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

DETAILED INSTRUCTOR GUIDE

LESSON TITLE

DATA BOOK

COURSE TITLE

ANNUAL RIFLE TRAINING

UNITED STATES MARINE CORPS
Weapons Training Battalion
Marine Corps Combat Development Command
Quantico, Virginia 22134-5040

DETAILED OUTLINE

DATA BOOK

INTRODUCTION (3 MIN)

1. GAIN ATTENTION. Of all the available tools that assist the shooter in firing accurately and consistently, the data book, if properly utilized, is his most valuable asset. It contains a complete record of every shot fired and the weather conditions and their effects on shooting. When used properly it will provide information for Holds and offset aiming adjustments at each range and will provide a basis for analyzing the performance of both the shooter and the rifle. The most competent shooter cannot consistently hit the center of the target unless he has a record of the conditions that affect his shooting. Once he has this record, he can analyze his performance and improve his accuracy.

2. OVERVIEW. This lesson will cover the use of the data book before, during, and after firing.

3. INTRODUCE LEARNING OBJECTIVES. The Terminal Learning Objective and Enabling Learning Objective pertaining to this lesson are as follows:

a. TERMINAL LEARNING OBJECTIVE. Given a service rifle/carbine, RCO, sling, magazines, cartridge belt, magazine retention device (pouches or load-bearing vest), ammunition, target, and data book, without the aid of references, zero the rifle/carbine IAW MCRP 3-01A. (0300.M16.1004)

b. ENABLING LEARNING OBJECTIVE. Given a service rifle/carbine, RCO, sling, magazines, cartridge belt, magazine retention device (pouches or load-bearing vest), ammunition, target, and data book, without the aid of references, record data before, during, and after firing IAW MCRP 3-01A. (0300.M16.1004e)

4. METHOD. This lesson will be taught in a classroom setting using lecture and demonstration.

5. EVALUATION. The Marine will be evaluated on this material during Table 1 firing.

TRANSITION: The data book is the most important tool a shooter has to evaluate and improve shooting performance and consistency. The information recorded in the data book allows a shooter to analyze his shooting. This information is used to establish and maintain a battlesight zero (BZO).

BODY (55 MIN)

1. (3 MIN) INTRODUCTION TO THE DATA BOOK

a. Importance of the Data Book to the Shooter

1) The data book is used to record elevation and windage adjustments, holds, and offset aiming adjustments that enable a BZO to be established and maintained. It is critical that all efforts be directed toward establishing a BZO setting on the rifle that can be taken into combat. The data book provides a precise record of weather conditions and their effect from day to day as well as a place to record any observations regarding your application of marksmanship fundamentals. These recorded observations provide a daily and future reminder of what errors in firing technique should be avoided and what holding adjustments should be used under a given set of weather conditions.

2) The data book should be retained for future use. It will provide a valuable resource regarding past errors and how to avoid them, and a reminder of how various weather conditions affected shooting and your BZO.

b. Rifle Marksmanship Data Book. The data book was developed to track the marksmanship training program and provide a ready reference of the "must know" information for Preparatory Training and Rifle Table 1.

Confirm by questions.

TRANSITION: Every shooter must learn the correct method of recording detailed information in the data book that can be accurately interpreted at a later date to assist in improving shooting performance. Information is recorded in the data book before, during, and after firing.

2. (15 MIN) USE OF THE DATA BOOK BEFORE FIRING

(ON SLIDE #1)

a. When the Data Book is Issued. As soon as the data book is issued, the following information should be recorded on

the data book cover:

1) Rank/Name. Your rank and name is recorded for identification purposes.

2) SSN. Your social security number is recorded for identification purposes.

3) Organization. Your organization, down to the unit level, is recorded to ensure return of a lost data book.

4) Blood Type. Your blood type is recorded in the event of injury on the range.

5) Rifle Serial Number. Your rifle's serial number is recorded. Always check the serial number of the rifle against the one recorded on the data book each day as the rifle is drawn from the armory.

6) Detail Number. Your detail number is recorded for identification and record score verification purposes.

7) Range. Your assigned firing range is recorded.

8) Date. The date the data book was issued is recorded.

b. Recording Data Before Firing. To save valuable firing time on the range, some information can be recorded before going to the firing line. In the BEFORE FIRING section of the data book, record the following:

1) Initial Setting or BZO. The optic is shipped with a preset center from the manufacturer for the service rifle / carbine. Normally this means that only small adjustments are necessary. If adjustments have been made during a BZO exercise and those adjustments are known, they can be recorded as the initial setting. In addition to any actual settings written you should draw your hold. There are three different areas that you can do this: in the call boxes, on the plotting grid, or in your remarks box.

2) Wind. Prior to firing, check the wind. If wind conditions are present, a hold adjustment will have to be made prior to firing to ensure shots group at the center of the target.

a) Direction. Determine the direction of the wind and draw an arrow through the clock indicating the direction the wind is blowing. In our example, there is a wind blowing from 4:30 to 10:30.

NOTE

Remember that your position is represented in the center of the clock and the target is at 12 o'clock.

b) Value. Look at the clock to determine if the wind is a full, half, or no value wind. Under VALUE, circle FULL or HALF to indicate the wind value. In our example, we will circle HALF to indicate a half value wind.

c) Speed. Observe the flag on the range and circle the appropriate flag indicating the wind's velocity (SPEED). In our example, the wind is blowing at 10 MPH so we will circle the flag blowing from right to left (4:30 to 10:30) above 10 MPH.

NOTE

The hold adjustment for wind is always shifted into the direction of the wind:

If the flag is blowing from right to left, the hold is shifted to the right to compensate for a bullet that is being deflected to the left.

If the flag is blowing from left to right, the hold is shifted to the left to compensate for a bullet that is being deflected to the right.

d) Wind Hold. When firing with iron sight that have adjustable clicks the chart beneath the flag indicates the required number of clicks on the rear sight windage knob to offset the effects of the wind at 300 yards/meters. Circle the number where the wind value and wind speed intersect. In our example, we will circle 1 because the wind is HALF value, blowing 10 MPH. This adjustment cannot be used as it is for adjustments using the RCO due to the windage and elevation rules being different for the RCO than for the iron sights. This information can be translated to inches in deflection from center and an appropriate hold can be made based on that calculation.

NOTE

The adjustment in hold is determined from the recommended adjustment in clicks that you would calculate for iron sights. For example, 300 yard line wind call is calculated to three clicks, that is 4.5 inches, you would hold 4.5 inches from center. Using the data book as a reference scale, you can determine where that hold would be.

Confirm by questions.

TRANSITION: Recording information in the data book prior to firing saves valuable time on the firing line that should be used to prepare for firing. During firing, shot groups are plotted in the data book and any hold or offset aiming adjustments are recorded.

3. (17 MIN) USE OF THE DATA BOOK DURING FIRING

The DURING FIRING portion of the zeroing page in the data book consists of a "A" target used to plot shot groups, and a section to record any adjustments or holds made to move the shot group to the center of the target. In the DURING FIRING section of the data book, record the following:

a. Plot the First 3-Shot String of Tri-fire. After your first 3-shot string is fired, the target is marked and raised from the pits indicating the shot group. When the target reappears, record these first 3 shots by plotting their precise location on the "A" target with a '1' for each shot. We will plot our first group low and to the left of target center.

b. Make a Sight Adjustment if Required. Triangulate the shot group to find the center. Indicate the center with a small "x." If the center of the first shot group is not in the center of the target, determine the sight adjustment by using the grid lines on the "A" target in the data book. The RCO is capable of being adjusted to achieve POA/POI. The adjusters are set to move in 1/3 minute of angle (MOA) per click. Moving either the elevation or windage adjusters one graduation or notch is referred to as moving one "click" on the scope.

1) To raise the strike of the bullet, rotate the elevation adjuster clockwise or to the right. To lower

the strike of the bullet, rotate the adjuster counterclockwise or to the left.

2) To move the strike of the bullet to the right, rotate the windage adjuster clockwise or to the right. To move the strike of the bullet to the left, rotate the adjuster counterclockwise or to the left.

a) Elevation Rule. One click on the elevation adjuster will move the strike of the bullet on the target approximately 1/3 inch at 100 meters.

b) Windage Rule. One click of windage adjustment will move the strike of the bullet on the target approximately 1/3 inch for every 100 meters.

c) Adjustment increments are approximately 1/3 inch per click at 100 meters. This means that three (3) clicks are required to move the bullet impact one inch on a target at 100 meters. One click is required to move the bullet impact one inch at 300m. At 36 yards field expedient zero, nine (9) clicks are required to move the bullet impact one inch or twelve (12) clicks move bullet strike one inch at 25 meters.

d) The AN/PVQ-31 is internally adjustable. The adjuster screw need only position the internal roof prism. For this reason, the first shot will be about the same spot on the target as the last group the recoil impulse from the weapon, will ensure proper seating of the internal mechanism and allow for an accurate zero.

NOTE

Ensure to make a solid strike on the RCO to reset the scope prior to the next string of fire.

c) You can record any elevation or windage adjustment in the FRONT SIGHT ELEV column and the wind column under ZERO FOR SECOND STRING.

c. Prepare to Fire the Second 3-Shot String of Tri-fire. As soon as the sight setting that will be used for the second string is recorded, prepare to fire the second 3-shot string. Aim and fire as soon as the target reappears.

d. Plot the Second 3-Shot String. After your second 3-shot string is fired, the target is marked and raised from the pits. When the target reappears, record these second 3 shots by plotting their precise location on the "A" target

with a '2' for each shot. We will plot our second shot group in the dead center of the target.

e. Make a Sight Adjustment if Required. Record any sight adjustments made in the ZERO FOR THIRD STRING column. For our example, we will make no sight adjustment because our shot group is centered. We will record the same sight setting in the ZERO FOR THIRD STRING column.

(ON SLIDE #7)

f. Prepare to Fire a Final 4-Shot String of Tri-fire. As soon as the sight setting that will be used for the third string is recorded, prepare to fire a final 4-shot string.

g. Plot the Final 4-Shot String. After your final 4-shot string is fired, the target is marked and raised from the pits. When the target reappears, record these final 4 shots by plotting their precise location on the "A" target with a '3' for each shot. We will record our final group centered. This concludes the information recorded DURING FIRING.

Confirm by questions.

TRANSITION: After firing, the shooter does not toss his data book aside. There is more information he can record that may be analyzed later to improve his shooting.

4. (10 MIN) USE OF THE DATA BOOK AFTER FIRING

The AFTER FIRING portion of the zeroing page in the data book is used to record the temporary sight setting established in Tri-fire. In the AFTER FIRING section of the data book, record the following:

(ON SLIDE #8)

a. ZERO. With the RCO once it is a zero is established your zero for each position and each yard line will be the required hold for POA POI.

b. WIND. Calculate the prevailing wind or the wind conditions during the final 4-shot string fired. The following information is calculated and recorded the same way it was in the BEFORE FIRING information of the data book.

1) DIRECTION. Draw an arrow through the clock in the direction the wind was blowing. For our example, the final 4-shot string was fired in a wind blowing from 3:00 to 9:00.

2) VALUE. Circle FULL or HALF to indicate the wind value. We will circle FULL to indicate a full value wind.

3) SPEED. Circle the appropriate flag indicating the wind's velocity. In our example, the wind is blowing at 10 MPH so we will circle the flag blowing from right to left above 10 MPH.

4) Windage Adjustment. Circle the number of clicks where the wind value and wind speed intersect. We will circle 3 because the wind is FULL value, blowing 10 MPH.

(ON SLIDE #10)

c. TRUE ZERO. A true zero does not include the windage adjustments to compensate for the effects of the day's wind. The next time you fire, the wind conditions will probably be different. Therefore, the hold made to compensate for today's wind may not be the correct hold required for wind conditions on other days.

Confirm by questions.

TRANSITION: Recording information in the data book and analyzing this information after firing will provide invaluable insight regarding your shooting performance and the factors that affect your performance. With this information, improvement can be made to your performance on the KD range and you can refine those skills essential to your combat effectiveness in the field. There are specific procedures for completing the data book during the KD Course of Fire that will allow the shooter maximum time to focus on firing well-aimed shots.

5. (10 MIN) RECORDING DATA FOR RIFLE TABLE 1

a. Introduction. Each data book page is broken down into three sections: BEFORE FIRING, DURING FIRING, and AFTER FIRING. The BEFORE FIRING portion should be completed just prior to moving to the firing line. The DURING FIRING portion will be completed during the string of fire. The AFTER FIRING portion will be completed immediately after firing.

(ON SLIDE #11)

b. Recording Data During Slow Fire. The method for calling and plotting shots in the data book is called "the shot behind method." It allows the shooter to spend less time recording data and more time firing at the target. This is because all the calling and plotting is done while the target is in the pits being marked. This information is

recorded in the DURING FIRING portion of the data book page. The proper and most efficient method for recording data during KD slow fire stages is as follows:

1) Fire the First Shot. Fire the first shot. Immediately check the wind flag to see if the speed or direction of the wind changed.

2) Call the Shot Accurately. As soon as the shot is fired and the target is pulled into the pits, record the exact location where the reticule was on the target at the exact instant the shot was fired. Record this on the target provided under box 1 in the column marked CALL.

3) Prepare to Fire the Second Shot. As soon as you have recorded the call for the first shot, prepare to fire the second shot and be ready to aim and fire as soon as the target reappears.

4) Look at Where the First Shot Hit. As the target reappears out of the pits, take a look at where the first shot hit the target. Remember this location so it can be plotted after firing the second shot.

5) Make a Sight Adjustment if Required. If the first shot is not where it was called, make the necessary adjustment to your hold. Do not forget to check for changes in the wind. Any hold change will be recorded in the data book under the next CALL column.

6) Fire the Second Shot. Fire the second shot. Check the wind flag to see if the wind changed speed or direction.

7) Call the Second Shot and Plot the First Shot. As soon as the second shot is fired and the target is pulled into the pits, record the call of the second shot. Now plot the precise location of the first shot by writing "1" on the large target diagram provided in the block marked PLOT.

8) Prepare to Fire the Third Shot. Repeat steps 2) through 7) until the required number of shots have been fired. Indicate each slow fire shot with the appropriate number (e.g., 1, 2, 3, 4, 5).

(ON SLIDE #12)

c. Recording Data for Rapid Fire Stages. In rapid fire, the firing sequence is different from that of slow fire. The following procedure should be used for recording data in the DURING FIRING portion of the data book page for rapid fire stages:

1) Make Final Windage Correction. The required hold for the final windage correction, if needed, is applied just before the targets appear.

2) Mentally Call Shots While Firing. While firing the rapid fire string, make a mental note of any shots called out of the group.

3) After the String is Fired. After firing the rapid fire string, record the following in the data book:

a) Plot All Hits With an "X." When the target is marked, plot all visible hits with an "X" precisely where they appear on the target provided in the block marked PLOT.

b) Record Correct Hold. Upon completion of firing, determine the hold required to center the final shot group and record this hold in the remarks box immediately for later reference.

d. Additional, Helpful Data. After firing a stage, record any data or information that can be helpful in improving shooting in the future. Anything done or observed should be recorded. These items will be helpful when analyzing daily shooting performance each evening. Record this information in the REMARKS column. What the shooter fails to record may be the information he will need to improve his performance.

Confirm by questions.

TRANSITION: If you understand and apply the proper procedures for adjusting your holds and record this information correctly in your data book, you will be able to maintain a combat BZO.

OPPORTUNITY FOR QUESTIONS: (1 MIN)

1. Respond to questions from the class.

2. Prompt the students with questions to the class.

a. QUESTION: What is the data book's primary purpose?

ANSWER: To record information that allows the shooter to analyze his performance. This information also allows the shooter to establish and maintain a true zero.

b. QUESTION: How is the direction of the wind indicated in the data book?

ANSWER: An arrow is drawn through the clock in the direction the wind is blowing.

> ***INSTRUCTOR'S NOTE:*** *Ask Marines as many questions as necessary to ensure they fully understand the material presented in this lesson.*

SUMMARY: (1 MIN)

This lesson covered data book procedures to include the importance of the data book to the shooter and use of the data book before, during, and after firing. A poorly maintained data book is useless to the shooter. Of all the tools available to the shooter in improving his shooting performance and firing accurately, the data book, if properly filled in, is his most valuable asset.

SLIDES

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