



DIV-12
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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

DIVISION MATCH COURSE



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 sight settings 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 Division Match instruction is structured to prepare the shooter to fire the Division Match Course and is not a component of a formal school program. Therefore, there are no learning objectives.
4. METHOD. This lesson will be taught in a classroom setting using lecture and demonstration. In addition, a practical application for determining sight adjustments will be conducted.
5. EVALUATION. The Division Match instruction is structured to prepare the shooter to fire the Division Match Course and is not a component of a formal school program. Therefore, students are not evaluated on this material.

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 sight 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 rifle sight settings 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 I.

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 Sight Setting or Known BZO

INSTRUCTOR'S NOTE: *If Marines have a known BZO, they may use that sight setting instead of initial sight setting.*

(ON SLIDE #2)

a) Initial Sight Setting: FRONT ELEV. Enter the front sight post setting by recording the number of clicks up (↑) or down (↓) under FRONT ELEV. We will start with a 0 initial sight setting on our front sight post and carry this example throughout instruction.

b) Initial Sight Setting: REAR ELEV. Circle the 200-yard setting for the rear sight elevation knob, 8/3-2, under REAR ELEV.

c) Initial Sight Setting: WIND. Under the WIND column, the R represents clicks right on the rifle from the initial sight setting and the L represents clicks left on the rifle. Enter the rear sight windage knob setting by recording the number of clicks right (clockwise) or left (counterclockwise) under WIND. In our example, we will start with a 0 initial sight setting for our windage knob setting.



(ON SLIDE #3)

2) Wind. Prior to firing, check the wind. If wind conditions are present, a sight 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 windage knob is always moved into the wind:

If the flag is blowing from right to left, the windage knob is moved 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 windage knob is moved to the left to compensate for a bullet that is being deflected to the right.

d) Windage Adjustment. 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.



(ON SLIDE #4)

3) ZERO. You must determine the sight setting you will place on your rifle to begin zeroing. This ZERO will be the Initial Sight Setting or Known BZO plus the rear sight windage setting to compensate for the effects of wind.

a) Front Elev and Rear Elev. Elevation adjustments are not affected by wind so the same settings will be carried over from the Initial Sight Setting or Known BZO column.

b) Wind. Wind will affect the strike of the round right or left on the target. Therefore, if wind is a factor, the rear sight windage knob must be adjusted to compensate for the effects of wind.

(1) If the wind is blowing from the right, add the number of clicks circled by moving the windage knob to the right. For example, our WIND setting from Initial Sight Setting is 0, and the number of windage clicks circled is 1 for a 10 MPH right wind, so we will move the windage knob 1 click right for a 1 R windage setting for our ZERO.

INSTRUCTOR'S NOTE: Add as many examples from a known BZO as necessary to ensure Marine understanding. Below are some additional examples. To minimize confusion, it is recommended that these examples be given following completion of the BEFORE FIRING section.

Additional Example for Wind Blowing from the Right.

If your WIND setting was 3 L, and the number of windage clicks circled is 1 for a 10 MPH right wind, move the windage knob 1 click right for a 2 L windage setting.

Example for Wind Blowing from the Left.

If the wind is blowing from the left, add the number of clicks circled by moving the windage knob to the left. If your WIND setting from Known BZO is 3 L, and the number of windage clicks circled is 1 for a 10 MPH left wind, move the windage knob 1 click left for a 4 L windage setting.



(2) Once the windage setting is determined, it is recorded in the WIND column and the rear sight windage knob is adjusted to this setting to begin firing.

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 elevation and windage 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 sight adjustments made to move the shot group to the center of the target. In the DURING FIRING section of the data book, record the following:

(ON SLIDE #5)

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. These grid lines represent the number of clicks required to bring a shot group center. Looking at the center of the shot group:

1) Locate the closest horizontal grid line to the "x." Follow the line across to the numbered vertical scale to determine the number of clicks required on your front sight post to bring your shot group to the center.

a) To move your shot group up, move the front sight post clockwise (in the direction of the UP arrow).

b) To move your shot group down, move the front sight post counterclockwise.



NOTE

Remember that to move the strike of the round up, the front sight post is rotated down into the front sight housing. To move the strike of the round down, the front sight post is actually raised up out of the front sight housing.

c) Record any elevation adjustment in the FRONT SIGHT ELEV column under ZERO FOR SECOND STRING. For example, our front sight elevation setting was 0, and the center of our 3-shot string was 2 clicks below center, so we would rotate our front sight post 2 clicks clockwise (in the direction of the UP arrow). This would put our new elevation setting at 2 ↑.

INSTRUCTOR'S NOTE: The instructor should add as many examples as necessary to ensure student understanding.

Additional Example. If your front sight elevation setting was 4 ↑, and the center of your 3-shot string was 6 clicks above center, rotate your front sight post 6 clicks counterclockwise and count 6 clicks up for a new elevation setting of 2 ↓.

2) Locate the closest vertical grid line to the "x." Follow the line down to the numbered horizontal scale to determine the number of clicks required on your rear sight windage knob to bring your shot group to the center.

a) To move your shot group to the right, rotate the rear sight windage knob clockwise (in the direction of the arrow).

b) To move your shot group to the left, rotate the rear sight windage knob counterclockwise.

c) Record any windage adjustment in the WIND column under ZERO FOR SECOND STRING. For example, our windage setting was 0, and the center of our 3-shot string was 8 clicks to the left of target center, so we would rotate our rear sight windage knob 8 clicks clockwise. This would put our new windage setting at 8 R.



INSTRUCTOR'S NOTE: *The instructor should add as many examples as necessary to ensure student understanding.*

Additional Example. *If your windage setting was 9 R, and the center of your 3-shot string was 8 clicks to the right of target center, rotate your rear sight windage knob 8 clicks counter-clockwise and subtract 8 clicks for a new windage setting of 1 R.*

(ON SLIDE #6)

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. This is the sight setting in elevation and windage that was required to place the center of your final shot group in the center of the target, from 200 yards/meters, from the sitting position, under a specific wind condition. (If a final sight adjustment is required following the last 4-shot string fired, this is your final setting.) Enter the final elevation and windage adjustment setting in the data book:

- 1) Under the column FRONT SIGHT ELEV, record the final elevation setting made on the front sight post. In our example, we will record 2 ↑ because our final 4-shot string was centered vertically on the target.
- 2) Under the column WIND, record the final windage setting made on the rear sight windage knob. For our example, our 4-shot group was centered on the target so we will record the same windage sight setting in the WIND column (8 R).
- 3) Enter the rear sight elevation knob setting in the data book by circling 8/3-2 under ELEV. Remember, all adjustments made in elevation were made on the front sight post.

(ON SLIDE #9)

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 rear sight windage knob adjustments made to compensate for today's wind will not be the correct setting required for wind conditions on other days.

1) FRONT ELEV. Enter the final elevation setting made to center the shot group under the column FRONT ELEV. In our example, we will record 2 ↑ because our final four-shot string was centered vertically on the target.

2) REAR ELEV. Enter the rear sight elevation knob setting in the data book by circling 8/3-2 under ELEV. Remember, all adjustments made in elevation were made on the front sight post.

3) WIND. Calculate the windage adjustment to compensate for today's wind conditions the same way it was calculated in the BEFORE FIRING information of the data book. The only exception is now windage adjustments are being removed from the rifle rather than added to the rifle.

a) Because the windage setting is being removed from the rifle, the number of clicks of windage are subtracted from the SIGHT SETTING (with wind) windage setting.

b) If the wind is blowing from the right (flag blowing left circled), remove the number of clicks circled. For example, our WIND setting was 8 R, and the number of windage clicks circled is 3 for a 10 mph right wind, so we will subtract 3 clicks to come up with 5 R for a windage knob setting for our BZO.



INSTRUCTOR'S NOTE: The instructor should add as many examples as necessary to ensure Marine understanding.

Additional Example. If your WIND setting was 8 L, and the circled number of windage clicks is 3 for a 10 mph right wind, subtract 3 clicks to come up with 11 L for a windage knob setting.

Additional Example for Wind Blowing From The Left. If the wind is blowing from the left (flag blowing right circled), remove the number of clicks circled.

1. For example, if your WIND setting was 3 R, and the number of windage clicks circled is 6 for a 10 mph left wind, add 6 clicks to come up with 9 R for a windage knob setting.

2. Likewise, if your WIND setting was 3 L, and the number of windage clicks circled is 6 for a 10 mph left wind, add 6 clicks to come up with 3 R for a windage knob setting.

c) Once the windage setting is determined, it is recorded in the WIND column and the rear sight windage knob is adjusted to this setting. This setting will be your sight setting for 200-yard stages.

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 tip of the front sight post 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 sight adjustment. Do not forget to check for changes in the wind. Any elevation or windage 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 final windage correction, if needed, is applied to the sights 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 Sight Setting. Upon completion of firing, determine the elevation and windage to center the final shot group and record this sight setting in the ZERO block of the AFTER FIRING section.

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 the rifle's sights 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.
 - c. **QUESTION:** Windage in the data book is decided by wind value and speed. What does the number represent that intersects value and speed?
ANSWER: The number of clicks required to offset the effects of the wind.

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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