normal training and combat parameters.**

**Soldiers and unit leadership need to consider the dangers of keeping rounds chambered in weapons that have elevated temperatures due to excessive firing. Or clearing ammunition that has the potential to cook-off when exposed to the cooler air outside of the chamber.**

**Exposure to the colder air outside of the chamber has the potential to cause the "cook-off" of ammunition. Keeping ammunition chambered in severely elevated temperatures also has the potential to cause the "cook-off" of ammunition.**

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*Note.* For more information about troubleshooting malfunctions and replacing components, see organizational and direct support maintenance publications and manuals.

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## **Chapter 8**

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### **TRANSITION TO SECONDARY WEAPON**

8-41. A secondary weapon, such as a pistol, is the most efficient way to engage a target at close quarters when the primary weapon has malfunctioned. The Soldier controls which actions must be taken to ensure the target is defeated as quickly as possible based on the threat presented.

8-42. The firer transitions by taking the secondary weapon from the HANG or HOLSTERED position to the READY UP position, reacquiring the target, and resuming the shot process as appropriate.

8-43. Refer to the appropriate secondary weapon's training publications for the specific procedures to complete the transition process.



## Chapter 9

# Movement

The movement functional element is the process of the Soldier moving tactically 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.

Proper application of the shot process during movement is vital to combat operations. The most complex engagements involve movement of both Soldier and the adversary. The importance of sight alignment and trigger control are at their highest during movement. The movement of the Soldier degrades stability, the ability to aim, and creates challenges to proper trigger control.

## MOVEMENT TECHNIQUES

9-1. Tactical movement of the Soldier is classified in two ways: vertical and horizontal. Each require specific considerations to maintain and adequately apply the other functional elements during the shot process.

9-2. **Vertical movements** are those actions taken to change their firing posture or negotiate terrain or obstacles while actively seeking, orienting on, or engaging threats. Vertical movements include actions taken to—

- Change between any of the primary firing positions; standing, crouched, kneeling, sitting, or prone.
- Negotiate stairwells in urban environments.
- Travel across inclined or descending surfaces, obstacles, or terrain.

9-3. **Horizontal movements** are actions taken to negotiate the battlefield while actively seeking, orienting on, or engaging threats. There are eight horizontal movement techniques while maintaining weapon orientation on the threat—

- **Forward** – movement in a direction directly toward the adversary.
- **Retrograde** – movement rearward, in a direction away from the threat while maintaining weapon orientation on the threat.
- **Lateral right/left** – lateral, diagonal, forward, or retrograde movement to the right or left.
- **Turning left/right/about** – actions taken by the Soldier to change the weapon orientation left/right or to the rear, followed by the Soldier's direction of travel turning to the same orientation.



## **Chapter 9**

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### **FORWARD MOVEMENT**

9-4. Forward movement is continued progress in a direction toward the adversary or route of march. This is the most basic form of movement during an engagement.

#### **TECHNIQUE**

9-5. During forward movement,—

- Roll the foot heel to toe to best provide a stable firing platform.
- Shooting while moving should be very close to the natural walking gait and come directly from the position obtained while stationary.
- Keep the weapon at the ready position. Always maintain awareness of the surroundings, both to your left and right, at all times during movement.
- Maintain an aggressive position.
- The feet should almost fall in line during movement. This straight-line movement will reduce the arc of movement and visible “bouncing” of the sight picture.
- Keep the muzzle of the weapon facing down range toward the expected or detected threat.
- Keep the hips as stationary as possible. Use the upper body as a turret, twisting at the waist, maintaining proper platform with the upper body.

### **RETROGRADE MOVEMENT**

9-6. Retrograde movement is where the orientation of the weapon remains to the Soldier's front while the Soldier methodically moves rearward.

#### **TECHNIQUE**

9-7. During retrograde movement, the Soldier should—

- Take only one or two steps that will open the distance or reposition the feet.
- Place the feet in a toe to heel manner and drop the center body mass by consciously bending the knees, using a reverse combat glide.
- Maintain situational awareness of team members, debris, and terrain.
- Use the knees as a shock absorber to steady the body movement to maintain the stability of the upper body, stabilizing the rifle sight(s) on the target.
- Ensure all movement is smooth and steady to maintain stability.
- Bend forward at the waist to put as much mass as possible behind the weapon for recoil management.
- Keep the muzzle oriented downrange toward the expected or detected threat.
- Keep the hips as stationary as possible. Use the upper body as a turret, twisting at the waist, maintaining proper platform with the upper body.



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**Movement**

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## **LATERAL MOVEMENT**

9-8. Lateral movement is where the Soldier maintains weapon orientation downrange at the expected or detected threat while moving to the left or right. In the most extreme cases, the target will be offset 90 degrees or more from the direction of movement.

### **TECHNIQUE**

9-9. During lateral movement, Soldiers should—

- Place their feet heel to toe and drop their center mass by consciously bending the knees.
- Use the knees as a shock absorber to steady the body movement to maintain the stability of the upper body, stabilizing the rifle sight(s) on the target.
- Ensure all movement is smooth and steady to maintain stability.
- Bend forward at the waist to put as much mass as possible behind the weapon for recoil management.
- Roll the foot, heel to toe, as you place the foot on the ground and lift it up again to provide for the smoothest motion possible.
- Keep the weapon at the alert or ready carry. Do not aim in on the target until ready to engage.
- Maintain awareness of the surroundings, both to the left and right, at all times during movement.
- Trigger control when moving is based on the wobble area. The Soldier shoots when the sights are most stable, not based on foot position.
- Keep the muzzle of the weapon facing down range toward the threat.
- When moving, the placement of the feet should be heel to toe.
- Do not overstep or cross the feet, because this can decrease the Soldier's balance and center of gravity.
- Keep the hips as stationary as possible. Use the upper body as a turret, twisting at the waist, maintaining proper platform with the upper body.

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**Note.** It is more difficult to engage adversaries to the firing side while moving laterally. The twist required to achieve a full 90-degree offset requires proper repetitive training. The basic concept of movement must be maintained, from foot placement to platform.

Twisting at the waist will not allow the weapon to be brought to a full 90 degrees off the direction of travel, especially with nonadjustable butt stocks. The Soldier will need to drop the non-firing shoulder and roll the upper body toward the nonfiring side. This will cause the weapon and upper body to cant at approximately a 45-degree angle, relieving some tension in the abdominal region, allowing the Soldier to gain a few more degrees of offset.

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## Chapter 9

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### TURNING MOVEMENT

9-10. Turning movement are used to engage widely dispersed targets in the oblique and on the flanks. Turning skills are just as valuable in a rapidly changing combat environment as firing on the move (such as lateral movement) skills are and should only be used with the alert carry.

9-11. It does not matter which direction the Soldier is turning or which side is the Soldier's strong side. The Soldier must maintain the weapon at an exaggerated low-alert carry for the duration of the turn.

9-12. Muzzle awareness must be maintained at all times. Ensure that the muzzle does not begin to come up on target the body is completely turned toward the threat.

9-13. When executing a turn to either side, the Soldier will—

- **Look first.** Turn head to the direction of the turn first.
- **Weapon follows the eyes.** The Soldier moves the weapon smoothly to where the eyes go.
- **Follow with the body.** The body will begin movement with the movement of the weapon. Soldiers finish the body movement smoothly to maintain the best possible stability for the weapon.
- **Maintain situational awareness.** The Soldier must be completely aware of the surrounding terrain, particularly for tripping hazards. When necessary, Soldiers should visually check their surroundings during the turning action and return their vision to the target area as quickly as possible.



## Appendix A

# Ammunition

Appendix A discusses the characteristics and capabilities of the different ammunition available for the M4- and M16-series weapons. It also includes general ammunition information such as packaging, standard and North Atlantic Treaty Organization (NATO) marking conventions, the components of ammunition, and general principles of operation. The information within this appendix is 5.56mm for the M4- and M16-series weapons only.

### SMALL ARMS AMMUNITION CARTRIDGES

A-1. Ammunition for use in rifles and carbines is described as a cartridge. A small arms cartridge (see figure A-1) is an assembly consisting of a cartridge case, a primer, a quantity of propellant, and a bullet. The following terminology describe the general components of all small arms ammunition (SAA) cartridges:

- **Cartridge case.** The cartridge case is a brass, rimless, center-fire case that provides a means to hold the other components of the cartridge.
- **Propellant.** The propellant (or powder) provides the energy to propel the projectile through the barrel and downrange towards a target through combustion.
- **Primer.** The primer is a small explosive charge that provides an ignition source for the propellant.
- **Bullet.** The bullet or projectile is the only component that travels to the target.

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*Note.* Dummy cartridges are composed of a cartridge case and bullet, with no primer or propellant. Some dummy cartridges contain inert granular materials to simulate the weight and balance of live cartridges.

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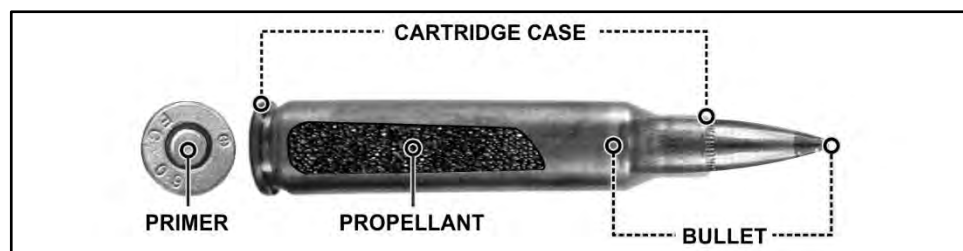


Figure A-1. Small arms ammunition cartridges



## Appendix A

A-2. There are multiple types of bullets used for various purposes. These include ball, tracer, armor-piercing, blank, special ball long range (LR), dummy, and short range training.

A-3. The cartridge case is made of steel, aluminum, or a brass combination (70 percent copper and 30 percent zinc) for military use. The M4- and M16-series weapons is a rimless cartridge case that provides an extraction groove (shown in figure A-2). These cartridge cases are designed to support center-fire operation.

A-4. Center-fire cases have a centrally located primer well/pocket in the base of the case, which separates the primer from the propellant in the cartridge case. These cases are designed to withstand pressures generated during firing and are used for most small arms.

A-5. All 5.56mm ammunition uses the rimless cartridge case. A rimless cartridge is where the rim diameter is the same as the case body, and uses an extractor groove to facilitate the cycle of functioning. This design allows for the stacking of multiple cartridges in a magazine.

A-6. When the round is fired, the cartridge case assists in containing the burning propellant by expanding the cartridge case tightly to the chamber walls to provide rear obturation.

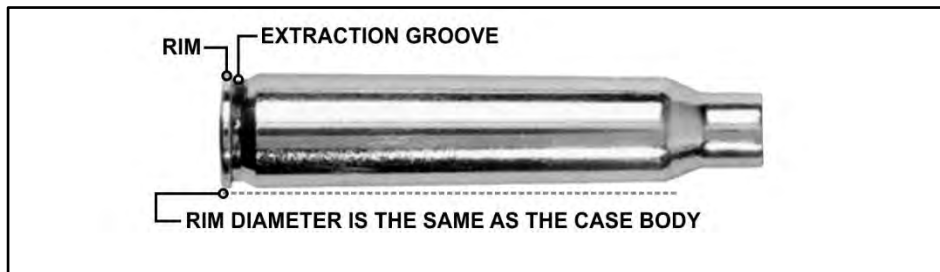


Figure A-2. Cartridge case



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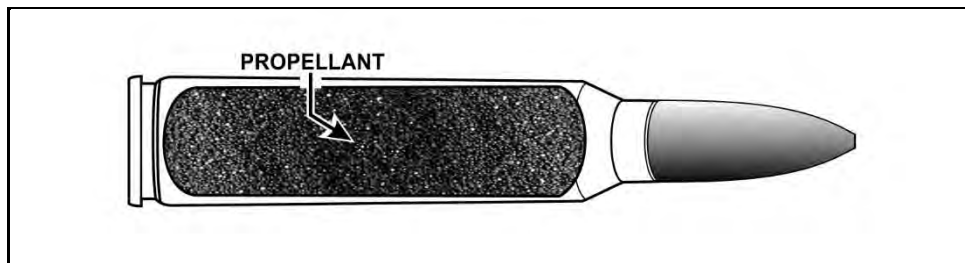
**Ammunition**

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**PROPELLANT**

A-7. Cartridges are loaded with various propellant weights that impart sufficient velocity, within safe pressure, to obtain the required ballistic projectile performance. The propellants are either a single-base (nitrocellulose) or double-base (nitrocellulose and nitroglycerine) composition.

A-8. The propellant (see figure A-3) may be a single-cylindrical or multiple-perforation, a ball, or a flake design to facilitate rapid burning. Most propellants are coated to assist the control of the combustion rate. A final graphite coating facilitates propellant flow and eliminates static electricity in loading the cartridge.



**Figure A-3. Propellant**



## Appendix A

### PRIMER

A-9. Center-fire small arms cartridges contain a percussion primer assembly. The assembly consists of a brass or gilding metal cup (see figure A-4). The cup contains a pellet of sensitive explosive material secured by a paper disk and a brass anvil.

A-10. The weapon firing pin striking the center of the primer cup base compresses the primer composition between the cup and the anvil. This causes the composition to explode. Holes or vents located in the anvil or closure cup allow the flame to pass through the primer vent, igniting the propellant.

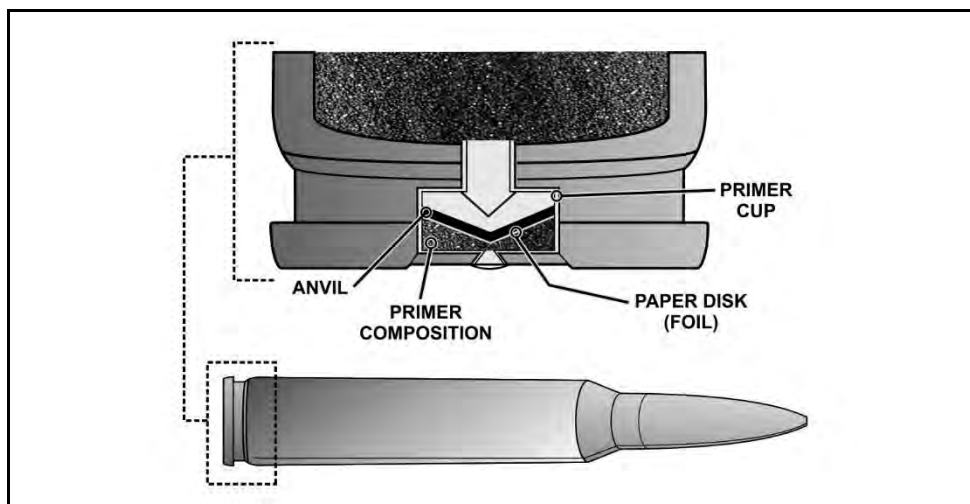


Figure A-4. 5.56mm primer detail



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**Ammunition**

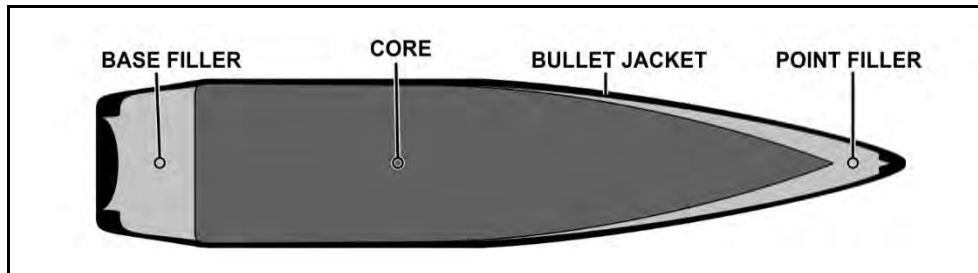
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**BULLET**

A-11. The bullet is a cylindrically shaped lead or alloy projectile that engages with the rifling of the barrel. Newer projectiles consist of a copper slug with exposed steel penetrator, as with the M855A1. The bullets used today are either lead (lead alloy), or assemblies of a jacket and a lead or steel core penetrator. The lead used in lead-alloy bullets is combined with tin, antimony or both for bullet hardness. The alloying reduces barrel leading and helps prevent the bullet from striping (jumping) the rifling during firing.

A-12. Jacketed bullets (see figure A-5) are used to obtain high velocities and are better suited for semiautomatic and automatic weapons. A bullet jacket may be either gilding metal, gilding metal-clad steel, or copper plated steel. In addition to a lead or steel core, they may contain other components or chemicals that provide a terminal ballistic characteristic for the bullet type.

A-13. Some projectiles may be manufactured from plastic, wax, or plastic binder and metal powder, two or more metal powders, or various combinations based on the cartridge's use.



**Figure A-5. Bullet example, Armor-piercing cartridge**



## Appendix A

### SMALL ARMS AMMUNITION TYPES

A-14. There are seven types of SAA for the M4- and M16-series weapons that are used for training and combat. Each of these ammunition types provides a different capability and have specific characteristics. The following are the most common types of ammunition for the rifle and carbine:

#### BALL

A-15. The ball cartridge (see figure A-6) is intended for use in rifles and carbines against personnel and unarmored targets. The bullet, as designed for general purpose combat and training requirements, normally consists of a metal jacket and a lead slug.

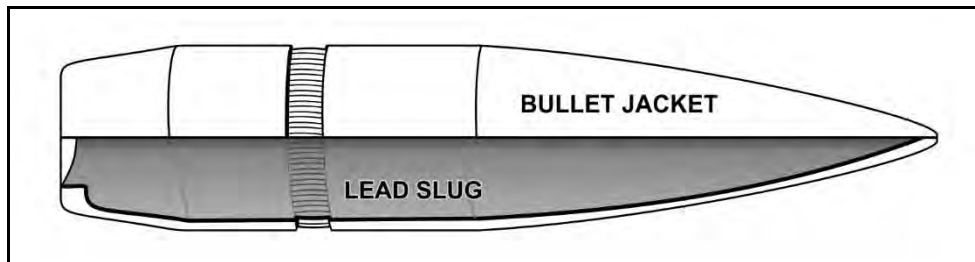


Figure A-6. Ball cartridge

#### TRACER (TCR OR T)

A-16. A tracer round contains a pyrotechnic composition in the base of the bullet to permit visible observation of the bullet's in-flight path or trajectory and point of impact. (See figure A-7) The pyrotechnic composition is ignited by the propellant when the round is fired, emitting a bright flame visible by the firer. Tracer rounds may also be used to pinpoint enemy targets to ignite flammable materials and for signaling purposes.

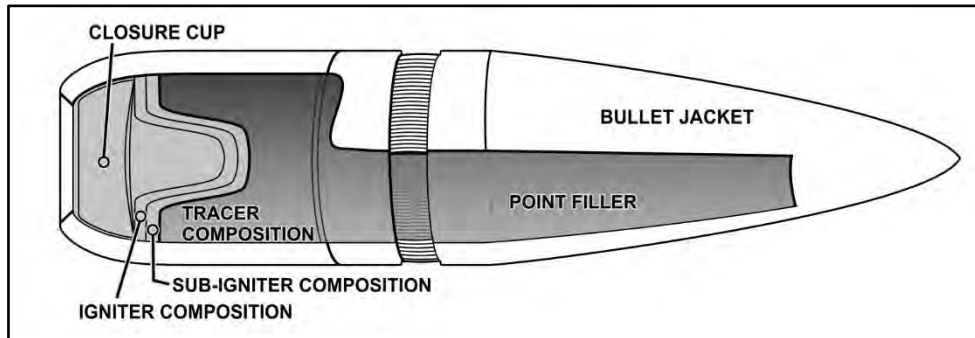


Figure A-7. Ball with tracer cartridge



## Ammunition

### ARMOR PIERCING (AP)

A-17. The armor-piercing cartridge (see figure A-8) is intended for use against personnel and light armored and unarmored targets, concrete shelters, and similar bullet-resistant targets. The bullet consists of a metal jacket and a hardened steel-alloy core. In addition, it may have a lead base filler and/or a lead point filler.

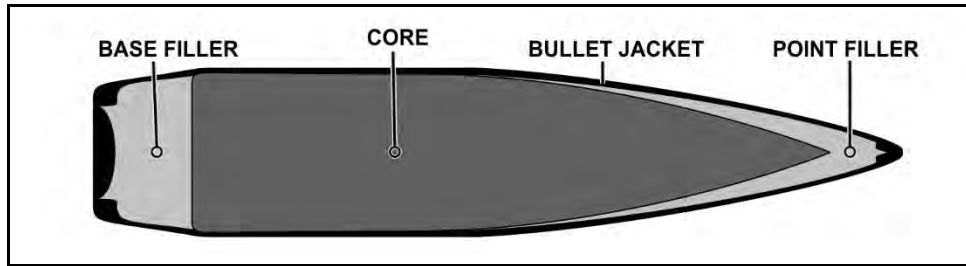


Figure A-8. Armor-piercing cartridge

### SHORT RANGE TRAINING AMMUNITION

A-18. The short range training ammunition (SRTA) (see figure A-9) cartridges are designed for target practice where the maximum range is reduced for training purposes. This cartridge ballistically matches the ball cartridge out to 300 meters, and rapidly drops in velocity and accuracy. This allows for installations with restricted training range facilities to continue to operate with accurate munitions. This cartridge is also a preferred round when conducting training in a close quarters environment, like a shoot house or other enclosed training facility.

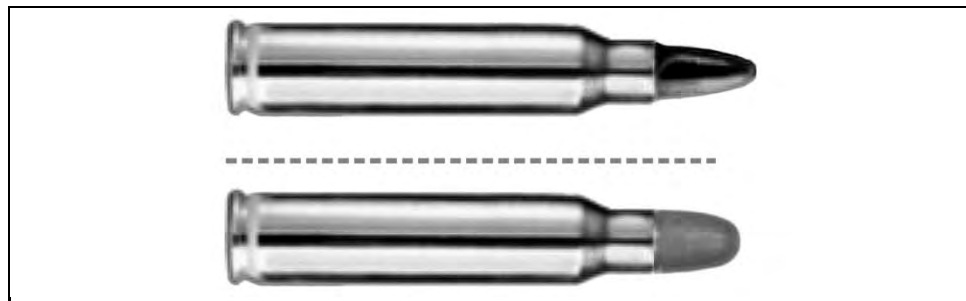


Figure A-9. Short range training ammunition cartridge



## Appendix A

### BLANK (BLK)

A-19. The blank cartridge (see figure A-10) is distinguished by the absence of a bullet or projectile. It is used for simulated fire, in training maneuvers, and for ceremonial purposes. These rounds consist of a roll crimp (knurl) or cannelure on the body of the case, which holds a paper wad in place instead of a projectile. Newer cartridges have rosette crimp (7 petals) and an identification knurl on the cartridge case.

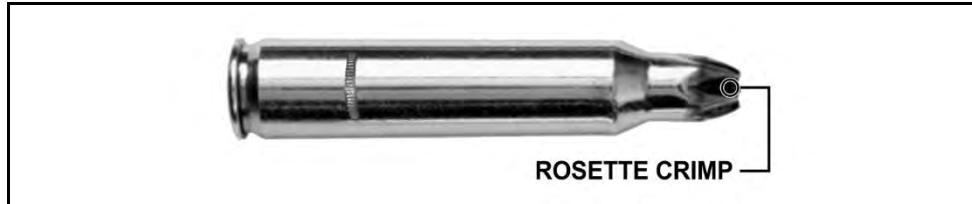


Figure A-10. Blank cartridge

### CLOSE COMBAT MISSION CAPABILITY KIT

A-20. The close combat mission capability kit (CCMCK) cartridge (see figure A-11) is used for training purposes only.

A-21. The M4 carbine/M16 rifle conversion adapter kit provides utmost safety, in-service reliability and maintainability. The kit is easy to install with a simple exchange of the bolt. It adapts the host weapon to fire unlinked 5.56mm M1042 man-marking ammunition with the feel and function of live ammunition. The kit includes fail-safe measures to prevent the discharge of a standard "live" round.



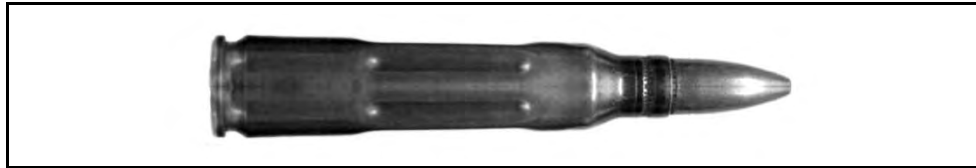
Figure A-11. Close combat mission capability kit cartridge



## **Ammunition**

### **DUMMY**

A-22. The dummy cartridge (see figure A-12) is used for practice in loading weapons and simulated firing to detect errors in employment skills when firing weapons. This round is completely inert and consists only of an empty cartridge case and ball bullet. Cartridge identification is by means of holes through the side of the case or longitudinal corrugations in the case and by the empty primer pocket.



**Figure A-12. Dummy cartridge**

### **COLORS, MARKINGS, AND SYMBOLS**

A-23. Small arms ammunition is identifiable by color coding specification per type and intended use. Table A-1 describes the general color codes for all types of 5.56mm small arms ammunition. Table A-2 identifies the color code specifications that are applied to the tip of 5.56mm ammunition.

A-24. Markings stenciled or stamped on munitions or their containers include all information needed for complete identification.

A-25. Packaging and containers for small arms ammunition are clearly marked with standard NATO symbols identifying the contents of the package by type of ammunition, primary use, and packaging information. The most common NATO symbols are described according to Standardization Agreement (STANAG) (see table A-2 on page A-11).

A-26. Small arms ammunition (less than 20mm) is not color-coded under MIL-STD-709D. Marking standards for small arms ammunition are outlined in—









- TM 9-1305-201-20&P.
- TM 9-1300-200.

A-27. These publications describe the color coding system for small arms projectiles. The bullet tips are painted a distinctive color as a ready means of identification for the user. (Refer to TM 9-1300-200 for more information.)



**Appendix A**

**Table A-1. Small Arms Color Coding and Packaging Markings**

<b>Ammunition Type</b>	<b>Color Coding</b>	<b>Package Marking</b>
Ball	No Color or Green (M855)	
Tracer (TCR or T)	Orange Tip	
Armor Piercing (AP)	Black Tip	
Short Range Training Ammunition (STRA)	Blue	
Blank (BLK)	Crimped or Capped End	
Close Combat Mission Capabilities Kit (CCMCK)	Black Cartridge and Tip, or Perforated Cartridge	None
Dummy		
<b>Special Markings</b>	<b>Color Code</b>	<b>Package Marking</b>
NATO Standard		
Interchangeable - suitable for use in similar caliber NATO weapons		
Bandoleers - ammunition is packaged in bandoleers		
Clipped - ammunition is packaged in clips for use with a speed loader		





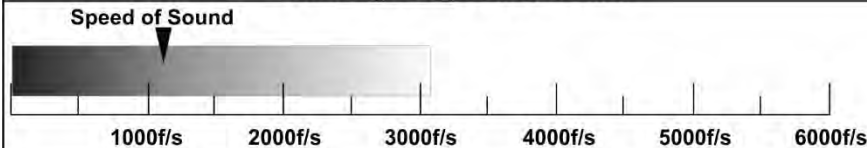
## 5.56-MM AMMUNITION

A-28. The following tables A-2 through A-10 on pages A-10 through A-18, will provide a brief description of the ten different types of commonly used 5.56mm ammunition for training and combat. Some types of 5.56mm ammunition will have more than one applicable Department of Defense Identification Code (DODIC); those DODICs are provided for the clarity and ease of the unit's ammunition resource manager.



**Ammunition**





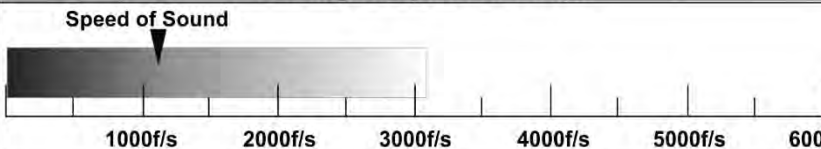
**Table A-2. 5-56mm, M855, Ball**

Cartridge, 5.56mm, M855, Ball			
DODIC	A059	AA33	Green Tip
Model:	M855		
Type:	Ball		
Weight:	190 grain		
Length:	57.4 mm	2.26 in	
Color Code:		Green Tip	
Markings:			
Case			
Type:	Center Fire	Description:	5.56 x 45 mm
Propellant			
Type:	WC844	Double Base	Nitrocellulose,
Weight:	26.1 gr	0.06 oz	Nitroglycerine
Primer			
Type:	Center Fire, Percussion		
Bullet			
Type:	Ball, Copper Alloy Jacket		
Design:	Conical steel insert and lead antimony alloy cylindrical core copper alloy jacket.		
Weight:	62 gr	0.14 oz	
Length:	23 mm	0.906 in	
Tracer:	None		
Characteristics			
Chamber Pressure:	3792 bars	55000 psi	
Velocity:	922 m/sec	3025 ft/sec	2.69 mach
Kinetic Energy (Ek)	1708 J	1260 FtLbsF	
Velocity to Speed of Sound			
			
Special Features			
<p>The M16A2 Rifle was designed to fire M855 Ball to achieve commonality of ammunition at the small unit level. Chamber pressures generated by the M855 and the required barrel twist (1:7 or 32 calibers) make it unsuitable in the obsolete M16 and M16A1 weapons. The M855's steel insert is effective against most types of fabric body armor while its three-piece construction achieve good effects against unprotected personnel targets.</p>			



Appendix A





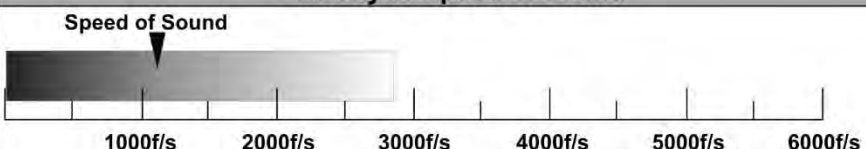
Table A-3. 5.56mm, M855A1, Enhanced Performance Round (EPR), Ball

Cartridge, 5.56mm, M855A1, Ball, EPR			
DODIC:	AB57	AB58	Bronze Tip
Model:	M855A1		
Type:	Ball, EPR		
Weight:	190 grain		
Length:	57.4 mm		
Color Code:		2.26 in Bronze Tip	
Markings:			
Case			
Type:	Center Fire	Description:	5.56 x 45 mm
Propellant			
Type:	WC844	Double Base	Nitrocellulose,
Weight:	28.1 gr	0.06 oz	Nitroglycerine
Primer			
Type:	Center Fire, Percussion		
Bullet			
Type:	Ball, EPR, Lead free slug (or core)		
Design:	Steel Penetrator encapsulated in a reverse gilded metal jacket.		
Weight:	62 gr	0.14 oz	
Length:	23 mm	0.906 in	
Tracer:	None		
Characteristics			
Chamber Pressure:	3792 bars	55000 psi	
Velocity:	960 m/sec	3150 ft/sec	2.8 mach
Kinetic Energy (Ek)	1851 J	1366 FtLbsF	
Velocity to Speed of Sound			
			
Special Features			
The M855A1's steel penetrator is effective against light armored targets while its three-piece construction maintains operational capabilities against unprotected personnel targets. The M855A1 enhances performance on hard targets/barriers. Improved propellant reduces muzzle flash. Optimized for use with the M4 series carbine for close quarters engagements.			



**Ammunition**




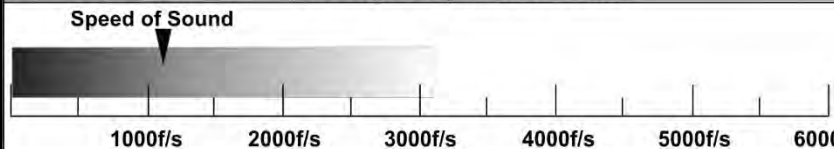
**Table A-4. 5.56mm, M856A1, Tracer**

Cartridge, 5.56mm, M856A1, Tracer			
DODIC	A063		 Orange Tip
Model:	M856A1		
Type:	Tracer		
Weight:	190 grain		
Length:	57.4 mm		
Color Code:			
Markings:			
Case			
Type:	Center Fire	Description:	5.56 x 45 mm
Propellant			
Type:	Wc844	Double Base	Nitrocellulouse,
Weight:	24.7 gr	0.06 oz	Nitroglycerine
Primer			
Type:	Center Fire, Percussion		
Bullet			
Type:	Tracer		
Design:	Lead alloy core in copper alloy jacket with incendiary compound fill in hollow base.		
Weight:	63.7 gr	0.15 oz	
Length:	29.3 mm	1.154 in	
Tracer:	None		
Characteristics			
Chamber Pressure:	3792 bars	55000 psi	
Velocity:	875 m/sec	2870 ft/sec	2.55 mach
Kinetic Energy (Ek)	1580 J	1165 FtLbsF	
Velocity to Speed of Sound			
 Speed of Sound			
Special Features			
Because the M856 loses mass as it travels, it necessitates a 1:7 barrel twist to keep it stable in flight.			



Appendix A



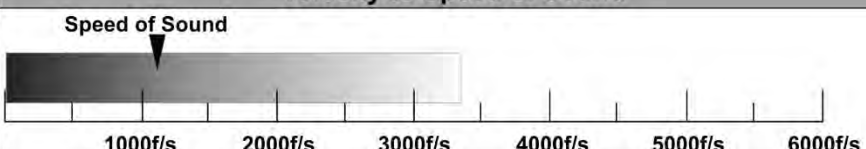
Table A-5. 5.56mm, Mk301, MOD 0, DIM Tracer

Cartridge, 5.56mm, Mk301 Mod 0, Dim Tracer			
DODIC	AB03	0	Violet Tip
Model:	Mk301 Mod 0		
Type:	Dim Tracer		
Weight:	190 grain		
Length:	57.4 mm		
Color Code:		2.26 in	Violet Tip
Markings:			
Case			
Type:	Center Fire	Description:	5.56 x 45 mm
Propellant			
Type:	WC844	Double Base	Nitrocellulouse,
Weight:	26.1 gr	0.06 oz	Nitroglycerine
Primer			
Type:	Center Fire, Percussion		
Bullet			
Type:	Dim Tracer, Copper Alloy Jacket		
Design:	Lead alloy core in copper alloy jacket with incendiary compound fill in a hollow case.		
Weight:	62 gr	0.14 oz	
Length:	23 mm	0.906 in	
Tracer:	Dim Tracer element		
Characteristics			
Chamber Pressure:	4047 bars	55000 psi	
Velocity:	922 m/sec	3025 ft/sec	2.69 mach
Kinetic Energy (Ek)	1708 J	1260 FtLbsF	
Velocity to Speed of Sound			
			
Special Features			
Low burning temperature of tracer mix produces IR light spectrum tracer effects, visible with use of night vision devices. Dim Tracer element consists of a barium nitrate composition, with tracer effective range to 900m. WC845S propellant provides flash suppression.			



**Ammunition**


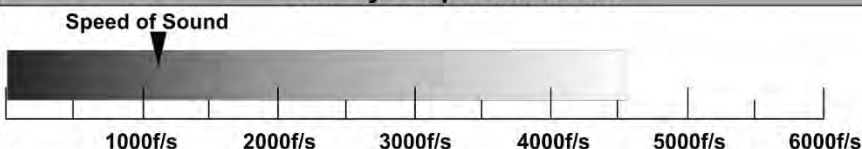
**Table A-6. 5.56mm, M995, Armor Piercing**

Cartridge, 5.56mm, M995, Armor Piercing			
DODIC	AA69	 Black Tip 2.26 in Black Tip	
Model:	M995		
Type:	Armor Piercing		
Weight:	180 grain		
Length:	57.4 mm		
Color Code:			
Markings:			
Case			
Type:	Center Fire	Description:	5.56 x 45 mm
Propellant			
Type:	WCR845	Double Base	Nitrocellulouse, Nitroglycerine
Weight:	27.5 gr	0.06 oz	
Primer			
Type:	Center Fire, Berdan		
Bullet			
Type:	Armor Piercing, Tungsten-Cobalt core		
Design:	Tungsten-Cobalt core located by aluminum cup in copper alloy jacket		
Weight:	52 gr	0.12 oz	
Length:	29.3 mm	1.154 in	
Tracer:	None		
Characteristics			
Chamber Pressure:	3465 bars	55000 psi	
Velocity:	1013 m/sec	3324 ft/sec	2.95 mach
Kinetic Energy (Ek)	1729 J	1276 FtLbsF	
Velocity to Speed of Sound			
 Speed of Sound 1000f/s 2000f/s 3000f/s 4000f/s 5000f/s 6000f/s			
Special Features			
The M995 was designed for use in all U.S. 5.56mm weapons, it will penetrate 12mm of steel at 100m to defeat light armored vehicles and other barrier materials on the battlefield.			



Appendix A

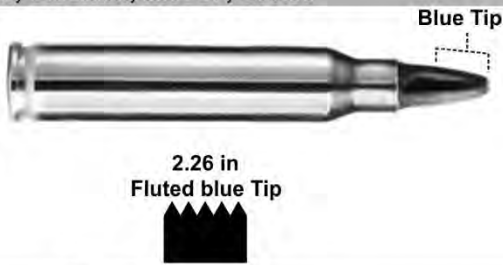
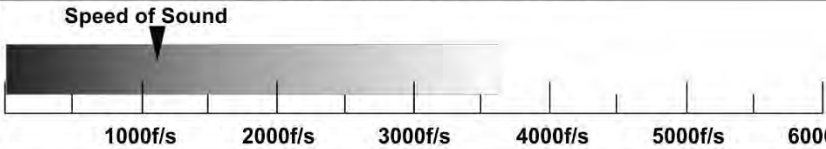
Table A-7. 5.56mm, M862, Short Range Training Ammunition

Cartridge, 5.56mm, M862, SRTA			
DODIC	AA68		
Model:	M862		
Type:	SRTA		
Weight:	108 grain		
Length:	57.4 mm		
Color Code:			
Markings:			
Case			
Type:	Center Fire	Description:	5.56 x 45 mm
Propellant			
Type:	0	Double Base	Nitrocellulouse,
Weight:	gr	0 oz	Nitroglycerine
Primer			
Type:	Center Fire		
Bullet			
Type:	SRTA		
Design:	Plastic projectile		
Weight:	6.9 gr	0.02 oz	
Length:	29.3 mm	1.154 in	
Tracer:	None		
Characteristics			
Chamber Pressure:	2758 bars	40000 psi	
Velocity:	1379 m/sec	4525 ft/sec	4.02 mach
Kinetic Energy (Ek)	425 J	314 FtLbsF	
Velocity to Speed of Sound			
			
Special Features			
The M862 is ballistically matched to standard M855 ball ammunition out to 25m, with a maximum range of 250m. M862 ammunition MUST be used with the M2 training bolt. This provides units the capability to conduct training on installations that have limited range facilities which require the use of reduced/decreased Surface Danger Zones.			



**Ammunition**


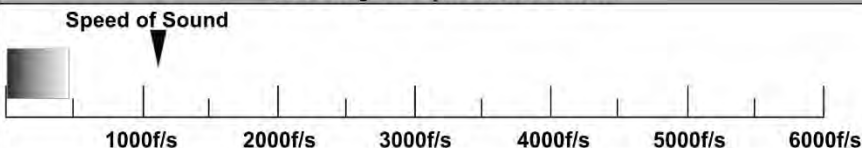
**Table A-8. 5.56mm, M1037, Short Range Training Ammunition**

Cartridge, 5.56mm, M1037, SRTA			
DODIC:	AB67		
Model:	M1037		
Type:	SRTA		
Weight:	165 grain		
Length:	57.4 mm		
Color Code:			
Markings:			
Case			
Type:	Center Fire	Description:	5.56 x 45 mm
Propellant			
Type:	0	Double Base	Nitrocellulouse,
Weight:	gr	0 oz	Nitroglycerine
Primer			
Type:	Center Fire		
Bullet			
Type:	SRTA, Frangible		
Design:	Copper, nylon and carbon fiber projectile		
Weight:	33 gr	0.08 oz	
Length:	29.3 mm	1.154 in	
Tracer:	None		
Characteristics			
Chamber Pressure:	2758 bars	40000 psi	
Velocity:	1097 m/sec	3600ft/sec	3.2 mach
Kinetic Energy (Ek)	1287J	950 FtLbsF	
Velocity to Speed of Sound			
			
Special Features			
The M1037 is ballistically matched to standard M855 ball ammunition out to 100m, with a maximum range of less than 600m. M1037 ammunition DOES NOT require the use of the M2 training bolt. This provides units the capability to conduct training on installations that have limited range facilities which require the use of reduced/decreased Surface Danger Zones.			



Appendix A

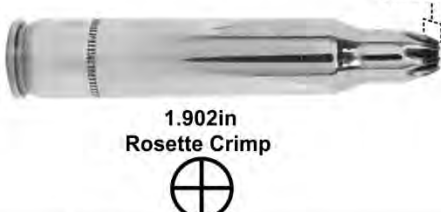


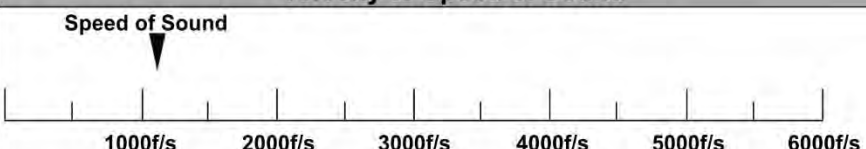
Table A-9. 5.56mm, M1042 Close Combat Mission Capability Kit

Cartridge, 5.56mm, M1042, Close Combat Mission Capability Kit			
DODIC:	AB09 (blue tip)	AB10 (red tip)	AB11 (yellow tip)
Model:	M1042		
Type:	CCMCK		
Weight:	94.86 grain		
Length:	57.4 mm		
Color Code:	Blue, red, or yellow plastic tip		
Markings:			
Case			
Type:	Rim Fire	Description:	5.56 x 45 mm
Propellant			
Type:	0	Double Base	Nitrocellulouse,
Weight:	gr	0 oz	Nitroglycerine
Primer			
Type:	Rim Fire		
Bullet			
Type:	CCMCK		
Design:	0		
Weight:	6.9 gr	0.02 oz	
Length:	29.3 mm	1.154 in	
Tracer:	None		
Characteristics			
Chamber Pressure:	0 bars	0 psi	
Velocity:	149 m/sec	488 ft/sec	0.43 mach
Kinetic Energy (Ek)	5 J	4 FtLbsF	
Velocity to Speed of Sound			
			
Special Features			
<p>The CCMCK is a user installed weapons modification system used for short range force on force training. The M1042 is a low velocity marking ammunition that prevents the weapon from firing service ammunition. Fail-safe is achieved by utilizing a 3mm offset firing pin which will only work with the M1042 rim fire primer. In the event that a "Live" 5.56mm cartridge is chambered and the trigger is pulled, the conversion will offset.</p>			



**Ammunition**

**Table A-10. 5.56mm, M200, Blank**

Cartridge, 5.56mm, M200, Blank			
DODIC:	A080		
Model:	M200		
Type:	Blank		
Weight:	107 grain		
Length:	48.3 mm		
Color Code:			
Markings:			
Case			
Type:	Center Fire	Description:	5.56 x 45 mm
Propellant			
Type:	HPC 13	Double Base	Nitrocellulouse,
Weight:	7 gr	0.02 oz	Nitroglycerine
Primer			
Type:	Center Fire, Berdan		
Bullet			
Type:	Blank, NA		
Design:	NA		
Weight:	NONE		
Length:	NA		
Tracer:	NA		
Characteristics			
Chamber Pressure:	0 bars	psi	
Velocity:	m/sec	ft/sec	0 mach
Kinetic Energy (Ek)	0	0	
Velocity to Speed of Sound			
			
Special Features			
The M200 cartridge is designed for simulated firing in training exercises and for saluting purposes. The cartridge is identified by a rosette-crimp closure of the case mouth.			



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## Appendix B

# Ballistics

Ballistics is the science of the processes that occur from the time a firearm is fired to the time when the bullet impacts its target. Soldiers must be familiar with the principles of ballistics as they are critical in understanding how the projectiles function, perform during flight, and the actions of the bullet when it strikes the intended target. The profession of arms requires Soldiers to understand their weapons, how they operate, their functioning, and their employment.

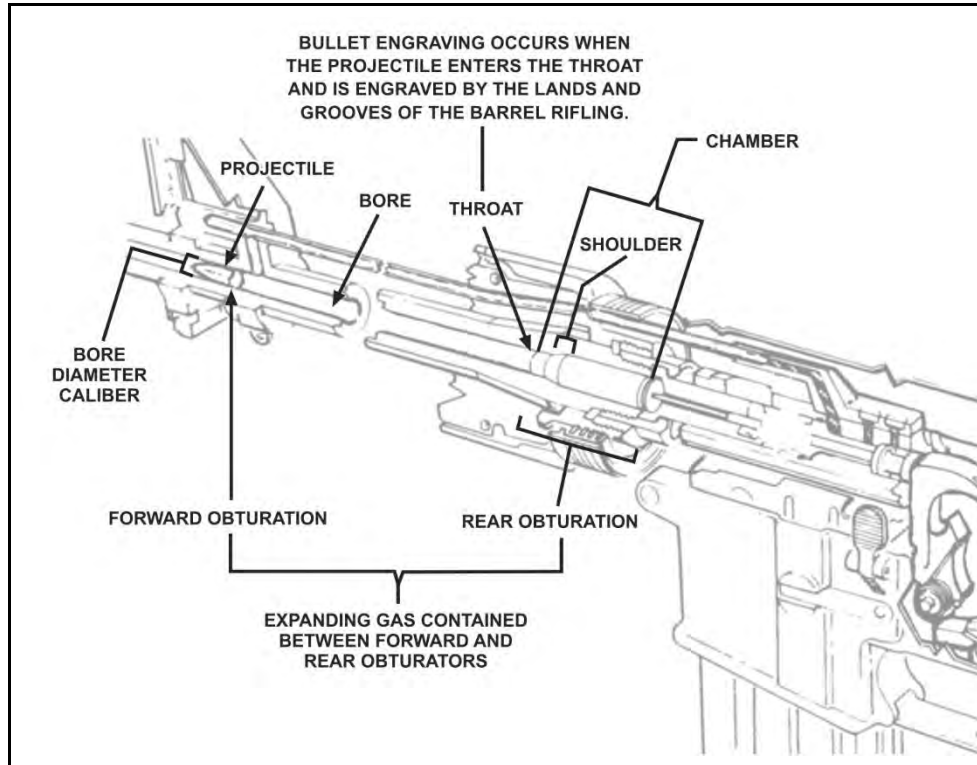
B-1. The flight path of a bullet includes three stages: the travel down the barrel, the path through the air to the target, and the actions the bullet takes upon impact with the target. These stages are defined in separate categories of ballistics; internal, external, and terminal ballistics.

## INTERNAL BALLISTICS

B-2. **Internal ballistics** – is the study of the propulsion of a projectile. Internal ballistics begin from the time the firing pin strikes the primer to the time the bullet leaves the muzzle. Once the primer is struck the priming charge ignites the propellant. The expanding gases caused by the burning propellant create pressures which push the bullet down the barrel. The bullet engages the lands and grooves (rifling) imparting a spin on the bullet that facilitates stabilization of the projectile during flight. Internal ballistics ends at shot exit, where the bullet leaves the muzzle. (See figure B-1.)



## Appendix B



**Figure B-1. Internal ballistic terms**

B-3. Several key terms are used when discussing the physical actions of internal ballistics —

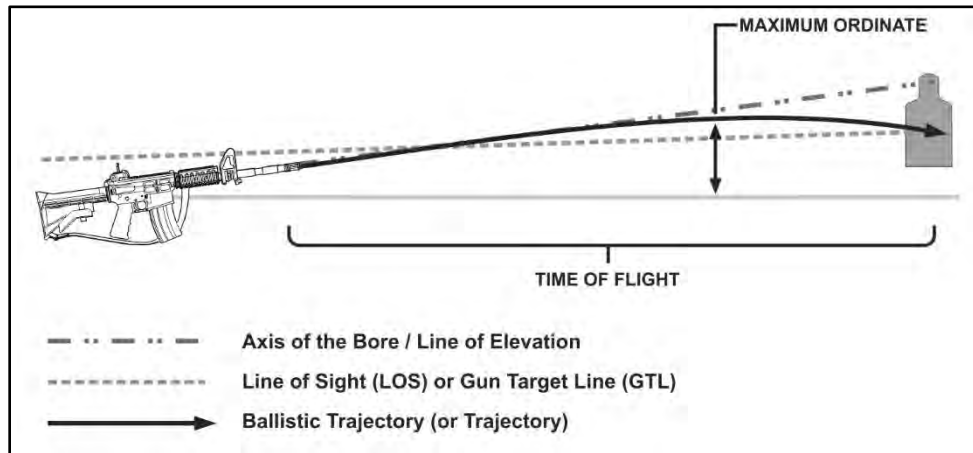
- **Bore** – the interior portion of the barrel forward of the chamber.
- **Chamber** – the part of the barrel that accepts the ammunition for firing.
- **Grain (gr)** – a unit of measurement of either a bullet or a projectile. There are 7000 grains in a pound, or 437.5 grains per ounce.
- **Pressure** – the force developed by the expanding gasses generated by the combustion (burning) of the propellant. Pressure is measure in pounds per square inch (psi).
- **Shoulder** – the area of the chamber that contains the shoulder, forcing the cartridge and projectile into the entrance of the bore at the throat of the barrel.
- **Muzzle** – the end of the barrel.
- **Throat** – the entrance to the barrel from the chamber. Where the projectile is introduced to the lands and grooves within the barrel.



**Ballistics**

## EXTERNAL BALLISTICS

B-4. **External ballistics** is the study of the physical actions and effects of gravity, drag, and wind along the projectile's flight to the target. It includes only those general physical actions that cause the greatest change to the flight of a projectile. (See figure B-2.) External ballistics begins at shot exit and continues through the moment the projectile strikes the target.



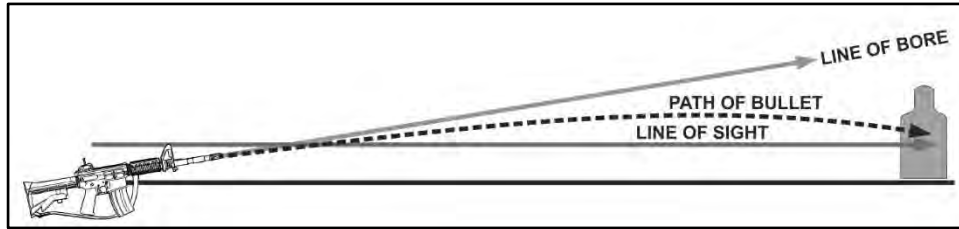
**Figure B-2. External ballistic terms**

B-5. The following terms and definitions are used to describe the actions or reactions of the projectile during flight. This terminology is standard when dealing with any weapon or weapon system, regardless of caliber. (See figure B-3.)

- **Axis of the bore** (Line of Bore) – the line passing through the center of the bore or barrel.
- **Line of sight (LOS) or gun target line (GTL)** – a straight line between the sights or optics and the target. This is never the same as the axis of the bore. The LOS is what the Soldier sees through the sights and can be illustrated by drawing an imaginary line from the firer's eye through the rear and front sights out to infinity. The LOS is synonymous with the GTL when viewing the relationship of the sights to a target.
- **Line of elevation (LE)** – the angle represented from the ground to the axis of the bore.
- **Ballistic trajectory** – the path of a projectile when influenced only by external forces, such as gravity and atmospheric friction.
- **Maximum ordinate** – the maximum height the projectile will travel above the line of sight on its path to the point of impact.
- **Time of flight** – the time taken for a specific projectile to reach a given distance after firing.



## Appendix B



**Figure B-3. Trajectory**

- **Jump** – vertical jump in an upward and rearward direction caused by recoil. Typically, it is the angle, measured in mils, between the line of departure and the line of elevation.
- **Line of departure (LD)** – the line the projectile is on at shot exit.
- **Muzzle** – the end of the barrel.
- **Muzzle velocity or velocity** – the velocity of the projectile measured at shot exit. Muzzle velocity decreases over time due to air resistance. For small arms ammunition, velocity (V) is represented in feet per second (f/s).
- **Twist rate** – the rotation of the projectile within the barrel of a rifled weapon based on the distance to complete one revolution. The twist rate relates to the ability to gyroscopically spin-stabilize a projectile on rifled barrels, improving its aerodynamic stability and accuracy. The twist rate of the M4- or M16-series weapon is a right hand, one revolution in every seven inches of barrel length (or R 1:7 inches).
- **Shot exit** – the moment the projectile clears the muzzle of the barrel, where the bullet is not supported by the barrel.
- **Oscillation** – the movement of the projectile in a circular pattern around its axis during flight.
- **Drift** – the lateral movement of a projectile during its flight caused by its rotation or spin.
- **Yaw** – a deviation from stable flight by oscillation. This can be caused by cross wind or destabilization when the projectile enters or exits a transonic stage.
- **Grain (gr)** – a unit of measurement of either a bullet or a propellant charge. There are 7000 grains in a pound, or 437.5 grains per ounce.
- **Pressure** – the force developed by the expanding gases generated by the combustion (burning) of the propellant. For small arms, pressure is measured in pounds per square inch (psi).
- **Gravity** – the constant pressure of the earth on a projectile at a rate of about 9.8 meters per second squared, regardless of the projectile's weight, shape or velocity. Commonly referred to as bullet drop, gravity causes the projectile to drop from the line of departure. Soldiers must understand the effects of gravity on the projectile when zeroing as well as how it applies to determining the appropriate hold-off at ranges beyond the zero distance.



## Ballistics

- **Drag (air resistance)** – the friction that slows the projectile down while moving through the air. Drag begins immediately upon the projectile exiting the barrel (shot exit). It slows the projectile's velocity over time, and is most pronounced at extended ranges. Each round has a ballistic coefficient (BC) that is a measurement of the projectile's ability to minimize the effects of air resistance (drag) during flight.
- **Trajectory** – the path of flight that the projectile takes upon shot exit over time. For the purposes of this manual, the trajectory ends at the point of impact.
- **Wind** – has the greatest variable effect on ballistic trajectories. The effects of wind on a projectile are most noticeable in three key areas between half and two-thirds the distance to the target:
  - **Time (T)** – the amount of time the projectile is exposed to the wind along the trajectory. The greater the range to target, the greater time the projectile is exposed to the wind's effects.
  - **Direction** – the direction of the wind in relation to the axis of the bore. This determines the direction of drift of the projectile that should be compensated.
  - **Velocity (V)** – the speed of the wind during the projectile's trajectory to the target. Variables in the overall wind velocity affecting a change to the ballistic trajectory include sustained rate of the wind and gust spikes in velocity.

## TERMINAL BALLISTICS

B-6. Terminal ballistics is the science of the actions of a projectile from the time it strikes an object until it comes to rest (called terminal rest). This includes the terminal effects that take place against the target.

- **Kinetic Energy ( $E_k$ )** – a unit of measurement of the delivered force of a projectile. Kinetic energy is the delivered energy that a projectile possesses due to its mass and velocity at the time of impact. Kinetic energy is directly related to the *penetration capability* of a projectile against the target.
- **Penetration** – the ability or act of a projectile to enter a target's mass based on its delivered kinetic energy. When a projectile strikes a target, the level of penetration into the target is termed the impact depth. The impact depth is the distance from the point of impact to the moment the projectile stops at its terminal resting place. Ultimately, the projectile stops when it has transferred its momentum to an equal mass of the medium (or arresting medium).

B-7. Against any target, penetration is the most important terminal ballistic consideration. Soldiers must be aware of the penetration capabilities of their ammunition against their target, and the most probable results of the terminal ballistics.

B-8. The 5.56mm projectile's purpose is to focus the largest amount of momentum (energy) on the smallest possible area of the target to achieve the greatest penetration. They are designed to resist deformation on impact to enter the target's mass. The steel



## **Appendix B**

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tip of the penetrator allows for reduced deformation through light skin armor or body armor, and the heavier steel penetrator allows for increased soft tissue damage.

### **ACTIONS AFTER THE TRIGGER SQUEEZE**

B-9. Once the trigger is squeezed, the ballistic actions begin. Although not all ammunition and weapons operate in the same manner, the following list describes the general events that occur on the M4- and M16-series weapons when the trigger is squeezed.

- The hammer strikes the rear of the firing pin.
- The firing pin is pushed forward, striking the cartridge percussion primer assembly.
- The primer is crushed, pushing the primer composition through the paper disk, and on to the anvil, detonating the primer composition.
- The burning primer composition is focused evenly through the primer cup vent hole, igniting the propellant.
- The propellant burns evenly within the cartridge case.
- The cartridge case wall expand from the pressure of the burning propellant, firmly locking the case to the chamber walls.
- The expanded cartridge case, held firmly in place by the chamber walls and the face of the bolt provide rear obturation, keeping the burning propellant and created expanding gasses in front of the cartridge case.
- The projectile is forced by the expanding gasses firmly into the lands and grooves at the throat of the bore, causing engraving.
- Engraving causes the scoring of the softer outer jacket of the projectile with the lands and grooves of the bore. This allows the projectile to spin at the twist rate of the lands and grooves, and provides a forward obturation seal. The forward obturation keeps the expanding gasses behind the projectile in order to push it down the length of the barrel.
- As the propellant continues to burn, the gasses created continue to seek the path of least resistance. As the cartridge case is firmly seated and the projectile is moveable, the gas continues to exert its force on the projectile.
- Once the projectile passes the gas port on the top of the barrel, a small amount of gas is permitted to escape from propelling the projectile. This escaping gas is directed up through the gas port and rearward through the gas tube, following the path of least resistance. The diameter of the gas port limits the amount of gas allowed to escape.
- As the end of the projectile leaves the muzzle, it is no longer supported by the barrel itself. Shot exit occurs.
- Upon shot exit, most of the expanding and burning gasses move outward and around the projectile, causing the muzzle flash.
- At shot exit, the projectile achieves its maximum muzzle velocity. From shot exit until the projectile impacts an object, the projectile loses velocity at a steady rate due to air resistance.



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**Ballistics**

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- As the round travels along its trajectory, the bullet drops consistently by the effects of gravity.
- As the actual line of departure is an elevated angle from the line of sight, the projectile appears to rise and then descend. This rise and fall of the projectile is the trajectory.
- The round achieves the highest point of its trajectory typically over half way to the target, depending on the range to target. The high point is called the round's maximum ordinate or *max ord*.
- From the max ord, the projectile descends into the target.
- The round strikes the target at the point of impact, which, depending on the firing event, may or may not be the desired point of impact, and is seldom the point of aim.

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*Note.* The point of aim and point of impact only occur twice during the bullet's path to the target at distance; once when the trajectory crosses the line of sight approximately 25 meters from the muzzle, and again at the zero distance (300 meters for the Army standard zero).

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- Once the projectile strikes a target or object, it delivers its kinetic energy (force) at the point of impact.
- Terminal ballistics begin.

B-10. Once terminal ballistics begin, no bullets follow the same path or function. Generally speaking, the projectile will penetrate objects where the delivered energy (mass times velocity squared, divided by 2) is greater than the mass, density, and area of the target at the point of the delivered force. There are other contributing factors, such as the angle of attack, yaw, oscillation, and other physical considerations that are not included in this ballistic discussion.

## **STRUCTURE PENETRATION**

B-11. The following common barriers in built-up areas can prevent penetration by a 5.56-mm round fired at less than 50 meters (M855) including:

- Single row sandbags.
- A 2-inch thick concrete wall (not reinforced with rebar or similar item).
- A 55-gallon drum filled with water or sand.
- A metal ammunition can filled with sand.
- A cinder block filled with sand (the block may shatter).
- A plate glass windowpane at a 45-degree angle (glass fragments will be thrown behind the glass).
- A brick veneer.

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*Note.* The M855A1 enhanced performance round (EPR) has increased capabilities for barrier penetration compared with M855 as shown above.

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B-12. Although most structural materials repel single 5.56-mm rounds, continued and concentrated firing can breach (penetrate through) some typical urban structures.

B-13. The best method for breaching a masonry wall is by firing short bursts in a U-shaped pattern. The distance from the firer to the wall should be minimized for best results—ranges as close as 25 meters are relatively safe from ricochet.

B-14. Ball ammunition and armor-piercing rounds produce almost the same results, but are more likely to ricochet to the sides and rearward back at the firer (called spit-back).

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**Note.** Soldiers must ensure the appropriate level of personal protective equipment is worn when conducting tactical and collective tasks, particularly at ranges less than 50 meters.

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B-15. The 5.56-mm round can be used to create either a loophole (about 7 inches in diameter) or a breach hole (large enough for a man to enter). When used against reinforced concrete, the M16 rifle and M249 cannot cut the reinforcing bars.

## SOFT TISSUE PENETRATION

B-16. A gunshot wound, or ballistic trauma, is a form of physical damage sustained from the entry of a projectile. The degree of tissue disruption caused by a projectile is related to the size of the cavities created by the projectile as it passes through the target's tissue. When striking a personnel target, there are two types of cavities created by the projectile; permanent and temporary wound cavities.

### Permanent Wound Cavity

B-17. The permanent cavity refers specifically to the physical hole left in the tissues of soft targets by the pass-through of a projectile. It is the total volume of tissue crushed or destroyed along the path of the projectile within the soft target.

B-18. Depending on the soft tissue composition and density, the tissues are either elastic or rigid. Elastic organs stretch when penetrated, leaving a smaller wound cavity. Organs that contain dense tissue, water, or blood are rigid, and can shatter from the force of the projectile. When a rigid organ shatters from a penetrating bullet, it causes massive blood loss within a larger permanent wound cavity. Although typically fatal, striking these organs may not immediately incapacitate the target.

### Temporary Wound Cavity

B-19. The temporary wound cavity is an area that surrounds the permanent wound cavity. It is created by soft, elastic tissues as the projectile passes through the tissue at greater than 2000 feet per second. The tissue around the permanent cavity is propelled outward (stretched) in an almost explosive manner from the path of the bullet. This forms a temporary recess or cavity 10 to 12 times the bullet's diameter.

B-20. Tissue such as muscle, some organs, and blood vessels are very elastic and can be stretched by the temporary cavity with little or no damage and have a tendency to absorb the projectile's energy. The temporary cavity created will slowly reduce in size



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**Ballistics**

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over time, although typically not returning completely to the original position or location.

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*Note.* Projectiles that do not exceed 2000 feet per second velocity on impact do not provide sufficient force to cause a temporary cavity capable of incapacitating a threat.

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B-21. The extent of the cavitation (the bullet's creation of the permanent and temporary cavities) is related to the characteristics of the projectile:

- **Kinetic energy ( $E_k$ )** – the delivered mass at a given velocity. Higher delivered kinetic energy produces greater penetration and tissue damage.
- **Yaw** – any yaw at the point of impact increases the projectile's surface area that strikes the target, decreasing kinetic energy, but increasing the penetration and cavity size.
- **Deformation** – the physical changes of the projectile's original shape and design due to the impact of the target. This increases the projectile's surface area and the size of the cavity created after penetration.
- **Fragmentation** – the fracturing of a projectile into multiple pieces or sub-projectiles. The multiple paths of the fragmented sub-projectiles are unpredictable in size, velocity, and direction. The bullet jacket, and for some types of projectiles, the lead core, fracture creating small, jagged, sharp edged pieces that are propelled outward with the temporary cavity. Fragments can sever tissue, causing large, seemingly explosive-type. Bone fragments caused by the bullet's strike can have the same effect.
- **Tumbling** – the inadvertent end-over-end rotation of the projectile. As a projectile tumbles as it strikes the target, the bullet travels through the tissues with a larger diameter. This causes a more severe permanent cavity as it passes through the soft tissue. A tumbling projectile can change direction erratically within the body due to its velocity and tendency to strike dense material with a larger surface area.

B-22. Once inside the target, the projectile's purpose is to destroy soft tissues with fragmentation. The ball ammunition is designed to not flatten or expand on impact, which would decrease velocity and delivered energy. For the M855-series cartridge, the penetrator tends to bend at the steel-core junction, fracture the weaker jacketed layer, and fragment into pieces when striking an object.



## **Appendix B**

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### **Incapacitation**

B-23. Incapacitation with direct fire is the act of ballistically depriving a target of the ability, strength, or capability to continue its tactical mission. To assist in achieving the highest probability of incapacitation with a single shot, the projectile is designed with the ability to tumble, ricochet, or fragment after impact.

B-24. The projectile or its fragments then must hit a vital, blood-bearing organ or the central nervous system to effectively incapacitate the threat. The projectile's limited fragmentation potential after entry maximizes the soft tissue damage and increases the potential for rapid incapacitation.

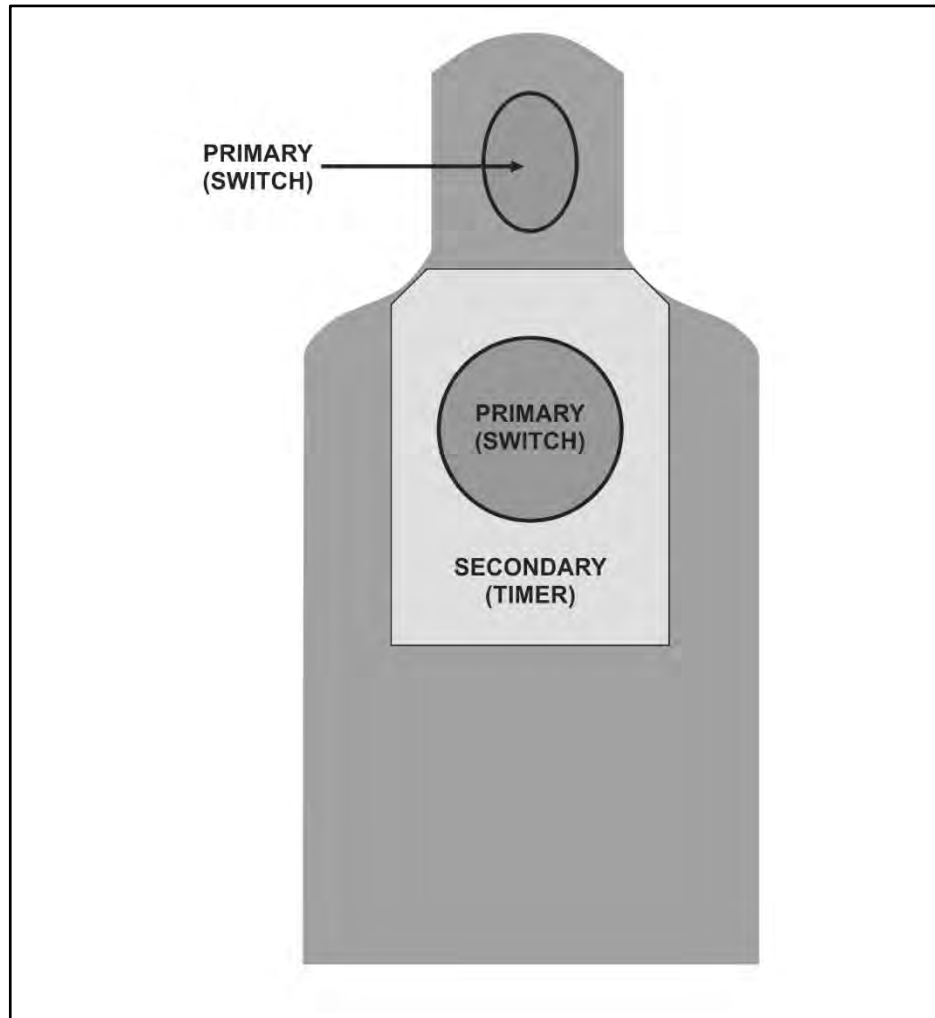
### **Lethal Zones**

B-25. The Soldier's primary point of aim at any target by default is center of visible mass. This allows for a tolerance that includes the greatest margin of error with the highest probability of a first round hit. The combat conditions may require more precise fires at partially exposed targets or targets that require immediate incapacitation.

B-26. Ideally, the point of aim is anywhere within a primary switch area. This point will maximize the possibility of striking major organs and vessels, rendering a clean, one-shot kill (see figure B-4.)



**Ballistics**



**Figure B-4. Lethal zone example**

B-27. Shots to the head should be weighed with caution. The head is the most frequently moved body part and are the most difficult to hit with precision. Shots to other exposed body parts, such as the pelvic area, should be considered for the shot.

B-28. Shots to the pelvic area are used when the target is not completely visible or when the target is wearing body armor that prevents the Soldier from engaging the primary zone. This area is rich in large blood vessels and a shot here has a good possibility of impeding enemy movement by destroying the pelvic or hitting the lower spine.

- Circuitry shots (switches).
- Hydraulic shots (timers).



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### **Circuitry Shots (Switches)**

B-29. Circuitry shots, or “switches,” are strikes to a target that deliver its immediate incapacitation. Immediate incapacitation is the sudden physical or mental inability to initiate or complete any physical task. To accomplish this, the central nervous system must be destroyed by hitting the brain or spinal column. All bodily functions and voluntary actions cease when the brain is destroyed and if the spinal column is broken, all functions cease below the break.

### **Hydraulic Shots (Timer)**

B-30. Hydraulic shots, or “timers,” are impacts on a target where immediate incapacitation is not guaranteed. These types of ballistic trauma are termed “timers” as that after the strike of the bullet, the damage caused requires time for the threat to have sufficient blood loss to render it incapacitated. Hydraulic shots, although ultimately lethal, allow for the threat to function in a reduced capacity for a period of time.

B-31. For hydraulic shots to eliminate the threat, they must cause a 40 percent loss of blood within the circulatory system. If the shots do not disrupt that flow at a rapid pace, the target will be able to continue its mission. Once two (2) liters of blood are lost, the target will transition into hypovolemic shock and become incapacitated.



## Appendix C

# Complex Engagements

This appendix provides detailed information on the calculations for determining *deliberate* holds for complex engagements and various engagement techniques. It is designed for the advanced shooter; however, all Soldiers should be familiar with the contents of the appendix in order to build their mastery and proficiency with their individual weapon.

C-1. A complex engagement includes any shot that cannot use the *CoVM* as the point of aim to ensure a target hit. Complex engagements require a Soldier to apply various points of aim (called hold, hold-off, or holds) to successfully defeat the threat.

C-2. This appendix builds upon the concepts discussed in Chapter 7, Aim, and only include topics specific to deliberate hold determinations. These topics are:

- **Target conditions:**
  - Range to target.
  - Moving targets.
  - Oblique targets.
- **Environmental conditions:**
  - Wind.
  - Angled firing.
- **Compound conditions:**

C-3. Each of these firing conditions may require the Soldier to determine an appropriate aim point that is not the CoVM. During any complex engagement, the Soldier serves as the ballistic computer during the shot process. The hold represents a refinement or alteration of the center of visible mass point of aim at the target to counteract certain conditions during a complex engagement for—

- Range to target.
- Lead for targets based on their direction and speed of movement.
- Counter-rotation lead required when the Soldier is moving in the opposite direction of the moving target.
- Wind speed, direction, and duration between the shooter and the target at ranges greater than 300 meters.
- Greatest lethal zone presented by the target to provide the most probable point of impact to achieve immediate incapacitation.

C-4. The Soldier will apply the appropriate aim (hold) based on the firing instances presented. Hold determinations will be discussed in two formats; immediate and deliberate.



## Appendix C

### TARGET CONDITIONS

C-5. Soldiers must consider several aspects of the target to apply the proper point of aim on the target. The target's posture, or how it is presenting itself to the shooter, consists of—

- Range to target.
- Nature of the target.
- Nature of the terrain (surrounding the target).

### RANGE TO TARGET

C-6. Rapidly determining an accurate range to target is critical to the success of the Soldier at mid and extended ranges. There are several range determination methods shooters should be confident in applying to determine the proper hold-off for pending engagements.

### Deliberate Range Determination

C-7. The deliberate methods afford the shooter a reliable means of determining the range to a given target; however, these methods require additional time. (See figure C-1.) With practice and experience, the time to determine the range with these methods is reduced significantly. The various methods of deliberate range determination are:

- Reticle relationship (mil or MOA).
- Recognition method.
- Bracketing method.
- Halving method.

RANGE ESTIMATION	MIL RELATION FORMULA
<p>SIZE OF OBJ <b>IN INCHES</b> X 25.4 = Constant.</p> <p>Divide the <b>Constant</b> by SIZE OF OBJ <b>IN MILS</b> to determine the range to target.</p> <p style="text-align: center;"><b>EXAMPLE</b></p> <p><b>67 inches</b> X 25.4 = 1701.8 rounded to the nearest whole number - 1702.</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">This is the constant.</div> <p><b>Constant</b> (1702) divided by 2.5 Mils = 681, or 681 meters to the target.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>This number comes from your own perception of an object measured with a mil scale from an optic, or a pair of binoculars. The number is whatever you observe it to be.</p> </div>	

Figure C-1. Mil Relation Formula example



## Complex Engagements

### Reticle Relationship Method

C-8. With this method, shooters use their aiming device's reticle to determine the range to target based on standard target information. To use the appearance of objects method based on how they align to an aiming device's reticle, shooters must be familiar with the sizes and details of personnel and equipment at known distances as shown in figure C-2.

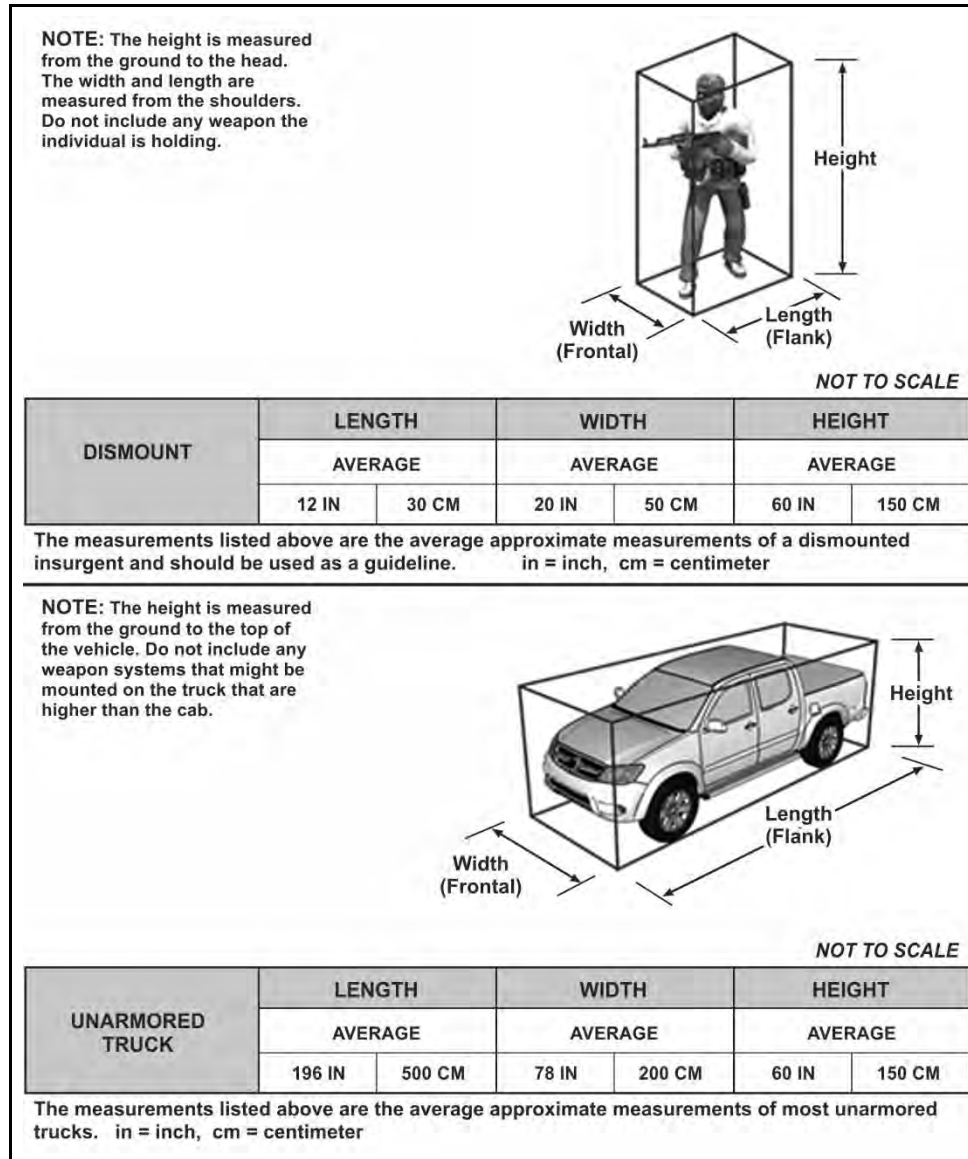
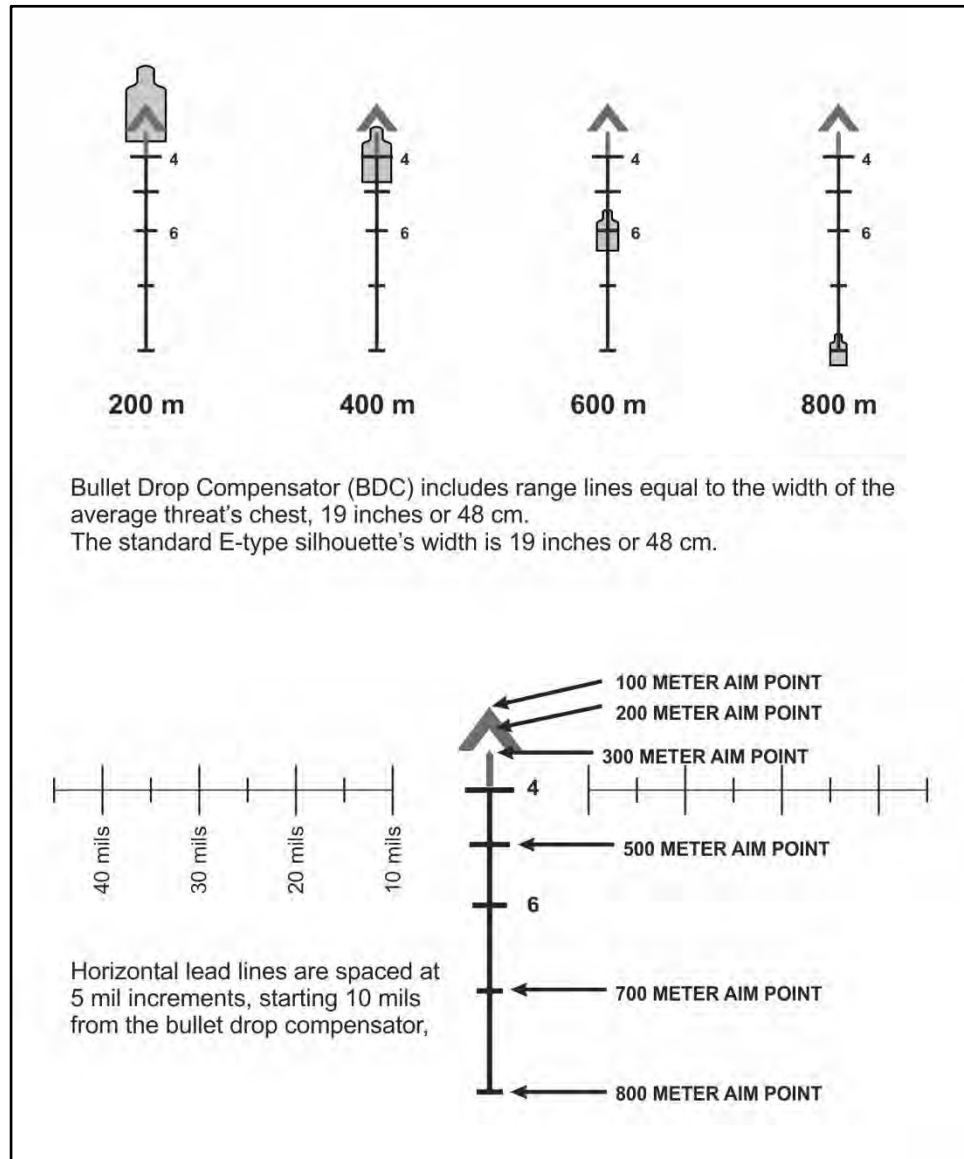


Figure C-2. Standard dismount threat dimensions example



## Appendix C

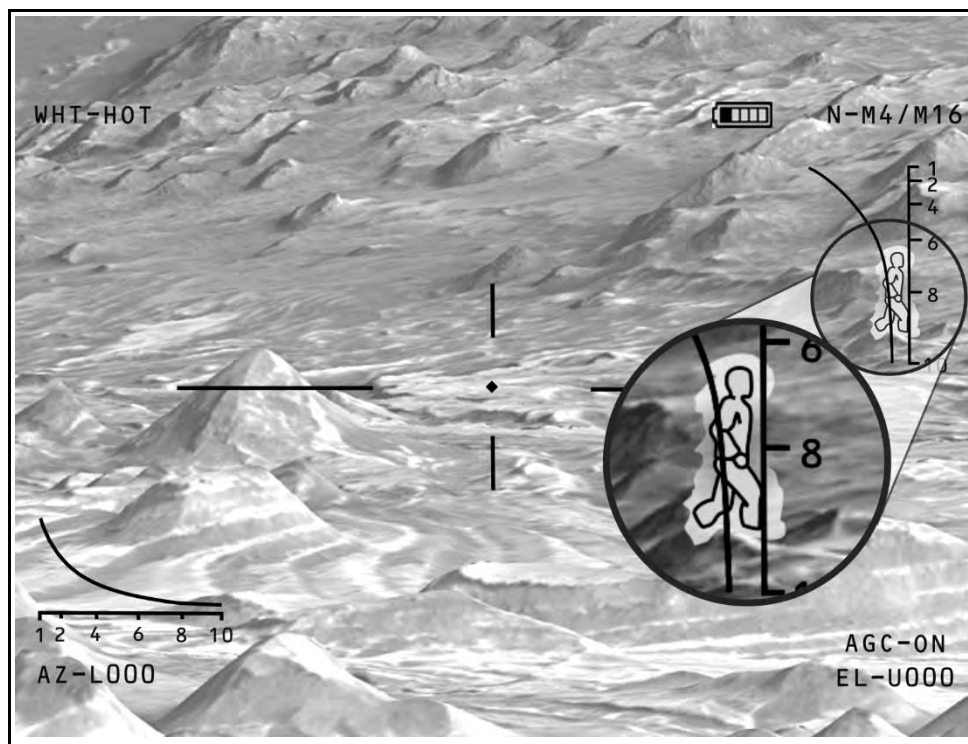
C-9. Knowing the standard dimensions to potential targets allows for the Soldier to assess those dimensions using the aiming device's reticle. The Soldier will apply the mil or MOA relationship as they pertain to the aiming device and the target. Figure C-3 and figure C-4 on page C-5, show various reticle relationship examples.



**Figure C-3. RCO range determination using the bullet drop compensator reticle**



**Complex Engagements**



**Figure C-4. Reticle relationship using a stadiametric reticle example**

C-10. Anything that limits the visibility (such as weather, smoke, or darkness) will also limit the effectiveness of this method. To become proficient in using the appearance of objects method with accuracy, shooters must be familiar with the characteristic details of objects as they appear at various ranges.



## **Appendix C**

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### **MOVING TARGETS**

C-11. Moving targets are those threats that appear to have a consistent pace and direction. Targets on any battlefield will not remain stationary for long periods of time, particularly once a firefight begins. Soldiers must have the ability to deliver lethal fires at a variety of moving target types and be comfortable and confident in the engagement techniques. There are two methods for defeating moving targets; tracking and trapping.

#### **Tracking Method**

C-12. The tracking method is used for a moving target that is progressing at a steady pace over a well-determined route. If a Soldier uses the tracking method, he tracks the target with the rifle's sight while maintaining sight alignment and a point of aim on or ahead of (leading) the target until the shot is fired.

C-13. When establishing a lead on a moving target, the rifle sights will not be centered on the target and instead will be held on a lead in front of the target. The basic lead formula for moving targets that are generally perpendicular to the shooter (moving across the sector of observation), is—

$$\frac{1}{100}R(7) = L$$

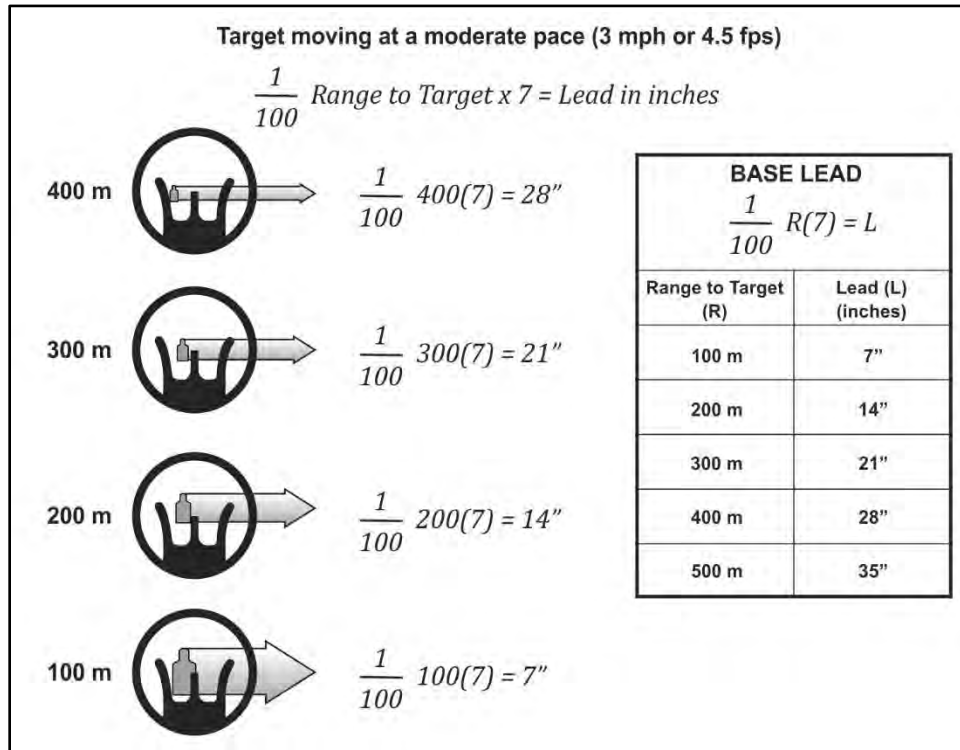
*or*

$$\frac{1}{100} \text{Range to Target} \times 7 = \text{Lead in Inches}$$

C-14. This formula is used to determine the baseline lead in the direction of travel of the target when its pace is approximately 3 mph or 4.5 feet per second (fps). Figure°C-5, on page C-7, shows the application of this formula at a notional moving target:



## Complex Engagements



**Figure C-5. Deliberate lead formula example**

C-15. To execute the tracking method, a Soldier performs the following steps:

- Swing the muzzle of the rifle through the target (from the rear of the target to the front) to the desired lead (point of aim). The point of aim may be on the target or some point in front of the target depending upon the target's range, speed, and angle of movement.
- Track and maintain focus on the rifle's sight while acquiring the desired sight picture. It may be necessary to shift the focus between the rifle's sight and the target while acquiring the sight picture, but the focus must be on the rifle's sight when the shot is fired. Engage the target once the sight picture is acquired. While maintaining the proper lead,—
  - Follow-through so the lead is maintained as the bullet exits the muzzle.
  - Continue to track in case a second shot needs to be fired on the target.

### Trapping Method

C-16. The trapping method (see figure C-6) is used when it is difficult to track the target with the aiming device, as in the prone or sitting position. The lead required to effectively engage the target determines the engagement point and the appropriate hold-off.



## Appendix C

C-17. With the sights settled, the target moves into the predetermined engagement point and creates the desired sight picture. The trigger is pulled simultaneously with the establishment of sight picture. To execute the trapping method, a Soldier performs the following steps:

- Select an aiming point ahead of the target – where to set the trap.
- Obtain sight alignment on the aiming point.
- Hold sight alignment until the target moves into vision and the desired sight picture is established.
- Engage the target once sight picture is acquired.
- Follow-through so the rifle sights are not disturbed as the bullet exits the muzzle.

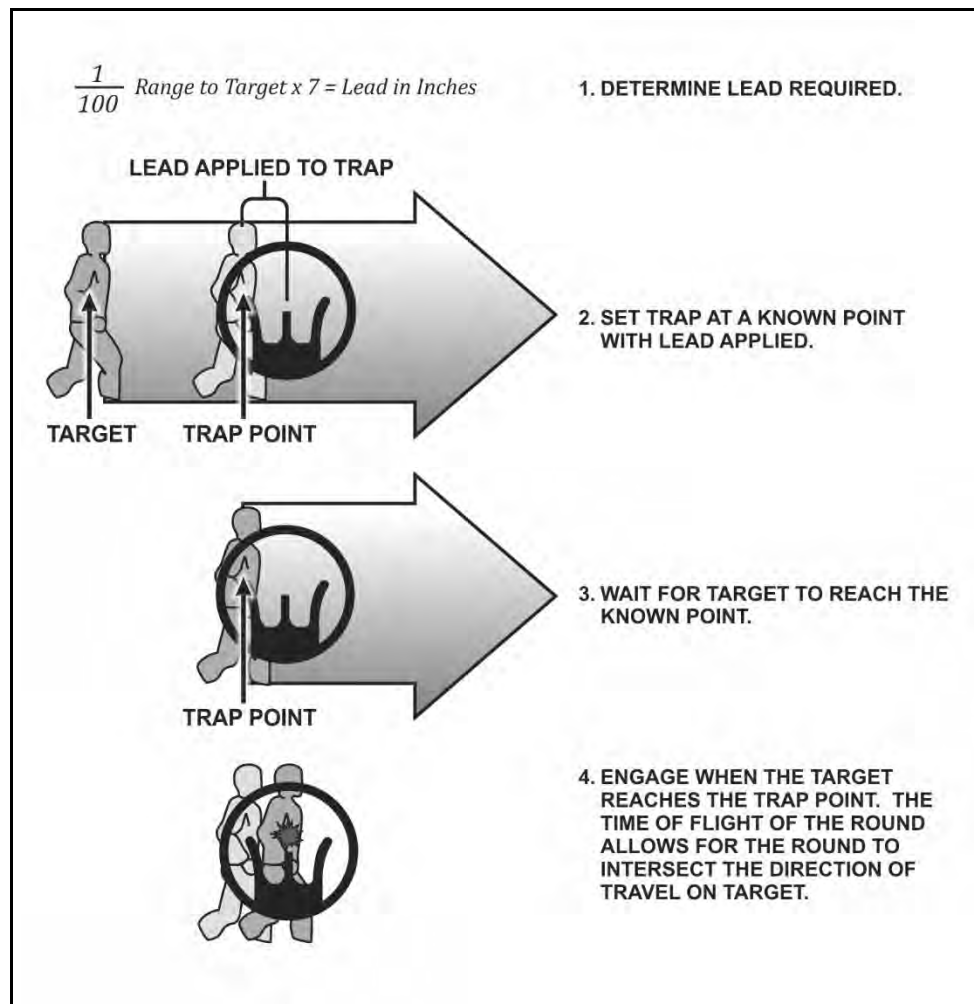


Figure C-6. Deliberate trapping method example



## Complex Engagements

### OBLIQUE TARGETS

C-18. Threats that are moving diagonally toward or away from the shooter are oblique targets. They offer a unique problem set to shooters where the target may be moving at a steady pace and direction; however, their oblique posture makes them appear to move slower.

C-19. Soldiers should adjust their hold-off based on the angle of the target's movement from the gun-target line. The following guide (see figure C-7) will help Soldiers determine the appropriate percentage of hold-off to apply to engage the oblique threats as they move.

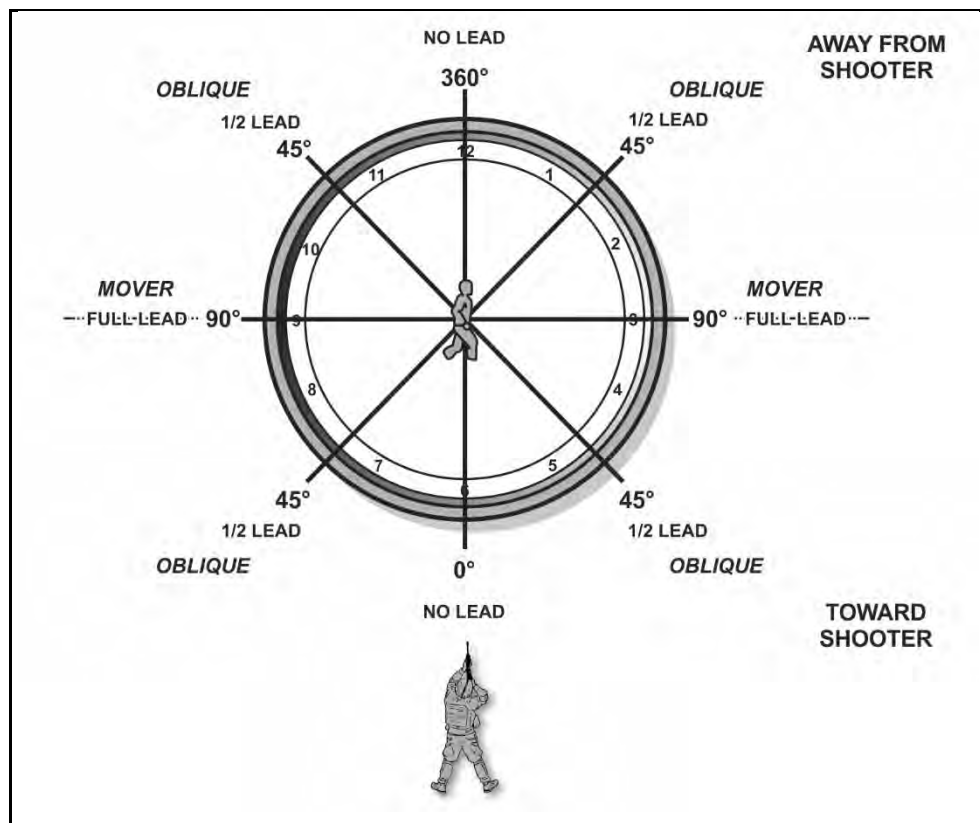


Figure C-7. Oblique target example



## Appendix C

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### ENVIRONMENTAL CONDITIONS

C-20. The environment can complicate the shooter's actions during the shot process with excessive wind or requiring angled firing limited visibility conditions. Soldiers must understand the methods to offset or compensate for these firing occasions, and be prepared to apply these skills to the shot process. This includes when multiple complex conditions compound the ballistic solution during the firing occasion.

#### WIND

C-21. Wind deflection is the most influential element in exterior ballistics. Wind does not push the projectile causing the actual deflection. The bullet's tip is influenced in the direction of the wind slightly, resulting in a gradual drift of the bullet in the direction of the wind. The effects of wind can be compensated for by the shooter provided they understand how wind effects the projectile and the terminal point of impact. The elements of wind effects are—

- The **time** the projectile is exposed to the wind (range).
- The **direction** from which the wind is blowing.
- The **velocity** of the wind on the projectile during flight.

#### Wind Direction and Value

C-22. Winds from the left cause an effect on the projectile to drift to the right, and winds from the right cause an effect on the projectile to drift to the left. The amount of the effect depends on the time of (projectile's exposure) the wind speed and direction. To compensate for the wind, the firer must first determine the wind's direction and value. (See figure C-8 on page C-11.)

C-23. The clock system can be used to determine the direction and value of the wind. Picture a clock with the firer oriented downrange towards 12 o'clock.

C-24. Once the direction is determined, the value of the wind is next. The value of the wind is how much effect the wind will have on the projectile. Winds from certain directions have less effect on projectiles. The chart below shows that winds from 2 to 4 o'clock and 8 to 10 o'clock are considered full-value winds and will have the most effect on the projectile. Winds from 1, 5, 7, and 11 o'clock are considered half-value winds and will have roughly half the effect of a full-value wind. Winds from 6 and 12 o'clock are considered no-value winds and little or no effect on the projectile.



Complex Engagements

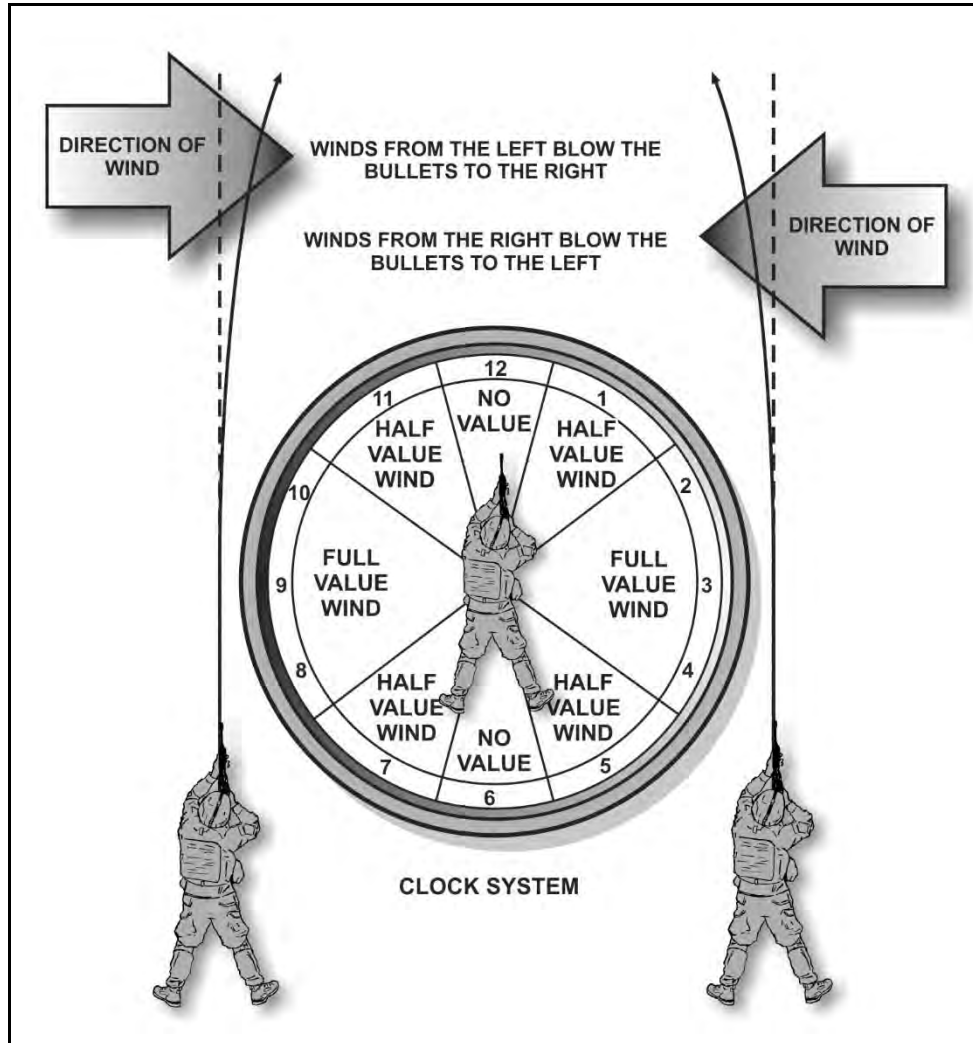


Figure C-8. Wind value

C-25. The wind will push the projectile in the direction the wind is blowing (see figure C-9). The amount of effects on the projectile will depend on the time of exposure, direction of the wind, and speed of the wind. To compensate for wind the Soldier uses a hold in the direction of the wind.



## Appendix C

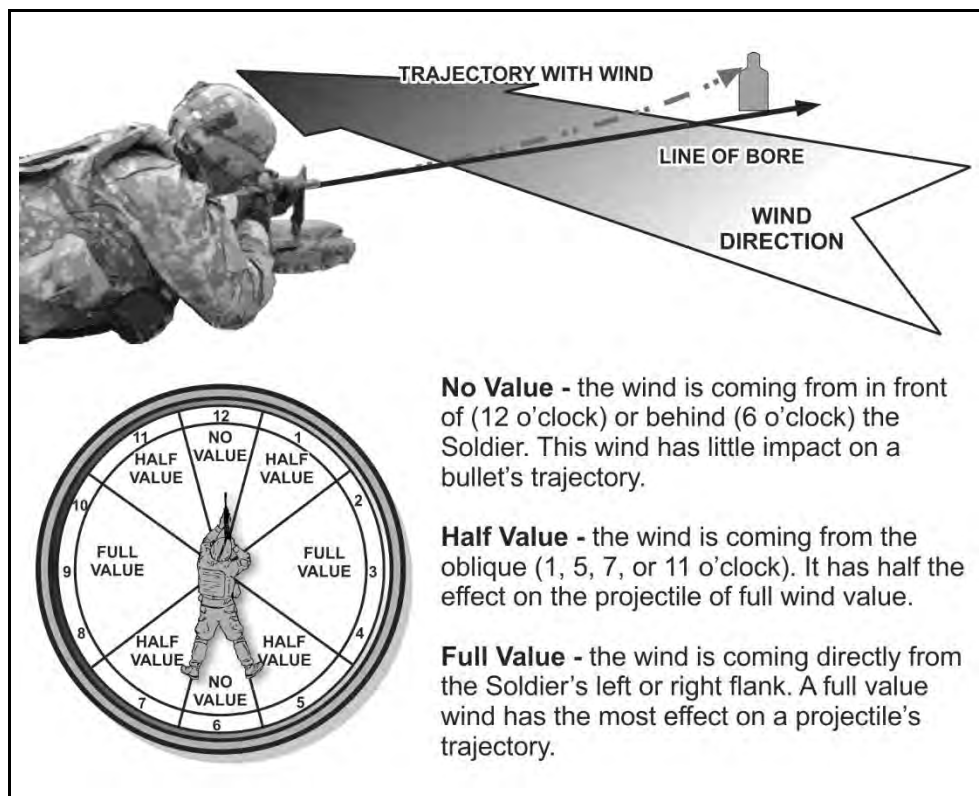


Figure C-9. Wind effects



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**Complex Engagements**

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**Wind Speed**

C-26. Wind speeds can vary from the firing line to the target. Wind speed can be determined by taking an average of the winds blowing on the range. The firer's focus should be on the winds between the firer and the target. The front 1/3 of the trajectory plays the most significant role in determining the bullet's wind drift deflection, but with increasing range, the firer must consider the wind speed at midpoint and the target area to make the best overall assessment.

C-27. The Soldier can observe the movement of items in the environment downrange to determine the speed. Each environment will have different vegetation that reacts differently.

C-28. Downrange wind indicators include the following:

- 0 to 3 mph = Hardly felt, but smoke drifts.
- 3 to 5 mph = Felt lightly on the face.
- 5 to 8 mph = Keeps leaves in constant movement.
- 8 to 12 mph = Raises dust and loose paper.
- 12 to 15 mph = Causes small trees to sway.

C-29. The wind blowing at the Soldiers location may not be the same as the wind blowing on the way to the target.

**Wind Estimation**

C-30. Soldiers must be comfortable and confident in their ability to judge the effects of the wind to consistently make accurate and precise shots. Soldiers will use wind indicators between the Soldier and the target that provide windage information to develop the proper compensation or hold-off.

C-31. To estimate the effects of the wind on the shot, Soldiers need to determine three windage factors:

- Velocity (speed).
- Direction.
- Value.

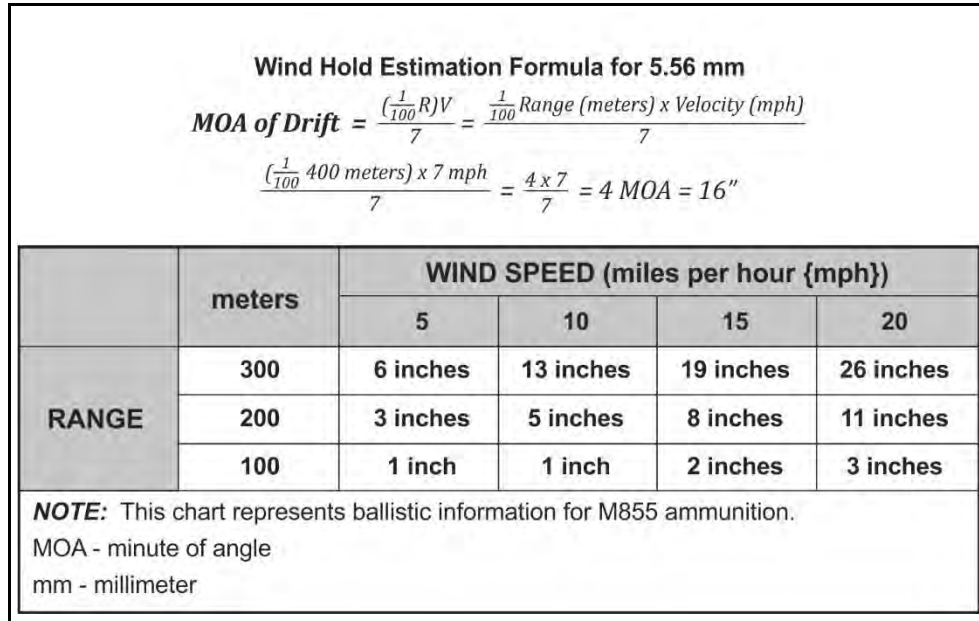
**Determining Wind Drift**

C-32. Once wind velocity, direction, and value have been determined, Soldiers determine how to compensate for the effects of wind. For the Soldier, there are three methods of determining the appropriate hold-off to adjust for excessive wind; using the wind formula, wind estimation, or referencing a generalized ballistic windage chart.

C-33. Once the range to target and wind speed are known, the formula below is used to determine drift. The output from the formula is in MOA. The final answer is rounded off to make the calculation quicker to perform. This formula (see figure C-10) will allow the Soldier to adjust for the distance that the wind displaces his projectile.



## Appendix C



**Figure C-10. Wind formula and ballistics chart example**

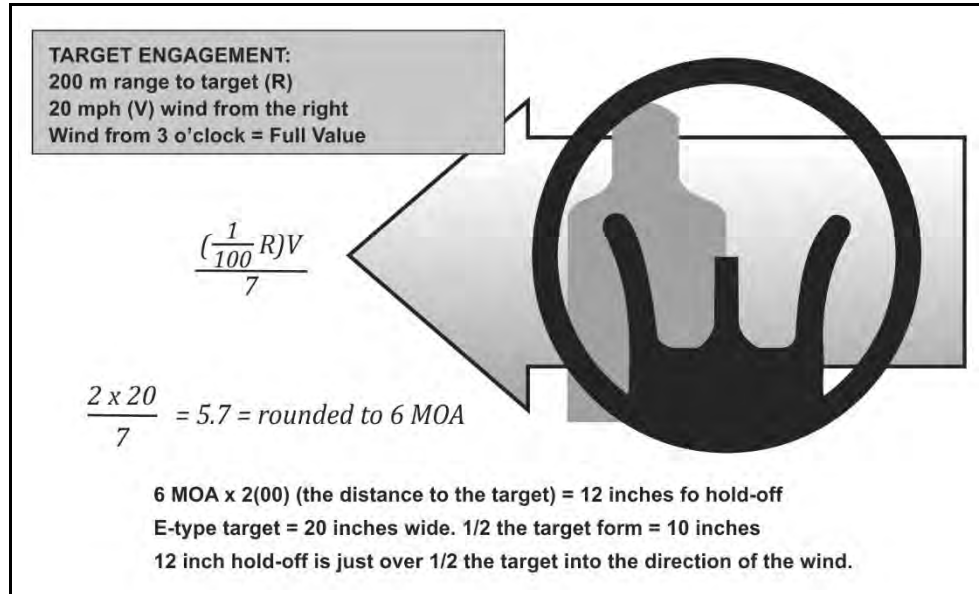
C-34. The ballistics chart shows the wind drift in inches at ranges from 100 meters – 300 meters and wind speeds up to 20 mph. The data from the 100-m (meter) line shows that even in a 20-mph wind there is very little deflection of the round. At 300 meters, it can be seen that the same 20-mph wind will blow the bullet 26 inches. This illustrates the fact that the bullet is effected more by the wind the further it starts out from the target.

### **Windage Hold**

C-35. Using a hold involves changing the point of aim to compensate for the wind drift. For example, if wind causes the bullet to drift 12 inches to the left, the aiming point must be moved 12 inches to the right. (See figure C-11 on page C-15.)



## Complex Engagements



**Figure C-11. Hold-off example**

**Note.** The aiming point is center mass of the visual target, allowing for the greatest possibility of impacting the target. The hold off is based on the distance *from* center mass. Soldiers apply the hold-off creating the new point of aim.

C-36. Firers must adjust their points of aim into the wind to compensate for its effects. If they miss a distant target and wind is blowing from the right, they should aim to the right for the next shot. A guide for the initial adjustment is to split the front sight post on the edge of the target facing the wind.

C-37. Newly assigned Soldiers should aim at the target's center of visible mass for the first shot, and then adjust for wind when they are confident that wind caused the miss. Experienced firers should apply the appropriate hold-off for the first shot, but should follow the basic rule—when in doubt, aim at the center of visible mass.



## Appendix C

### ANGLED FIRE

C-38. Firing uphill or downhill at angles greater than 30 degrees, the firer must account for the change in the strike of the round from a horizontal trajectory. Rounds fired at excessive angles at extended ranges beyond the weapon's zero distance strike high on the target. To compensate for this, firers can rapidly determine a correct firing solution using the Quick High Angle Formula.

C-39. The first step is to determine the appropriate hold for the range to target beyond zero distance. Table C-1 provides the approximate holds for M855A1, 5.56mm, Ball, Enhanced Performance Round (EPR) at ranges beyond the Army standard 300 meter zero—

**Table C-1. Standard holds beyond zero distance example**

Range (meters)	Drop from Point of Aim (inches)	MOA Hold	Mil Hold
400	-11.9	2.6	0.7
500	-31.4	5.5	1.6
600	-59.7	8.7	2.5

C-40. Next, the firer estimates the angle of fire to either 30, 45, or 60 degrees. The firer then applies that information to the Quick High Angle Formula to determine the approximate high angle hold. This formula is built to create a rapid hold adjustment that will get the shot on target.

C-41. Figure C-12 shows the quick high angle formula with an example in both MOA and mils. The example is based on a target at 500 meters, and provides effective solutions for the three angle categories; 30, 45, and 60 degrees.



Complex Engagements

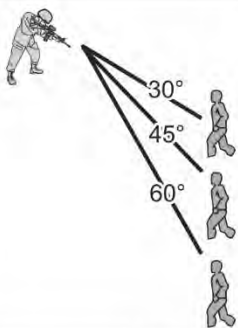
QUICK HIGH ANGLE FORMULA						
	DOWN ANGLE	MOA ADJUSTMENT/ 100 METERS		Mil ADJUSTMENT/ 100 METERS		
	30°	-1/2 MOA		0.15 mils		
	45°	-1 MOA		0.3 mils		
	60°	-2 MOA per 100 meters, then add 1 MOA		0.6 mils per 100 meters, then add 0.3 mils		
MINUTE OF ANGLE (MOA) EXAMPLE at 500 meters						
DEGREES	RANGE HOLD	ANGLE OFFSET (-)		60 DEGREE OFFSET (+)		HIGH ANGLE HOLD
30°	5.5 MOA	-	2.5 MOA	+	=	3 MOA
45°	5.5 MOA	-	5 MOA	+	=	1/2 MOA
60°	5.5 MOA	-	10 MOA	+	1 MOA =	-3 1/2 MOA
MILS EXAMPLE at 500 meters						
DEGREES	RANGE HOLD	ANGLE OFFSET (-)		60 DEGREE OFFSET (+)		HIGH ANGLE HOLD
30°	1.6 mils	-	0.75 mils		=	+0.85 mils
45°	1.6 mils	-	1.5 mils		=	+0.1 mils
60°	1.6 mils	-	3 mils	+	0.3 mils =	-1.1 mils
60° Rule of Thumb is Range Hold -2 MOA / 0.6 mil + High Angle Hold						

Figure C-12. Quick high angle formula example



## Appendix C

### COMPOUND CONDITIONS

C-42. When combining difficult target firing occasion information, Soldiers can apply the rules specific to the situation together to determine the appropriate amount of hold-off to apply.

C-43. The example below shows the application of different moving target directions with varying speed directions. This is a general example to provide the concept of applying multiple hold-off information to determine complex ballistic solutions for an engagement. (See figure C-13.)

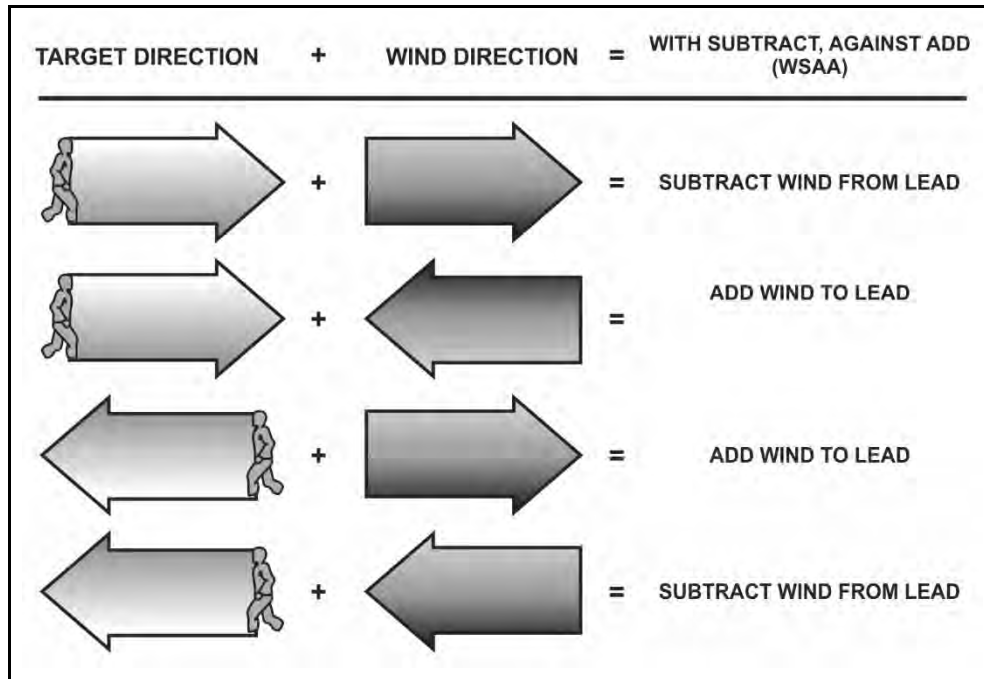


Figure C-13. Compound wind and lead determination example



## Appendix D

### Drills

This appendix describes the various drills for the rifle and carbine, and their purpose. The drill structure is standardized for all individual and crew served weapons in order to reinforce the most common actions all Soldiers need to routinely execute with their assigned equipment during training and combat.

These drills are used during Table III of the integrated weapons training strategy, as well as during routine maintenance, concurrent training, and during deployments. The drills found within this appendix are used to build and maintain skills needed to achieve proficiency and mastery of the weapon, and are to be ingrained into daily use with the weapon.

D-1. Each drill is designed to develop confidence in the equipment and Soldier actions during training and combat operations. As they are reinforced through repetition, they become second nature to the Soldier, providing smooth, consistent employment during normal and unusual conditions.

D-2. The drills provided are designed to build the Soldier's proficiency with the following principles:

- **Mindset** – the Soldier's ability to perform tasks quickly and effectively under stress.
- **Efficiency** – ensure the drills require the least amount of movement or steps to complete correctly. Make every step count.
- **Individual tactics** – ensure the drills are directly linked to employment in combat.
- **Flexibility** – provide drills that are not rigid in execution. Units may alter the procedural steps depending on their equipment, configuration, or tactical need.

### MINDSET

D-3. Continuous combat is inherently stressful. It exhausts Soldiers and causes physiological changes that reduce their ability to perform tasks as quickly or effectively as necessary. The Soldier's ability to function under stress is the key to winning battles, since, without the Soldier, weapons and tactics are useless. Individual and unit military effectiveness depend on the Soldier's ability to think clearly, accurately, quickly, all with initiative, motivation, physical strength, and endurance.



## Appendix D

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D-4. The impact of physiological changes caused by the stress of combat escalates or de-escalates based on the degree of stimulation, causing Soldiers to attain different levels of awareness as events occur in the continually transitioning operational area around them. Maintaining a tactical mindset involves understanding one's level of awareness and transitioning between the levels of awareness as the situation requires escalation or de-escalation.

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**Note.** Stress can be countered using the principles associated with Soldier resilience and performance enhancement. The Comprehensive Soldier and Family Fitness (CSF2) is designed to increase a Soldier's ability and willingness to perform an assigned task or mission and enhance his performance by assessing and training mental resilience, physical resilience, and performance enhancement techniques and skills. This initiative introduces many resources used to train Soldiers on skills to counter stress. For more information about CSF2, see <http://csf2.army.mil/>.

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## EFFICIENCY

D-5. Efficiency is defined as the minimization of time or resources to produce a desired outcome. Efficient movements are naturally faster than movements that contain excessive or wasteful actions.

D-6. By reducing the amount of effort, mental, and/or physical, the movement becomes repeatable and the effect becomes predictable. This allows the Soldier to focus on the tactics while still maintaining the ability to produce accurate and precise fires.

## INDIVIDUAL TACTICS

D-7. Individual tactics are actions independent of unit standard operating procedures (SOPs) or situations that maximize the Soldier's chance of survival and victory in a small arms, direct fire battle.

D-8. Examples of individual tactics include use of cover and standoff, or the manipulation of time and space between a Soldier and his enemy.

## FLEXIBILITY

D-9. The techniques presented in this publication are not meant to be prescriptive, as multiple techniques can be used to achieve the same goal. In fact, there is no singular "one size fits all" solution to rifle fire; different types of enemies and scenarios require the use of different techniques.

D-10. However, the techniques presented are efficient and proven techniques for conducting various rifle-related tasks. Should other techniques be selected, they should meet the following criteria:



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**Drills**

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**RELIABLE UNDER CONDITIONS OF STRESS**

D-11. Techniques should be designed for reliability when it counts; during combat. The technique should produce the intended results without fail, under any conditions and while wearing mission-essential equipment.

D-12. It should also be tested under as high stress conditions as allowed in training.

**REPEATABLE UNDER CONDITIONS OF STRESS**

D-13. As combat is a stressor, a Soldier's body responds much as it does to any other stressful stimulus; physiological changes begin to occur, igniting a variable scale of controllable and uncontrollable responses based on the degree of stimulation.

D-14. The technique should support or exploit the body's natural reaction to life-threatening stress.

**EFFICIENCY IN MOTION**

D-15. The technique should be designed to create the greatest degree of efficiency of motion. It should contain only necessary movement. Excessive or unnecessary movement in a fighting technique costs time to execute. In a violent encounter, time can mean the difference between life and death.

D-16. Consider the speed at which violent encounters occur; An unarmed person can cover a distance of 20 feet in approximately 1 second. Efficiency decreases the time necessary to complete a task, which enhances the Soldier's safety.

**DEVELOP NATURAL RESPONSES THROUGH REPETITION**

D-17. When practiced correctly and in sufficient volume, the technique should build reflexive reactions that a Soldier applies in response to a set of conditions. Only with correct practice will a Soldier create the muscle memory necessary to serve him under conditions of dire stress. The goal is to create automaticity, the ability to perform an action without thinking through the steps associated with the action.

**LEVERAGE OVERMATCH CAPABILITIES**

D-18. Engagements can occur from 0 to 600 meters and any variance in between. Fast and efficient presentation of the rifle allows more time to stabilize the weapon, refine the aim, and control the shot required to deliver precise fires. This rapidly moves the unit toward the goal of fire superiority and gains/maintains the initiative. Speed should be developed throughout the training cycle and maintained during operations.

D-19. As distance between the Soldier and a threat decreases, so does the time to engage with well-place lethal fires. As distance increase, the Soldier gains time to refine his aim and conduct manipulations.



## **Appendix D**

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### **DRILLS**

D-20. To build the skills necessary to master the functional elements of the shot process, certain tasks are integrated into drills. These drills are designed specifically to capture the routine, critical tasks or actions Soldiers must perform fluently and as a second nature to achieve a high level of proficiency.

D-21. Drills focus on the Soldier's ability to apply specific weapons manipulation techniques to engage a threat correctly, overcome malfunctions of the weapon or system, and execute common tasks smoothly and confidently.

#### **DRILL A – WEAPON CHECK**

D-22. The weapon check is a visual inspection of the weapon by the Soldier. A weapon check includes at a minimum verifying:

- Weapon is clear.
- Weapon serial number.
- Aiming device(s) serial number.
- Attachment points of all aiming devices, equipment, and accessories.
- Functions check.
- Proper location of all attachments on the adaptive rail system.
- Zero information.
- Serviceability of all magazines.

D-23. The weapon check is initiated when first receiving the weapon from the arms room or storage facility. This includes when recovering the weapon when they are stacked or secured at a grounded location.

D-24. Units may add tasks to Drill A as necessary. Units may direct Soldiers to execute Drill A at any time to support the unit's mission.

#### **DRILL B – SLING/UNSLING OR DRAW/HOLSTER**

D-25. This drill exercises the Soldier's ability to change the location of the weapon on demand. It reinforces their ability to maintain situational and muzzle awareness during rapid changes of the weapon's sling posture. It also provides a fitment check between the weapon, the Soldier's load bearing equipment, and the Soldier's ability to move between positions while maintaining effective use of the weapon.

D-26. When conducting this drill, Soldiers should:

- Verify the proper adjustment to the sling.
- Rotate the torso left and right to ensure the sling does not hang up on any equipment.
- Ensure the weapon does not interfere with tactical movement.

#### **DRILL C – EQUIPMENT CHECK**

D-27. This drill is a Pre-Combat Check (PCC) that ensures the Soldier's aiming devices, equipment, and accessories are prepared –



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**Drills**

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- Batteries.
- Secured correctly.
- Equipment does not interfere with tactical movement.
- Basic load of magazines are stowed properly.

**DRILL D – LOAD**

D-28. This is predominantly an administrative loading function. This allows the Soldier to develop reliable loading techniques.

**DRILL E – CARRY (FIVE/THREE)**

D-29. This is a series of five specific methods of carrying the weapon by a Soldier. These five methods are closely linked with range operations in the training environment, but are specifically tailored to combat operations. This drill demonstrates the Soldier's proficiency moving between:

- Hang.
- Safe hang.
- Collapsed low ready.
- Low ready.
- High ready (or ready up).

D-30. 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.

**DRILL F – FIGHT DOWN**

D-31. The Fight Down drill builds the Soldier's understanding of how to move effectively and efficiently between firing postures. This drill starts at a standing position, and, on command, the Soldier executes the next lower position or the announced position by the leader. The Fight Down drill exercises the following positions in sequence:

- Standing.
- Kneeling.
- Sitting.
- Prone.

D-32. Each position should be executed a minimum of three times. Leaders will use Drill F in conjunction with Drill G.

**DRILL G – FIGHT UP**

D-33. The Fight Up drill builds the Soldier's timing and speed while moving from various positions during operations. This drill starts in the prone position, and, on command, the Soldier executes the next higher position or the announced position by the leader. The Fight Up drill exercises the following positions in sequence:

- Prone.
- Sitting.



## **Appendix D**

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- Kneeling.
- Standing.

D-34. Each position should be executed a minimum of three times. Leaders will use Drill F, Fight Down, in conjunction with Drill G, Fight Up.

D-35. Leaders may increase the tempo of the drill, increasing the speed the Soldier needs to assume the next directed position. After the minimum three iterations are completed (Drill F, Drill G, Drill F, Drill G, etc.), the leader may switch between Drill F and G at any time, at varying tempo.

### **DRILL H – GO-TO-PRONE**

D-36. The Go-To-Prone drill develops the Soldier's agility when rapidly transitioning from a standing or crouched position to a prone firing position. Standard time should be below 2 seconds.

D-37. Leaders announce the starting position for the Soldier to assume. Once the Soldier has correctly executed the start position to standard, the leader will announce GO TO PRONE. This drill should be conducted a minimum of five times stationary and five times while walking.

D-38. Leaders should not provide preparatory commands to the drill, and should direct the Soldier to go to prone when it is unexpected or at irregular intervals. Leaders may choose to include a tactical rush with the execution of Drill H.

### **DRILL I – RELOAD**

D-39. The Tactical Reload drill is executed when the Soldier is wearing complete load bearing equipment. It provides exercises to assure fast reliable reloading through repetition at all firing positions or postures.

D-40. The Soldier should perform Drill I from each of the following positions a minimum of seven times each:

- Standing.
- Squatting.
- Kneeling.
- Prone.

D-41. Leaders may include other drills while directing Drill I to the Soldier to reinforce the training as necessary.

### **DRILL J – CLEAR MALFUNCTION**

D-42. This drill includes the three methods to clear the most common malfunctions on a rifle or carbine in a rapid manner, while maintaining muzzle and situational awareness. Soldiers should perform all three variations of clearing a malfunction based on the commands from their leader.



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**Drills**

D-43. Each of the three variations of Drill J should be executed five times. Once complete, leaders should incorporate Drill J with other drills to ensure the Soldier can execute the tasks at all positions fluently.

**DRILL K – UNLOAD / SHOW CLEAR**

D-44. This is predominantly an administrative unloading function, and allows the Soldier to develop reliable clearing techniques. This drill should be executed in tandem with Drill D, Load. It should be executed a minimum of seven times in order to rotate through the Soldier's magazine pouch capacity, and reinforce the use of a "dump pouch" or pocket, to retain expended magazines during operations.

D-45. This drill can be executed without ammunition in the weapon. Leaders may opt to use dummy ammunition or spent cartridge cases as desired. In garrison environments, Leaders should use Drill K on demand, particularly prior to entering buildings or vehicles to reinforce the Soldier's skills and attention to detail.



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## **Appendix E**

# **Zeroing**

Zeroing a weapon is not a training exercise, nor is it 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 zeroing 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, then align the mean point of impact of that grouping to the appropriate point of aim. Soldiers use the process described in this appendix with their weapon and equipment's technical manuals to complete the zeroing task.

## **BATTLESIGHT ZERO**

E-1. The term battlesight zero means the combination of sight settings and trajectory that greatly reduces or eliminates the need for precise range estimation, further eliminating sight adjustment, holdover or hold-under for the most likely engagements. The battlesight zero is the default sight setting for a weapon, ammunition, and aiming device combination.

E-2. An appropriate battlesight zero allows the firer to accurately engage targets out to a set distance without an adjusted aiming point. For aiming devices that are not designed to be adjusted in combat, or do not have a bullet drop compensator, such as the M68, the selection of the appropriate battlesight zero distance is critical.

## **ZEROING PROCESS**

E-3. A specific process should be followed when zeroing. The process is designed to be time-efficient and will produce the most accurate zero possible.

E-4. The zero process includes mechanical zero, laser borelight, 25-m grouping and zeroing, and zero confirmation out to 300 meters.



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*Note.* Although wind and gravity have the greatest effect on the projectile's trajectory, air density and elevation must also be taken into consideration.

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### **LASER BORELIGHT**

E-5. The borelight is an eye-safe laser that is used to boresight optics, iron sights, and aiming lasers. The borelight assists the first shot group hitting the 25-m zeroing target when zeroing the weapon. Using the borelight will save range time and require less rounds for the zeroing process. Borelighting is done with a borelight, which is centered in the bore of the weapon, and with an offset target placed 10 meters from the muzzle of the weapon.

### **25-M GROUPING AND ZEROING**

E-6. After successfully boresighting the weapon, the next step is to perform grouping and zeroing exercises. Grouping and zeroing is done at 25 meters on a 25-m zero target or at known distance range.

#### **25-M GROUPING**

E-7. The goal of the grouping exercise is for the shooter to fire tight shot groups and consistently place those groups in the same location. Tight, consistently placed shot groups show that the firer is applying proper aiming and smooth trigger control before starting the zeroing process. The firer should not start the zeroing process until they have demonstrated their ability to group well.

#### **25-M ZEROING**

E-8. Once the firer has shown their ability to accurately group, they should begin adjusting the aiming device to move the groups to the center of the target. During the zeroing process, the firer should attempt to center their groups as much as possible. Depending on the aiming device used, there may be a zero offset that needs to be used at 25 meters. During the zeroing process it is important that the firer adjusts their groups as close to the offset mark as possible.

### **ZERO CONFIRMATION OUT TO 300 METERS**

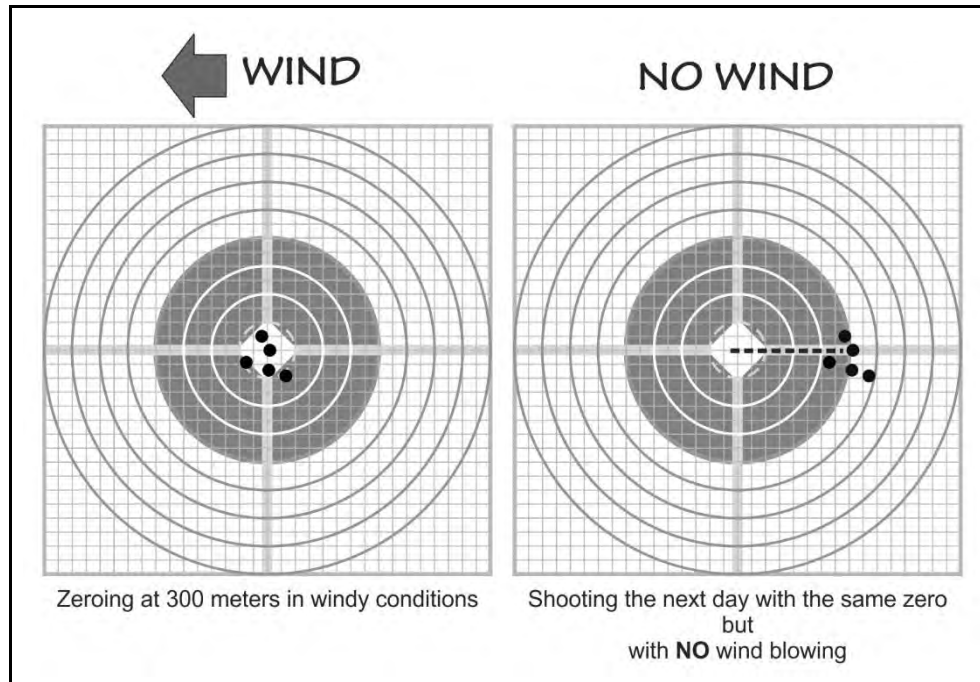
E-9. The most important step in the zeroing process is zero confirmation out to 300 meters. Having a 25 m zero does not guarantee a center hit at 300 meters. The only way to rely on a 300-m hit, is to confirm a 300-m zero.

E-10. Confirmation can be done on any range where Soldiers 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. If rounds are available, groups can be fired at various ranges to show the firers where their impact will be.

E-11. 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. (See figure E-1 on page E-3.)



**Zeroing**



**Figure E-1. Wind effects on zero at 300 meters**

## **DOWNRANGE FEEDBACK**

E-12. Feedback must be included in all live-fire training. Soldiers must have precise knowledge of a bullet strike; feedback is not adequate when bullets from previous firings cannot be identified. To provide accurate feedback, trainers ensure that Soldiers triangulate and clearly mark previous shot groups on a zeroing target or receive a hard copy from the tower on an automated range.

E-13. After zeroing, downrange feedback should be conducted. If modified field fire or known distance ranges are not available, a series of scaled silhouette targets can be used for training on the 25-m range.

E-14. With the M4- and M16-series of weapons, this range is 25 to 300 meters. This means, that with a properly zeroed rifle, the firer can aim center mass of a target between 25 meters and 300 meters and effectively engage it. A properly trained rifleman should be able to engage targets out to 600 meters in the right circumstances.



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*Note.* A common misconception is that wearing combat gear will cause the zero to change. Adding combat gear to the Soldier's body does not cause the sights or the reticle to move. The straight line between the center of the rear sight aperture and the tip of the front sight post either intersects with the trajectory at the desired point, or it does not. Soldiers should be aware of their own performance, to include a tendency to pull their shots in a certain direction, across various positions, and with or without combat gear. A shift in point of impact in one shooting position may not correspond to a shift in the point of impact from a different shooting position.

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E-15. Figure E-2, on page E-5, shows the zeroing target for use for the M16A2/M16A4. Figure E-3, on page E-6, M4-/M16-series weapons.



Zeroing

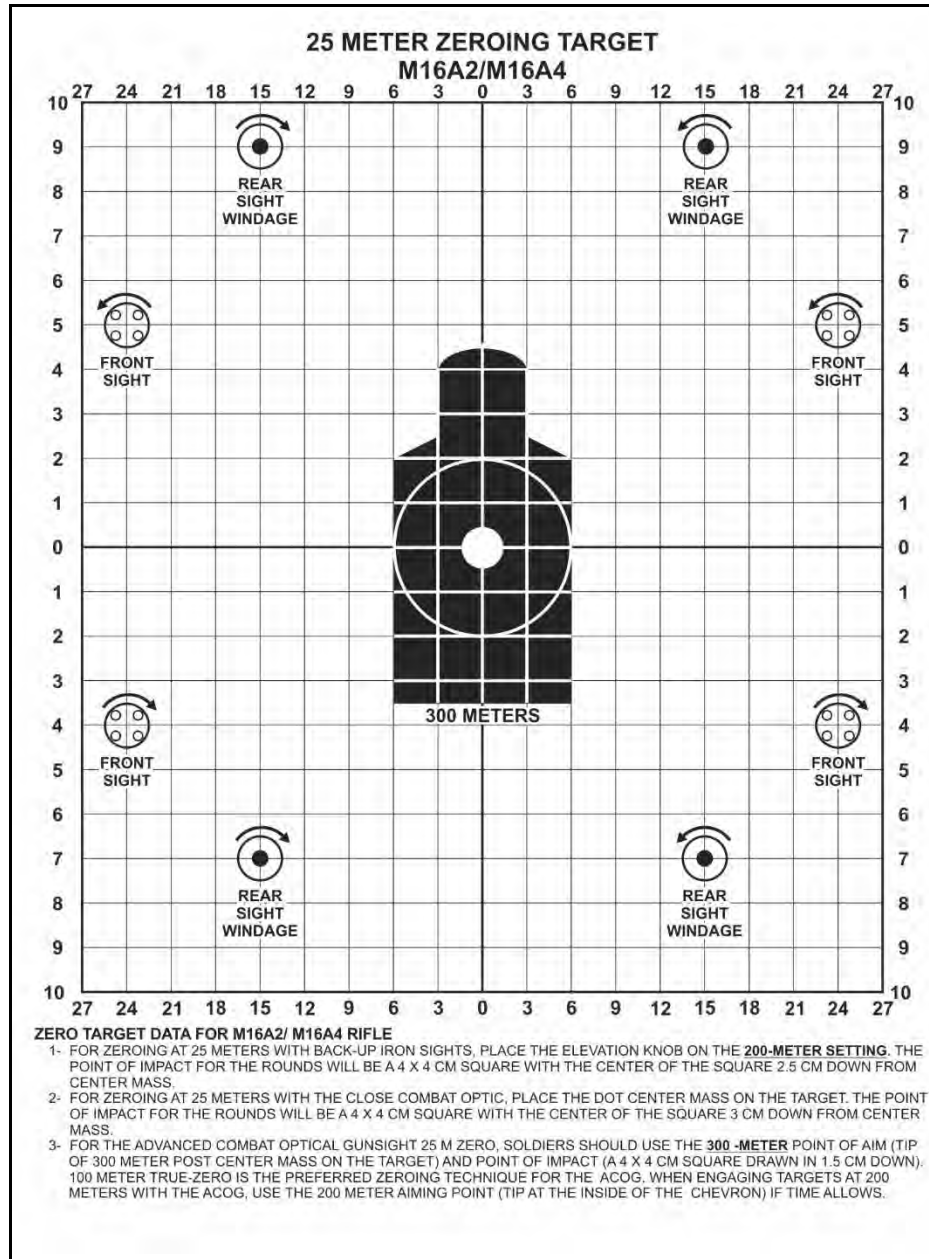
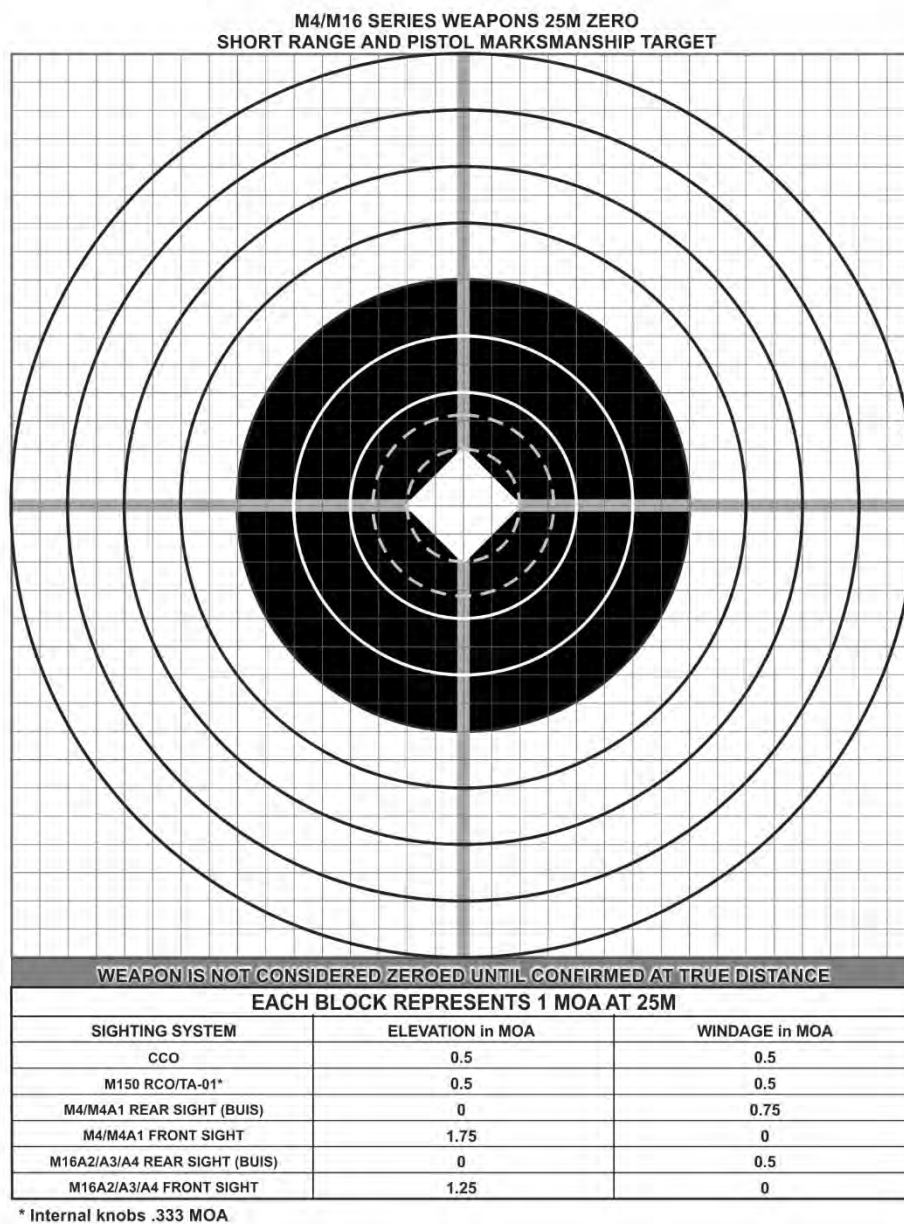


Figure E-2. M16A2 / M16A4 weapons 25m zero target



## Appendix E



**Figure E-3. M4-/M16-series weapons 25m zero short range and pistol marksmanship target**



## Zeroing

E-16. A good zero is necessary to be able to engage targets accurately. Whenever the Soldier deploys or does training in a new location, they should confirm the zero on their rifle if possible, as elevation, barometric pressure, and other factors will affect the trajectory of a round. There are multitudes of factors that can affect a zero, and the only sure way to know where the rounds are going, is to fire the rifle to confirm.

E-17. The zero on each assigned rifle WILL NOT transfer to another rifle. For example, if the windage zero on the Soldier's iron sights was three minutes (3MOA) left of center, putting that same setting on another rifle does not make it zeroed. This is due to the manufacturing difference between the weapons.

E-18. It is recommended that Soldiers setup their equipment and dry practice in position with gear on before coming to the range.

E-19. Standard in Training Commission (STRAC) Department of the Army Pamphlet (DA PAM) 350-38 allocates ammunition to conduct zeroing procedures using three-shot groups. The preferred method is to use a five-shot grouping, allowing the firer to more accurately analyze their shot group. Figure E-4 shows similar three-shot and five-shot groups with one shot on the right edge of the group. If all the shots were taken into account in the three-shot group, the firer would probably adjust their zero from the right edge of the four-cm circle. It is possible that the shot on the right was a poor shot and should not be counted in the group. The five-shot group on right is in the same place as the one on the left with the exception of the one shot out to the right. With four out of five shots in a tight group, the wide shot can be discounted and little or no change to the windage is necessary.

E-20. Part of the grouping and zeroing process is the marking and analysis of shot groups.

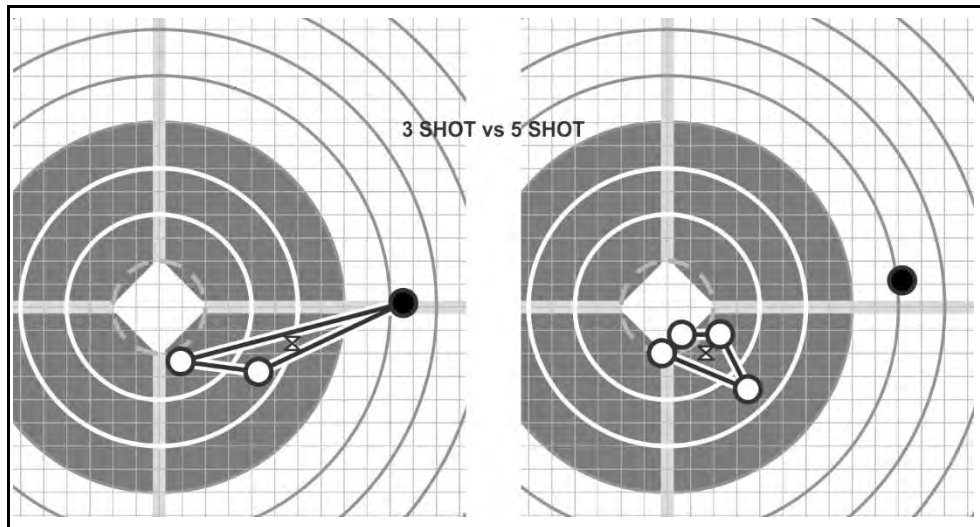


Figure E-4. Grouping



## Appendix E

### MARKING THE SHOT GROUP

E-21. If possible, shot groups should be marked using different colored markers so the firer can track their progress. Figure E-5 shows a technique for marking shot groups on a zero target. This technique allows the firer and coach to track their progress throughout the grouping and zeroing phase.

E-22. All sight adjustments are from the center of the group, called the *mean point of impact (MPI)*, and not from the location of a single shot. When using five-shot group, a single shot that is outside of the rest of the group should not be counted in the group for sight adjustment purposes.

*Note.* This figure depicts the color variations in shades of gray.

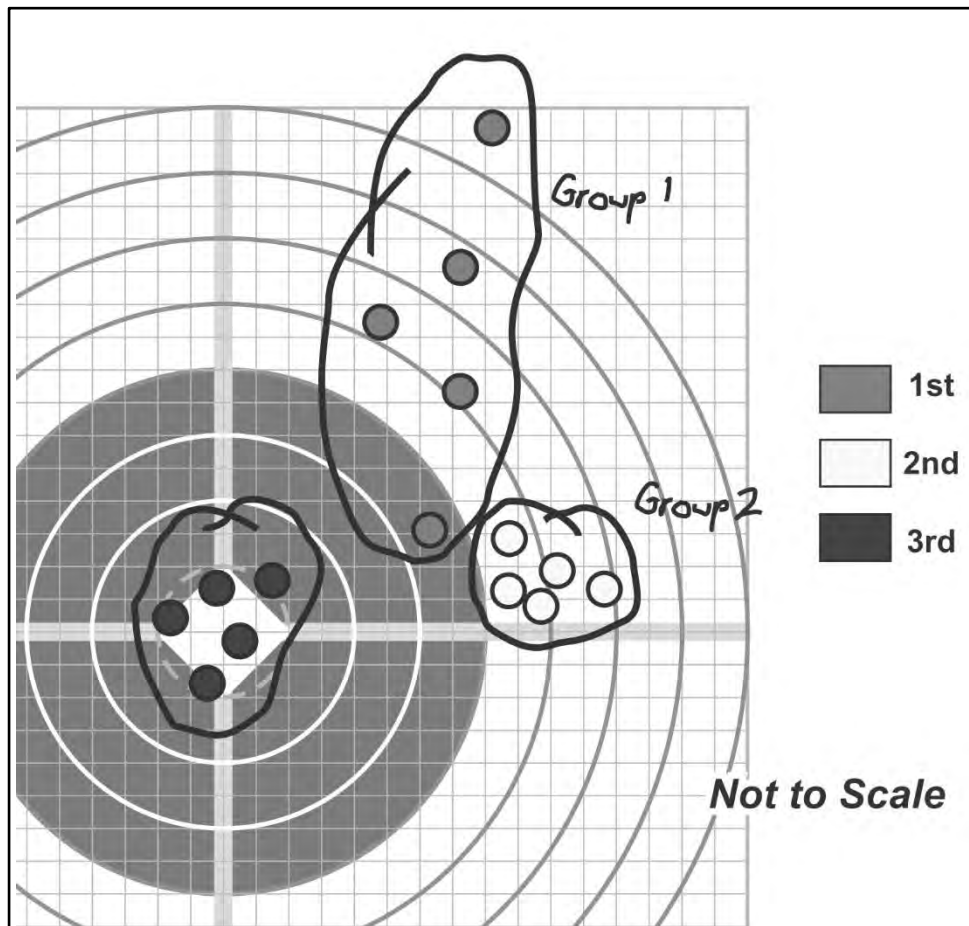


Figure E-5. Marking shot groups



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**Zeroing**

E-23. The firer shoots and marks their first shot group with a colored marker. The color of the first group is noted by placing a line with that marker next to the 1 on the right side of the zero target. Groups are fired and marked until they are consistently in the same location.

E-24. Each sight adjustment is annotated in the same color as the group that was just fired.

## **COACHING**

E-25. Coaching is the process of having another Soldier observe the firer during the firing process to look for shooting errors that the firer themselves may not consciously know they are making.

### **TYPES OF COACHES**

E-26. Firing a rifle properly requires the consistent and proper application of the elements of employment. It is about doing the right thing, the same way, every shot. The small arms trainer is also the validation point for any questions during employment training. In most cases, once group training is completed, it will be the firer's responsibility to realize and correct his own firing errors but this process can be made easier through the use of a coach.

E-27. Two types of coaches exist, the experienced coach and the peer coach. Although each should execute coaching the same way, experienced coaches have a more thorough understanding of employment and should have more knowledge and practice in firing than the Soldiers they are coaching. Knowledge and skill does not necessarily come with rank therefore Soldiers serving as experienced coaches should be carefully selected for their demonstrated firing ability and their ability to convey information to firers of varying experience levels.

### **EXPERIENCED COACHES**

E-28. Experienced coaches are generally in shorter supply throughout the Army and are generally outnumbered by less skilled firers. This lack of experienced coaches usually leads to one experienced coach watching multiple firers dependent upon the table or period of employment being fired. It often helps the experienced coach to make notes of errors they observe in shooters and discuss them after firing that group. It is often difficult for the coach to remember the errors that they observe in each and every firer.

### **PEER COACHES**

E-29. Using a peer coach, although generally not as effective as using an experienced coach, is still a very useful technique. The advantage of using a peer coach is two-fold: a peer coach may use their limited knowledge of employment to observe the firer when an experienced coach is not available or is occupied with another firer and can either talk the firer through the shooting errors that they have observed or bring any observed shooting errors to the attention of the experienced coach. The other advantage of using a peer coach is that the peer coach themselves, through the act of coaching, may be able to observe mistakes made by the firer and learn from them before making the mistakes



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themselves. Many people grasp instruction more deeply when they are coaching others than when they are simply told to do something.

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*Note.* Peer coaches can be limited by their level of training.

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E-30. Except for aiming, the coach can observe most of the important aspects of the elements of employment. To determine the unobservable errors of shooting the coach and the firer must have an open dialog and there must be a relaxed environment for learning. The firer cannot be hesitant to ask questions of the coach and the coach must not become a stressor during firing. The coach must have the ability to safely move around the firer to properly observe. There is no one ideal coaching position. The following section will discuss the elements of shooting and how best to observe them as a coach.

### STABILIZE

E-31. For the coach to observe how stable the shooter is, they may have to move to different sides of the shooter. To observe the shooter's non-firing elbow (to ensure it makes contact with the ground), the coach will need to be on the shooter's non-firing side. To observe the cant of the weapon (the sights on the weapon should be pointing towards 12 o'clock position, not 11 or 1 o'clock positions), the coach will need to watch the relationship of the front sight to the barrel from behind the shooter. The coach should look for all the other aspects of good positions as outlined in chapter 6 of this publication. The coach should also observe the total amount of weapon movement on recoil. A good stable position will have minimal movement under recoil.

### AIMING

E-32. Determining the aspects of the firer's aiming (sight picture, sight alignment, point of focus) requires dialogue between the firer and the coach. Often, a shooter will not realize his aiming errors until he discovers them on his own. The only method a coach has to observe aiming errors is to use of an M16 sighting device (A2, left and right, DVC-T 7-84), but this device can only be used on rifles with carrying handle sights. Without the use of a sighting device, the coach must rely on drawings, discussions, or the use of an M15A1 aiming card (DVC-T 07-26) to determine where the firer is aiming on the target, his focus point during firing (which should be the front sight), and where his front sight was at the moment of firing in relation to the rear sight aperture and the point of aim on the target. The technique of having the firer call his shots should also be used. This technique involves calling the point on the target where the sights were located at the moment of firing and matching the point called with the impact locations on the target. Calling the shot helps the firer learn to focus on the front sight during the entire firing process.

E-33. When optics are being used, the shooter can tell the coach where he was holding. This is of particular importance with the RCO. Coaches must insure the 300m aim point is used when zeroing at 25-m.



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**Zeroing**

**CONTROL**

E-34. The ideal position to observe trigger squeeze is from the non-firing side because the coach will have a better view of the speed of pull, finger position on the trigger, and release or pressure on the trigger after firing. The coach can look from behind the shooter to observe the barrel for lateral movement caused by slapping the trigger during firing.

**COACHING FACTORS**

E-35. All firing happens at the weapon. This means that the coach should be focused solely on the shooter during firing and not on what is happening down range.

E-36. There is no way for a coach to observe only the bullets impact on target and know what errors the firer made. The coach must watch the shooter during firing to determine errors and use the impacts to confirm their assumptions.

E-37. For a coach to properly observe all aspects of firing they must be able to observe the shooter, safely, from both sides and the back. There is no prescribed coaching position.

E-38. Coaching requires a relaxed atmosphere with open communication between the firer and the coach.

**SHOT GROUP ANALYSIS**

E-39. Shot group analysis involves the firer correlating the shots on paper with the mental image of how the shots looked when fired. An accurate analysis of the shot group cannot be made by merely looking at the holes in the paper. It is more important to observe the firer than to try and analyze the target. All firing takes place at the weapon, and the holes in the paper are only an indicator of where the barrel was pointed when the rifle was fired. When coaches are analyzing groups, they must question the firer about the group to make a determination of what caused the placement of the shots.

E-40. For example, if the firer has a tight group – minus one shot that is well outside of the group, the firer should have observed the outlying shot while firing. The firer would discount this shot when marking their group. (See figure E-6a and figure E-6b.) If a coach is analyzing the group, the firer would tell them that they performed poorly on the one shot that is out of the group.



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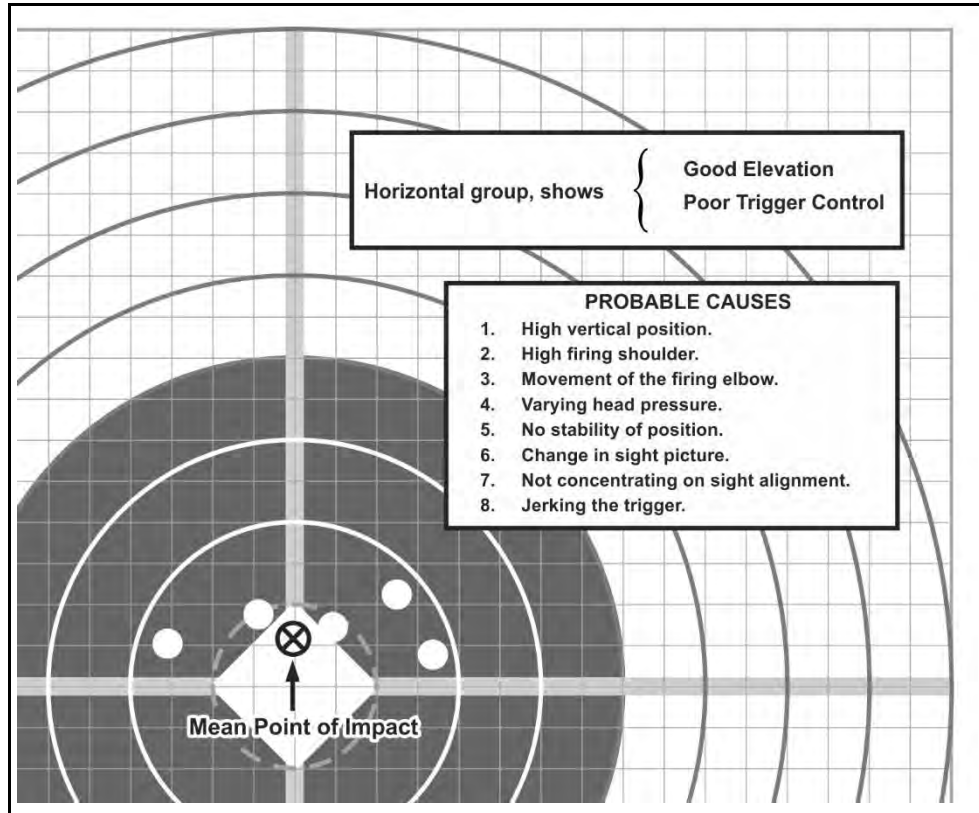
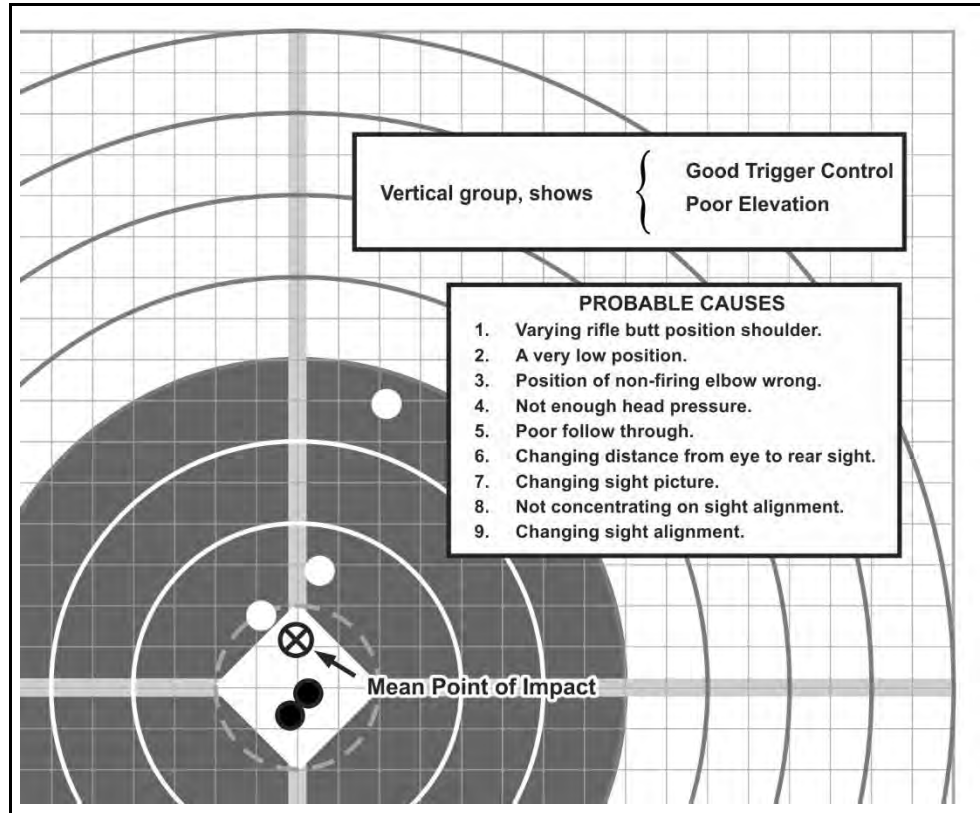


Figure E-6a. Horizontal diagnostic shots



## Zeroing



**Figure E-6b. Vertical diagnostic shots**

E-41. Novice shooters may benefit from not marking their own shot group. When marking a shot group an inexperienced or stressed Soldier may unintentionally make mental corrections. These mental corrections along with the mechanical corrections to their weapon will cause further issues during follow on shot groups. The experienced Soldier is less likely to make adjustments to their sight placement along with the mechanical changes to the weapon, knowing the zero process is aligning the sights to the location of the impact of the rounds. Having a coach or the employment instructor simply inform the Soldier of mechanical changes needed to the aiming device is an effective way to accomplish this method.

E-42. Observing the shooter must be accomplished before analyzing the target can become effective. Bullets strung vertically do not necessarily mean a breathing issue, nor do bullets strung horizontally absolutely indicate a trigger squeeze problem. Coaches must learn to identify shooter errors during firing and use the bullet's impacts on target to confirm their observations. There are often several firing errors that can be the cause of certain misplacements of impacts. The coach has to realize that bullets only go where



## **Appendix E**

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the barrel is pointed, so he has to determine what happened that caused the barrel to be pointed in those directions, and those causes can be many.

E-43. The key to proper coaching is becoming a shooting DETECTIVE. The coach needs to observe the shooter, question the shooter, look at the evidence down range, question the shooter again, make assumptions based upon the evidence available, and then act upon his assumptions. The coach and shooter must have a free and open dialog with each other in a relaxed atmosphere. Remember if a Soldier learns to shoot poorly they will only be capable of shooting poorly.

### **Displacement of Shots Within a Group (Flyers)**

E-44. The capability of the weapon to shoot groups varies dependent on the number of rounds fired through the barrel over its lifetime. The average expected group size is 1 inch (approximately 2.5 centimeters) at 25 meters; some guns may shoot slightly larger than this. If a shooter is firing groups larger than a normal group size the next step should be to have a known skilled shooter attempt to fire and group with the shooter's weapon. If a proven skilled shooter is able to fire groups of the normal size it is most likely an issue with the original shooter. If however the skilled shooter cannot fire within the accepted group size there may be something wrong with the gun or barrel.

E-45. When looking at groups where there are one to two shots away from the group body (one shot away for a three round group, one or two shots away for a five round group), the coach must look objectively at the overall consistency of group placement. A bad shot or group might not indicate a poor grasp of the elements; every shooter will have a bad shot now and again, and some shooters may even have a bad group now and again. Coaches need to use their experience and determine whether or not the firer had a bad shot, a bad group, or doesn't have a clear grasp of the elements and take the necessary steps to get the shooter to the end-state. The coach may have the firer shoot again and ignore the bad group or bad shot, instead hoping that the new group matches up with the previous shot groups or the coach may need to pull the shooter off the line and cover the basic elements. Contrary to popular belief, having a firer shoot over and over again in one sitting, until the firer GETS IT RIGHT is not a highly effective technique.

### **Bullets Dispersed Laterally on Target**

E-46. Bullets displaced in this manner could be caused by a lateral movement of the barrel due to an unnatural placement of the trigger finger on the trigger. Reasons for this could include—

- The shooter may be slightly misaligning the sights to the left and right.
- The shooter may have the sights aligned properly but may have trouble keeping the target itself perfectly centered on the tip of the front sight.
- Shooter may be closing eyes at the moment of firing or flinching.

### **Bullets Dispersed Vertically on Target**

E-47. Bullets displaced in a vertical manner could be caused by the following:



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### **Zeroing**

- Shooter may be misaligning the front sight in the rear sight aperture vertically. May be caused by the shooter watching the target instead of the front sight. Happens more frequently from less stable positions (kneeling, unsupported positions) due to the natural movement of the weapon.
- Shooter may have trouble seeing the target and keeping the tip of the front sight exactly centered vertically on the target. Coach may consider using a larger target or a non-standard aiming point such as a 5-inch circle. Many shooters find it easier to find the center of a circle than a man shaped target.
- Shooter may not have good support, which causes him to readjust their position every shot and settle with the sights slightly misaligned.
- Shooter may be flinching or closing eyes at the moment of firing.
- Shooter may be breathing while firing the rifle. (This is not normally the case, most shooters instinctively hold their breath just before the moment of firing).

### **Large Groups**

E-48. Large groups are most commonly caused by the shooter looking at the target instead of the front sight. This causes the shooter to place the front sight in the center of the target without regard for its location in the rear sight aperture. A small misalignment of the sights will result in a large misplacement of shots downrange.

E-49. Most likely it is not a point of aim issue; most shooters will not fire when their properly aligned sights are pointed all over the target.

### **Good Groups That Change Position on the Target**

E-50. When the shooter has good groups but they are located at different positions on the target, there can be a number of reasons. These include the following:

- May be caused by the shooter properly aligning sights during shooting but picking up a different point of aim on the target each time.
- May be caused by the shooter settling into a position with the front sight on target but the sights misaligned. The shooter maintains the incorrect sight picture throughout the group but aligns the sights incorrectly and in a different manner during the next group. Tell the firer to focus on the front sight and have them check natural point of aim before each group.



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## Appendix F



### 10-Meter Boresight Offsets and 25-Meter Zero Offsets

This appendix provides the 10-meter target offsets and the 25-meter zero offsets for M16- and M4-series weapons mounted with iron sights, optics, MILES, TWSs, or aiming lasers.

“The general purpose of the 10 meter borelight offset targets and the 25m live-fire zero offset targets is to ensure the firer has properly borelighted their rifle.”

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**Note.** The borelight is a visible laser. The purpose of boresighting is to obtain an initial setting on the firer’s sights, optics, and/or night equipment (aiming lights and TWS) to enable the firer to hit the 25m zero live-fire target when starting the zero process, resulting in efficient use of range time. Borelighting is conducted prior to live-fire zeroing. It is not a substitute for live-fire zeroing.

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F-1. The boresight target shows the desired relationship between the bore of the weapon and the firer’s aiming point, which varies with the weapon/sight system combination. Different symbols are used for designating different sights/optics, and so forth. All borelighting is done at 10 meters. This is a dry-fire exercise. Sight settings based on borelight procedures must be verified with live-fire zero at 25 meters.



F-2. A blank, reproducible 10-meter target offset (figure F-2 on page F-3) and an example of each weapon configuration (figure F-3 on page F-4, figure F-4 on page F-9, and figure F-5 on page F-10) are provided. The M16A2 300-meter zeroing target is used for 25-meter zeroing with all weapon configurations, except when zeroing with iron sights.

### MARKING 10-METER TARGET OFFSETS



F-3. To mark the proper 10-meter target offsets—

- Find the correct template for the weapon configuration.
- Starting from the center of the borelight circle on the offset, count the number of squares to the desired point of aim.



## Appendix F



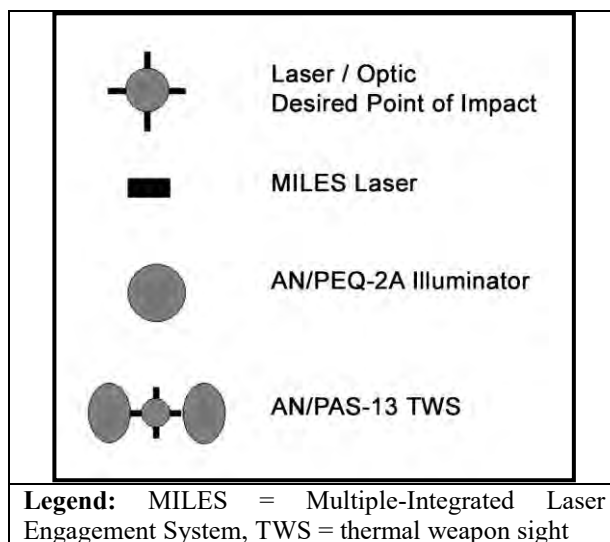
### EXAMPLE

L2.0, U2.4

Starting from the center of the borelight circle (0.0, 0.0), move left 2 squares and up 2.4 squares.

**Note.** Each template also provides a number formula for the proper offset.

- Place the appropriate symbol or mark. (See figure F-1.)



**Figure F-1. 10-meter target offset symbols**

- Notes.**
- To reproduce the 10-meter target offset, obtain a copy of the blank 10-meter target offset and place the example of the weapon being used on the back. This reproducible copy can be laminated and used repeatedly.
  - Table F-1 on page F-5 provides offset mounting information for various weapon configurations.



10-Meter Boresight Offsets and 25-Meter Zero Offsets

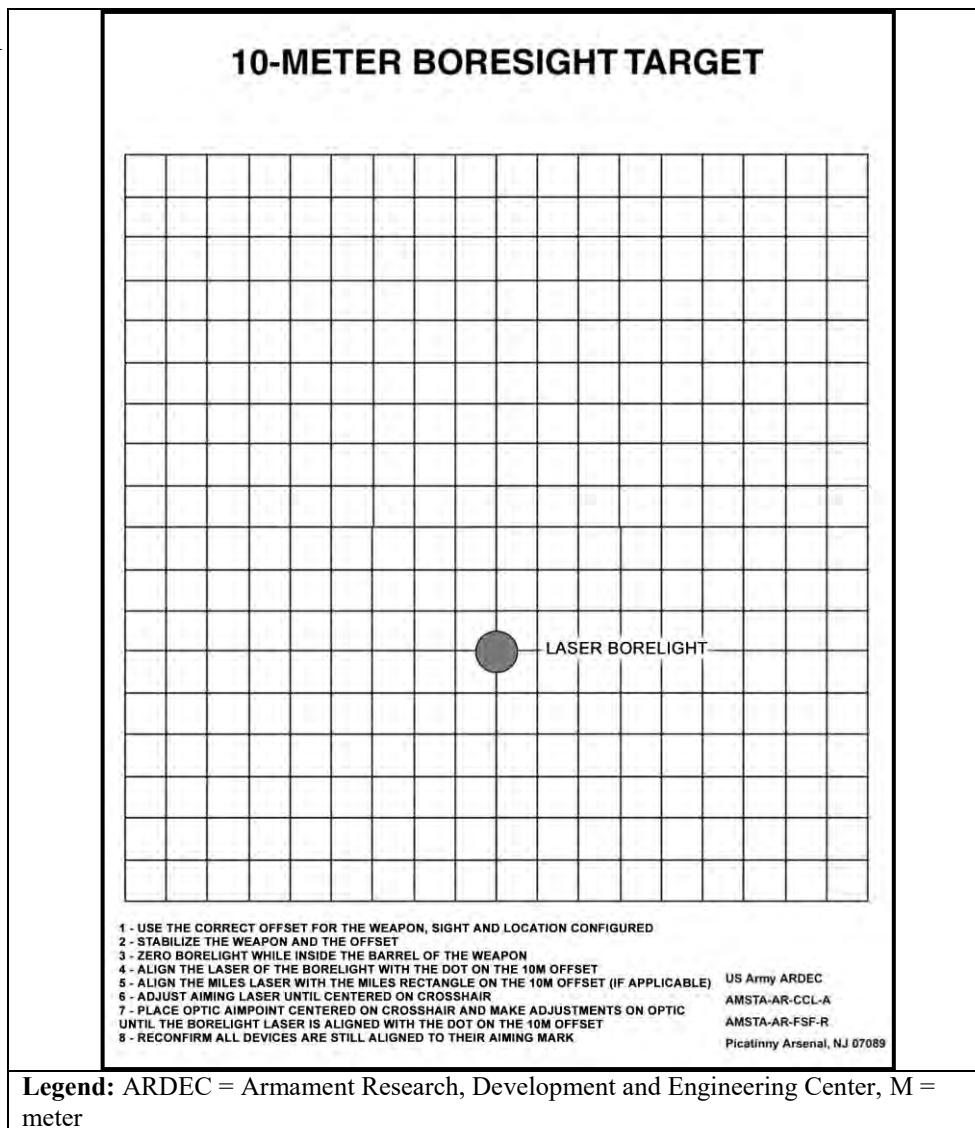
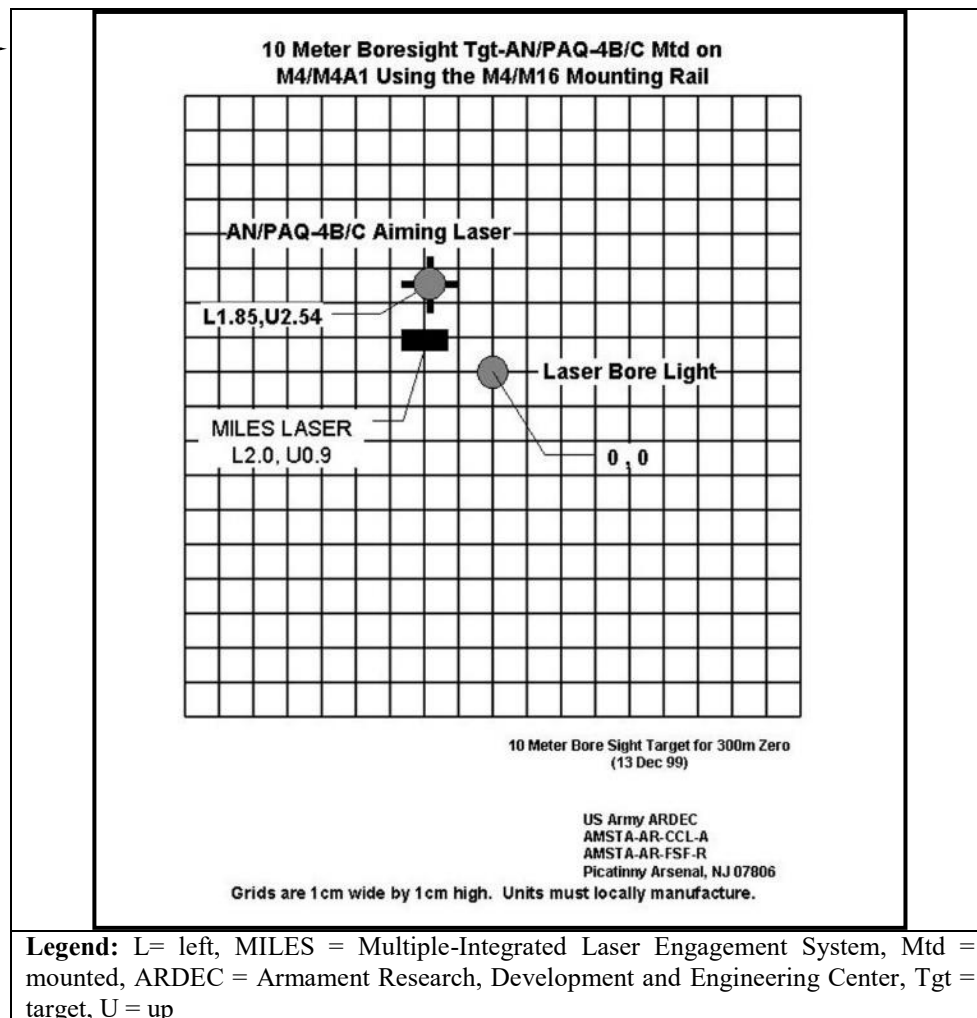


Figure F-2. Blank 10-meter target offset



Appendix F




**Figure F-3. M16A2 10-meter boresighting target**



## 10-Meter Boresight Offsets and 25-Meter Zero Offsets



Table F-1. Offset mounting



WEAPON	ACCESSORY	RAIL GRABBER	MOUNT	LOCATION	RANGE TO ZERO	ZERO OFFSET	BORESIGHT TARGET	MILES OFFSET
M16A2	Iron sight	N/A	N/A	N/A	300 m	0.0 0.0	0.0 4.2U	2.0L 0.9U
M16A2	M68	N/A	M68 goose-neck bracket	Carrying handle	300 m	0.0 1.4 cm DN	0.0 5.2U	2.0L 2.4U
M16A2	LTWS	TWS	TWS bracket assembly	Carrying handle	300 m	0.0 10D	0.0 13.4U	2.0L 2.4U
M16A2	TWS	N/A	TWS bracket assembly	Carrying handle	300 m	0.0 8.1D	0.0 11.5U	2.0L 2.4U
M16A2	AN/PA Q-4B/C	N/A	M4/M16 bracket	Hand guards	300 m	1.5R 0.5U	1.85L 2.54U	2.0L 0.9U
M16A2	AN/PE Q-2A/B	N/A	M4/M16 bracket	Hand guards	300 m	1.5L 0.5U	1.8R 2.4U	2.0L 0.9U
M16/M203	AN/PA Q-4B/C	N/A	Spacer	Carrying handle	300 m	1.85R 2.6D	1.85L 8.6U	2.0L 3.9U
M4/M4A1	BUIS	N/A	N/A	Upper receiver	300 m	0.0 0.0	0.0 4.01U	2.0L 0.9U
M4/M4A1	AN/PA Q-4B/C	N/A	M4/M16 bracket	Hand guards	300 m	1.5R 2.5U	1.85L 2.54U	2.0L 0.9U
M4/M4A1	LTWS	TWS	N/A	Upper receiver	300 m	0.0 4.5D	0.0 7.9U	TBD
M4/M4A1	TWS	Picatinny	TWS spacer and rail grabber	Upper receiver	300 m	0.0 5.7D	0.0 9.4U	2.0L 2.4U
M4/M4A1	AN/PE Q-2A/B	N/A	M4/M16 bracket	Hand guards	300 m	1.0L 0.3U	1.8R 2.4U	2.0L 0.9U
M4/M4A1	M68	M68	Half-moon spacer	Upper receiver	300 m	0.0 1.4 cm DN	0.0 5.63U	2.0L 2.4U
M4/M203	BUIS	N/A	N/A	Upper receiver	300 m	0.0 0.0	0.0 6.01U	2.0L 0.9U
M4/M203	AN/PA Q-4B/C	N/A	Spacer	Carrying handle	300 m	1.3R 1.9D	1.85L 8.6U	2.0L 0.9U

**Note.** Target offsets not yet developed are indicated by TBD.

**Legend:** BUIS = back up iron sight, cm = centimeters, D or DN = down, L = left, LTWS = light thermal weapon sight, m = meter, R = right, N/A = not applicable, TBD = to be developed, TWS = thermal weapon sight, U = up



Appendix F

Table F-1. Offset mounting (continued)

WEAPON	ACCES-SORY	RAIL GRAB-BER	MOUNT	LOCA-TION	RANGE TO ZERO	ZERO OFFSET	BORE-SIGHT TARGET	MILES OFFSET
M4 MWS	BUIS	N/A	N/A	Upper receiver	300 m	0.0 0.0	0.0 4.01U	2.0L 0.9U
M4 MWS	M68	M68	Rail grabber	Upper receiver	300 m	0.0 1.4 cm DN	0.0 5.63U	2.0L 2.4U
M4 MWS	LTWS	TWS	N/A	Upper receiver	300 m	0.0 4.5D	0.0 7.9U	2.0L 2.4U
M4 MWS	TWS	TWS	Spacer	Upper receiver	300 m	0.0 5.7D	0.0 9.4U	2.0L 2.4U
M4 MWS	ANPEQ -2A	Insight	N/A	Left	300 m	TBD	4.5L 1.0D	2.0L 0.9U
M4 MWS	AN/PEQ -2A/B	Insight	N/A	Right	300 m	N/A	5.5R 5.4D	2.0L 0.9U
M4 MWS	AN/PEQ -2A/B	Insight	N/A	Top	300 m	1.5L 0.5D	2.9R 2.3U	2.0L 0.9U
M4 MWS	AN/PEQ -2A/B	Picatinny	Spacer	Top	300 m	N/A	1.95R 4.1U	2.0L 0.9U
M4 MWS	AN/PEQ -2A/B	Picatinny	Spacer	Right	300 m	N/A	6.35R 4.4D	2.0L 0.9U
M4 MWS	AN/PEQ -2A/B	Picatinny	Spacer	Left	300 m	6.9R 2.0U	6.2L 0.60D	2.0L 0.9U
M4MWS	AN/PEQ -2A/B	Insight	Training adapter	Top	300 m	2.0L 1.5D	N/A	2.0L 0.9U
M4 MWS	AN/PAQ -4B/C	Picatinny	AN/PA Q-4B/C bracket adapter	Top	300 m	4.9R 6.1U	1.75L 3.9U	2.0L 0.9U
M4 MWS	AN/PAQ -4B/C	Picatinny	AN/PA Q-4B/C bracket adapter (spacer)	Right	300 m	N/A	6.9R 0.9D	2.0L 0.9U
M4 MWS	AN/PAQ -4B/C	Insight	N/A	Top	300 m	N/A	1.75L 2.15U	2.0L 0.9U
M4MWS	AN/PAQ -4B/C	Insight	N/A	Right	300 m	N/A	4.35R 0.65D	2.0L 0.9U
M4MWS	AN/PAQ -4B/C	Insight	N/A	Left	300 m	N/A	4.30L 4.25D	2.0L 0.9U

**Legend:** BUIS = back up iron sight, cm = centimeters, D or DN = down, L = left, LTWS = light thermal weapon sight, m = meter, MWS = modular weapon system, R = right, N/A = not applicable, TBD = to be developed, TWS = thermal weapon sight, U = up



10-Meter Boresight Offsets and 25-Meter Zero Offsets



Table F-1. Offset mounting (continued)



WEAPON	ACCESSORY	RAIL GRABBER	MOUNT	LOCATION	RANGE TO ZERO	ZERO OFFSET	BORE-SIGHT TARGET	MILES OFFSET
M4 MWS M203	BUIS	N/A	N/A	Upper receiver	300 m	0.0 0.0	0.0 6.01U	2.0L 0.9U
M4 MWS M203	AN/PAQ -4B/C	Picatinny	Bracket adapter (spacer)	Left	300 m	4.9R 6.1U	6.0L 4.0D	2.0L 3.9U
M16A4 MWS	BUIS	N/A	N/A	Upper receiver	300 m	0.0 0.0	0.0 4.01U	2.0L 0.9U
M16A4 MWS	AN/PAQ -4B/C	Picatinny	AN/PAQ -4B/C bracket adapter (spacer)	Left	300 m	6.5R 8.1U	6.03L 4.25D	2.0L 0.9U
M16A4 MWS	TWS	TWS	Spacer	Upper receiver	300 m	0.0 6.0D	0.0 9.4U	2.0L 2.4U
M16A4 MWS	M68	M68	N/A	Upper receiver	300 m	0.0 1.4 cm DN	0.0 5.63U	2.0L 2.4U
M16A4 MWS	AN/PEQ -2A/B	Insight	N/A	Left	300 m	3.0R 3.0U	4.5L 1.0D	2.0L 0.9U
M16A4 MWS M203	BUIS	N/A	N/A	Upper receiver	300 m	0.0 0.0	0.0 6.01U	2.0L 0.9U
M16A4 MWS M203	AN/PAQ -4B/C	Picatinny	AN/PAQ -4B/C bracket adapter (spacer)	Left	300 m	6.5R 8.1U	6.0L 4.0D	2.0L 3.9U
M16A4 MWS	AN/PEQ -2A/B	Picatinny	Spacer	Left	300 m	6.0R 2.0U	6.2L 0.60D	2.0L 0.9U
M16A4 MWS	AN/PEQ -2A/B	Picatinny	Spacer	Right	300 m	TBD	6.35R 4.4D	2.0L 0.9U
M16A4 MWS	AN/PEQ -2A/B	Picatinny	Spacer	Top	300 m	TBD	1.95R 4.1U	2.0L 0.9U
M16A4 MWS	AN/PEQ -2A/B	Insight	N/A	Right	300 m	TBD	5.5R 5.4D	2.0L 0.9U
M16A4 MWS	AN/PEQ -2A/B	Insight	N/A	Top	300 m	1.5L 0.5D	2.0R 2.3U	2.0L 0.9U
<b>Note.</b> Target offsets not yet developed are indicated by TBD.								
<b>Legend:</b> BUIS = back up iron sight, cm = centimeter, D or DN = down, m = meter, L = left, MWS = modular weapon system, R = right, N/A = not applicable, TBD = to be developed, TWS = thermal weapon sight, U = up								



**Appendix F**



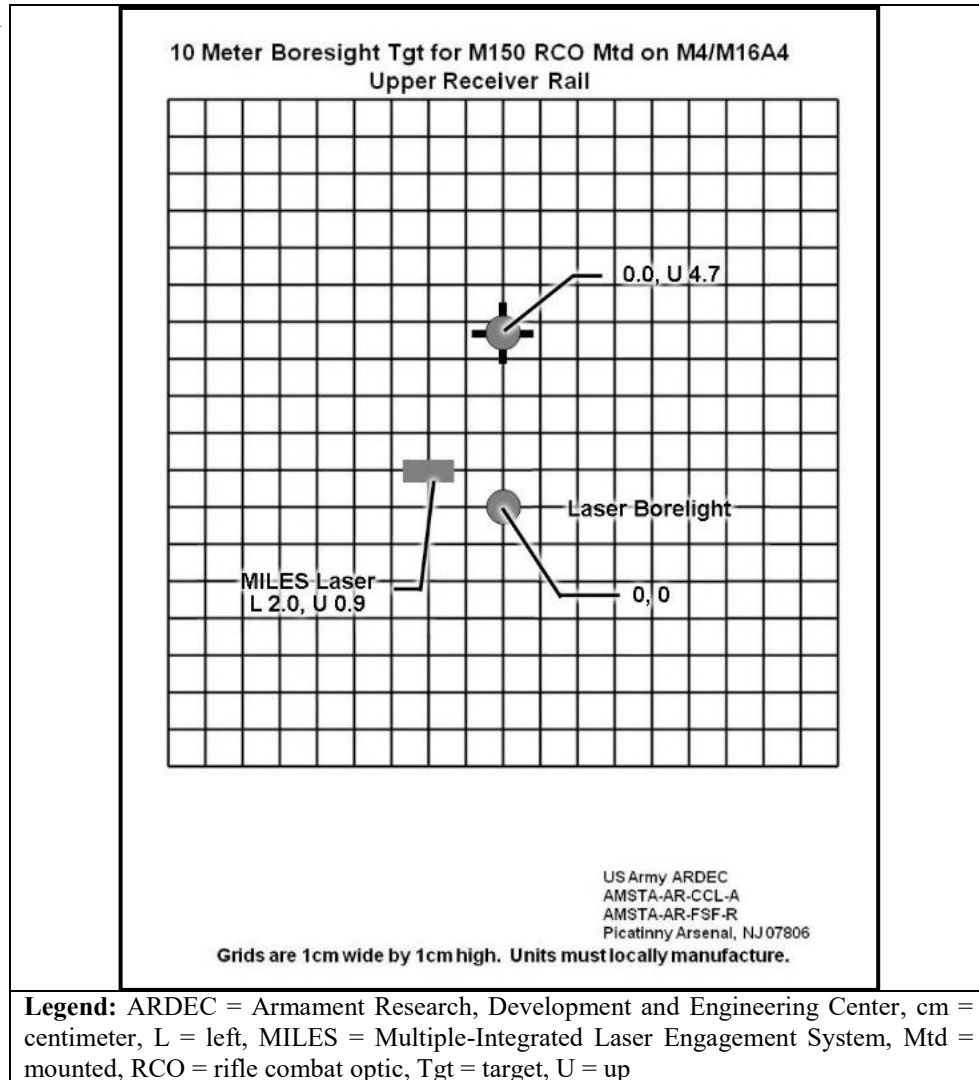
**Table F-1. Offset mounting (continued)**



WEAPON	ACCES-SORY	RAIL GRAB-BER	MOUNT	LOCA-TION	RANGE TO ZERO	ZERO OFFSET	BORE-SIGHT TARGET	MILES OFFSET
M16A4 MWS	AN/PEQ -2A/B	Insight	Training adapter	Top	300 m	2.0L 1.5D	TBD	2.0L 0.9D
M16A4 MWS	AN/PAQ -4B/C	Picatinny	AN/PA Q-4B/C bracket adapter	Top	300 m	4.9R 6.1U	1.75L 3.9U	2.0L 0.9U
M16A4 MWS	AN/PAQ -4B/C	Picatinny	AN/PA C-4B/C bracket adapter	Right	300 m	N/A	6.0R 0.9D	2.0L 0.9U
M16A4 MWS	AN/PAQ -4B/C	Insight	N/A	Top	300 m	N/A	1.75L 2.15U	2.0L 0.9U
M16A4 MWS	AN/PAQ -4B/C	Insight	N/A	Right	300 m	N/A	4.35R 0.65D	2.0L 0.9U
M16A4 MWS	AN/PAQ -4B/C	Insight	N/A	Left	300 m	N/A	4.30L 4.25D	2.0L 0.9U
<i>Note.</i> Target offsets not yet developed are indicated by TBD).								
<b>Legend:</b> D = down, L = left, m = meter, MWS = modular weapon system, N/A = not applicable, R = right, TBD = to be developed, TWS = thermal weapon sight, U = up								



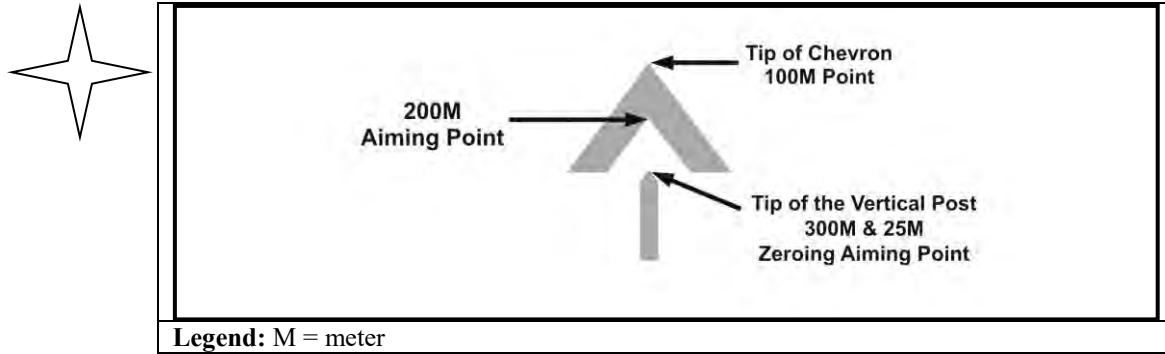
10-Meter Boresight Offsets and 25-Meter Zero Offsets



△ Figure F-4. 300-meter zero of the advanced combat optical gunsight



Appendix F



△ Figure F-5. Advanced combat optical gunsight points of aim (100 to 300 meters)



## Glossary

The glossary lists acronyms and terms with Army or joint definitions. Where Army and joint definitions differ, (Army) precedes the definition. Terms for which TC 3-22.9 is the proponent are marked with an asterisk. The proponent manual for other terms is listed in parentheses after the definition.

### SECTION I – ACRONYM/ABBREVIATIONS

AM	arc of movemet
ARNG	Army National Guard
ARNGUS	Army National Guard of the United States
ARS	adapter rail system
ATPIAL	advanced target pointer illuminator aiming light
BC	ballistic coefficient
BDC	bullet drop compensater
BUIS	back up iron sight
BZO	battle sight zero
CBRN	chemical, biological, radiological, and nuclear
CCO	close combat optic
CSF2	Comprehensive Soldier and Family Fitness
CoVM	center of visible mass
DA	Department of the Army
DBAL-A2	dual beam aiming laser-advanced2
DMC	digital magnetic compass
DOTD	Directorate of Training and Doctrine
DODIC	Department of Defense Identification Code
EENT	end evening nautical twilight
Ek	kinectic energy
fps	feet per second
FOV	field of view
GTL	gun target line
HTWS	heavy thermal weapons sight
I2	image intensifier
IR	infrared
LASER	light amplified stimulated emitted radiation
LCD	liquid crystal display
LRF	laser range finder
LWTS	light weapons thermal sight
MASS	modular accessory shotgun system



## **Glossary**

---

MCoE	United States Army Maneuver Center of Excellence
METT-TC	mission, enemy, terrain and weather, troops and support-time available, and civil considerations
MIL STD	military standard
m	meter
mm	millimeter
mph	mile per hour
MOA	minutes of angle
MTBF	mean time between failures
MWO	modified word order
MWS	modular weapon system
MWTS	medium weapon thermal sight
NATO	North Atlantic Treaty Organization
NOD	night observation device
PAM	pamphlet
PMCS	preventative maintenance checks and services
POA	point of aim
POI	point of impact
NSN	National Stock Number
RCO	rifle combat optic
SAA	small arms ammunition
SOP	standard operating procedure
STANAG	Standardized Agreement
STRAC	Standard in Training Commission
STORM	illuminator, integrated, small arms
TACSOP	tactical standard operating procedure
TC	Training Circular
TES	tactical engagement simulation
TM	Technical Manual
T	time
TWS	thermal weapon sight
µm	micrometer
USAR	United States Army Reserve
U.S.	United States
VAL	visible aim laser
VFG	vertical foregrip
V	velocity
WCS	weapon control status
WTS	weapons thermal sights



Glossary

**SECTION II – TERMS**

*\*employment*

The application of the functional elements of the shot process and skills to accurately and precisely fire a weapon at stationary or moving targets.





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20 November 2019

TC 3-22.9, C3

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**TC 3-22.9**  
**13 May 2016**

By Order of the Secretary of the Army:

**MARK A. MILLEY**  
*General, United States Army*  
*Chief of Staff*

Official:

A handwritten signature in black ink, appearing to read "Gerald B. O'Keefe". The signature is stylized with a large "G" and "O".

**GERALD B. O'KEEFE**  
*Administrative Assistant to the*  
*Secretary of the Army*  
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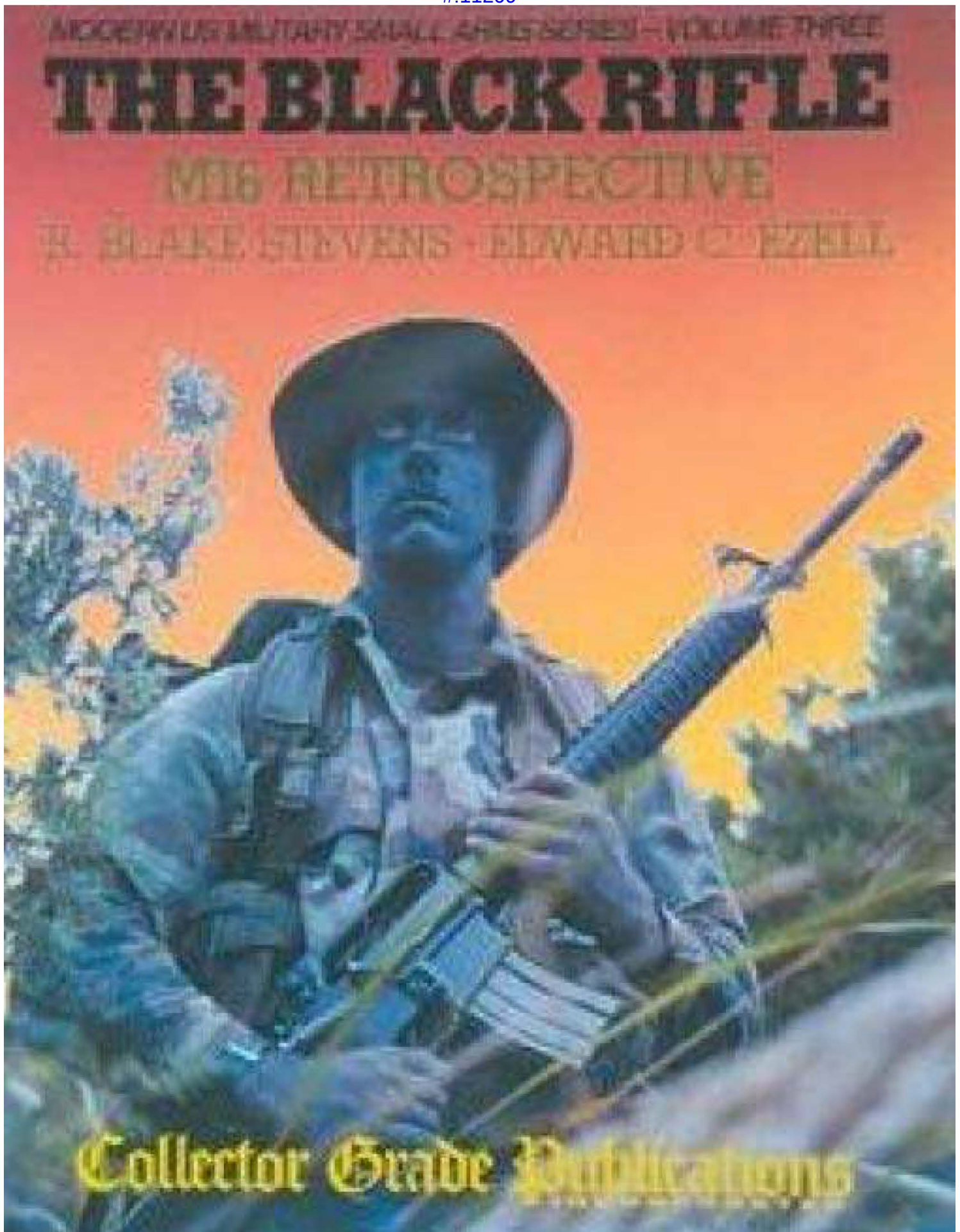


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## **EXHIBIT 67**







# **THE BLACK RIFLE**

## **M16 RETROSPECTIVE**

**R. Blake Stevens • Edward C. Ezell**

Edited by R. Blake Stevens

**Collector Grade Publications**  
INCORPORATED



## OTHER COLLECTOR GRADE BOOKS . . .

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(1993) by Larry L Ruth

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Enhanced Second Edition

Printed in Canada

10 9 8 7 6 5 4 3 2



## 24 The Great Johnson/Garand Controversy

ever purchased. General LeMay was unable to get any further funding requests approved, the reason being that there were already sufficient numbers of earlier M4 and M6 survival rifles in Air Force stores. However, much had been accomplished for such a short time, and the "success" of the AR-5 had put ArmaLite on the military map, so to speak.

This, combined with the "know-how" which had accrued from building and testing the earlier designs, prompted a decision to apply the full force of Gene Stoner's considerable talents to the original, as-yet unformulated idea for an in-line military rifle. As a measure of the importance accorded this move by everyone concerned, no less a personage than the recently retired Commanding General of the Continental Army Com-

mand (CONARC), Jacob L. Devers, joined the staff of Fairchild as Military Liaison Officer.

As discussed below, the fourth-prototype version of Gene Stoner's AR-10 was the first to be made in any but one-off numbers. When it burst upon the scene in 1955, the experience of first viewing and handling the AR-10's grey alloy metalwork and foam-filled plastic furniture seemed so utterly without precedent that for many it simply suspended the critical faculties, leaving nowhere to begin any comparison with ordinary wood-and-steel rifles. The AR-10 came complete with a very interesting "family tree", however, and in order to do justice to this epochal weapon itself we must retrace some steps and pick up yet another thread of our story.

## Flashback: The Great Johnson/Garand Controversy of 1940



Bitter controversy, denigrations and accusations; investigations and whiffs of scandal: all these and more have attended the manufacture and issuance of a number of US Army shoulder rifles since at least the first Allin conversion of the Springfield rifled musket in 1865. The whole process seemed about to begin again when the US adopted the world's first general-issue semi-automatic rifle, the .30-06 (7.62x63mm) M1 Garand: many minds, military and otherwise, were far from convinced that the Army had made the right move.

The M1 was adopted in January, 1936. The following month, the original toolroom model of a new .30-06 short-recoil rifle mechanism was test fired for the first time. It was the brainchild of Melvin M. Johnson, Jr., a young man described in a later *American Rifleman* article as "a well-heeled Boston lawyer whose passion was the design of advanced rifles and machine guns". Johnson, also an officer in the Marine Corps Reserve, pursued the refinement and contract manufacture of several prototypes of his rifle with all of the considerable private resources he could muster. Nor was he hesitant about calling for help from his fellow officers: in March of 1938 he was allowed to conduct a week-long field demonstration before the Infantry Board at Fort Benning, with his rifle "serial no. 1". For his pains he received the following reminder that the US already had a rifle:

*...until the [Johnson] rifle can be subjected to intensive test firing, such as has been done with the US Rifle, M1, no sound conclusions can be made concerning the ability of the rifle or its parts to stand up.*

26. John Cantius Garand and the M1 rifle, in a National Rifle Association photo taken at Springfield Armory shortly before his death in 1974. The M1 was the world's first general-issue semi-automatic rifle, and many felt that it was an impossible design to mass-produce. Mr. Garand here holds "US Semi-automatic Rifle Caliber .30 M1" serial no. 1, the first of more than six million which were eventually made.



## **EXHIBIT 68**



# What does an AR-15 do to a human body? A visual examination of the deadly damage.

Nick Kirkpatrick, Atthar Mirza, Manuel Canales



Editor's note: We are publishing these 3D animations to show the destructive power of the AR-15. The images may disturb some people.

The wounds show the lethal force of the AR-15.

But they are rarely seen.

The gun is the weapon of choice for many mass killers.

It works with brutal efficiency.

The scenes of chaos and terror are all too familiar in America.

The AR-15 fires bullets at such a high velocity — often in a barrage of 30 or even 100 in rapid succession — that it can eviscerate multiple people in seconds. A single bullet lands with a shock wave intense enough to blow apart a skull and demolish vital organs. The impact is even more acute on the compact body of a small child.



"It literally can pulverize bones, it can shatter your liver and it can provide this blast effect," said Joseph Sakran, a gunshot survivor who advocates for gun violence prevention and a trauma surgeon at Johns Hopkins Hospital.

During surgery on people shot with high-velocity rounds, he said, body tissue "literally just crumbled into your hands."

The carnage is rarely visible to the public. Crime scene photos are considered too gruesome to publish and often kept confidential. News accounts rely on antiseptic descriptions from law enforcement officials and medical examiners who, in some cases, have said remains were so unrecognizable that they could be identified only through DNA samples.

As Sakran put it: "We often sanitize what is happening."

American Icon

A series examining the AR-15, a weapon with a singular hold on a divided nation

More stories

About the terminology

Colt acquired the AR-15 patent and trademark from Armalite in 1959. The patent expired, leaving many companies to produce their own weapons, commonly called AR-style rifles. While Colt still holds the trademark, "AR-15" has become a ubiquitous term for a popular style of gas-operated, magazine-fed semiautomatic rifles. For this reason, we refer to the rifle broadly as the AR-15 in this series.

The Washington Post sought to illustrate the force of the AR-15 and reveal its catastrophic effects.

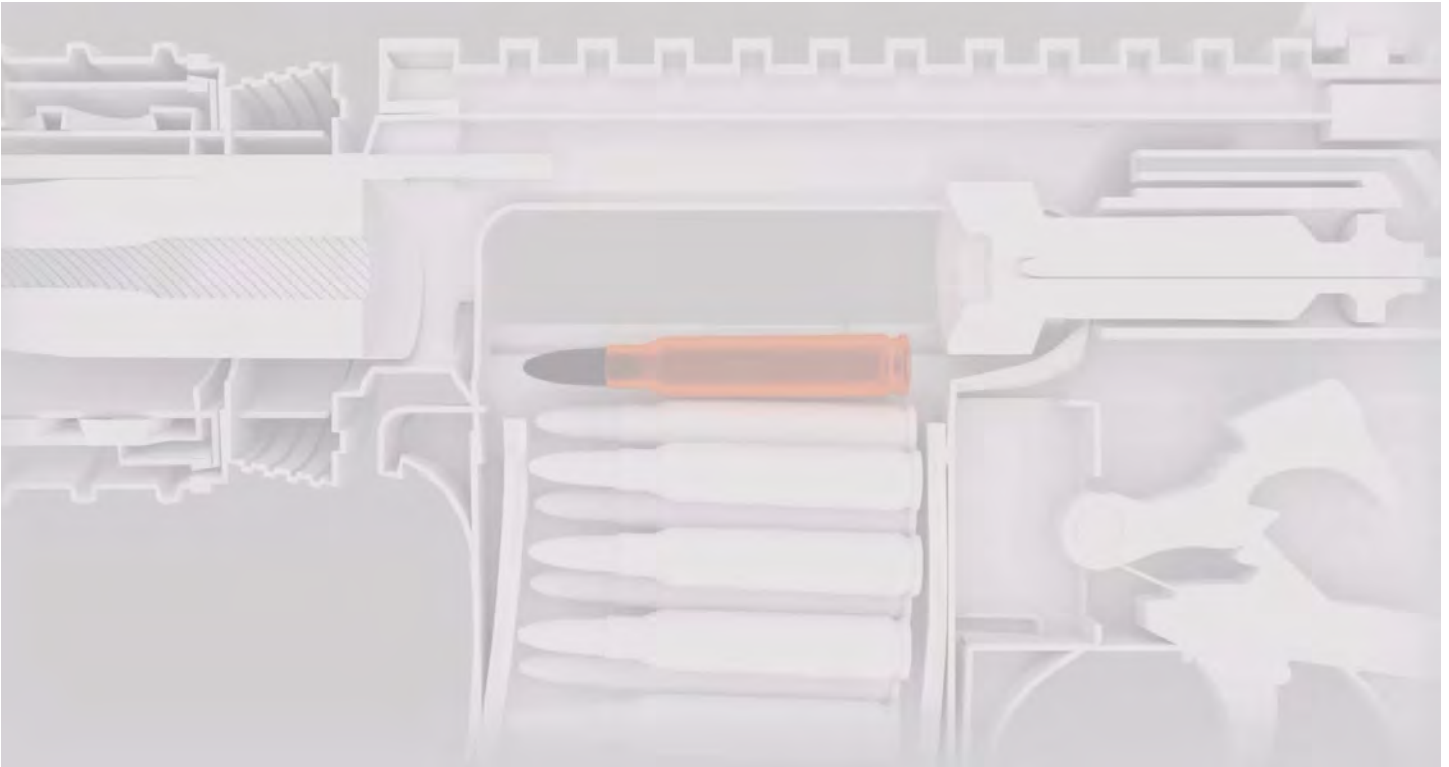
The first part of this report is a 3D animation that shows the trajectory of two different hypothetical gunshots to the chest — one from an AR-15 and another from a typical handgun — to explain the greater severity of the damage caused by the AR-15.

The second part depicts the entrance and exit wounds of two actual victims — Noah Pozner, 6, and Peter Wang, 15 — killed in school shootings when they were struck by multiple bullets.

This account is based on a review of nearly 100 autopsy reports from several AR-15 shootings as well as court testimony and interviews with trauma surgeons, ballistics experts and a medical examiner.

The records and interviews show in stark detail the unique mechanics that propel these bullets — and why they unleash such devastation in the body.





This is a .223-caliber-sized round inside an AR-15. What makes the weapon so deadly is the speed of that bullet.

It is small and light. Its cartridge holds enough propellant to send the bullet flying out of the barrel at a speed that would cross six football fields in a second.

This is a 9mm-sized round, a common choice in handguns. Its bullets are larger, inside smaller cartridges. They don't hold enough gunpowder to match the velocity of the .223.

Any bullet can kill, and instantly, when it hits a vital organ. The higher speed of a bullet from an AR-15 causes far more damage after it hits the body and drastically reduces a person's chances of survival.

"As that bullet slows down," said trauma surgeon Babak Sarani, an authority on casualties from mass killings, "that energy is so massive it has to go someplace, and your body will literally tear apart."

In this hypothetical scenario, the bullet bursts into the chest cavity. It shreds lung tissue, severs nerves and vessels and causes massive bleeding. It also begins to tumble, taking a chaotic path in the body.

The speed at impact creates a blast effect, like the wake that follows a boat, causing internal injuries far outside the bullet's path. Here, the blast destroys large veins that carry blood back to the heart.

A 9mm bullet from the same distance takes a relatively linear path. Because that bullet doesn't produce the same blast effect, it causes far less damage.

The bullet from the AR-15 leaves behind a gaping exit wound. The 9mm bullet fired from the handgun



has a much smaller exit wound.

In this scenario, with immediate medical care and minimal bleeding, the victim has a chance at surviving the 9mm shot to the chest.

The bullet from the AR-15, however, causes torrential bleeding that is quickly lethal.

Two children, many bullets

When multiple bullets from an AR-15 strike one body, they cause a cascade of catastrophic damage.

This is the trauma witnessed by first responders — but rarely, if ever, seen by the public or the policymakers who write gun laws.

The Post determined that there is a public interest in demonstrating the uniquely destructive power of the AR-15 when used to kill.

What follows is a detailed depiction showing the impact of bullets fired from AR-15s at two young victims. It is based on autopsy reports for Noah Pozner and Peter Wang that The Post obtained through public records.

Due to the unusual visual nature of the presentation, The Post took the added step of seeking — and receiving — the consent of the victims' families before proceeding with this account. The Post offered the families the opportunity to view the depictions in advance of publication, which they declined to do.

The families also declined to be interviewed for this story, but a spokesperson for the Wang family offered a statement explaining why Peter's parents, Hui and Kong Wang, provided their consent to The Post.

"Peter's parents want people to know the truth," said Lin Chen, their niece and Peter's cousin. "They want people to know about Peter. They want people to remember him."

This presentation may be disturbing to some people.

Noah Pozner, 6

Newtown, Conn.

Noah was found dead on the floor of Classroom 8 at Sandy Hook Elementary on Dec. 14, 2012. He was 6. He was wearing a red Batman sweatshirt, black pants and black sneakers.

He loved Batman. He was full of energy, his family said, curious and imaginative. He wanted to be an astronaut, and he also wanted to manage a taco factory, because he loved tacos. Noah would tease his



sisters that when they went to bed, he was going off "to his third shift" at the factory, so convincingly that they would wake up to make sure he was still in bed.

It was cold that morning when his father, Lenny, dropped him off at school, "but he jumped out not wearing his jacket and he had one arm in one sleeve and his backpack in his other arm, and he was kind of juggling both and walking into the school that way," Lenny Pozner would later testify.

"And that's the last visual I have of Noah."

The first visual that Connecticut state police Sgt. William Cario has of Noah is this: 15 children and two educators are piled on top of one another in a small school bathroom on the southwest corner of the classroom. Cario proceeded to pull them out one by one. All were dead.

One of them was Noah.



Noah was shot three times. Adam Lanza took his mother's AR-15 rifle to the school and fired 80 rounds into the bathroom. Here are the wounds that killed Noah.

The bullet that struck Noah's left thumb caused the smallest of his wounds. His hand was badly mangled.

The bullet that struck Noah's back crossed through the center of his chest, filling it with blood. It broke apart into fragments, according to 2019 court testimony from chief state medical examiner Wayne Carver.



The bullet that hit Noah's face caused an almost "complete destruction" of the lower lip and jaw.

Noah's wounds were not survivable, Carver testified. "This particular kind of projectile, it's got so much energy that it just breaks up." The pattern of metal over a wide area, he said, "would give me a marker of ... what organs were destroyed and how completely."

Peter Wang, 15

Parkland, Fla.

Peter was found dead in a third-floor hallway of Marjory Stoneman Douglas High School on Valentine's Day 2018. He was 15. He was wearing his Army JROTC uniform.

He kept notes in his bedroom drawer about his plans. He had joined the military training corps, with its mission to "motivate young people to be better citizens," as an important step toward attending the U.S. Military Academy at West Point.

Born in New York to parents from China, he was always helping everyone around him, friends and family said. Once, at Disney World, he held a friend's child aloft in a crowd for 20 minutes so she could see a fireworks display.

When gunfire broke out at Parkland, Peter was in study hall, playing chess with a friend. He held the door open for other students to escape.

A few of them made it. He did not.





Peter was shot 13 times. Nikolas Cruz used an AR-15 he bought legally and fired at least 139 rounds. Here are the wounds that killed Peter.

Peter was running down the hallway when he was shot. He was struck once in the foot, twice in the thigh, once in the torso, five times in his arms and, finally, four times in the head.

One of the bullets that hit his thigh fractured his hipbone and then broke partially apart before exiting through his abdomen.

Two bullets tore Peter's chest apart. One entered his torso and flew upward, fragmenting and perforating his chest muscle, which bruised his lungs and created a cluster of three large exit wounds. The other struck the back of his upper right arm, pierced the shoulder joint and opened up a gaping hole on the way out.

The four bullets that obliterated Peter's head were the last four he received, medical examiner Wendolyn Sneed, who performed the autopsy, testified at Cruz's sentencing trial last year. Surveillance video showed that Peter's legs were moving as the killer came closer to him and fired rapidly.

The combined energy of those bullets created exit wounds so "gaping" that the autopsy described his head as "deformed." Blood and brain splatter were found on his upper body and the walls. That degree of destruction, according to medical experts, is possible only with a high-velocity weapon.

Peter was one of 16 Parkland victims who were shot several times. The shooter had equipped his AR-15 with the ability to fire dozens of rounds without pausing to reload, preventing people from escaping.

In many of America's mass killings, shooters hit multiple victims, multiple times. In seconds.

You have been on this page for 18 seconds.

It took 32 seconds for the shooter to [kill 9 people](#) and injure 27 others on the street of a Dayton, Ohio, entertainment district.

About this story

Reporting by N. Kirkpatrick and Atthar Mirza. 3D modeling and animations by Manuel Canales and Ronald Paniagua. Jon Swaine and Alex Horton contributed to this report.

Design and development by Aadit Tambe, Anna Lefkowitz and Rekha Tenjarla. Design editing by Madison Walls.



Editing by Ann Gerhart, Peter Wallsten, Chiqui Esteban and Wendy Galietta. Additional editing by Jordan Melendrez, Kim Chapman and Tom Justice.

Additional support by Frank Hulley-Jones, Angela M. Hill, Natalia Jimenez, Sarah Murray, Courtney Beesch, Angel Mendoza, Bishop Sand, Kyle Schultz, Brandon Carter, Ashleigh Wilson and Bryan Flaherty.

Video credits: Bystanders take cover outside the Odessa Cinergy Theater during a shoot out with law enforcement in 2019 in Texas.

People flee as shots ring out at a Las Vegas concert on in 2017. (Twitter/Morgan Marchand/Storyful)

Students raise their hands as armed law enforcement officers enter a classroom at Marjory Stoneman Douglas High School in Parkland, Fla., in 2018 (Alexander Ball/Storyful)

The models and animations were constructed from academic research reviews, interviews, autopsy reports and other records The Post obtained, in consultation with the following: Babak Sarani, director of trauma and acute care surgery at George Washington University Hospital; Joseph Sakran, vice chair of clinical operations and a trauma surgeon at Johns Hopkins Hospital; Cynthia Bir, chair of biomedical engineering at Wayne State University; and Victor Weedn, deputy medical examiner for Washington, D.C.

The Post relied on post-mortem and autopsy reports and medical examiner testimony at trials to illustrate with precision the entrance and exit wounds that were identified in the bodies of Noah Pozner and Peter Wang. The depictions are as precise as could be determined from the records, which included the medical examiner's hand-drawn diagrams for Peter. Those documents do not detail the position the victims were in when they were struck, or the full sequence of the bullets and their precise path through the body.

The calculation that a .223 round fired from an AR-15 can reach speeds of up to six football fields in a second was made using a 55 grain .223 Remington full metal case round fired at a horizontal trajectory. The muzzle velocity of this round is 3,240 feet per second. This estimate accounts for drag as the bullet slows down over distance and time. It does not account for weather or other interference. Nor does it account for horizontal drop as the bullet would probably hit the ground before reaching six football fields. The Post consulted with mechanical engineer John Greenawalt and Cynthia Bir, chair of biomedical engineering at Wayne State University.

Ten of the 17 deadliest U.S. mass killings since 2012 have involved AR-15-style guns. (Handguns are [involved in the bulk](#) of U.S. gun homicides, responsible for 90 percent of cases in which the type of firearm is known.)

The Washington Post defines mass killings as a shooting event in which at least four people are killed,



not including the gunman.

The timer at the conclusion includes 10 mass killing events that involved AR-15s. The time elapsed from the first shot to last were all under 11 minutes. That timing is approximate and based on official reports and news reports.



[A letter from Executive Editor Sally Buzbee on the AR-15 series](#)

[March 27, 2023](#)



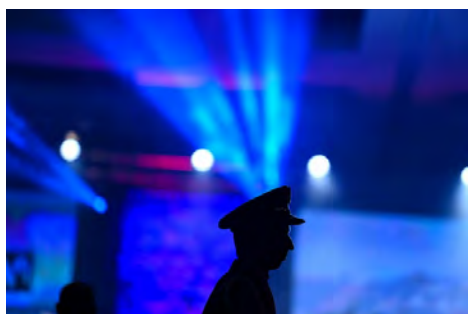
[Sutherland Springs survivors haunted by an AR-15's carnage, trauma](#)

[March 27, 2023](#)



[Magazine restrictions could reduce mass killings by AR-15s, but courts must decide](#)

[March 27, 2023](#)





[As guns saturate the United States, police turn to the AR-15](#)

[March 27, 2023](#)



[Decades of marketing reinvented the AR-15 into a top-selling firearm](#)

[March 27, 2023](#)



[Why do people own AR-15s? 33% of owners cited self-defense, poll finds](#)

[March 27, 2023](#)



## **EXHIBIT 69**



# We spent 7 months examining the AR-15's role in America. Here's what we learned.

Washington Post Staff



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The AR-15 is more than a weapon.

It is a potent symbol with a grip on the American imagination — a readily available and easy-to-use killing machine wielded during some of the country's darkest moments, and a tactical weapon championed as the ultimate expression of Second Amendment rights. It is also a lucrative consumer product with a distinct appeal: The more controversial it becomes, the better it sells.

To understand the AR-15 and its impact, The Washington Post interviewed more than 200 people with expertise or relevant firsthand experience — including firearms industry executives and lobbyists, gun owners, shooting survivors and victims' families, lawmakers, trauma surgeons, first responders, activists, armed militants, academics and ballistics experts, among others. Our seven-month examination also relied on a review of more than 1,000 pages of documents, including internal company records, court and regulatory filings, and autopsy reports, many of them obtained through



public records requests. And, in the most detailed poll of its kind to date, The Post partnered with Ipsos to survey hundreds of AR-15 owners about their reasons for having the weapon.

Here's what we learned:

A flip by the gun industry: The AR-15's rise over the past two decades was sparked by a [dramatic reversal in strategy by the country's biggest gun companies](#) to invest in a product that many in the industry had long viewed as anathema to their culture and traditions. The industry embraced the gun's political and cultural significance as a marketing advantage as it looked for new revenue. [Manufacturers rode a post-9/11 surge in military admiration](#) while also stoking a desire among new gun owners to personalize their weapons with tactical accessories. Gun companies seeking to rebrand the AR-15 have used images of police and soldiers wielding tactical rifles in the field, urging civilian buyers to, as one ad put it, "use what they use."

Spikes in consumer demand: While handguns account for the most gun-related killings in the United States, [sales of AR-15s surge in times of tragedy and political change](#). They soared in the run-up to the election of Barack Obama in 2008, and after the mass killing at Sandy Hook Elementary School in 2012 and a high school in Parkland, Fla., in 2018, and again ahead of the turbulent 2020 presidential election. AR-15s, which once accounted for a small fraction of guns produced in the United States, now represent nearly 1 in 4, according to industry and government figures.

Who owns AR-15s and why: About 1 in 20 U.S. adults — or about [16 million people — own at least one AR-15](#), according to new polling data from The Post and Ipsos. Self-defense is the most popular reason for owning one, with many respondents also citing recreation, target shooting and hunting. Compared with Americans as a whole, AR-15 owners are more likely to be White, male and between the ages of 40 and 65. They're also more likely than adults overall to be Republican and to live in states Donald Trump won in 2020. The industry, meanwhile, has shifted operations in many cases to more culturally welcoming terrain. Numerous firearms, ammunition and gun accessory companies have [moved headquarters or production facilities from liberal to conservative states](#), where communities see the companies as sources of jobs, not controversy.

The gun's brutal efficiency: The AR-15's mechanics, which allow shooters to easily fire bullets at a high velocity in rapid succession, make the weapon lethal and destructive. [When the bullets penetrate the body, they create a blast effect](#) that blows up organs and pulverizes bones. The weapon's power magnifies the impact of gun violence, both because of the number of victims and, for survivors, the long-lasting effects on physical and mental health. In [Sutherland Springs, Tex.](#), where more than two dozen people were killed during an eight-minute rampage in 2017, the additional 20 people injured continue to grapple with debilitating, lifelong conditions such as paralysis or infertility. More than 90 percent of gun-related homicides involve handguns, according to the FBI, but 10 of the 17 deadliest U.S. mass killings since 2012 have involved AR-15s.



Escalating arsenals: In response to years of right-wing violence and intimidation linked to the AR-15, [some far-left activists have begun to form armed groups](#), billed as community defense, often turning to the AR-15 as their weapon, as well. Some leftist activists who long favored nonviolence have grown more tolerant of armed support at public events as threats against the LGBTQ community and other vulnerable groups rise and faith in law enforcement recedes.

Outgunned police: Police departments that once deferred to SWAT teams wielding military-style rifles for active-shooter situations have started equipping officers with AR-15s and other long guns, as those weapons have flooded the neighborhoods they patrol. Many officers welcome the change, some buying their own AR-15s and using them for sport. But [police often say they still feel outgunned and ill-prepared](#) — hampered by a lack of training and by public demands that they do everything possible to avoid using force.

A path to fewer deaths: Many gun violence experts and law enforcement veterans say that [restricting the sizes of ammunition magazines would lessen the carnage](#) caused by AR-15s and other guns. Smaller capacity magazines would force shooters to pause during their attacks to reload, allowing people to flee or fight back, research shows. Most states do not limit magazine sizes, but in the past year, four states have capped them at anywhere from 10 to 17 rounds. Such efforts face growing legal challenges, and the issue could ultimately wind up before the Supreme Court.

About this series

Reporting by Hannah Allam, Holly Bailey, Mark Berman, Shawn Boburg, Manuel Canales, Josh Dawsey, Todd C. Frankel, Silvia Foster-Frau, Emily Guskin, Alex Horton, N. Kirkpatrick, Atthar Mirza, Ashley Parker and Jon Swaine. Photography by Jabin Botsford, Lisa Krantz, Joshua Lott and Jim Urquhart. Videos by Jon Gerberg. Motion graphics by Osman Malik. Design and development by Anna Lefkowitz, Tucker Harris, Aadit Tambe and Rekha Tenjarla.

Lead editors: Peter Wallsten and Wendy Galietta. Editing by Scott Clement, Karly Domb Sadof, Tim Elfrink, Amanda Erickson, Ann Gerhart, Matea Gold, Philip Rucker and Debbi Wilgoren. Additional editing: Jordan Melendrez, Kim Chapman and Tom Justice. Design editing by Madison Walls and Virginia Singarayar. Photo editing by Natalia Jimenez and Monique Woo. Video editing by Angela M. Hill. Graphics editing by Chiqui Esteban.

Additional support from Courtney Beesch, Matthew Callahan, Brandon Carter, Alice Crites, Brian Gross, Bryan Flaherty, John Harden, Stephanie Hays, Meghan Hoyer, Frank Hulley-Jones, Jai-Leen James, Agnes Lee, Sarah Murray, Angel Mendoza, Andrea Platten, Tyler Rimmel, Bishop Sand, Kiley Schultz, Ashleigh Wilson and Irfan Uraizee.



## **EXHIBIT 70**



# Decades of marketing reinvented the AR-15 into a top-selling firearm

Alex Horton, Monique Woo, Tucker Harris

Varmints, soldiers and looming threats: See the ads used to sell the AR-15



The Colt AR-15 looked more like a laser blaster than dad's trusty rifle when it hit the market in 1964.

It was made from aluminum and plastic, not the heavier metals and wood used in traditional firearms. Its cartridges were tiny compared with typical hunting ammunition. And it was all black — a dour monochrome far from the rich walnut accentuating many guns at the time.

American Icon

A series examining the AR-15, a weapon with a singular hold on a divided nation



More stories

## About the terminology

Colt acquired the AR-15 patent and trademark from Armalite in 1959. The patent expired, leaving many companies to produce their own weapons, commonly called AR-style rifles. While Colt still holds the trademark, “AR-15” has become a ubiquitous term for a popular style of gas-operated, magazine-fed semiautomatic rifles. For this reason, we refer to the rifle broadly as the AR-15 in this series.

In short, the AR-15 presented a litany of challenges for those tasked with trying to sell it.

Many gun enthusiasts and industry executives were initially skeptical that an offshoot of a weapon originally designed for combat could sell in a marketplace focused on extolling the virtues of rifles for hunting and handguns for self-defense.

But in the ensuing decades, the AR-15 would become a powerful symbol for whoever invoked it, from gun-control advocates decrying it as a preferred tool for mass killers to gun owners who championed it as the pinnacle of Second Amendment rights.

Through it all, the gun also became a point of emphasis for gun companies that turned to tactical weapons as an emerging and lucrative market.

An examination of the ads used to sell the AR-15, from the 1960s until today, reveals how the gun industry followed social and cultural changes as it sought to broaden the appeal of an unusually polarizing consumer product.

This analysis is based on a review of more than 400 advertisements, catalogue entries, brochures, social media posts and other messages produced by gun manufacturers and ad agencies. Many of the ads appeared in gun-oriented publications, including *American Rifleman* and *Guns & Ammo* — and some have been cited over the years in lawsuits and Federal Trade Commission complaints filed by victims of gun crimes or their families. The Washington Post sought additional analysis from experts on the intersection of marketing and culture.

The ads show how an industry attuned to public opinion across the decades, particularly among its heavily conservative customer base, has heralded the AR-15 as a weekend toy, an effective tool for hunting and home defense, and an expression of masculine energy — at times, all at once. Frequent images of police and soldiers wielding tactical rifles in the field urged civilian buyers to, as one ad put it, “use what they use.”

Unless otherwise noted, gunmakers whose ads appear in this story did not respond to requests for



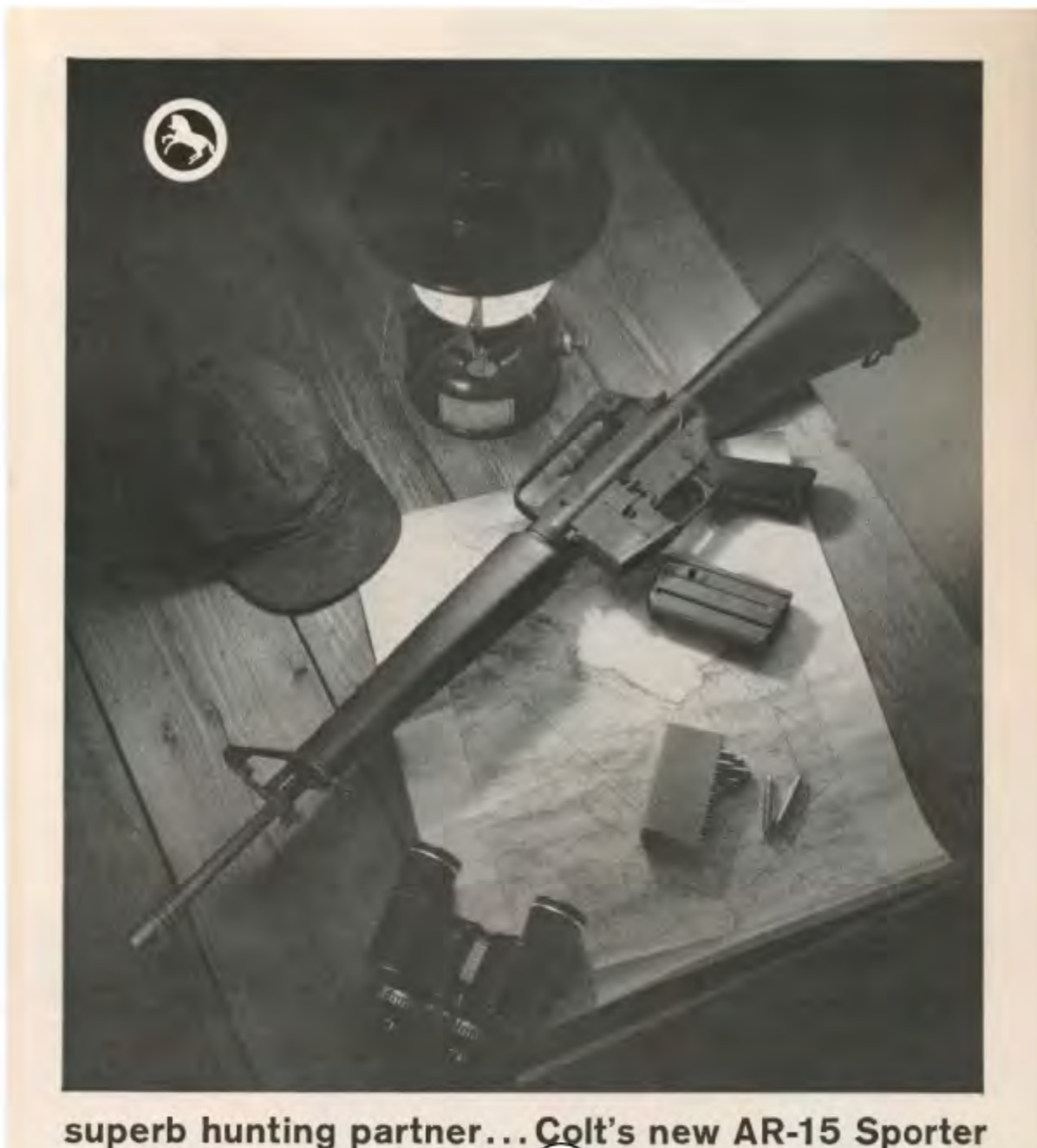
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### A modest debut

The industry's initial advertising messages often sought to portray the AR-15 as an enhancement for hunters and others who used their guns for recreation.

The earliest ad reviewed by The Post was a 1964 clipping from Guns magazine in which Colt pitched its AR-15 Sporter.

The ad suggested "this is part of what you already do," said Grant Reeher, a political science professor and director of the Campbell Public Affairs Institute at Syracuse University, who is at work on a book about gun politics and culture.





With Colt's new AR-15 Sporter you're ready for a new hunting adventure.

The AR-15 Sporter weighs only six pounds. Its .223 cal., 55-grain bullet has a muzzle velocity of 3,100 fps. Every AR-15 Sporter is factory targeted at 100 yards.

If you're a hunter, camper or collector, you'll want the AR-15 Sporter. At any Registered Colt Dealer. \$189.50

Colt's Firearms Hartford, Connecticut

Colt Industries Inc  
Colt Firearms Division

GUNS • NOVEMBER 1964 19



superb hunting partner... Colt's new AR-15 Sporter

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Colt Industries Inc  
Colt Firearms Division

GUNS • NOVEMBER 1964 19

"... you're ready for a new hunting adventure."

"... weighs only six pounds."

"If you're a hunter, camper, or collector ..."





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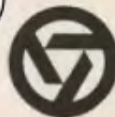
Colt's Firearms

Hartford, Connecticut

1

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**Colt Industries Inc**  
**Colt Firearms Division**





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Colt's Firearms Hartford, Connecticut

 **Colt Industries Inc**  
**Colt Firearms Division**

GUNS • NOVEMBER 1964 19

"... you're ready for a new hunting adventure."

"... weighs only six pounds."

"If you're a hunter, camper, or collector ..."

1964, Colt (Guns magazine)

"... you're ready for a new hunting adventure."

"... weighs only six pounds."

"If you're a hunter, camper or collector ..."

The focus on hunting was premature, Reeher said. Early rifles were inaccurate for varmint hunting, and the newly developed .223 cartridge was too slight for bigger game. The rifle did not yet have an identity. One had to be crafted.

Colt was "fumbling around, looking for the angle to take," Reeher said.



Yet soon after launch, Colt would get a boost of legitimacy from the Vietnam War. The company's AR-15 was the civilian variant of the M16 rifle, which the U.S. military adopted as its service rifle, and the conflict helped popularize both weapons.

"Now you can buy a hot new combat rifle for sport," Popular Science wrote in early 1965, welcoming the new AR-15.

Despite reliability problems of the M16 voiced by soldiers in the late 1960s that [triggered congressional inquiries](#), Colt and other companies continued to highlight the AR-15's military progeny as a growing part of the weapon's cultural identity.

"The Sporter looks like, feels like, and performs like its military cousin," Colt said in a 1977 brochure.

Common themes in early advertising of the AR-15 included hunting, "varmint control" and highlighting the weapon's military pedigree.

Hover on (or tap and hold) image to zoom

1977, Colt (Colt catalogue)

"... looks like, feels like, and performs like its military cousin."

"... used efficiently for both varmint control and hunting."

1985, Colt (American Rifleman magazine)

"For a rancher ..."

"... battle proven ..."

"... as accurate as it is dependable."

1993, Colt ("1993 New Products Tri-fold" brochure)

Note: This rifle is built on the AR platform but is chambered in a caliber larger than typical AR-15s.

"... game-getting power ..."

"... shrugs off the abuses of brush and boulders ..."

"... hunting companion."

Promoted as protector

As public concerns about crime mounted in the 1980s and 1990s, manufacturers drifted from a focus on hunting and outdoor imagery to emphasizing self-defense and law enforcement themes. The shift coincided with moves by numerous states to expand the rights of residents to carry concealed



weapons, helping transform gun culture into one centered on personal protection, [studies have shown](#).

AR-15 marketers started to adjust their depiction of what was on the receiving end of the barrel.

"People, rather than animals, were the target," Reeher said. "That allows it to be sold more as a self-defense weapon, particularly inside the home."



## New! The AR-15 you know is now available in 9mm.

Colt adds a new compact 9mm Carbine to its M16/AR-15 family of weapons used by law enforcement and military forces throughout the world. Acquiring the new 9mm Carbine eliminates hours of training and familiarization that other 9mm weapon systems require. It is the most practical way to broaden your police department's selection of calibers, while reducing the risk of confusion.



**New — AR-15 9mm Carbine:** Short compact carbine chambered for 9mm NATO, with collapsible buttstock (shown extended) ribbed round handguard, and 16" barrel. Furnished with a 20-round magazine, cleaning kit and sling.



**223 Caliber AR-15A2 Rifle:** This new sporter model incorporates many of the features adopted by the U.S. Military; forward bolt assist, a stiffer 20" barrel, with rifling twist of 1 turn in 7" for use with both standard and new NATO ammunition; stronger nylon ribbed round handguard, buttstock and pistol grip; improved heat deflector. Furnished with two 5-round magazines, cleaning kit and nylon sling.

**New target style rear sight.**



Available mid 1985

**AR-15A2 Match Grade 223 Caliber Rifle:** This match grade version is equipped with the new M16A2 target style rear sight, adjustable for elevation and windage up to 800 meters, and features a cartridge deflector for left hand shooters.



**AR-15A2 223 Caliber Carbine:** Short compact AR-15 carbine with collapsible buttstock (shown extended) ribbed round handguard, and 16" barrel with new 1 in 7" twist. Furnished with two 5-round magazines, cleaning kit and sling.



**Colt 4x scope:** Can be mounted in seconds without the need for special tools.

All Colt M16 and AR-15s fire from a closed bolt position for increased accuracy. Fully automatic models available to military and bonafide law enforcement agencies.

Be a safe shooter — never chamber a round until you are ready to shoot. Always read and follow the instruction manuals which accompany each firearm. Free Colt catalogs and instruction manuals are also available from the factory on request.



A Heritage of  
Fine Craftsmanship  
Hartford, CT 06101

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Printed in U.S.A.





## New! The AR-15 you know is now available in 9mm.

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**COLT** A Heritage of Fine Craftsmanship  
Hartford, CT 06101

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"... family of weapons used by law enforcement and military forces ..."

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**New target style rear sight.**

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Hartford, CT 06101

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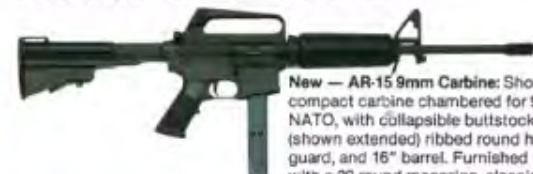
"... family of weapons used by law enforcement and military forces ..."

"... eliminates hours of training and familiarization ..."



## New! The AR-15 you know is now available in 9mm.

Colt adds a new compact 9mm Carbine to its M16/AR-15 family of weapons used by law enforcement and military forces throughout the world. Acquiring the new 9mm Carbine eliminates hours of training and familiarization that other 9mm weapon systems require. It is the most practical way to broaden your police department's selection of calibers, while reducing the risk of confusion.



**New — AR-15 9mm Carbine:** Short compact carbine chambered for 9mm NATO, with collapsible buttstock (shown extended) ribbed round handguard, and 16" barrel. Furnished with a 20-round magazine, cleaning kit and sling.



**223 Caliber AR-15A2 Rifle:** This new sporter model incorporates many of the features adopted by the U.S. Military; forward bolt assist, a stiffer 20" barrel, with rifling twist of 1 turn in 7" for use with both standard and new NATO ammunition; stronger nylon ribbed round handguard, buttstock and pistol grip; improved heat deflector. Furnished with two 5-round magazines, cleaning kit and nylon sling.



**New target style rear sight.**



Available mid 1985

**AR-15A2 Match Grade 223 Caliber Rifle:** This match grade version is equipped with the new M16A2 target style rear sight, adjustable for elevation and windage up to 800 meters, and features a cartridge deflector for left hand shooters.



**AR-15A2 223 Caliber Carbine:** Short





1985, Colt (Colt Catalog)

"... family of weapons used by law enforcement and military forces ..."

"... eliminates hours of training and familiarization ..."

While police officers became a fixture in AR-15 ads, gunmakers also chose images that suggested professional-grade weapons were necessary for civilians seeking protection from violent crime.

One print ad for Stag Arms rifles spoke to police and prospective buyers. "When you go Stag, you're not alone," it read, showing what appears to be a nighttime crime scene.

According to experts, police imagery has the additional effect of conferring increased legitimacy.

"It signals the practical benefit to the consumer and the sort of symbolic benefit," said Aimee Huff, an associate professor at Oregon State University specializing in marketing and gun culture.

Gunmakers increasingly focused ads on self-defense and depictions of law enforcement as crime became a bigger public issue.

Hover on (or tap and hold) image to zoom

2008, Smith & Wesson (Guns & Ammo magazine)

"military & police"

2010, Smith & Wesson (American Rifleman magazine)

"Tested. Proven. Selected."

"... proving itself by winning department testing and evaluations across the country."

"... tactical advantage ..."

2008, Stag Arms (Guns & Weapons for Law Enforcement magazine)



"When your life depends on it ..."

"... you're never alone."

## A second chance

The 2004 expiration of the federal assault weapons ban, which for 10 years had prohibited the sale of many AR-15s, gave the gun industry a chance for a reinvention. Some manufacturers, seeking to reintroduce the AR-15, latched on to tactical imagery and phrasing, inventing jargon along the way.

"The introduction of distinctive colors and patterns, decorative handguards, and models like Panther Arms' 'Sportical,' which incorporated multiple features that appeal to sport shooters buying their first AR, are all examples of efforts to differentiate from the competition," said Michelle Barnhart, an associate professor who researches gun culture and marketing at Oregon State University.

Other companies boasted about their ability to shape their products, such as the now-defunct Sabre Defence, which said in a 2008 print ad that "we don't simply assemble our rifles, we also craft key pieces that go into them."

"It's one of the ways Sabre Defence stood out from its competition," said Sarah Mota, the director of operations at New Empire Industries, the company that acquired Sabre's holdings.

After the expiration of the federal assault weapons ban, gunmakers tried to capture new customers by showcasing the AR-15's multiple potential uses while also marketing at times to women.

Hover on (or tap and hold) image to zoom

2011, DPMS Panther Arms (American Rifleman magazine)

"Resist convention. Resist the norm."

"... attractive yet stealthy camo-finished ..."

2008, DPMS Panther Arms (Guns & Ammo magazine)

"Sportical"

"Whether you are buying your first AR rifle, or need an affordable yet accurate plinking gun ..."

"Built to bridge the gap between the Sporting and Tactical markets ... "

2008, Sabre (Guns & Ammo magazine)

"Shoot. Admire. Repeat."

"... we also craft ..."



"... flawless ..."

2013, Colt (American Rifleman magazine)

"... custom hydro-dipped graphics and patterns."

"... unlike anything else on the market."

"Muddy girl camo"

2017, Springfield Armory (American Rifleman magazine)

"Our legacy is helping you protect yours."

"Built for the free and independent ..."

"... the next generation ..."

Gun advertising in the last decade and a half has also increased its focus on capturing the female shooter market. Often that would include a twist on traditional gender associations, like Colt's pink hue that it coined "muddy girl camo."

The turn has been apparent in recent years at National Rifle Association conventions, Barnhart said. "The exhibition floor included an abundance of promotional imagery featuring women wielding AR-15-style rifles," she said.

In the shadow of war

The sunset of the assault weapons ban in 2004 allowed another way to channel military valorization unleashed by the U.S. wars in Iraq and Afghanistan, prompting gunmakers and accessory companies to add tactical appeal to their wares, Huff said. Austere combat environments became common backdrops in ads for AR-15s and accessories, and rifles once sold almost exclusively in black became available in desert tan and foliage green.

The bearded commando decked out in tactical gear emerged as a potent pop culture image, playing a central role in video games like the Call of Duty series and box office smashes like "Lone Survivor."

In the wake of the Sept. 11 attacks, gunmakers marketed the gun with nationalistic vocabulary and military lexicon.

Hover on (or tap and hold) image to zoom

2011, Sig Sauer (American Rifleman magazine)

Note: This rifle has many of the AR-15's design characteristics but uses a piston operating system, rather than a typical gas impingement.



"... I'll answer the call."

"When failure is not an option ..."

2012, Sig Sauer (American Rifleman magazine)

"... accurate and reliable ..."

"When it counts"

2017, Mossberg (American Rifleman magazine)

"Stand and salute the tactical rifles"

"... family-owned ..."

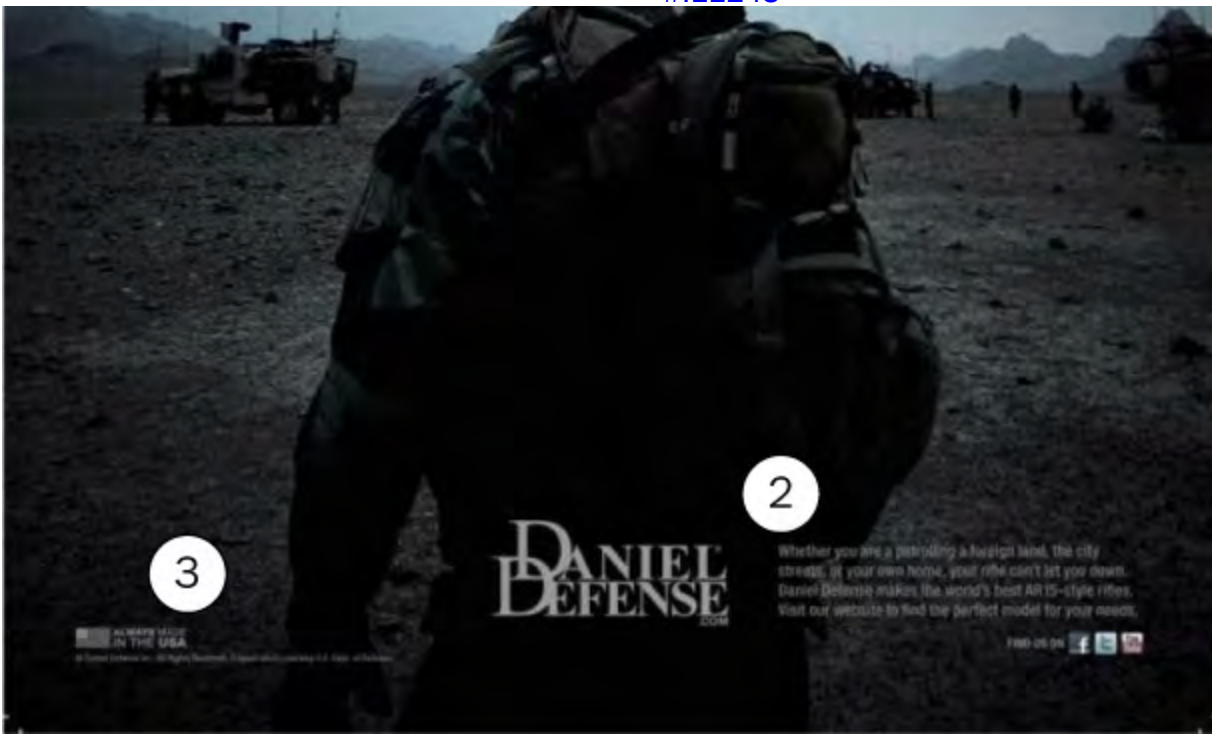
"American built. American strong."

"It's no accident that when you get to the 2000s, you're seeing people in uniform over and over again," Reeher said. The Special Operations raid to kill Osama bin Laden in 2011 was a key moment in the development, and after that, "everybody wanted to be a Navy SEAL."

Gunmakers seized on the fantasy. In 2012, Daniel Defense produced an ad featuring a short-barreled rifle using a rail system for attaching accessories that [the company says](#) is designed for Special Operations Command.









"... military adopted ..."

"Whether you are patrolling a foreign land, the city streets, or your own home ..."

"Always made in the USA"







"... military adopted ..."

"Whether you are patrolling a foreign land, the city streets, or your own home ..."

"Always made in the USA"

2012, Daniel Defense (Daniel Defense's Facebook)

"... military-adopted ..."

"Whether you are patrolling a foreign land, the city streets, or your own home ..."

"Always made in the USA"



The advertisement then links the AR-15 with the country's overseas wars, showing how a weapon first described as a hunter's tool was now being presented as the everything rifle.

"Whether you are patrolling a foreign land, the city streets, or your own home," the ad said, "your rifle can't let you down."

### A message of masculinity

Bushmaster presented a problem and a solution for men concerned about evolving notions of gender when it launched its ad campaign: "Consider your man card reissued."

The advertisement, which ran in magazines including the men's publication Maxim, is notable for the placement of the rifle itself. Firearms in ads are typically shown flat with the barrel pointing in an innocuous direction, Huff said. But in this ad, the rifle is canted toward the audience and pointed left, positioning that, according to Huff, suggests conflict.

"The text and the imagery clearly signal power and vaguely implicate some enemy that the gun user needs to employ their masculinity against," Huff said.









"If it's good enough for the professional, it's good enough for you ..."



**CONSIDER  
YOUR MAN CARD  
REISSUED.**

**BUSHMASTER**  
FIREARMS

1

If it's good enough for the professional, it's good enough for you. Bushmaster. The world's finest commercial AR-platform rifle.





"If it's good enough for the professional, it's good enough for you ..."

2009, Bushmaster (Maxim magazine)

"If it's good enough for the professional, it's good enough for you."

The ad drew widespread scrutiny in 2012 after a gunman slaughtered 26 people at Sandy Hook Elementary School in Newtown, Conn., using a Bushmaster like the one in the image. It became a centerpiece exhibit in a [lawsuit against Bushmaster owner Remington Arms](#) filed by the families of survivors that challenged how it marketed guns. The company settled for \$73 million in 2022.

Other advertisements tapped into masculinity in subtle and not-so-subtle ways. Smith & Wesson declared its M&P 15-22 could help you "kick brass" and save money firing the more economical .22



cartridge.

Self-defense and defending loved ones are keystone desires for many gun owners, said Barnhart, with Oregon State. That often translates to a traditional social norm of men as strong protectors shepherding family values, she said.

In a social media post published by Daniel Defense in May, a child holds an [AR-15-style pistol](#) in his lap as an arm wearing what appears to be a man's watch — presumably that of a father — gestures to him. An ammunition magazine is nearby. The caption, taken from a Bible verse, reads: "Train up a child in the way he should go, and when he is old, he will not depart from it."

The ad could be interpreted as "you need to teach this kid how to use this firearm so he can defend himself in the future," Barnhart said.

Daniel Defense was widely criticized for the image, which was [tweeted a week before](#) a gunman used one of the company's rifles to carry out a massacre at a school in Uvalde, Tex., killing 21. The company took the ad down soon after. Marty Daniel, who last month stepped down as the chief executive of Daniel Defense, [told lawmakers in July](#) that the post meant to convey gun safety. "We took it down because children had just been killed and we didn't think it was appropriate," he said.

Even some gun advocates may have felt the inclusion of a child went too far, Reheer said.

"There is a lot going on with this one, for people to despise and like," he said.

About this story

Reporting by Alex Horton. Additional reporting and photo editing by Monique Woo. Top illustration credits: Bushmaster ad via Maxim magazine (2009); Sig Sauer ad via American Rifleman magazine (2012); Mossberg ad via American Rifleman magazine (2017); Smith & Wesson ad via American Rifleman magazine (2010).

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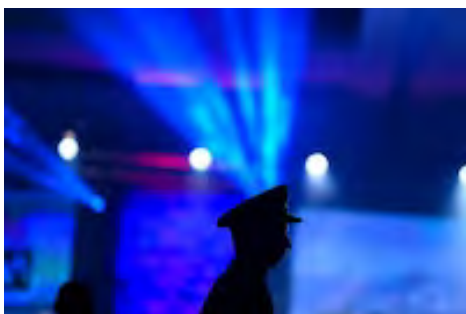
[Why do people own AR-15s? 33% of owners cited self-defense, poll finds](#)

[March 27, 2023](#)



[Gunmakers' growth in red states marks a divide on weapons like the AR-15](#)

[March 27, 2023](#)



[As guns saturate the United States, police turn to the AR-15](#)

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[Armed with AR-15s, extremist and militia groups anticipate civil unrest](#)

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[Magazine restrictions could reduce mass killings by AR-15s, but courts must decide](#)

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[What does an AR-15 do to a human body? A visual examination of the deadly damage.](#)

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