UNITED STATES MARINE CORPS
WEAPONS TRAINING BATTALION
MARINE CORPS COMBAT DEVELOPMENT COMMAND
QUANTICO, VIRGINIA 22134-5040

INSTRUCTOR GUIDE

DEMONSTRATE UNKNOWN DISTANCE THREAT ENGAGEMENT SKILLS (DAY)

0300-M16-1008
0300-M16-1012 (REV.)

ANNUAL RIFLE TRAINING POI

APPROVAL_____ DATE_____

(SLIDE #1)

INTRODUCTION **(3 MIN)**

1. **GAIN ATTENTION**. As a Marine, you may be required in a combat situation to engage targets at unknown distances from varying positions as well as changing weather conditions. It is important to practice and be familiar with these types of engagements.

Notes:_____
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(SLIDE #2)

2. **OVERVIEW**. This lesson will cover supported firing positions, determining range, weather considerations, and engaging threats at unknown distance.

3. **LEARNING OBJECTIVES**. The Terminal Learning Objectives pertaining to this lesson are as follows:

(SLIDE #3)

a. **TERMINAL LEARNING OBJECTIVE**

(1) Given a service rifle/ Infantry Automatic Rifle (IAR) with primary aiming device, individual field equipment, common weapon sling, magazines, ammunition, and threat targets at short, mid, and long range, achieve mastery during execution of the performance checklists within the Master Lesson Files for Entry-Level and Annual Rifle Marksmanship Training. (0300-M16-1008)

b. **ENABLING LEARNING OBJECTIVES:**

(SLIDE #4)

(1) Given a service rifle/ Infantry Automatic Rifle (IAR) with primary aiming device, individual field equipment, common weapon sling, magazines, ammunition, and threat targets at short, mid, and long range, engage targets from supported firing positions (standing, kneeling, and prone). (0300-M16-1008a)

(SLIDE #5)

(2)) Given a service rifle/ Infantry Automatic Rifle (IAR) with primary aiming device, individual field equipment, common weapon sling, magazines, ammunition, and threat targets at short, mid, and long range, determine the range to the threat. (0300-M16-1008b)

(SLIDE #6)

(3) Given a service rifle/ Infantry Automatic Rifle (IAR) with primary aiming device, individual field equipment, common weapon sling, magazines, ammunition, and threat targets at short, mid, and long range, compensate for the effects of weather. (0300-M16-1008c)

(SLIDE #7)

(4) Given a service rifle/ Infantry Automatic Rifle (IAR) with primary aiming device, individual field equipment, common weapon sling, magazines, ammunition, and threat targets at short, mid, and long range, apply engagement techniques (controlled pair, precision shot). (0300-M16-1008d)

(SLIDE #8)

4. **METHOD/MEDIA**: This period of instruction will be taught using the informal lecture method, aided by the PowerPoint, demonstration, practical application and my assistant instructor.

INSTRUCTOR'S NOTE:

ASSIGN SPECIFIC SHOOTERS TO FILL OUT INSTRUCTIONAL RATING FORMS (IRFS). HAVE THEM SET ASIDE AND FILL THEM OUT AFTER THE COMPLETION OF THE CLASS.

5. **EVALUATION**: Shooters will be evaluated by a performance based evaluation.

6. **SAFETY/CEASE TRAINING (CT) BRIEF**: As per ORAW.

(SLIDE #9)

TRANSITION: Now that I've covered everything we are going to

cover during this lesson, and how it will be presented and evaluated; are there any questions? If not, then let's begin by discussing firing from supported positions.

Notes:_____
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(BODY) **(40 MIN)**

1. **SUPPORTED FIRING POSITIONS:** **(10 MIN)**

(SLIDE #10)

a. Supported Standing: When the supported prone or kneeling position cannot be used to engage the target, the supported standing position may be used. The supported standing position is effectively used behind high cover (e.g., window, over a wall) or narrow cover (e.g., tree, telephone pole).

1) To assume the supported standing position, the Marine leans his body forward or against support to stabilize the weapon and the position.

(SLIDE #11)

2) Support the position by placing the handguards, the forearm, or the magazine on or against support. In addition, the position (e.g., the side of the body) may rest against support.

(SLIDE #12)

b. Supported Kneeling: When the prone position cannot be used because of the height of the support, the supported kneeling position may be appropriate. The kneeling position provides additional mobility over the prone position.

1) The kneeling position allows shooting from all sides and from cover of varying sizes. This position may be altered to maximize the use of cover or support by assuming a variation of the kneeling position (high, medium, or low).

2) In the kneeling position, the Marine must not telegraph his position behind the cover with his knee. When shooting around the sides of cover, strive to keep your right knee in line with your left foot so as not to expose your knee.

(SLIDE #13)

3) Support the position by placing the handguards, the forearm, or the magazine on or against support. In addition, the position (e.g., a knee, the side of the body) may rest against support.

4) If the rifle is resting on support, the Marine may not need to stabilize the weapon by placing their left elbow on their knee.

(SLIDE #14)

c. Supported Prone: Whenever possible, the supported prone position should be used when firing from behind cover. It is the steadiest position and provides the lowest silhouette, thereby providing maximum protection from enemy observation and fire.

1) The prone position can be assumed behind a tree, a wall, a log, or almost any type of cover. It is flexible and allows shooting from all sides of cover and from cover of varying sizes.

(SLIDE #15)

2) Support the position by placing the handguards, the forearm, or the magazine on or against support.

3) Keep the position as low as possible to ensure no part of the body is exposed to the enemy.

4) The body must be adjusted to conform to cover. For example, if the cover is narrow, get directly behind it and keep the legs together. The body should be in line with the rifle, directly behind the weapon. This presents a smaller target to the enemy and more body mass to absorb recoil.

TRANSITION: Now that we have covered the supported firing positions, are there any questions? I have one for you.

QUESTION: When possible what position is the most stable and

ideal?

ANSWER: The supported prone position.

Notes:_____
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Now that we have covered firing from supported positions, let's focus our attention to determining range.

(SLIDE #16) **(10 MIN)**

2. DETERMINING RANGE: For a Marine to engage a target successfully, the Marine must determine the range to the target. The Marine should not be satisfied with a rough or "ballpark" estimate. Precision enhances accuracy and, ultimately, survival on the battlefield. In addition, accurate range determination will allow the Marine to determine if the target can be effectively engaged using his BZO or if a new sight setting should be placed on the rifle. There are many methods of range estimation that can provide accurate measurements. The most common are those methods that rely on the eye.

(SLIDE #17)

a. Unit of Measure. To determine the total distance to the target using this method, the Marine must visualize a distance of 100 meters on the ground, and then estimate how many of these units can fit between himself and the target.

1) 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 the Marine and the target can be seen, it becomes difficult to use the unit of measure method of range estimation with accuracy.

2) Proficiency in the unit of measure method requires constant practice. Throughout training, comparisons should be continually made between the range estimated by the Marine and the actual range as determined by pacing or other, more accurate measurement.

(SLIDE #18)

b. Appearance of Objects Method. To use this method, the

Marine must be familiar with the sizes and details of personnel and equipment at known distances. Anything that limits the visibility (such as weather, smoke, or darkness) will also limit the effectiveness of this method. To use the appearance of objects method with accuracy, the Marine must be familiar with the characteristic details of objects as they appear at various ranges.

(SLIDE #19)

1) Rifle Front Sight Post Method. The area of the target that is covered by the front sight post of the M16A2 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, the Marine 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, the Marine's eye relief and perception of the front sight post will also affect the amount of the target that is visible. To utilize this method, use the following general guidelines:

a) The service rifle front sight post will cover 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.

b) 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 BZO.

(SLIDE #20)

2) Rifle Combat Optic (RCO) Ranging. The area of the target that is covered by the chevron or stadia lines of the RCO reticle can be used to estimate range to the target. 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 chevron or stadia lines will vary depending upon its range. In addition, the Marine's eye relief will also affect the amount of the target that is visible. To utilize this method, use the following general guidelines:

a) The chevron will cover the width of a man's chest

(approximately 19” wide) at 300 meters. If the target is wider than the chevron, you can assume the target is less than 300 meters and can be engaged point of aim/point of impact using your BZO.

b) If the target is less than the width of the chevron, you should assume the target is in excess of 300 meters. Therefore, your BZO cannot be used effectively. The ‘4’ stadia line will cover the width of a man’s chest (approximately 19” wide) at 400 meters. The next stadia line will cover the width of a man’s chest at 500 meters, and so on.

c) The ranging feature is designed for the ideal situation where a target is exposing his torso and is facing you. This is not the case in the real world. You may have a headshot, side shot, or an angled shot. Being able to relate 19” to other objects in your area of operation such as a vehicle wheel, a truck door, a window, etc., can assist with determining a target’s range.

(SLIDE #21)

3) Visible Detail Method. When observing a target, the amount of detail seen at various ranges gives the Marine a good indication of the target's distance. The Marine should study the appearance of a man when he is standing at a range of 100 meters. The Marine fixes the man's appearance firmly in his mind, carefully noting details of size and the characteristics of uniform and equipment. Next, the Marine should study the same man in a kneeling position and then in a prone position. By comparing the appearance of these positions at known ranges from 100 meters to 500 meters, the Marine can establish a series of mental images that will help determine range on unfamiliar terrain. The Marine should also study the appearance of other familiar objects such as weapons and vehicles. The following general guidelines apply:

a) At 100 yards/meters, the target can be clearly observed in detail, and facial features can be distinguished.

b) At 200 yards/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.

c) At 300 yards/meters, the target has a clear body outline, face color usually remains accurate, but remaining details are blurred.

d) At 400 yards/meters, the body outline is clear, but remaining detail is blurred.

e) At 500 yards/meters, the body shape begins to taper at the ends. The head becomes indistinct from the shoulders.

f) At 600 yards/meters, the body appears wedge-shaped with the appearance of no head.

(SLIDE #22)

c. Bracketing Method. This method of range estimation involves estimating the shortest possible distance and the greatest possible distance to the target. For example, the Marine might estimate that a particular target is as close as 300 meters away but could be as far as 500 meters away from his position. The estimated distances are then averaged to determine the estimated range to the target. In this example, the average of 300 meters and 500 meters is 400 meters.

1. Halving. The halving method of range estimation can be used to judge ranges out to 800 meters. Estimate the distance to the halfway point between your position and the target, then double that distance to get the total distance to the target. This method operates on the premise that it is easier to estimate 400 meters than 800 meters. The Marine must be careful when judging the distance to the halfway point. Any error made in judging the halfway distance will be doubled when estimating the total distance.

2) Combination of Methods. Most of the methods previously discussed require optimal conditions with regard to the target, terrain, and visibility. Therefore, it is likely that a more accurate estimate of range can be obtained by utilizing a combination of methods to support your estimate. For instance, two Marines could estimate range using different methods and compare their findings. The average of the two responses should be close to the range to the target.

TRANSITION: Now that we have covered determining range, are there any questions? I have one for you.

QUESTION: What are two methods used to determine range?

ANSWER: Two of the methods are bracketing and appearance of object.

Notes:_____
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TRANSITION: Now that we have covered how to determine range, let's talk about weather considerations.

(10 MIN)

(SLIDE #23)

3. WEATHER CONSIDERATIONS: The well-trained shooter who understands how to obtain a steady position, carefully align their sights, and execute perfect trigger control may still fail to hit the center of the target. Failure to hit the target can occur because the shooter failed to compensate for the effects of weather. Some conditions, such as wind, can cause significant changes in bullet impact. Other conditions such as light, temperature, and precipitation have less of an effect, but can easily cause the shooter to miss the center of the target.

a. EFFECTS OF WIND.

(SLIDE #24)

1) The Shooter. The effect the wind has on the shooter will depend on the velocity of the wind and the firing position. The stronger the winds, the more difficult it will be to hold the weapon steady. The wind is the one weather condition that affects all shooters in the same way. However, measures can be taken to counter the effects the wind has on your ability to fire accurately:

a) If the situation permits, choose a shooting position that is the least susceptible to the effect of the wind. The prone shooting position offers the most stable firing position in windy conditions, while windy conditions make the standing position the least stable.

b) If the situation permits, counteract the effects of wind by timing your shots. By waiting for a steady wind or a

lull in the wind, you can balance properly and deliver a well-aimed shot on the target.

c) The effects of wind can be partially offset if you train yourself and have a positive mental attitude.

(SLIDE #25)

2) The Bullet. The effect the wind has on the round as it travels down range is referred to as deflection. The wind deflects the bullet laterally in its flight path to the target. It is an effect that increases with the distance to the target. The deflection of the bullet can be compared to that of a boat crossing a river with a strong current. The skipper of the boat may aim for a point directly across the river, but will end up farther downstream because of the current. There are three factors that affect the amount of deflection of the bullet:

a) The Velocity of the Wind. The greater the velocity of the wind, the more it will deflect the bullet.

b) The Range to the Target. Because the initial velocity of the bullet as it leaves the muzzle of the rifle is high, the wind will have little effect on bullets traveling short distances. The velocity of the round decreases as it travels down range, causing the wind to produce a greater deflection. Therefore, the wind deflection increases the farther a round must travel before it strikes the target.

c) Direction of the Wind. The direction of the wind, in relation to the path of the bullet, will determine how much of an effect the velocity of the wind will have on the bullet.

(SLIDE #26)

b. EFFECTS OF DIFFERENT LIGHT CONDITIONS. Many inexperienced shooters do not recognize that light conditions can affect their shooting accuracy and affect a weapon's zero. Light conditions can change the appearance of a target. Light affects each shooter differently. Light can affect range estimation and visual acuity. Shot placement can be affected by the changing light conditions. By maintaining a center mass hold, the effects of light can be reduced. Common light conditions include:

1) Bright Light. Bright light conditions exist under a clear blue sky with no fog or haze present to filter the

sunlight.

a) Bright light can affect the perception of the reticle in the optic. Too much light causes the chevron to glow excessively and appear indistinct.

b) Place a piece of tape over the fiber optic light collector to create a finer aiming point on the red chevron and post below it.

c) Bright light can make a target appear smaller and farther away. As a result, it is easy to overestimate range. Bright light can affect your perception of the target and therefore can affect your zero.

(SLIDE #27)

2) Haze. Haze exists when smog, fog, dust, or humidity is present. Hazy conditions could cause additional eye strain. Haze can make a target appear indistinct, making it difficult to establish sight picture.

(SLIDE #28)

3. Overcast. Overcast conditions exist when a solid layer of clouds blocks the sun. The amount of light changes as the cloud cover thickens. Overcast conditions make a target appear larger and closer. As a result, it is easy to underestimate range.

a) Light Overcast. Light overcast conditions exist when no blue sky is visible and a thin layer of clouds is present. In light overcast, both the target and the RCO reticle pattern appear very distinct. Light overcast is comfortable on the eyes with no glare present, making probably the best light condition for shooting.

b) Dark Overcast. As the amount of light decreases, it becomes more difficult to identify the target.

(SLIDE #29)

4. Scattered Clouds. Scattered cloud conditions exist when the clouds are broken up into small patches with the sun appearing at times between the clouds. Your eyes may have problems adjusting between a target which is brightly lit and one that is shadowed.

5. Moving Clouds. Moving clouds exist when scattered clouds move across the sky rapidly, making the sun appear periodically. Rapidly moving clouds can fatigue the eyes due to the rapid changes from bright light to shadows. This condition is probably the most difficult to contend with because the light changes rapidly. If the situation permits, this condition can be compensated for by selecting one of the two light conditions (bright light or shadow) in which to fire. Best results will be obtained if each shot is fired under the same light condition.

c. **EFFECTS OF TEMPERATURE.**

(SLIDE #30)

1) Extreme Heat:

a) Effects of Extreme Heat on the Shooter. Hot temperatures can lead to rapid fatigue and cause distractions that can result in inaccurate shooting. This can cause blurred vision and reduce concentration levels. Excessive heat can cause muscle cramps, heat exhaustion, or heat stroke. Increased fluid intake, good physical condition, and periodic rest breaks (if possible) will help offset these effects.

b) Target. At high temperatures, ground mirage can cause a target to appear indistinct and drift from side to side. Heat waves or mirage may distort the target shape.

c) The Rifle and Bullet. In hot weather, rifle chamber pressure increases, causing the bullet to exit the muzzle at a higher velocity and impact the target above the point of aim. Hot air is less dense than cooler air and provides the bullet with less resistance allowing it to travel faster, causing the bullet to experience less deflection when there is wind.

(SLIDE #31)

2) Extreme Cold:

a) The Shooter. Extreme cold can cause you to shiver, feel uncomfortable, have lapses in memory, and difficulty holding a frigid rifle with numb hands. Shivering can make aiming very difficult, if not impossible. Trigger control is also difficult to execute properly if the fingers are numb.

Additionally, the potential for frostbite is a concern. Proper dress in cold climates is paramount.

b) The Rifle and the Bullet. Extreme cold will affect the rifle and the bullet. In cold weather, the rifle chamber pressure decreases, causing the bullet to exit the muzzle at a lower velocity and impact the target below the point of aim. The air is denser at lower temperatures and tends to slow the speed of the bullet, causing the bullet to experience a greater deflection when there is wind.

(SLIDE #32)

d. HOLDS: To engage a target in wind conditions, a shooter may be required to aim their rifle at a point on the target other than center mass. This is known as a hold. Using holds involves adjusting sight picture to compensate for the distance and size of the target to account for wind conditions and range to the target. The RCO adjusters should not be adjusted for a wind change. Holds must be used to compensate for the strike of the round when wind is a factor.

TRANSITION: Now that we have covered weather considerations, are there any questions? I have one for you.

QUESTION: What are the two ways weather affects the shooter?

ANSWER: Weather can affect the shooter mentally and physically.

Notes:_____
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TRANSITION: Now that we have covered weather considerations, let's talk about engaging targets at unknown distances.

(SLIDE #33) **(10 MIN)**

4. **ENGAGE TARGETS AT UNKNOWN DISTANCE.** While in a combat environment Marines will have to engage targets at all distances. The distance to the targets will dictate the engagement technique used.

a. Controlled Pair. For threats 50 yards and closer a controlled pair will be used to engage the threat. This requires three sight pictures and execution of the basic fundamentals of

marksmanship.

b. Single Precision Shot. If a target is located at long range, or partially exposed, the Marine's stability of hold and sight alignment are critical to accurately engage a threat utilizing a precision shot.

1) Breathing methods (forced exhale).

2) Aiming (Chevron is the focus through 300yds).

3) Trigger control (Interrupted/Uninterrupted; PID).

c. Post Fire Drills. After engaging the threat the shooter must conduct their post fire drills, to include:

1. Search and Assess.

2. Ensure your weapon is condition 1 and that your magazine has sufficient rounds for another engagement. Conduct a speed or tactical reload depending on available time.

TRANSITION: Now that we have covered engaging threats at unknown distances, are there any questions? I have one for you.

QUESTION: What two engagement techniques are utilized while engaging threats at unknown distances?

ANSWER: Controlled Pairs and Precision Shots.

Notes:_____
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Let's summarize.

(SLIDE #34) **(2 MIN)**

SUMMARY:
Being able to engage targets at unknown distances is crucial in a Marines ability to be effective in a combat environment. The constant change on the battlefield will test your marksmanship

skills in all areas. Having confidence in your ability to identify targets at unknown distances and engage them effectively from different supported positions will greatly increase your units overall success.