



# RIFLE ZERO

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There has been a good deal of discussion recently — in print and otherwise — about the Army's marksmanship training program and whether that program is turning out soldiers who can shoot accurately. Judging from much of that discussion, it is not. And one of the major problems with the program seems to lie in the fact that the soldiers do not really know how to zero their rifles.

There is far more to zeroing a rifle than merely firing it on a 25-meter range to obtain a battlesight zero. Basically speaking, zeroing, as well as all other aspects of shooting, involves five components — ammunition, target, distance to the target, weapon, and firer. Because none of these are absolutes, though, the degree to which each varies from a theoretical norm has a certain amount of influence on the overall probability that a soldier will hit his target.

## Ammunition

Fortunately, ammunition is the least variable of the five components. The current service round, for example, the M193 5.56mm ball cartridge, is accurate enough so that it plays virtually no part in a soldier's hitting or missing a man-sized target. By Government specifications, the ammunition must fire a four-inch shot group or smaller at 200 yards. The round does that. In fact, it can be expected to fire a group with a mean radius of just over two inches at 300 yards when fired from a test rifle that

is secured firmly in place.

Besides, the ammunition is manufactured according to strict quality control standards, and samples from each lot are fired frequently so that its performance can be monitored. Great care is taken in packing, storing, and handling the ammunition to protect it from the effects of climate. An occasional faulty round might be encountered, but the vast majority of soldiers will probably never be aware that such faulty ammunition exists.

## Target

For the soldier in combat, his target will almost always be enemy personnel. There may be occasions when he will need to fire at something else, but usually his intention will be either to hit another man or to suppress that man's fire. The opposing soldier may represent a perfect target — standing erect and motionless 100 meters away — or he may be a target that is extremely difficult to hit — only a small portion of his body may be exposed, or he may be moving.

## Distance to Target

The distance to a target is a critical element, because the amount of error from a misplaced shot increases with the range and is influenced by three things. First, the simple deviation of a round from a straight line increases with the distance so that a round that misses dead center by three inches at

50 meters will be off by six inches at 100 meters and by twelve inches at 200 meters.

The second factor is the force of gravity, which affects the flight of the bullet more as the range increases, because as the bullet loses velocity it drops more over a given distance.

Finally, the most critical factor is the simple fact that a soldier in combat will seldom know exactly how far away his target is. On a known distance range a soldier is told the exact distance, and on a qualification range he can figure it out easily enough. But in combat he may miss a seemingly sure kill because he has not accurately estimated the range. All too often even experienced shooters misjudge ranges and miss their targets completely.

## The Rifle

The M16 rifle itself is another component that must be considered in any discussion of proper zeroing procedures. The M16 is capable of delivering its rounds on a target at the ranges at which a soldier can expect to engage an enemy. It is true that, mostly because of its light weight, short barrel, and loosely mated upper and lower receiver groups, it cannot fire the tight shot groups that a target rifle can. But it was not designed to be a highly accurate target firearm; it was intended to be an effective combat weapon, which it is.

It should be kept in mind, though, that any time a soldier is issued a rifle

must be familiar with it and aware of where his rounds will hit when he fires it. The only way he can do these two things is to get as accurate a zero as possible and to fire the rifle as often as he can.

### The Firer

But the soldier who is firing the rifle is by far the greatest variable in the zeroing process. To begin with, a rifle fits each person differently, and this alone causes each soldier to view a rifle's sights from a different angle. Each soldier is also built differently and assumes a position that is a little different from that of any other soldier when he aims his rifle. Some soldiers put their eyes quite close to the rear sight of the rifle when they assume a firing position; others do not. If a soldier does not position his eyes in exactly the same place on the rifle every time he sights, his rifle's zero will change, because there will be a change in the angle at which he will view the alignment of the sights. The aiming point on his target will also change.

Even with the rather obvious differences between soldiers and between rifles, there are still some widespread misconceptions about zeroing a rifle. Some people think it is possible for one soldier to zero a rifle for another. Some even think that an especially good marksman should be able to zero the rifles for, say, an entire platoon, when the fact is that a soldier cannot even use the same setting to zero two different rifles he plans to fire himself; he must go through the zeroing procedures for each one.

As a first step toward improving marksmanship, then, both trainers and soldiers must understand all of these variables and the ways in which they affect zeroing a rifle. Some other tips might also help. From tests conducted by the U.S. Army Marksmanship Unit (AMU) at Fort Benning, for instance, if a soldier is forced to take a new rifle and does not have an opportunity to zero it, he might be better off to center the rear sight as prescribed in Field Manual 23-9 and fire the rifle with it centered.

At the same time, there are other things a soldier should know. Although the Army's training centers teach otherwise, the AMU has said that it takes from 32 to 35 clicks to traverse the rear sight on an M16 rifle from the right to the left side. The training centers teach that there are only 32 clicks on the rear sight of any M16 and that the proper way to center it is to move it all the way to the left and count back 16 clicks to the right.

Since there can be a variation of at least three clicks from rifle to rifle — and possibly even more — the training centers are teaching our soldiers to use a technique that has a considerable degree of error built into it. When this error is added to those caused by the normal variations encountered from weapon to weapon, the probability of zeroing different rifles with the same sight setting becomes quite remote. Of even more concern is the fact that most soldiers in the Army do not know what this means to rifle marksmanship.

### NOT GOOD ENOUGH

There is no question that it is possible to hit a man 300 meters away with the M16A1 rifle, but "possible" is not good enough. We must attain something more. Our doctrine and our training programs must make certain that when a soldier fires his rifle he does so with a high probability of hitting what he shoots at.

All the factors mentioned earlier work against a soldier when he is firing; when other variables enter the picture his chance of a successful shot becomes even smaller. For instance, he may have to contend with wind, poor light, limited time to aim and fire, and fear or excitement. The very moment when all these things are working against him is the time when he most needs to be able to fire accurately.

Even if a soldier is firing under ideal conditions and is employing the fundamentals of marksmanship flawlessly, he will only hit what his rifle's sights and bore are lined up to hit. He may place all the rounds from a 20-round magazine within a 2-inch group at 300 meters, but unless the rifle is zeroed, that group will be off the target. And, of course, in combat he will seldom, if ever, have ideal conditions under which to fire.

This means that in his initial marksmanship training, and in all the training that follows, the soldier must be made aware of the importance of a properly zeroed rifle. He must receive his training and guidance from personnel who understand the subject well enough not to perpetuate misinformation.

The particular point that needs to be disseminated throughout the Army is that to be a good marksman, a soldier must zero each rifle he fires. The confusion on this point has given too many soldiers an unfounded and undesirable lack of confidence in their basic weapon, the M16A1 rifle.



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