Shooting Clinic, Alaska Biathlon – Anchorage

9 May 2009

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Session 8: Shooting Log, Wind Effects, Exercises

A. Shooting Log

1. Record of dryfiring, position holding, six basic shooting steps, mental exercises;

2. Record any changes you make to sight settings, front aperture, adjustments to sling or buttplate or cheekpiece or harness to compare to previous (lots of numbers, hard to remember them all) and possible effects;

3. Check the log every time you shoot – can allow you to determine what is affecting your performance and how,

4. Record conditions of the day - time, temperature, cloudcover, lighting, sun position, wind direction and speed (imagine a horizontal clock face with the target at 12:00 and firing point at the center; draw this with an arrow for direction and a small flag indicating speed in your log – see C.1 below), wind consistency, ammunition used - and compare your shooting to conditions/results for other days;

5. Even details such as the clothing you are wearing can be important - whether it is adequate for the conditions and any apparent effects it may have had (e.g., bulkier jacket for lower temperatures will change tightness of the sling, and potentially your position comfort and stability, and reflection of heartbeat in rifle movement, etc.);

6. Team situation: coach keeps record of basic information such as sight settings, rifle adjustments, and previous shooting results so they can be checked before a shooting bout or race, but you should not depend on others to record the many details that comprise an accurate and useful shooting record;

7. Also see notes on this topic, sessions 5 and 6.

B. Dryfire

1. Absolutely necessary: you can learn what to do at range sessions, but you need the repetitions of daily dryfire practice for the shooting process to become automatic;

2. You will get more from dryfire and holding practice than actual firing because you can get the required practice volume you need to improve (and the bonus is that it can be done at your convenience);

3. The bottom line: the amount of time you should make available for dryfiring depends on your commitment to your biathlon goals and desire to improve.

C. Wind Effects

1. Determining the wind velocity

- to determine the velocity in miles per hour estimate the angle in degrees a dry flag makes with its vertical flagpole (smaller, lighter wind flags are more sensitive, and those near the target line are more important to use than those near the firing line) and divide this by four; for example, if the angle is about 45 degrees (halfway between vertical or 0 degrees and horizontal or 90 degrees), the velocity would be about 10-11 mph;

- an alternative to using a flag to estimate the angle: with yourself as the vertical, from about shoulder level drop a small amount of fine dry grass, dust, light paper or fine dry snow (not very likely in Anchorage) and point to where it strikes the ground;

- when you return to the range after a course lap, if the wind is gusting so it is considerably different from when you zeroed your rifle, it probably is worth waiting 5-10 sec to see if it will return to something more similar to the zero period.

2. Wind value

- winds from 9:00 or 3:00 are termed a full value winds, so they will cause a maximum deflection of the bullet trajectory at a particular velocity;

- for example, if you've determined that a 10 mph wind from 3:00 or 9:00 moves the bullet strike of that particular ammunition 1", then it will require about 8 clicks of windage adjustment into the wind to move the strike back to the target center (recall that a biathlon rifle sight accuracy is ¼ min of angle at 100 yd = ¼"/click of adjustment, so at 50 yd or about 50 m it is 1/8"; see notes for sessions 4 and 5);

- if the wind is from halfway between 12:00 and 3:00 (i.e., about 1:30) it can be called a half value wind and would require only 4 clicks windage adjustment in the example above; strictly speaking, half value winds would be from about 10:30, 1:30. 4:30 and 7:30;

- winds from about 1:00, 5:00, 7:00, or 11:00 could be called quarter value;

- effect of wind from 12:00 or 6:00 (from in front of or behind the shooter) would be to make the bullet strike higher if from 6:00 or strike lower if from 12:00, but as a practical matter has virtually no effect in the short distance of 50 m – for example if the effect is 1/16", the minimum sight accuracy of 1/8" would not allow a meaningful correction to be made.

3. Vertical wind

- certain atmospheric conditions could result in the wind, after being forced upward by hitting a range berm, to enter the infield almost vertically, requiring some clicks of elevation to compensate; this is rather rare, the more typical situation being that the wind hits a berm and enters at a slight downward angle near the berm and levels out in the middle of the infield so the vertical component can be ignored;

- at the Kincaid range winds travel through or above forested areas before approaching the berms, so may not be affected as much vertically; in summer we often get winds from the southeast so they enter the range fron about 4:00 or 5:00 and are not much affected by berms.

4. Wind correction practice

- it may be useful for you to practice thinking through various combinations of wind direction and velocity that might occur at your range so when you are faced with such a situation during a race you won't need to spend a lot of time thinking about what sight adjustment to make.

D. Range Exercises

1. No-wind zero

- obviously the no-wind zero should be done when there is little or no wind (check tightness of sight attachment screws before you do this); once the no-wind zero is accomplished, mark the sight in some way where the zero mark on both elevation and windage knobs come to rest so you always know where the zero starting point is and where you should start each shooting bout;

- this should not be a permanent mark on club loaner rifles;

- also, you may not want a permanent mark on your personal rifle either since, although it is assumed that the no-wind zero is not going to change, it is possible some change in the rifle or your position might occur in the future that would require you to revise the no-wind zero and move the starting mark;

- after each shooting bout when shooting under the no-wind zero procedure, including each time you shoot during a race, you should return the sight to the zero position: this is to reduce confusion about how many clicks of correction you applied for the previous bout, which direction, and whether elevation, windage, or both; it is especially difficult to remember this during a race (during higher level competitions, a coach who has observed where your shots are hitting during the first of your two prone shooting bouts in a e.g. pursuit format race may feel you need to make a correction of the day's zero, not related to changes in the wind, and so will radio a coach on the course to tell you the correction – in this case you will have to remember the correction until you return to the range);

- in order to effectively use the no-wind zero when you return to the range from the course, you will need to know what effects specific value and velocity winds have on the strike of your shots.

2. Random targets

- have someone else randomly designate which of the five prone targets you will shoot at for each shot; this provides practice adjusting your natural point of aim for each shot;

3. Eyes closed drill

- after you have adjusted your prone position and natural point of aim and have stopped your breath, close your eyes for the trigger squeeze (can be combined with previous or following drills);

- this provides practice for trigger control;

4. Metal target prone with penalty loops for missed targets (try with previous drill)

- mix in some of these which will emphasize accuracy rather than speed on the range at this point;

5. Misses

- once zeroed for prevailing conditions, misses may result from natural point of aim not quite correct as you got into position, or some settling movement in natural point of aim after eyes are closed;

- or perhaps more likely, lack of good trigger control: if not straight back on increasing pressure of squeeze you probably will not be aware that the rifle moves as the shot fires;

- breath control should be a constant and not a source of misses, is yours?

- once again: into position → natural point of aim (hold) →breath out (hold) pressure on trigger to start squeeze →close eyes → finish trigger squeeze → follow through.

6. Get a partner and do a few rounds of the “Ball and Dummy” drill (see notes for session 7), applying the above.

7. Apply all the above (maybe not the closed eyes part!) in the standing position.