Dear Colleagues

**Relative errors of techniques and practices in rifle shooting**

**The Problem:** an observer walking behind the firing point and observing numerous shooters, would reasonably believe that the relative errors of all techniques and practices in use are fully understood. For example, there is considerable interest among shooters who use factory-loaded ammunition while the majority choose to hand-load. The latter have confirmed from testing, that the components and reloading procedures result in a significant reduction in group size, i.e. compared with that of factory-loaded ammunition.

The relative errors, indicated by the sizes of groups, achieved using all known shooting techniques would be expected to differ considerably. If rifle shooters knew which practices and techniques lead to the best scores, then it would be expected that a demand would exist. As well, there would be a rush to adopt techniques which offer the smallest errors.

Sadly, it appears that few shooters actually understand the relative errors of their techniques. If shooters were to examine and select the techniques which produce the smallest groups, then they could become leading shooters. Yet, most continue shooting without knowing the extent of the handicap that results from each of the techniques and practices they use.

This article describes a list of techniques and practices used by shooters, among which trigger-release to avert the tremor effect, offers by far the smallest relative error. It has been used by shooters for more than the past century. The technique enables shooters to gain such an advantage, that they may shoot highest possible scores of 50.10 (TR) and 60.10 (F Class). No other technique affords such an advantage. Yet, in the 2000s many shooters appear to have little understanding of the nervous system tremor, the effect it has upon shot release and how it may be circumvented.

**Discussion:** an observer standing behind the firing point is able to identify shooters who:

* upon taking their position on the mound, carefully place the supporting elbow directly in line with the shooter’s head and target, place the butt firmly into the shoulder, then make sideways adjustments of the left leg with forward-rearward movements of the navel, which results in the forearm being supported vertically upon the elbow directly under the rifle (so that the total weight of arm and rifle is supported on this elbow) (TR)
* while raising the rifle for each shot, confirm the natural point of aim with a half-closed eye and if necessary, adjust the position of the left foot and the navel before shot release (TR)
* apply a test of sling tension and readjusts the sling prior to starting a shoot (TR)
* discharge a dry shot or two prior to starting a shoot, memorising the required degree of care to release a shot which does not generate a tremor (TR, F Class)
* release each shot using the trigger-release technique to avert the tremor effect, pulling the trigger in two imagined trigger stages, the first stage fast and the second stage very slowly, taking no more than an extra 3 or 4 seconds than otherwise (TR, F Class)
* position the hand on the pistol grip, with no recoil absorbed by the thumb, the three large palm muscles are in contact with the pistol grip, while hand position is set by fingers 3 to 5, as near as possible the same for each shot (TR, F Class)
* interrupt a string of shots to discharge a dummy round, to re-assess the degree of care required to release a shot into the V-bull or X-ring (TR, F Class)
* upon releasing a shot, wait for the flags to return to the position estimated to be the likely wind strength for the next shot (TR, F Class)
* release shots without wasting time, in an effort to maximise the number fired while the wind remains at the same strength (TR, F Class)
* reload at the shoulder instead of lowering the rifle butt to the ground, enabling a greater number of shots to be released at the same wind strength (TR)

and other shooters, who handicap themselves as a result of:

* lying with one leg pulled up higher than the other and when necessary, adjusting the natural point of aim sideways by moving one leg, then the other, which inadvertently affects the position of the pelvic girdle (TR)
* supporting the rifle with the forward elbow as fulcrum, yet placed several cm to one side of the rifle stock (TR)
* taking a long time to aim and as a result strain eye muscles (TR and F Class)
* moving a leg or the pelvic girdle to regain comfort during the course of a shoot (TR)
* balancing upon both elbows and hence, try to reload with the elbow of the loading arm in the same position on the firing point and as a consequence, waving the rifle barrel at the sky above the line of targets (TR)
* trying to hold the rifle dead still, with the muzzle clearly seen to move while aiming (TR)
* stopping their shoot to converse with the scorer (TR, F Class)
* catching each empty shell upon unloading, then placing it in a container with other shells (TR, F Class)
* quickly turning the head upon releasing a shot, to look at the electronic screen (TR, F Class).

Techniques and procedures omitted here were unintended. Of all these advantageous techniques and handicapping practices, the only procedure which can result in 10 shots grouping within the V-bull (TR) or X-ring (F Class) is trigger-release from a dead still rifle barrel, using a degree of care which does not generate a nervous system tremor. All other shooting techniques and practices result in a group larger than the V-bull or X-ring.

A conscientious shooter could be expected upon learning of such a technique, to test the truth of this for him- or herself. There are of course complications when a shooter is convinced of the efficacy of a particular technique. It might be found for example that another practice, which occurs at the same time, can widen the group. This can occur using the trigger-release technique when the group is found to widen, a result of the thumb inadvertently positioned so as to absorb recoil at the pistol grip. This suggests that when testing a technique, it should be undertaken while observed and hence confirmed by several shooters.

**Practical**:  it is reasonable for a shooter to want to test the relative error of a particular technique. This should confirm that the technique does in fact result in all shots grouping within the V-bull or X-ring. As indicated above, there are interfering factors which can confuse such a conclusion.

Hence, it could be reasonable for a shooter to want to have all of his groups examined after every shoot, to identify the cause of any widening. Fortunately, many shooters today have a database available whether using the Hex or Ozscore systems. The images of shooters groups may enable clubs to routinely assist their members to identify interferences, which commonly occur as a result of:

* change of the natural point of aim due to muscular movements
* ineffective trigger-release from a too rapid trigger pull
* varying tension from the reapplied loading hand.

**Conclusion:** it appears that for much of the past century many shooters have not believed they are capable of grouping within the V-bull or X-ring. However, there are now many shooters who are returning to the well-known trigger-release technique to overcome the tremor effect. Many of these shooters are finding they can group as small as 1 MOA (TR) or 0.5 MOA (F Class), i.e. score 50.10 or 60.10.

Best regards

Geoff