



Long Range Clinic

Presented by:

SEMNO *High Masters* Shooting Team

With the cooperation of the

Midland County Sportsman's Club

Training Agenda

1. Introduction

Cebula

1. Welcome and statement of purpose
2. Introduction of coaches and instructors
3. Review of agenda, and plan for the day

2. Equipment Overview

Gross

3. Fundamentals

Cebula

4. Prone Position

Hoham

5. Reloading

Cebula

6. Wind reading

Church

7. Conclusion – Questions

Cebula



Equipment Overview

Ray Gross

Equipment

- Rifle
- Sights
- Jacket
- Sling
- Matt
- Spotting Scope
- Glasses
- Miscellaneous

Rifle

- Three types are legal in United States Competition
 - Service Rifle (not recommended)
 - Palma Rifle (recommended)
 - Any Rifle (recommended with reservation)

Sights

- Aperture rear sight with adjustable iris
- Aperture front sight with adjustable iris
- Lenses
 - Available front, rear, and both
 - Front is not typically recommended for shooters interested in making the U.S. Team

Jacket

- A heavy leather jacket is recommended.
- Manufacturers include:
 - Creedmoor Sports
 - Champions Choice Shooter Supplies
 - Champion Shooter Supplies (sells coats under the Freeland name)

Sling

- Comfort is paramount
- Recommend a sling that is 40 mm in width
- A variety of manufacturers

Matt

- Water proof on the bottom
- Non-slip surface on the upper part for stability
- Light weight

Spotting Scope

- At least 20X
- Stand to allow seeing through scope without breaking position. Manufacturers include:
 - Freeland
 - Ewing
 - EKL
- Straight or 45 degree eyepiece
 - Either will work
 - Many good long range shooters prefer 45 degree because it is easier to look through the scope while the rifle is shouldered.

Glasses

- Don't shoot without safety glasses, not even your .22.
- If you don't need glasses, purchase safety glasses.
- For glasses find a Doctor that understands the requirements of a shooter.
 - We can recommend Lawrence Hoffman, M.D. (248) 478-8990
 - Typical correction for middle aged shooter's glasses is one-half of your bifocal less .25 diopter
- For the middle aged, consider rear sight lenses, they are available from B. Jones Sights in Phoenix, and others.

Miscellaneous

- Wrenches for your sights, rifle, scope stand
- Rain suit
- Timer or Stop-watch
- Sun-block
- Hat (with the floppy side shields)
- Something to carry it all in



Fundamental-Foundation

- What is a Fundamental?
- The five fundamentals of rifle shooting:
 - Aiming
 - Breath Control
 - Hold Control
 - Trigger Control
 - Follow-Through

Ai ming

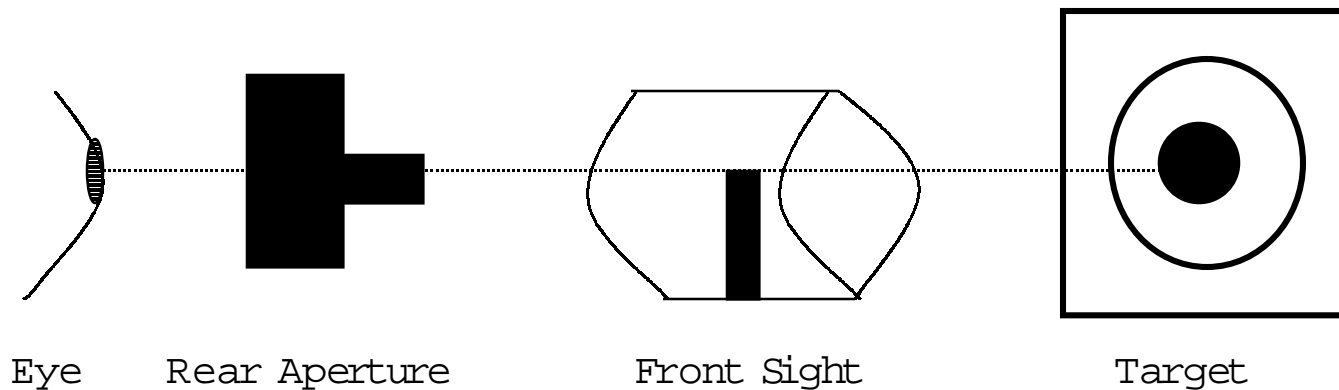
- Eye Dominance
- Sight Alignment
- Sight Picture

Eye Dominance

- What is eye dominance?
- What is its importance?
- Eye dominance exercise:

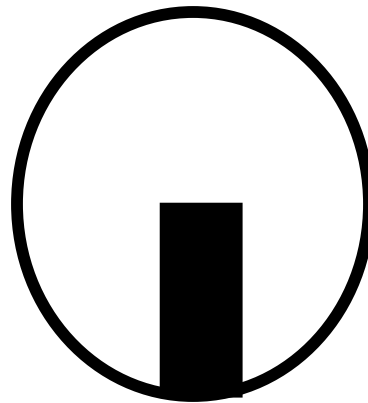
Aiming

- What is meant by aiming?
 - Eye
 - Rear Sight
 - Front Sight
 - Target



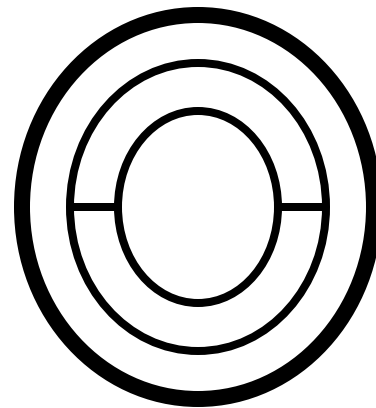
Sight Alignment

- What is sight alignment?
- With a Post Front Sight:



Sight Alignment

- With an aperture Front Sight:

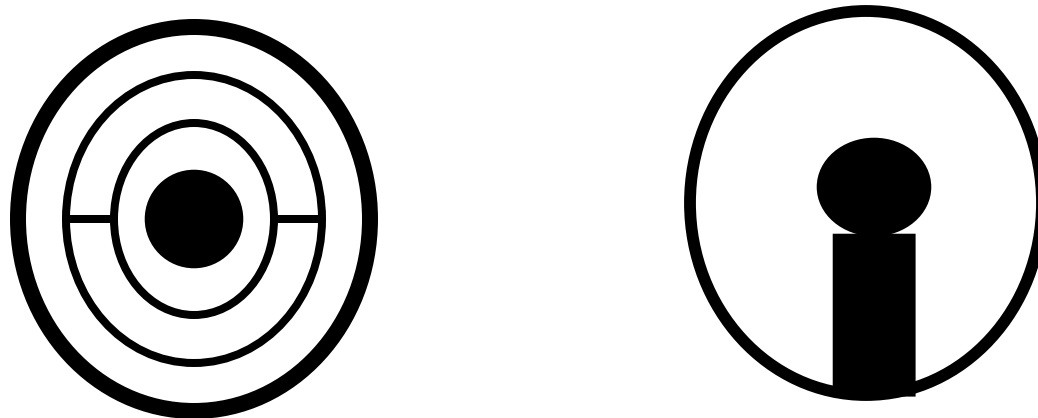


Head Position

- What is eye relief?
 - Correct eye relief is between 3 inches to 5 inches distance from the eye to the rear sight.
- How do you preserve correct eye relief?
 - Stock Weld
 - Spot Weld

Sight Picture

- What is meant by Sight Picture?
 - Sight picture is created by adding the target to the rear sight and front sight arrangement created by Sight Alignment.



Sight Picture

- Mechanics:
 - The front sight aperture should appear approximately 1.5 times the size of the target.
 - With a 30 inch barrel a typical shooter should start with a front sight aperture of about 3.2 mm for 600 yards, 3.0 mm for 800 yards, 2.8 mm for 900 yards, and 2.6 mm for 1000 yards.
 - Rear sight aperture size should vary with the amount of light available.
 - Good light: 1.0 mm
 - Poor light: 1.3 mm or larger
 - The rear sight aperture should not be adjusted to provide more or less light around the front sight globe. If the ring around the front sight globe is too small, move the rear sight towards your eye. If it is too big, move it away from your eye.

Sight Picture

- Filters:
 - Very Bright Light: Use Gray filters in varying degrees. Adjust the rear sight iris to compensate for reduced light.
 - Normal Light: Use Yellows, Greens or even Red. These filter out blue light, and improve visual acuity.
 - Haze or Fog, but light: Use Yellows, Greens or Reds.
 - Dark: Use no filter at all.

Blinder and Blockers

- What is a blinder?
 - A blinder can be used to occlude an eye to improve sight picture with the aiming eye.
 - It should be transparent. Your eyes work best when each gets the same amount of light.
- What is a blocker?
 - A blocker is used to eliminate random light rays from entering the eyes from the sides.
 - These can be attached to your glasses (be careful of fogging), or as part of your hat (generally does not cause fogging).

Breath Control

- The Normal Respiratory Cycle operations over an approximate six (6) second cycle that includes the inhale, and then the exhale leading to the next inhale.
- When firing the shot, we must interrupt the Normal Respiratory Cycle while firing.
 - It is recommended that you interrupt the cycle during the exhale, while retaining in your lungs the amount of air that you normally would have at the completion of the exhale phase of the cycle. Do not force air out, be relaxed and normal.

Hold Control and Trigger Control

- What is hold control?
 - Hold control is the act of eliminating movement to ensure that the rifle is as still as possible while aiming and firing the shot.
 - Hold control varies with the position
 - Prone hold control is limited by training, and then by breath control.
- What is trigger control?
 - Trigger control is the act of pressing the trigger back far enough without distributing the rifle.
 - The optimal point for contacting the trigger is the first pad of your index finger, towards its end. Leverage is increased by moving the contact point further down the finger towards the hand.

Follow-Through

- What is Follow-Through?
 - Just like a batter swinging a bat, the shooter must maintain breath and hold control until the bullet leaves the barrel.
 - Best results are to be had by accentuating the Follow-Through.

Integrated Act of Firing a Shot

- The Integrated Act of Firing a Shot is the combination of the fundamentals to execute firing the rifle perfectly every time. The steps are as follows:
 - Find your target, Relax and Breathe, stopping at your normal respiratory pause.
 - Aim, perfect your sight picture.
 - Hold, maintain your aim while watching the slow movement of your front sight on the target.
 - Squeeze the trigger, while maintaining your hold press on the trigger until the rifle fires.
 - Follow-through, accentuate your hold, and breath control until the bullet leaves the barrel.
- While firing in the prone position your mental focus should be on ensuring that you actuate the trigger without distributing the rifle.

Zeroes

- What are zeroes?
 - Mechanical Zero:
 - When your rear sight is set to no elevation, and centered for windage. On a service rifle all movements are from mechanical zero. On match rifle all movements are generally from an article mechanical zero.
 - True Zero:
 - True zero is the sight adjustments for elevation and windage to ensure that your rifle will strike the center of the target at a known range, with zero wind.
- When do you move your front sight?
 - Whenever mechanical zero windage is more than 1.5 minutes from True windage zero.

Score Books

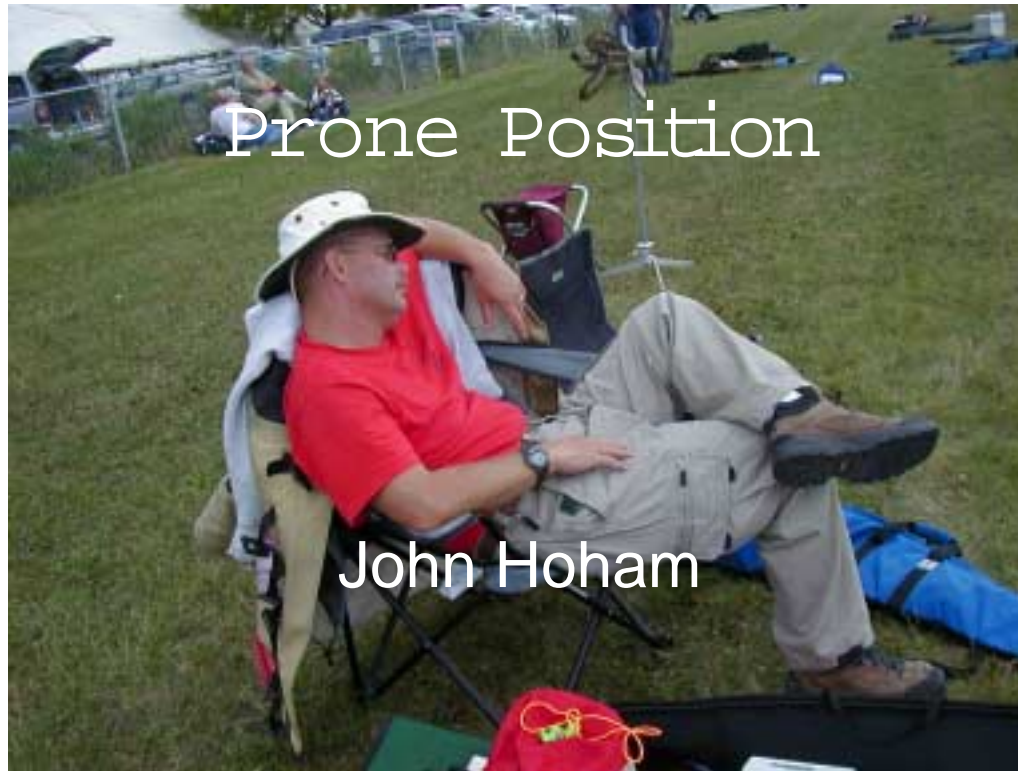
- For new shooters they are recommended.
- To be effective a simple strategy must be followed:
 - Fill out the general section regarding date, place, time, weather and sight adjustments prior to moving to the line. As you adjust your sights for next stage of the competition fill out the information regarding the elevation and windage zero you will be using (True Zero).
 - Calculate the wind that you will be using for your first shot. Record that in the first shot box.

Scorebook Strategy

- Strategy continued:
 1. Fire your first shot, check the wind to see if it has changed, and call the shot.
 2. Reload, mentally note the location of the shot, make any adjustment necessary.
 3. Check the wind, and adjust, if necessary.
 4. Fire your second shot, check the wind, and call the shot.
 5. Plot your first shot in the score book.
 6. Repeat from #2, until you have completed all shots.

Conclusion

- What are the five elements of the integrated act of firing a shot?
- Do you have any questions?



Prone Position

- Goal: Provide a clear understanding of the position used to deliver a shot accurately to the target.



Prone Position

- Overview
 - Basic Position
 - Head Position
 - Controlling Recoil
 - Spotting Scope Position
 - Loading the rifle
 - Fine Tuning



Prone Position

- Elements of the basic position
 - Body angled 15 degrees from line of fire
 - Dominant leg drawn up
 - 75% of weight on non-dominant side
 - Forward elbow slightly outside the line of the bore
 - Spine straight
 - Shoulders perpendicular to spine
- Head Position
 - Head tilted slightly forward
 - Neck muscles relaxed
 - Eyes Level
 - Cheek piece support cheek bone, not jaw

Prone Position

- Controlling recoil
 - Why? The rifle begins to move at the same time the bullet begins to move. Therefore, your recoil effects the course of the bullet before it leaves the barrel.
 - A 0.010" variance in the exit point is enough to move the bullet from a center X to a 9!

- How do I control recoil
 - Consistent pressures are a must
 - Head pressure
 - Shoulder pressure
 - Grip pressure
 - Sling pressure
 - Recoil is primarily absorbed by the forward hand
 - Proper basic position promotes straight back recoil reducing muzzle rise.

Prone Position

- Spotting Scope Position
 - Goals:
 - Minimize disturbance of position
 - Minimize time to sights to spot the shot quickly
 - Type:
 - 45 degree is most recommended
 - Straight will work fine
 - Stand:
 - Sturdy to minimize vibration in the wind
 - Designed to get the scope close

Prone Position

- Loading
- Methods:
 - Taking the rifle out of the shoulder
 - Loading with the rifle in position
- Each has pros and cons
- You should learn to be proficient with each



Prone Position

- Fine Tuning
 - Adjustable Buttplate Assembly
 - Used to adjust length of pull
 - When raising or lowering the height of the position
 - To adjust position for slope of firing line
 - To adjust position for height of targets
 - Rotated to adjust for cant and stabilize rifle vertically
 - Adjustable Cheekpiece
 - Adjusted to provide consistent cheek pressure to compensate for sight elevation changes from distance to distance
 - Helps to position the head so that the eye is centered on the rear aperture

Prone Position

- Stepped front sight base
 - Allows for less changes in rear sight elevation when changing range distances
 - Allows greater range of elevation using the same rear sight
- Height Adjustable Front Sight
 - Allows rear sight to remain in relatively the same place for different distances
 - Reduces or eliminates the need to adjust cheekpiece

Prone Position

- Adjustable front sight aperture
 - Allows for quick changes in aperture size without danger of changing zero
- Adjustable rear aperture
 - A “must have” item
 - Allows compensation for varying light conditions
 - Allows adjustment for depth of field
 - Bypasses the eye’s own iris providing a false iris, that can be adjusted



Reloading

- Case Selection – Good Quality Cases
 - Winchester
 - Norma
 - Lapua
- Purchase a sufficient Quantity
 - Up to 30% more than you want to finish
- Sort into groups of one grain

Reloading

- Case Preparation
 - Check case wall variance and eliminate bad cases
 - Trim to length: For .308 trim to 2.00"
 - Chamfer mouth
 - Neck turn cases with more than 0.0015" variance, not thinner than 0.010"
 - Size either two stage or single stage with Redding bushing die
 - Check cases for concentricity
 - Debur Flashhole
 - Uniform primer pockets

Reloading

- Case preparation
 - Weight and sort into grain or less groups
- Bullet Selection
 - Needs to remain supersonic at required distance
- Bullet Sorting
 - Weight and sort into 0.1 grain groups

Reloading

- Priming
 - Hand or automatic priming tool
 - Don't use a press – too much leverage
- Powder
 - Weigh to 0.1 Grain
 - Beware of trickling with electronic scales
- Bullet seating
 - Use a high quality seating die (Redding, RCBS Forester)

Reloading

- Bullet Seating
 - Typically seat to touch or slightly engrave (0.005"-0.010")
 - Small caliber's (.22 or 6mm) may shoot better with a jump (0.020")
 - Palma Rifles may shoot better with a jump, too
- Soft Seating
 - Bullet is seated long with minimal neck tension to allow it to be pushed further into the case when closing the bolt
 - Compensates for throat erosion, bullet always touching rifling
 - May pull bullet out of case in a "Cease fire!" – Nasty

Reloading

- Testing
 - Test at the distance that you plan on shooting at
 - Accuracy is not a linear function: ¼ minute at 200 yards does not mean 2.5” groups at 1000 yards
 - Short range will eliminate bad ammo
 - Short range testing with a chronograph will provide an indication. Look for a small Standard Deviation – less than 10 fps



Wind Reading

- “You can only learn wind reading through experience”
- Fundamentals
 - Wind zero
 - Accurate shot calls
 - Accuracy of the rifle
 - Holding error
 - Record book

Wind Reading

- Where do you look?
 - Firing line
 - Mid range
 - Target

- Reading the wind
 - Direction
 - Full value
 - Quartering
 - Mirage
 - Winds less than 5 minutes of correction
 - Winds with more than 5 minutes of correction

Wind Reading

- Flags
 - Wind Direction
 - Wind Velocity
 - Which flag to use
- Establishing the Wind Parameters
 - Maximum correction
 - Minimum correction
 - Be able to change parameters during a string
- Wind Cycles
 - More velocity – shorter cycles
 - Less velocity – longer cycles
 - Higher velocity - steadier

Wind Reading

- Doping your first shot
 - Light Wind
 - Heavy Wind
- Determine the value of the shot that you will accept
- Firing the shot
 - Know how much wind you have on the rifle
 - Never fire outside of your established parameters without considering the consequence

Wind Reading

- Additional Techniques
 - Quartering winds – like a fish tailing wind
 - Determining wind parameters with sighters
 - Watching other targets
 - Listening to shooters and scorekeepers
 - Anticipation of what is happening next
 - Safe side shooting



Questions and Conclusion

Leo Cebula