Machine Guns and Machine Gun Gunnery

U.S. Marine Corps

PCN 143 000014 00
1. PURPOSE

Marine Corps Warfighting Publication (MCWP) 3-15.1, *Machine Guns and Machine Gun Gunnery*, describes how various machine guns are maintained and employed by the U.S. Marine Corps' machine gun crews. It also provides the principles and techniques for their use in engaging and destroying enemy targets.

2. SCOPE

This reference publication is designed for machine gunners, platoon commanders, platoon sergeants, S-3 officers and chiefs, armorers, and ammunition technicians. It outlines a standardized way to train Marine machine gunners through the use of gunnery tables.

3. SUPERSESSION


4. CHANGES

Recommendations for improving this manual are invited from commands as well as directly from individuals. Forward suggestions, using the User Suggestion Form format, to—

Commanding General  
Doctrine Division (C 42)  
Marine Corps Combat Development Command  
3300 Russell Road Suite 318A  
Quantico, Virginia 22134-5021

5. CERTIFICATION

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

PAUL K. VAN RIPER  
Lieutenant General, U.S. Marine Corps  
Commanding General  
Marine Corps Combat Development Command  
Quantico, Virginia

DISTRIBUTION: 143 000014 00
User Suggestion Form

From:

To: Commanding General, Doctrine Division (C 42), Marine Corps Combat Development Command, 3300 Russell Road Suite 318A, Quantico, Virginia 22134-5021

Subj: RECOMMENDATIONS CONCERNING MCWP 3-15.1, MACHINE GUNS AND MACHINE GUN GUNNERY

1. In accordance with the foreword to MCWP 3-15.1, which invites individuals to submit suggestions concerning this FMFM directly to the above addressee, the following unclassified recommendation is forwarded:

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Nature of Change:

- □ Add
- □ Delete
- □ Change
- □ Correct

2. Proposed new verbatim text: (Verbatim, double-spaced; continue on additional pages as necessary.)

3. Justification/source: (Need not be double-spaced.)

Note: Only one recommendation per page.

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Chapter 1

INTRODUCTION TO MACHINE GUNS

“For their part the machine-gun units must be on the alert to seize and exploit every opportunity to assist the forward movement of the rifle units, without waiting for specific orders to engage a particular target or locality.”

—FMFRP 12-2, Infantry In Battle

“Leaders must know what the guns can do before the attack starts, what they can do while the attack is in progress, and what they can do during reorganization and consolidation. They must learn to seek and recognize opportunities for employing machine guns in every phase of the action. Finally, they must have the aggressiveness to keep everlastingly at the task of getting the guns forward, so that when opportunity does present, they will be able to seize it.”

—FMFRP 12-2, Infantry In Battle

Desert Storm, Kuwait
A Marine Machine Gunner Scans the Desert For Targets
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Chapter 1

Introduction to Machine Guns

1001. History

Despite their post-Civil War development, modern machine guns didn’t begin to exhibit their full potential in battle until World War I. The effects on employment of these new weapons systems altered the doctrinal way of waging war for both Allied and Axis powers. Properly employed machine guns proved to be devastating to massed infantry formations and paved the way for the creation of a whole new methodology of warfighting. The machine gun became the keystone of the infantry defense and a major supplier of organic firepower in the offense. New tactics were being developed by both sides to not only exploit the effects of the machine gun, but to counter the enemy’s machine gun employment capabilities.

The machine gun changed the face of modern warfare just as surely as the development of aircraft and precision indirect fire artillery. The impact of this weapon can be seen not only in military writings of that period, but in the principles of employment still in use today. FMFRP 12-2, Infantry in Battle, a compilation of lessons learned from World War I, provides a wealth of knowledge concerning the employment of machine guns. These lessons remain applicable and are still studied today, almost 70 years later. The proper employment of machine guns has won many a battle at the company and platoon level, and a well-rehearsed, proficient machine gun team can sometimes make the difference between success and failure on the battlefield. Military history is filled with examples of the impact that machine guns and their gunners have had in turning the tide of battle:

“The machine gun acts by fire alone; movement of this weapon has no other purpose than to secure positions from which more effective fire can be delivered. Maximum usefulness is obtained only when every gun within range of the enemy is firing effectively against him.”

“Although machine guns lend themselves more readily to the defense than to the attack, this is no excuse for a failure to exact the utmost from them in support of advancing troops. The handicaps to their effective employment in the attack can be and must be overcome.”

Though the weapons themselves have changed over the years and will continue to do so, the basic considerations for their employment remain constant. The excerpts from FMFRP 12-2, listed above, serve as reminders of this fact, and the lessons contained in them are just as applicable today as when they were first written.

1002. Types of Machine Guns

Machine guns are classified as light, medium, or heavy. Classifications are determined by a combination of weapon caliber, weapon system weight, crew size, and the primary type of intended target.

a. Light Machine Guns/Automatic Rifles. The light machine gun (LMG) classification generally includes .22 to .250 caliber (5.45mm to 6mm) automatic weapons. An LMG typically weighs between 15 and 30 pounds, complete. An LMG is normally manned by a crew of one or two individuals depending on the accessories being used. Neither a tripod nor a spare barrel is normally used with an LMG when it is manned by a single individual. Bullet weights for LMGs normally range from 45 to 72 grains. They are optimally employed against exposed and lightly protected personnel at ranges less than 1,000 meters. In
this category, the Marine Corps employs the squad automatic weapon, M249, 5.56mm. Figure 1-1 provides an example of a Marine using an LMG.

b. Medium Machine Guns. This medium machine gun (MMG) classification generally includes .264 to .33 caliber (6.5mm to 8mm) automatic weapons. Typical MMG weights are 25 pounds or more when loaded with 50 rounds of ammunition. Remaining ammunition, ground tripod, spare barrel, and other accessories can add another 25 pounds or more to the overall weight of MMG systems. The MMG is generally employed by a crew of three. A MMG generally uses bullets that weigh between 140 and 220 grains. Optimally, they are employed against personnel and light materials (e.g., motor vehicles) at ranges of 1500 meters or less. In this category, the Marine Corps employs several variants of the 7.62mm, M240G machine gun. Figure 1-2 show Marines training with a MMG.

c. Heavy Machine Guns. The heavy machine gun (HMG) classification generally includes .50 caliber or larger (12.7mm to 15mm) automatic weapons. The system weight of a heavy machine gun is substantial. In a ready to fire configuration using a ground tripod, an HMG without ammunition can weigh more than 125 pounds. An HMG is normally manned by a crew of four or more personnel (although a crew of three may be sufficient if motor vehicles or draft animals are employed for transportation over distance). The common bullet weight of an HMG is 700 grains or larger. HMGs are primarily employed against field fortifications, vehicles, and aircraft. They are generally effective against these types of targets at ranges of 1,000 meters or greater. The machine guns from this category currently employed by the Marine Corps are the caliber .50, Browning, M2HB, machine gun and the 40mm, MK-19 MOD 3 machine gun. Figure 1-3 portrays a HMG squadron during Operation Desert Shield.

Figure 1-1. Marine Automatic Rifleman, Operation Desert Shield.
1003. Machine Gun Employment

Properly employed, the machine gun provides a high volume of accurate fire in support of the infantry in both the offense and defense. In the offense, the machine gun can add firepower to the assault, but it is often best employed to suppress or neutralize the objective from a base of fire. The long-range, close defensive, and final protective fires of the machine gun provide an integral part of the defense against infantry attack. HMGs may also be used to destroy lightly armored vehicles or as defense against slow-moving, low-flying aircraft. In addition, the machine gun is used effectively in convoy security, point defense of rear area facilities, and other rear-area security missions.

1004. Principles of Machine Gun Employment

Maximum efficiency in the tactical employment of all types of machine guns can be reached by applying the following principles during planning. Most tactical situations would benefit from the employment of all eight principles simultaneously. However, in actuality, these principles are prioritized according to the tactical situation and some may be abandoned in favor of others that are more crucial. These principles are not meant to serve as absolutes. They are, however, sound ideas, proven in combat, that should be understood and considered by all personnel involved in the operation and employment of machine guns. Chapter 6 addresses detailed employment of today’s weapons.
a. **Mutual Support.** No machine gun should be placed in isolation. Machine guns should be placed where they can cover each other by fire, fires of one machine gun can help defeat attacks on another machine gun. Another reason to place guns so that they cover each other is so one gun can fire directly at the other position if it is overrun. In some instances, it may be necessary to have other weapons (AT-4 or M203) provide covering fire.

An important facet of the principle of mutual support is security. Protection of machine guns should be of primary concern. Since machine gun positions inflict devastating fire upon the enemy, they will come under concentrated attacks by the enemy in his attempt to stop the attack. To provide protection and security, well-placed riflemen, and/or automatic riflemen are placed so they can cover approaches that the enemy may use to attack the guns. For example, although machine guns should be placed on the flanks to provide defense, they should not be placed in the last position out since this leaves them vulnerable to a flanking attack. A fire team, or perhaps even larger element, should be positioned outboard of the gun position. This securely “tucks” the machine guns into the defense.

b. **Employed in Pairs.** Employing machine guns in pairs ensures a continuous, high volume of fire. It also gives the guns the capability of efficiently engaging targets of larger width or depth than one machine gun could effectively engage alone. Employment in pairs also provides the opportunity for continued fire from one machine gun while the other machine gun is reloading or clearing a malfunction or stoppage.

c. **Coordination of Fire.** Ensure machine gun fire is coordinated with the fires of other machine guns and other weapons. In the defensive, the machine gun forms the backbone around which other infantry weapons are organized. The machine gun fire plan must be studied by the leader, other fires are then

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**Figure 1-3. Heavy Machine Gun Squad in Training During Operation Desert Shield.**
planned to complement the machine gun fire plan. For example:

- Dead space in a machine gun’s final protective line (FPL) is covered by other indirect and/or direct fire weapons.
- Indirect fire planned to concentrate along the line where the machine gun’s FPL is expected to stop the enemy, hitting him when he seeks cover.

In the offensive, machine gun fire must be coordinated with other weapons systems to ensure complementary or additive effects against the enemy during all phases, i.e.; preparation firing, final assault, consolidation, and pursuit by fire.

d. Positioned in Defilade. If at all possible, gun positions should be in defilade. As previously discussed, the enemy will quickly target gun positions, trying to neutralize or destroy them. Placing the machine guns in defilade provides them with some substantial cover between them and the enemy’s direct fire weapons. This could be essential to their survival.

e. Positioned to Produce Enfilade Fire. To achieve the greatest effect from the machine gun, position it so that the long axis of the beaten zone coincides with the long axis of the target. This type of fire, called enfilade fire, causes the maximum amount of rounds to be concentrated on the maximum amount of targets, significantly increasing the chances of hitting targets. Enfilade fire is normally associated with flanking fire.

f. Interlocking Fire. Ensuring that fire from one machine gun position interlocks with the fires of other machine gun positions prevents gaps through which the enemy can easily close with and attack friendly positions. Machine gun fire, properly augmented with obstacles and other weapons effects, should form a “wall of steel” between friendly positions and the enemy.

g. Cover and Concealment. Well-planned and well-prepared alternate and supplementary positions that provide cover and concealment for machine guns are essential. Employ machine guns from a covered and concealed position and do not open fire until necessary. Once machine guns open fire they may be located by the enemy. Once machine gun positions are located, they become a high priority target for the enemy. When tactically feasible, employ machine guns from a defilade or partial defilade position. This provides cover and some concealment. The use of cover and concealment protects the guns and their crews.

h. Economy. Machine guns fire at high rates making excessive ammunition consumption a concern. Wasteful use of ammunition can severely jeopardize the success of an operation if resupply is slowed or halted by enemy action, weather, terrain, and other factors beyond friendly control. Therefore, a detailed, accurate mission analysis plans to use only those types and amounts of ammunition that will effectively cripple or destroy the enemy. Rates of fire are used when determining a mission analysis.

To conserve ammunition, gunners can be taught to count the length of the burst and to time the pause in between bursts. Another way to conserve/regular ammunition expenditure is to employ machine guns in pairs or to use alternating fires. In alternating fires, as one machine gun finishes its burst and is about to pause, the other machine gun opens fire. This technique is known as “talking guns”. In addition to controlling ammunition consumption, these techniques also reduce the wear and tear on a machine gun’s operating parts and prevent overheating and damage to barrels.
Chapter 2

MACHINE GUN, LIGHT, SQUAD AUTOMATIC WEAPON, M249

“Our main defense was two light machine guns, fairly close together, backup up by two heavy machine guns. We had our riflemen all around them.

“That’s where Joe comes in. His BAR [Browning Automatic Rifle] was to see that no Koreans would sneak up and heave a hand grenade at the machine guns....Those machine guns could lay down a field of fire that could keep the mass of the enemy away, but you had to keep a sharp eye out for those that broke through It would only take one or two of them to put those guns out of action....

“[Joe] was killed just before the last attack was repulsed....

“....about ten yards forward of Joe there was a dead North Korean sergeant. The fellow had a pistol in one hand and a hand grenade in the other. He’d obviously been hit by a BAR. Joe must have gotten him just as he was going to throw a grenade at our machine gunners.”

—Account of Cpl Joseph Vittori, USMC, Company F, 2d Battalion, 1st Marines, in Korea, September 1951. Cpl Vittori was post-humously awarded the Congressional Medal of Honor.6
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Chapter 2

MACHINE GUN, LIGHT, SQUAD AUTOMATIC WEAPON, M249

Section 1
Introduction

The machine gun, light, squad automatic weapon, M249 (SAW) is a gas-operated, air-cooled, belt or magazine-fed, automatic weapon that fires from the open-bolt position (see figure 2-1). It has a maximum rate of fire of 850 rounds per minute. Primarily, ammunition is fed into the weapon from a 200-round ammunition box containing a disintegrating metallic split-link belt. As an emergency means of feeding, the SAW can use a 20 or 30 round M16 rifle magazine, but this will increase the chance of stoppages.

The SAW can be fired from the hip, or underarm using assault fire techniques; however, the preferred method of employment is to fire from the bipod-steadied position. The bipod gives the weapon the stability needed to engage targets at its maximum effective range. The SAW has a spare barrel to allow quick barrel changes during employment; however, barrels must not be interchanged with those from other SAWs unless the headspace has been set for that weapon by

Figure 2-1. The SAW (Left and Right Sides).
ordnance personnel. Each automatic rifleman and assistant automatic rifleman should have ready access to TM 08671A-10/1A, a detailed, pocket-sized reference manual for operators of the SAW.

### 2101. General Data

**Weight of SAW:**
- With bipod and tools: 17 pounds
- With 200 round drum: 23.92 pounds

**Measurements:**
- Length: 40.87 inches
- Muzzle velocity:
  - Ball ammunition: 3,025 feet per second
  - Tracer ammunition: 2,870 feet per second
- Rifling: Standard right hand twist one turn in 7 inches

**Ranges:**
- Maximum: 3,600 meters
- Maximum effective:
  - Point targets: 800 meters
  - Area targets: 1,000 meters
  - Grazing fire: 600 meters

**Ammunition:**
- Caliber: 5.56 millimeter
- Types in use: Ball, tracer, blank, and dummy
- Basic allowance: 600 rounds per SAW, carried by the automatic rifleman and assistant automatic rifleman
- Weight of full 200 round drum: 6.92 pounds

**Rates of fire:**
- Sustained: 85 rounds per minute, fired in 3 to 5 round bursts, no barrel changes
- Rapid: 200 rounds per minute, fired in 6 to 8 round bursts, barrel change every 2 minutes
- Cyclic: 850 rounds per minute, continuous burst, barrel change every minute

### 2102. Sights

The SAW has a hooded and semi-fixed front sight (see figure 2-2A). The rear sight assembly (see figure 2-2B) mounts on the top of the cover and feed mechanism assembly. The elevation knob drum has range settings from 300 meters to 1,000 meters. Range changes are made on the SAW sight by rotating the elevation knob to the desired range setting. Rotation of the rear sight aperture (peep sight) is used for fine changes in elevation or range adjustments, such as during zeroing. Each click of the peep sight (180-degree turn) equals a one-half-mil change in elevation, which is .5 cm at 10 meters. The sight adjusts for windage by rotating the windage knob. Each click of windage adjustment also equals a one-half-mil change, which is .5 cm at 10 meters. There is also a windage sliding scale marked with index lines for centering the rear sight aperture.

### 2103. Safety

The safety (figure 2-3) is in the trigger housing. The safety is pushed from left to right (red ring NOT visible) to render the weapon SAFE, and the bolt cannot be released to go forward. The safety is pushed from right to left (red ring visible) to render the weapon ready to fire. The cocking handle on the right side of the weapon is used to pull the bolt to the rear.

### 2104. Roles of the SAW

From the mid-1960s to the mid-1980s the Marine Corps operated with an automatic weapon at the squad/fire team level that was extremely limited. The automatic rifleman’s weapon (the M16A1) was the same weapon carried by the other members of the fire team. The automatic rifleman had no unique capabilities or equipment except that he was given a removable, “clip on” bipod for his weapon. This shortfall was remedied with the introduction of the SAW in the late 1980s. The Marine Corps has never had a more capable and versatile weapon at the squad level. Prior to the fielding of the SAW, the Browning automatic
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rifle had been the last automatic weapon used by the Corps that provided significant fire power to the rifle squad beyond the capabilities of the other small arms carried within it. Various models of the Browning automatic rifle were used by Marine units from World War I to the early 1960s. Even the much respected Browning automatic rifle, that served the Corps so well for over 40 years, had limitations that the design of the SAW has overcome. The Browning was an automatic rifle and it had some design limitations common to other rifles of its day. These included a limited ammunition supply (only a 20 round box magazine), problems with overheating during continuous firing (because of a fixed barrel that could not be changed by the operator), and a limited maximum effective range.

Although employed as an automatic rifle by the Marine Corps, the SAW is designed like a medium machine gun. As such it has design features that make it a more versatile weapon, such as: it can be belt or magazine fed thus providing more continuous fire before reloading and it has a quick change barrel feature which allows barrel changes during periods of continuous firing without taking the weapon out of action for more than a few seconds. The SAW also has greater effective range and a higher rate of fire than any other weapon in the present rifle squad.

The SAW can provide a heavy volume of continuous, accurate fire in support of offensive or defensive operations. Its presence in large numbers (e.g., nine per rifle platoon) at the small unit level has significantly increased the combat power of those units. In the past, medium machine guns were often attached to platoons or squads, more out of concern over the lack of fire power in those small units than for sound tactical reasons. The introduction of the SAW into those units has changed that. The SAW provides the platoons with significant fire power against enemy personnel and light equipment. Because of this, more times than not, the company’s machine gun section can now be employed as a section, in a general or direct support role, rather than attached out. The SAW’s presence, in any type of unit, increases the available fire power and provides additional flexibility to the unit leader in terms of weapons employment options.

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Section 2
Disassembly and Assembly

The SAW is designed for easy disassembly and assembly; the use of force is not necessary and no special tools are required. As the weapon is disassembled, place the parts (in the order in which they are removed) on a clean, flat surface. This reduces the possibility of losing a part and aids in assembly, as all parts are replaced in reverse order. To prevent unnecessary wear, disassembly should be kept to the minimum, consistent with maintenance and training requirements.

Disassembly and assembly may be divided into two categories; general and detailed. General disassembly involves separation of the weapon into main groups. This is also known as field stripping and is a practice that stems from past experience in combat situations. The intent behind designating main groups for a weapon and the practice of field stripping is to allow the operator to quickly break the weapon down into a set of major components that can be hastily cleaned to keep the weapon ready for action. The idea is to disassemble the weapon just far enough to conduct basic cleaning without having to contend with numerous assemblies and parts.

Detailed disassembly, for the operator, involves the removal of some of the component parts and assemblies from the main groups. The idea here is that, when the situation and conditions permit, the operator can then take the time to more fully disassemble and thoroughly clean the weapon. Complete general and detailed disassembly is normally the expected routine in garrison after the completion of firing and/or field training, but this may also be conducted in a field environment when necessary, to ensure the proper functioning and maintenance of the weapon. Disassembly of the weapon beyond that described in this publication is not authorized, except by qualified ordnance personnel.
Figure 2-2. Front and Rear Sights.

Figure 2-3. Safety.