Range Data – 07/10/22 Gun Thread

Over the last few weeks, we have talked a bit about elevation and windage in long distance shooting, and I have mentioned it's a good idea to keep notes on previous outings handy along with your rifle. Are you keeping notes? If not, why not? If you aren't recording data each and every time you go out, you are missing a really valuable opportunity to gather important information.

What sort of data am I talking about? Well, it can be anything really. Phone numbers of the hot range babes, weather information, lottery numbers, poetry, and oh I don't know, how about range to target and elevation? Let's review some basics.

The most significant factors determining a bullet's ballistic arc are velocity, bullet weight, and atmospheric conditions, and every pairing of rifle A and ammo B are going to produce different results. Period. Sometimes by a little and sometimes by a lot. You might not notice a big difference at 100 yards, but it will begin to make a difference as you move farther out. By 300 yards or so the differences will become so pronounced you might be missing the target altogether. As long as you are shooting the same rifle and the same ammo and practicing sound fundamentals, the rest is simply a math problem.

And I mean exactly the same rifle and ammo. If your buddy has scored a killer deal on surplus Czechoslovakian factory-second ammo, and wants you to try it, you're going to need to establish a zero first. There is no getting around this if you want to move from 100 yards to 200 yards and so forth out to say 500 yards and accomplish much besides wasting time.

Repeat after Weasel: Every time you change ammunition you need to re-zero your rifle if you plan on engaging more distant targets with any degree of success.

Begin each range session by checking your point of impact at the same distance which you zeroed the rifle and ammo originally. If the bore is clean, disregard the first couple of rounds as they will perform differently as the barrel becomes fouled. Why do this? Aren't the rifle and the ammo the same? Yes, but something else has more than likely changed, and that is the weather. Yep, atmospheric conditions play a part in the bullet's performance in as little as a few hundred yards. You may have been shooting out the center of the target last week, but today everything is going low by let's say an inch, and that one inch at 100 yards will become over five inches at 500 yds. By confirming your data at the same 100 yards, you can make adjustments to the zero before everything becomes a train wreck at 500 yards. By eliminating the atmospheric component first, you don't have to worry (much) about it later. With me so far?

Wouldn't it be nice if there was a way to take some of the work out of the process and get started sooner on impressing range babes? Well, there is, and this is where you range notes become useful. Say you take your favorite rifle and ammo to the range for an afternoon of shooting at distances out to 500 yards. You checked the zero at 100 yds and made the necessary adjustments, and now your buddy wants to go out to 300 yards. Let's go Hombre!

Except you don't know what to do with the little up/down and right/left knobs on the scope. Look at your damn notes! The last time you were shooting that gun and that ammo at 300 yds, you recorded 300/4.25 in your little notebook, and since atmospherics have now largely been removed from the list of

variables, you dial up 4.25 MOA, take the shot and clang the target! Woo-hoo! You thump your chest triumphantly and begin your happy dance behind the line. Want to go out to 500 yds? No problemo! Check your little notebook and find 500/11.0, dial up to 11.0 MOA and make that target look stupid too!

Beginning to see the value of range data?

Q: Weasel, what if I am unable to check my zero and really, really need to hit a 500-yard target on my first shot?

A: You're screwed.

Yep. I mean, you can try dialing up the 11 MOA, but chances are you're wasting ammo, and unless you are shooting into a large earthen berm you probably will not have a clue where the bullet is going. That's about the time you begin to spaz out and try to solve the problem with a large volume of essentially undirected fire, as the hot range babe looks at you with pity and disgust and begins packing her shit to get away from the pathetic spectacle you have become.

Geez - too bad there isn't a way to incorporate atmospheric data as part of your range data too. You know, somebody really should invent that.

Well, you're in luck. Airplane pilots and race car drivers, as well as shooters, also need a way to quantify and summarize changes in atmospheric conditions. The result is a measurement known as "density altitude" or DA, which affects things like the lift of a wing and the performance of an engine, as well as ballistics. Density Altitude is simply an expression of four measurable local elements; elevation, air temperature, atmospheric pressure and humidity, compared to those of a standard atmosphere. These are the factors that make the atmosphere more or less dense and change the performance characteristics of your bullet.

There is a nifty little device which I have recommended here approximately 74,218.3 times made by a company called Kestrel (https://kestrelballistics.com). The basic 5000 series will measure DA, and there are even models with ballistic functions.

Good News: With their Series 5000 models and up, you can measure density altitude whenever and wherever you like.

Bad News: The Series 5000 models begin at $269.

Badder News: The 5700 Ballistics models start at $400.

So now you're back at the range and the hot range babe hasn't left yet. Mom gave you a Kestrel for your birthday, in the hope you will one day get married and move out of the basement, and you have been recording DA along with range to target and elevation data for a couple of months. All you need to do then is to find a previous measurement close to your current conditions and you have your elevation data, and with that, you stand a fairly good chance at a first round hit on a 500-yard target.

Is that important to you? Is it worth $300, $400 or more? Well, it depends on how interested you are in making a first-round hit. You might not be interested in making that investment, and that's OK. Not everyone wants or needs that level of precision, but it's nice to know the options exist. Every single time you shoot your rifle, note the ammo used, distance to target, and the elevation data.

I always recommend, insist really, that shooters have a good working knowledge of ballistics and be able to engage targets based on data collected from previous engagements. All the earlier stuff is related to elevation only with no mention of windage (yet), where a different set of processes exist in terms of estimating wind speed and direction and converting those to a firing solution. These are things you really need to be able to do quickly in your head and without using an app or other ballistic aid to come up with the correct answers. Conditions change constantly and you simply cannot spend precious time fumbling around with gear to compute the effect of wind. When I am spotting for a shooter, I tell them if they have not taken the shot within three seconds of my wind call not to bother pulling the trigger because I need to re-compute the firing solution. Having help is fine, but there may come a day when you want or need to take an important shot quickly.