PURE COLLIMATOR SIGHTS 2 Nov 95

Introduction

Pure collimator sights are those sights which produce by means of mirrors or lenses, a collimated image of an aiming mark. Unlike a reflex collimator sight, the pure collimator does not include any device or surface at which the collimated aiming mark is mixed with the target picture to produce a combined picture. The combination of the external image and the collimated aiming mark is produced by the mental action of the brain of the observer in combining the images from the left and right eyes.

Psychological effects

The left and right eyes of an observer are not permanently and rigidly locked parallel. Whilst they are parallel for distant objects, their line of vision for near objects can, and do, converge by as much as sixteen degrees..Moreover, they need not be parallel in the vertical plane (the tolerance on the parallelism of binoculars in the eye space is +/- 15' in the vertical and +/- 30' in the horizontal). These errors in parallelism are accommodated by the eyes over long periods without eyestrain. The eyes therefore can and do adjust to provide pictures on the retinae which can be fused by the brain.

However, if by external means the views are drastically altered either in size, shape or direction the brain cannot fuse them. The eyes may converge to try to obtain fusing; if a shot is fired with the eyes converged it will be well (and randomly) off for line; the firer is unaware that this is happening. When the brain then fails to fuse “retinal rivalry” ensues and the brain believes, and presents, one or other view i.e. the firer can see the target not the aiming mark or vice versa. The degrees of difference in the views give rise to varying effects; this shows in differing degrees of tolerance between observers in the time taken for the effects to become apparent. In addition, a proportion of the population do not have binocular vision and cannot use the pure collimator sight.

Type of engagement

Shooting at opportunity targets is usually less affected than deliberate shooting as the firer dwells in the aim for a shorter time. But the acquisition of the aiming mark for opportunity shooting is harder with a small aperture sight; the larger the aperture is made to make acquisition easier, the more the deleterious effects become apparent since the aiming eye sees less of the target scene (seeing the target scene helps to keep the eyes parallel).

Mortar sights

Pure collimator mortar sights are used satisfactorily because the aiming mark is at the top of the collimator and the aiming eye sees much of the target scene. However the target is not likely to be firing back at the mortar man and he has more time to lay.

Conclusion

Pure collimator sights, while they provide a cheap aiming means, do not give the rifleman confidence that he will hit the target when he wants to. Even though he thinks that all is well, he may find that the target has been missed. And then, when he is taking great care in aiming, suddenly either the target, or the aiming mark, has vanished.