

LESSON 6: SIGHT ADJUSTMENT AND SCORING

PURPOSE

This lesson introduces you to correct sight adjustment and scoring.



zeroing
calculate
evaluate
score
sight zero

INTRODUCTION

During your previous range firing sessions you shot five-shot groups (series of five shots) in the standing position. This practice helps you become more comfortable with the position as well as to learn and coordinate the different actions involved in the technique of firing a shot. After you fire several five-shot groups, your groups become smaller. You will soon reach a point where you and the other cadets in your marksmanship class want to know what **scores** you can fire. Shooting for score is, after all, one of the most interesting challenges of target shooting. Scoring your targets allows you to determine whether your latest score beat your previous day's best or perhaps a personal record.

In target shooting, shots that hit the central scoring ring, the ten ring, score the most points. Shots that hit each successive scoring ring outside of the ten ring, score one point less until shots in the last scoring ring count one and then no points. To score the highest number of points on any series of shots, your shot groups must be centered on the target so that the ten

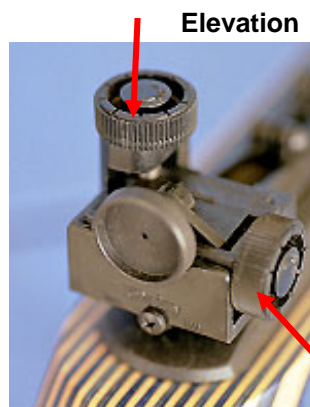
ring coincides with the middle of the shot group.

The correct way to move shot groups to the center of the target is to adjust the sights so that the next groups fired are centered. This is called **zeroing** the rifle. Some cadets may have heard of "Kentucky windage" where a shooter aims away from the target center in an attempt to compensate for a rifle that is not zeroed. This means firing with an incorrect sight picture. That simply cannot be done consistently or with the kind of accuracy demanded in target shooting. If a shot group is not centered or zeroed, there is only one correct way to move the group to the center of the target. The sights must be adjusted.

In this chapter you will learn how to adjust the sights on your rifle to zero your shot groups. You will also learn the correct method of scoring targets so that you can determine the scores that you are firing



Shots that hit the center or ten ring, score the most points



When the shot groups fired with a rifle are off-center, the only correct way to move them to the center of the target is to adjust the rear sight by using the elevation and windage adjustments on the sight.

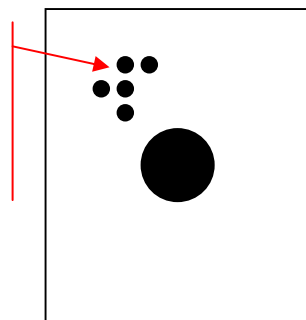
Windage

HOW TO EVALUATE SHOT GROUPS

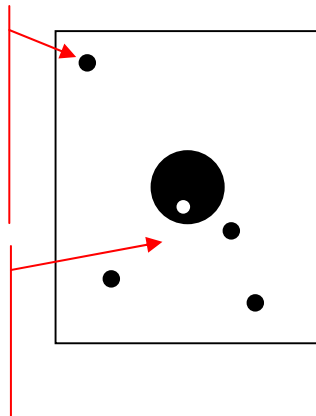
In your first live firing in the standing position, it is not important that your 5-shot groups be in the center of the target. However, no matter where they are located on the target, it is important to **evaluate** your shot groups to know how you are progressing. Here are some things to look for in evaluating your shot groups.

- **Overall size of the group** - the smaller your shot groups are, the better you are doing.
- **Shot group location** - if your shot groups are always in the same location on the target, that indicates your position and shot technique are consistent.
- **Wild shots** - if your shot groups have wild shots or “fliers” that are away from the main group, those shots indicate a mistake in shot technique was made on that shot.

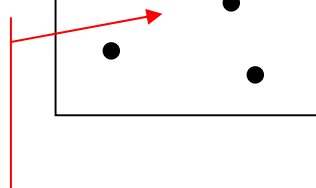
Excellent shot group, indicates good shooting performance



“Flier” away from main shot group indicates a mistake in shot technique



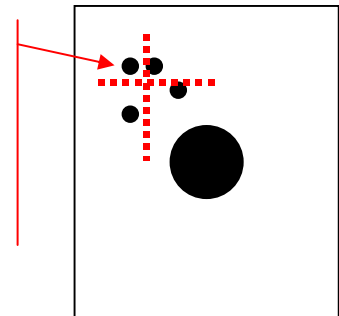
Large shot group indicates need for improvement



The next step in preparing to adjust your sights is to locate the center of your most recent shot group. Keep these points in mind as you determine shot group centers.

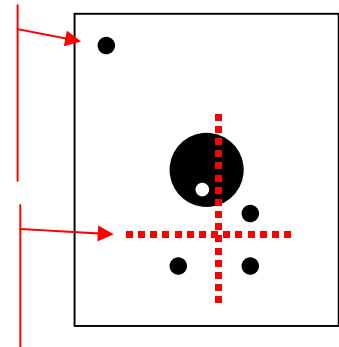
- Draw real or imaginary vertical and horizontal lines through the midpoints of the group.
- On shot groups with fliers, disregard any wild shots when determining the center of the group.
- Use the crossing point to mark the center point of the shot group.

Draw vertical and horizontal lines through center of group



Disregard fliers when determining center of group

Draw lines through center of main part of group



REAR SIGHT ADJUSTMENT

As soon as you determine the center point of your group or the center point of the good shots in your group, you are ready to **calculate** the sight adjustments that are required to place your next shot group in the center of the target.

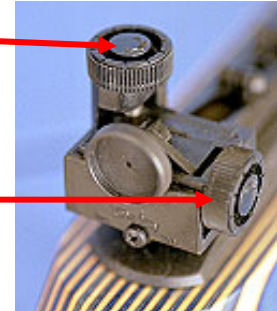
To calculate and make the necessary sight adjustments, you need to be familiar with your rear sight and how it works. The most common rear sight is the Daisy sight that is on most Daisy M853 and M888 air rifles. The El Gamo sight is used on Daisy M753 and Crosman M2000 air rifles. Precision air rifles have similar rear sights except that these sights have more precise (finer) adjustments and their adjustment knobs move shot groups in the opposite directions from the adjustment knobs on sporter air rifle sights. Note these things when examining the rear sight on the air rifle that you use.

- Target sights have adjustment knobs that turn in increments called “clicks” that can be felt and counted.
- The sight adjustment knob on top of the sight is called the “elevation” knob. Turning that knob moves the shot group up or down. Look for the direction arrow on the knob to see which direction to turn the knob. For example, turning the elevation knob in the same direction as the “UP” arrow (clockwise) on the Daisy M853 sight moves the shot group up.
- The sight adjustment knob on the side of the sight moves the shot group left or right when it is turned. It is called the “windage” knob. Look for the direction arrow on the knob to see which direction to turn the knob. Turning the windage knob in the direction of the “R” arrow (clockwise) on the Daisy M853 sight moves the shot group to the right.
- Each click of change on a sight moves the shot group center a

uniform distance. Check the sight adjustment chart to determine how many clicks of elevation and windage it will take to move your shot group to the center. To move a shot group a distance equal to the distance between two scoring rings on the BMC Target, requires an adjustment of approximately 12 clicks.

Elevation knob, turning knob clockwise moves shot group up

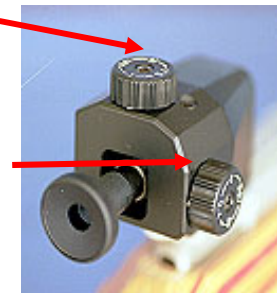
Windage knob, turning knob clockwise moves shot group to right



The Daisy rear sight is commonly used on Daisy M853 and M888 air rifles.

Elevation knob, turning knob clockwise moves shot group down

Windage knob, turning knob clockwise moves shot group to left



Precision air rifle sights have more precise adjustments. Their elevation and windage knobs often have directions marked in German and move shot groups the opposite direction from the Daisy and El Gamo sights.

CALCULATING SIGHT ADJUSTMENT AND ESTABLISHING ZEROES

To calculate the sight adjustment needed to move your shot group to the center of the target, take the latest target you fired and locate the center of the shot group. Then calculate and make the necessary sight adjustments to correct your shot group by following these steps:

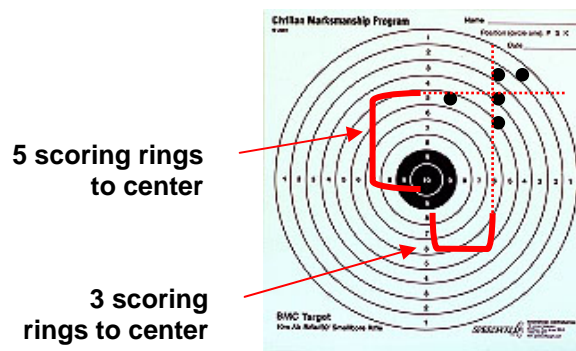
- Count the number of whole scoring rings from the horizontal line through the center of the group to the center of the target. In the illustration, this vertical distance is six scoring rings.
- Multiply the number of scoring rings in vertical distance times the number of clicks per ring for the target and sight you are using (use Sight Adjustment Chart). For a Daisy sight and the shot group in the illustration, the result would be 72 clicks (12x6).
- Turn the elevation knob on your sight, that number of clicks in the correct direction (down for group in illustration).
- Count the number of whole scoring rings from the vertical line through the center of the group to the center of the target. In the illustration, this horizontal distance is four scoring rings.
- Multiply the number of scoring rings in horizontal distance times the number of clicks per ring for the target and sight you are using (Use Sight Adjustment Chart). For a Daisy sight and the shot group in the illustration, the result would be 48 clicks (12x4).
- Turn the windage knob on your sight, that number of clicks in the correct direction (left for group in illustration).

After making the necessary sight adjustments, fire another group to see if the sight adjustment is correct. One or two additional, smaller sight adjustments may be

required to place your shot group in the center of the target.

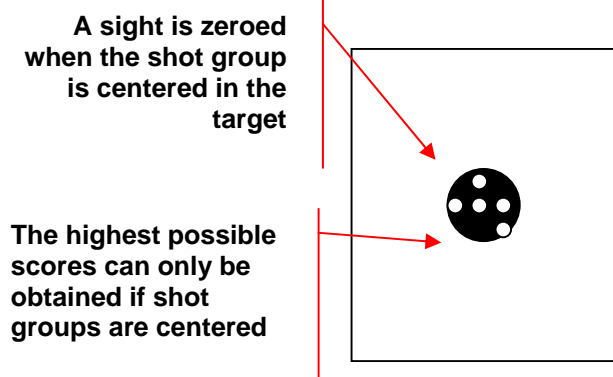
Air Rifle Sight Adjustment Chart				
Sight	To move zero up, turn	To move zero right, turn	Clicks per scoring ring, BMC Target	Clicks per scoring ring, official target
Daisy	Clockwise	Counter-clockwise	12	2
El Gamo	Clockwise	Counter-clockwise	24	4
PRECISION, Anschütz, FWB, etc.	Counter-clockwise	Clockwise	30	5-6

The click adjustment values given here are approximate and may vary with different sights.



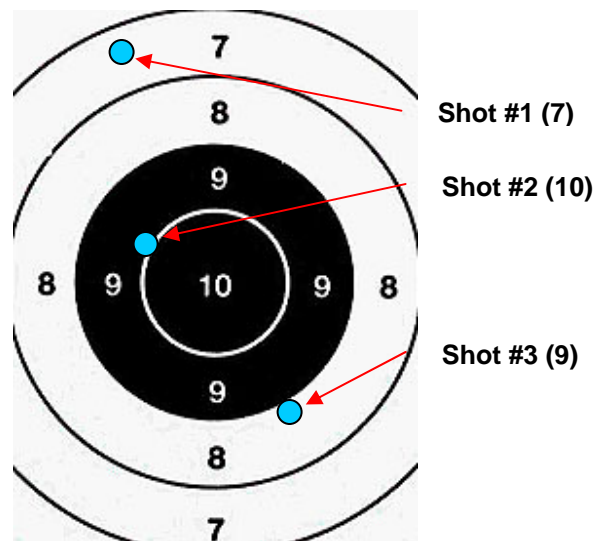
THE SIGHT ZERO

A sight is “zeroed” when it is adjusted so that the center of the shot group is the same as the center of the target.



- When the shot group is centered on the target, the rifle is zeroed and the sight should not be changed unless subsequent groups are off center.
- Whenever a shot group is fired that is not centered, the necessary sight adjustments must be **calculated** and the adjustments made to the sight.
- Just because a sight is zeroed once does not mean it will stay zeroed. If a shooter's position or shot technique changes, the shot group center will change.
- Just because a sight is zeroed for one shooter does not mean it is zeroed for other shooters who use that same rifle. Unless two shooters use exactly the same position and technique, their zeroes will probably be different.
- One of the most important skills a target shooter must develop is the ability to continually **evaluate** whether his/her rifle sight is zeroed and to make changes when necessary to keep the sight zeroed.

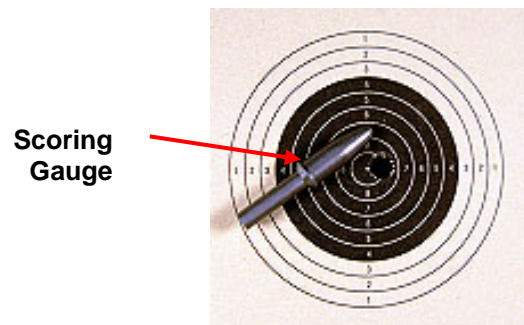
- The second rule is that if a shot hole cuts two or three scoring rings, the shot is scored according to the value of the highest scoring ring it hits. If a shot cuts both the nine and ten rings, it **scores** ten points (see illustration, shot #2).
- The third rule is that if a shot lies in one scoring ring, but just touches a higher value scoring ring, the shot is scored according to the highest scoring ring that any part of the shot hole touches. If a shot is in the eight ring, but just barely touches the nine ring, it **scores** nine points (see illustration, shot #3).



HOW TO SCORE TARGETS

After you learn to adjust the sights on your rifle so that your shot groups are centered on the target, you are ready to learn how to properly score targets. There are only a few rules that control the scoring of targets.

- The first rule is that a shot is scored according to the value of the scoring ring that it hits. If a shot is in the seven ring, it **scores** seven points (see illustration, shot #1).



In official scoring, a scoring gauge is used to determine whether a doubtful shot touches a higher value scoring ring.

- The fourth rule is that if it is doubtful whether a shot hole touches a higher value scoring ring, a scoring gauge should be used. The scoring gauge, when used with a magnifying glass, allows the scorer to see exactly where the edge of the shot hole is, to determine the correct score for that shot. If a scoring gauge is not available, it is important to look carefully at the edge of the shot hole and to also use a magnifying glass to determine whether the edge of the hole touches a higher value scoring ring.
- The total score for a target is the total value of all shots on the target. At first you will fire five-shot groups where the maximum score is 50 points. Soon you will fire ten shots on a target where the maximum score for the target will be 100 points.



When a scoring gauge is inserted in a shot hole, it is possible to see exactly where the edge of the shot hole lies.

CONCLUSION

In your next range firing exercises, you will have an opportunity to adjust your sights so that your shot groups hit the center of the target. With your shot groups centered, it is then possible to score your targets so that you can begin to make records of your progress as a shooter.