

LEAD RECOIL VS. STEEL RECOIL

Dear Technoid,

I love your column and am so impressed to see someone in the shooting industry who is not afraid to express their views/opinions, while actually being able to back it up with experience and objectivity.

My first question to you is- Since steel shot weighs less than lead, why is it that I hear so many shooters complain of excessive recoil with steel shot?

I hear both the public and gun writers who should know better talking about the elevated recoil levels of steel shot, and how it is yet one more reason to dislike the use of steel. I have always felt that steel shot is actually quite soft shooting.

For example, the max load of a 3" 12 gauge shooting steel shot is 1 3/8 oz. at 1265 fps. This is considerably less than max loadings possible for both lead and bismuth. Shouldn't a 2 3/4" 1 1/2 oz. lead load at 1260 fps. have considerably more recoil?

I offer as proof the fact that Remington sells 3" chambered steel shot barrels to be used on 2 3/4" receivers for their 1100's. They know that any 3" steel load won't put any more wear than any heavy lead 2 3/4" load can.

Since most hunters shoot 1 1/8 oz. steel loads at 1375 fps., I would think they would all rejoice about the softer recoil of steel. Yet I've never heard this fact mentioned anywhere by any gun writer.

Steel shot may be ballistically inferior to lead, but doesn't that also lead to less recoil? Lead can't have it both ways- less recoil and more penetration?

Regards,

Tom.

Dear Tom,

Thanks for the kind words. As to commercial (more successful) gun writers, they write for magazines that actually carry paid advertising. They have to work around this to keep the publisher and advertiser happy. It really doesn't do much good to say that the latest Remington O/U is a real pig when Remington has just bought four pages of ads in your magazine in order to advertise it. At Shotgun Report we are poor, but forthright. That said, also remember that my opinion is only that of one person and that reasonable men may differ. Unreasonable men too. Most of my knowledge came from doing something wrong a few times before I got it right.

As I see it, there are two types of recoil: Free recoil and subjective recoil. Free recoil is 100% mathematical computation and can be quite precise. Unfortunately, it does not take the human body into account. Subjective recoil reflects how the human body responds to free recoil and is very difficult to measure accurately. Subjective recoil is based on stock fit, type of gun action, interior barrel design and that sort of thing. Since subjective recoil varies from person to person and cannot really be measured accurately, I will concentrate on free recoil, which can be measured.

The formula for free recoil does not care whether you are shooting steel or lead. It only cares how much your ejecta (shot, wad and powder) and gun weigh and how fast it all leaves the muzzle. It also requires a constant for the speed of the powder gas. That's it. The rest is pure math. I would give you the formula, but this mail editor will not handle all the little symbols and stuff. I am sure that the Lyman Shotshell Reloading Handbook carries it somewhere, as does just about every other gun book.

One ounce of steel, lead or bismuth leaving the muzzle of an 8# gun at 1200 fps will all have exactly the same amount of free recoil if they use the same weight of powder. They almost certainly will not use the same weight of powder, but the difference in recoil caused by this is very slight. The problem with steel is that it is often driven at high initial speeds due to its miserable terminal ballistic performance. Often the speeds are significantly higher than lead. Increases in speed increase free recoil significantly. Of course the weight of the charge is lowered slightly, but not as much as the speed is increased. That is why most steel kicks more than lead.

Remember though that the formula for free recoil is just that- free recoil. When you bring a human being into the equation (something for that gun to recoil against) human perception is factored in and you are dealing with the elusive subjective recoil. Free recoil does not care about gun fit or face slap. It does not care whether the powder is slow burning or fast burning (just how much of it there is- more slow powder is required than fast powder, so slow powder ALWAYS has a bit more free recoil than the fast if velocity remains the same- it is built into the formula). Some shooters claim that slow powders give them more of a shove than a kick, but that is very subjective and I have not found it to be so for me in every case.

Gas guns have exactly the same amount of free recoil pound for pound as fixed breech guns, but most people subjectively find gas guns softer shooting. This is because the gas gun spaces out the recoil into basically two recoil pulses. The fixed breech gun whacks you all at once. Total free recoil is the same, only the way that it is delivered differs. If you graphed it, the areas under the curves representing free recoil for the O/U and the gas gun would be exactly the same, but the shape of the O/Us recoil curve would look like a traffic cone, while the shape of the gas gun's curve would look like a Bactrian (two hump) camel's back.

Confused yet? Me too.

Regards,
Bruce Buck
Shotgun Report's Technoid