
▼ A fixed-breech shotgun offers no inherent forgiveness when it comes to recoil. For these guns in particular, a perfect fit and a comfortable recoil pad on the buttstock will go a long way toward improving comfort.



Reduce Recoil With The RIGHT GUN And Load

Nothing causes your scores to tank faster than a sore shoulder. With the right combination of gun and load for your body size, you can keep recoil to a minimum.

BY TOM ROSTER

Recoil is the number one negative inhibiting and suppressing shotgunners' scores. On top of that, recoil is the number one phenomenon making shotgun shooting uncomfortable for light-bodied shooters — youth and women especially — turning them off of clay target shooting. If you personally want to improve your scores and the clay target shooting world wants to increase recruitment, we all need to recognize the ugly reality of recoil. And then *do something about it*.

First, consider scores. Once recoil becomes a big enough negative to your shooting that you begin involuntarily flinching — shoving your shoulder forward, lifting your head from the gun or closing your eyes at the moment of pulling the trigger — from that point forward you will never improve on your scores at clays or afield. At that point you need to take serious steps to reduce recoil.

▶ Shot charge weight is an important factor in load selection. Going from 1½-ounce to 1-ounce (or smaller) shells will save you a significant amount of free recoil during the course of an event.



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UNDERSTANDING ACTUAL (FREE) RECOIL

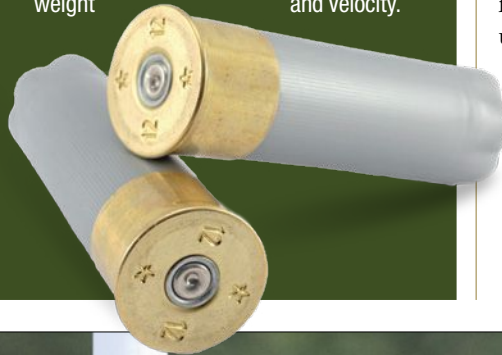
If we're going to conquer recoil, we have to first understand how recoil works.

All recoil in shotgun shooting originates in the shotshell itself.

Actual or free recoil is a simple, inescapable phenomenon of physics — for every action there is an equal and opposite reaction. The action in a shotgun involves accelerating the weight of the ejecta (shot charge plus wad) out of the barrel. The reaction (recoil) is the resulting force generated in the opposite direction toward the shoulder and face. It is proportional to the launch-velocity speed and the weight of the shot charge.

All recoil force is transferred to the shooter through the gun. The heavier the gun, the less recoil reaches the shooter. If the gun has a gas-operated autoloading system, then it bleeds off some of the recoil force, and even less recoil reaches the shooter.

Actual recoil can be reduced by shooting lighter and slower loads. If you want to know how to calculate actual recoil, go to *Hodgdon's Basic Reloader's Manual*, available free from Hodgdon at www.hodgdon.com, phone (913) 362-9455. In it you'll find an excellent little explanation on the effect of recoil caused by shotshell loads versus gun weight. It also presents the most common formula used by the shotgunning industry for calculating recoil when shooting a shotgun. The formula takes into account all the factors involved, including gun weight, weight of the ejecta, powder weight and velocity.



Second, consider recruitment. Once most 150-pound-or-lighter beginning shooters start experiencing pain when pulling the trigger, unless immediate mitigations are put into place to reduce the actual and felt recoil of their gun/load combination, they soon drift away from the sport. And there goes another potential member of NSSA-NSCA. It can even stop their shotgun shooting altogether so that local ranges lose the benefit of active shooters practicing and engaging in fun shoots at their club.

What about those really good, champion shooters grinding up thousands of targets a year, absorbing all the recoil of heavy, fast loads even in fixed-breech shotguns such as over/unders, without seeming to have trouble with recoil? The answer

▼ Gas-operated semi-autos mitigate some of the recoil via the action, allowing you to shoot slightly faster loads without an increase in felt recoil.



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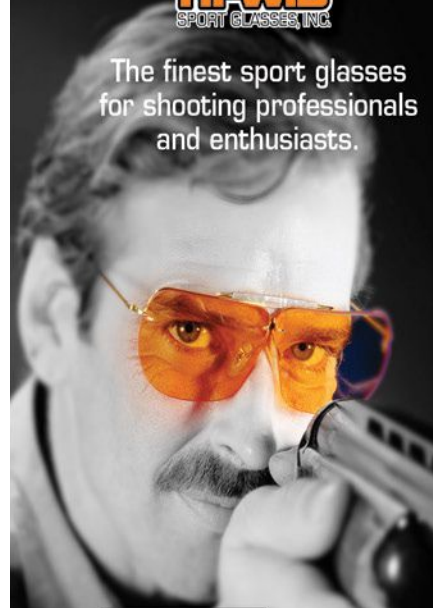
▲ Ammo selection is also about velocity — faster loads generate more recoil. If you really want velocities higher than 1,200 fps, try stepping down the weight of the shot charge.

is: Look at them. Most of them are heavy-bodied men weighing nearly or over 200 pounds. Few approach the 150-pound-or-less body size that suffers most from recoil. So it's their bodies and weight that make recoil less punishing for them. If you don't have as heavy a body as theirs, you're going to have more trouble with recoil. And this is especially true as shooters age. Thus two undeniable facts: Light bodies and older bodies are simply more sensitive to recoil.

Since the shotshell is where harsh recoil originates, let's look at what factors in a given load cause the recoil. First, velocity: Every 50 fps increase in velocity of shotshell loads has a significant effect on increasing recoil. Let's say you're a 12-gauge sporting clays shooter toting a typical sporting clays-type over/under shotgun that weighs close to 8 pounds. If you're shooting a typical 1½-oz. lead load with an instrumental velocity of 1,145 fps, that load in your 8-pound gun is generating about 19.86 ft./lbs. of free recoil; let's call it 20 ft./lbs. This means during the course of a 100-target event, you're going to be absorbing almost one ton of cumulative recoil!



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◀ A smaller-built shooter can effectively handle about 16 ft./lbs. of free recoil. Higher than that, and scores start eroding as the day goes on.

I've kept the scores of hundreds of shooters using 8-pound or nearly 8-pound fixed-breech shotguns, and their scores over time tell me that 20 ft./lbs. of free recoil is about all any 200-pound shooter can repeatedly withstand in a 50- to 100-target event without having scores begin to erode. If you weigh less than 200 pounds, your scores will be negatively affected by even 20 ft./lbs. of recoil. If you weigh about 150 pounds, you're not going to be able to handle much more than about 16 ft./lbs. of free recoil throughout a typical sporting clays shoot.

And if you're a 150-pound shooter but you're shooting a gun lighter than 8 pounds — gas-operated autoloader or not — you're not going to be able to handle even 17 ft./lbs. of free recoil. For every pound less in gun weight you are swinging, your shotshell load is going to be transferring significantly more recoil to your body. So, you're not going to be able to handle a 1½-ounce load at even 1,145 fps very well. You're going to need to be shooting 1 ounce or lighter loads at very modest velocities. You'll see why in a minute.

With 20 ft./lbs. in mind as the maximum free recoil most 200-pound shooters can withstand, let's look at what happens when we

UNDERSTANDING AND REDUCING FELT RECOIL

Felt recoil is simply the amount of recoil force felt or perceived by the shooter. It is not a calculable or measurable phenomenon like actual recoil, because individual shooters have uniquely individual sensitivity levels to recoil, and some of the factors that make up felt recoil are impossible to measure. So in reducing recoil, besides reducing the actual recoil force generated by the shotshell by going to lighter and slower loads, there are other options a shooter can employ to reduce the felt recoil sensation he or she must deal with.

Next to increasing gun weight, in my experience the most important step is to employ a good, thick recoil pad on the butt of every shotgun. This cushions the recoil blow significantly, causing it to be felt as more of a soft push than a sharp rap. A proper recoil pad absolutely eliminates any bruising of the shoulder.

A second important option is to be sure the gun fits properly. With regard to felt recoil, the most important variable is length of

pull. Too short a length of pull causes the trigger-hand thumb to smash into the nose.

Third, much of each shooter's sensitivity to recoil is reaction to the muzzle blast or the loud sound made by the shotshell ejecta as it leaves the muzzle. Good hearing protection is imperative; it will help eliminate flinching from muzzle blast and protect one's hearing from erosion over time.

Fourth is to be sure not to shoot any shotgun with a sharp comb. A rounded and wide comb is good, while a sharp and narrow comb will cause the stock to bite into the cheek.

Fifth, padded shoulder panels help some shooters.

And lastly, the most recoil-sensitive shooters benefit from "hydracoil" type devices which in effect put a mechanical or pneumatic spring between the butt of the gun and the shoulder.

How about porting? Ported barrels and screw-in chokes do not reduce the rearward thrust of recoil. But if properly installed, ports can mitigate slightly the recoil-caused upward jump of the gun.



◀ Every shooter could significantly reduce recoil, especially during practice, by going to ¾-ounce lead 28-gauge loads. Even at 1,300 fps, this load is still comfortable to shoot for even light-bodied shooters.



increase the instrumental velocity of that 1 $\frac{1}{8}$ -ounce load in that same 8-pound gun by 50 fps increments. At 1,200 fps that same load delivers about 21.5 ft./lbs. of free recoil, at 1,250 fps about 23 ft./lbs., and at 1,300 fps almost 25 ft./lbs. of free recoil through the same 8-pound gun. Now that's brutal.

Secondly, realize that the weight of the shot charge in any given shotshell load con-

tributes more to recoil than velocity. So the lighter the weight of the load you're willing to shoot, the less recoil you'll have to deal with. If you believe you just have to have velocities higher than 1,200 fps, a smart move would be to go to 1-ounce loads in the same 8-pound gun. For example, at 1,300 fps, a 1-ounce load would only be transferring about 20.41 ft./lbs. of recoil to

◀ Your body size is a major factor in how much recoil you can handle before your scores begin to suffer.

your shoulder and face through the same gun. It's what you have to do if you want to shoot 1,300 or so fps target loads and not have them erode your shooting.

Now, if you are willing to shoot

1-ounce 12-gauge loads at no more than 1,200 fps, you're well down below 20 ft./lbs. of recoil. A $\frac{7}{8}$ -ounce load at 1,200 fps gets you below 15 ft./lbs. of free recoil. Now you're entering the zone of comfortable shooting for even 150-pound individuals. And my records show the best scores over time tend to be shot by shooters dealing with less than 16 ft./lbs. of free recoil.

That's why shooting $\frac{7}{8}$ -ounce 20-gauge loads at 1,200 fps in even light, little 6 $\frac{1}{2}$ -pound guns is so comfortable: You're only dealing with about 15.4 ft./lbs. of free recoil from that gun/load combination. Drop down to a $\frac{3}{4}$ -ounce 1,200 fps lead load (which would be a typical 28-gauge load) in a 6 $\frac{1}{2}$ -pound gun and you're only dealing

◀ Excessive free recoil will eventually fatigue any shooter, regardless of strength and experience. Fatigue leads to missed targets. It makes sense to do everything you can, within reason, to mitigate recoil.

with about 11.5 ft./lbs. of free recoil. And that, my friends, is a recoil level any man, woman or child with a body weight of 125 pounds or more can comfortably shoot 100 rounds a day — several days a week — and never develop recoil-related flinches or the desire to give up shotgun shooting.



▲ For every pound less in gun weight you're swinging, your body is absorbing significantly more recoil.

In sum, the wise shooter seeking to reduce recoil should shoot light, modest velocity (\leq 1,200 fps) loads whenever possible, especially for practice. If you want to make the jump up to 1,300 fps, make sure the load is no heavier than $\frac{7}{8}$ -ounce, and $\frac{3}{4}$ -ounce would be even better. **CTN**

► For answers to questions or for a list of any of Tom Roster's shotgunning books, instructional shooting DVDs or other shotgunning consulting services, contact him at (541) 884-2974, tomroster@charter.net.

