

YOU ASK THE QUESTION

QUESTIONS & ANSWERS

...WE ANSWER!



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EACH ISSUE, OUR PANEL OF EXPERTS, GUNSMITH **BOB JAMES**, BALLISTIC EXPERT **TIM WOODHOUSE** AND COACH **WILL FENNEL**, WILL ANSWER YOUR QUESTIONS

● **I HAVE AN O/U WITH DROP OUT TRIGGERS WITH WHICH I SHOOT SPORTING CLAYS COMPETITIVELY. THE STOCK KEEPS CRACKING BEHIND THE TRIGGER GUARD AND/OR TOP TANG. I HAVE REPLACED IT 4 TIMES IN 2 YEARS. WHY IS THIS HAPPENING? WHAT CAN I DO TO FIX THIS PROBLEM?**

Bob says

First, let us have a firm understand of what is going on. Our guns that are built today are better than ever before. We have better steel, better design, better machining and better finishes. We understand more about wood to metal fit. We still have a decent wood supply by which to manufacture fine guns. Our major problem is more rounds than ever before are being shot through today's guns. If we are shooting competition, we will shoot a gun more in 6 months than a fine hunting gun will be shot in two life times. This equates to punishment, and lots of it. Yet, we see some of these guns last for a lifetime of competitive use. So my



hat is off to some of those fine gun makers. They have met the challenge and are continuing to improve. That said, it does not mean we aren't having problems and won't continue to. We will continue to find answers to resolve problems.

So what happens when we fire a round in our gun? Each time a 1 1/8 oz shell goes off, there is 750lbs of force that strikes the face of the receiver. The majority of this energy is taken up in the mass weight of the gun. What happens each time we fire the gun is that the 750lbs of force is topped by the wood where it joins the metal – wood to metal fit. Over a period of time and rounds, this action causes something called “set back”. It will actually drive the metal back into the wood, thus prying the grain apart or creating a split. Wood is constantly changing, depending on many factors, and that is why each piece of wood needs to be hand scraped and fit to each receiver. Guns are designed to transfer the recoil load to the wood (i.e. Recoil bar at the back of the receiver. This area has more wood mass and will accept the recoil longer and



better). The thin slabs, cheeks or sides, that protrude along each side of the receiver to mate with the receiver are thin and vulnerable. With drop out triggers they are even thinner than on non drop out trigger guns. Therefore, they cannot carry as much shock or load. When we truly understand the abuse the wood takes from 20 or 50 thousand rounds, I am in awe that this is even possible.

Due to the many designs in metal and the many variants in wood, it becomes very difficult to mass produce stocks where each stock has been hand selected or rejected for each specific job. Most manufacturers have found a wood type and have selected specific grain flow that they find acceptable for the job. They set parameters and if the piece of wood falls within those parameters it is used. I feel that most quality gun makers have done a good job. However, this method can introduce a bad piece of wood on a fine gun and we then have problems.

So back to the problem and how do we fix it? Over the last fifty years, I have studied and fought these very problems but still do not have the “perfect” answer. However, here are some things that certainly do help. Wood selection is priority #1. The fitting of the wood to the metal is next. We know we are going to get set back – we can’t stop it, but we can slow it down by the way the wood fits the metal. I have found that a

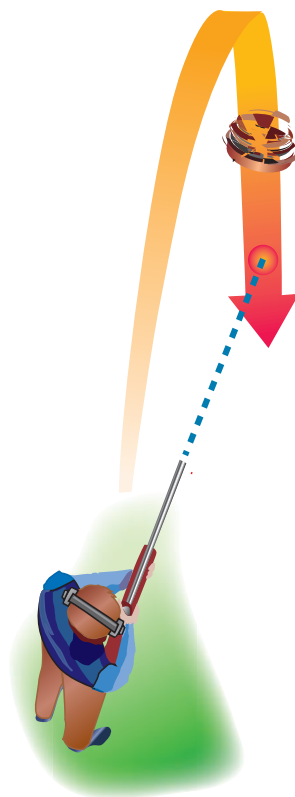
glass bedding or Devcon liquid steel bedding (like we use on a rifle) will help slow down this process. Through scraping and removing some of this material, we can now load certain portions of the stock and put the load where we want it. Although the cost is a little more, I have found it is truly worth it. All in all, I would suggest you have a competent gunsmith do the job. It may not guarantee total success, but it will give you the best chance of success. I hope this information has been helpful.

● **I’M A C CLASS SHOOTER AND MY NIGHTMARE TRUE PAIR IS A RISING TEAL AND CROSSER. CURRENTLY I ALWAYS OPT TO TAKE THE CROSSER FIRST (IF I MISS I TAKE A SECOND SHOT) SO I CAN GUARANTEE A 50 PER CENT SCORE. TAKING THE CROSSER FIRST MEANS I ALMOST ALWAYS HAVE TO SHOOT THE TEAL ON THE DROP, OFTEN RESULTING IN A MISS. WHAT TIPS DO YOU HAVE FOR DROPPING TEAL TARGETS?**

Will says

First, you should work diligently on mastering teal on the way up, at the top and on the way down. Target setters are going to put you in situations where you will have to shoot teal differently, so you might as well learn them all.

But, you asked about droppers, so here we go. Look on the bright side, you should be able to see the target well – it will be showing full face or belly as it falls, and it will be ABOVE your barrel at the shot, so there will be no difficulty seeing the bird. Physics dictate that the bird will pickup speed as it falls, so the earlier you can take it in its drop the slower it will be moving.



All things being equal, I like to take a dropper in the first third of its fall, before it picks up too much speed. Other advantages are that usually this target is up in the sky, and away from background changes that can rob you of your focus on the clay.

Insert the barrel just below the clay, match the speed briefly until it comes into sharp focus, and give the bird some pull-away. Remember, unlike most crossers or rising teal, this bird will be ACCELERATING, not DECELERATING, so your pull away will have to be slightly more aggressive. Keep your focus on the

target until your subconscious delivers the shot. Practice this, and you will soon look forward to droppers.

● WHY DO GAS OPERATED SELF-LOADERS HAVE LESS RECOIL?

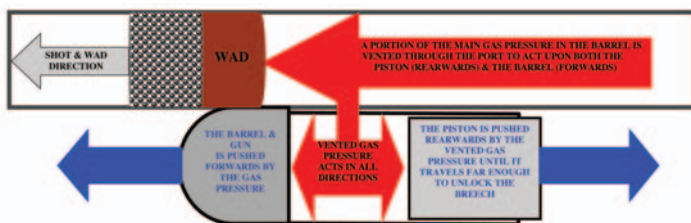
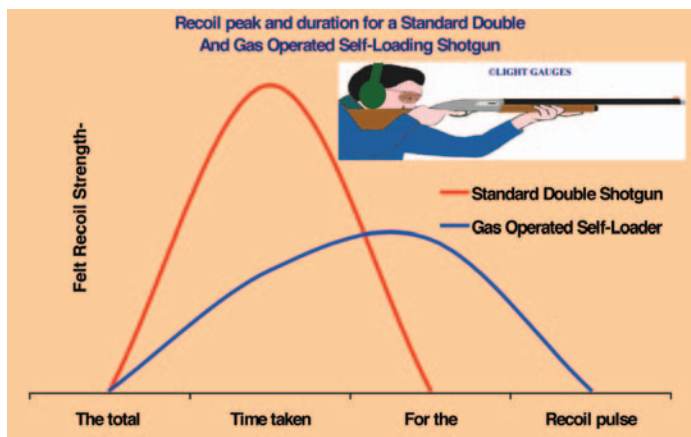
Tim says

All self-loading shotguns use an element of the recoil, or gas pressure of the load, to recycle the action and feed a fresh shell into the breech. Firstly, and most importantly, the breech must be kept closed until the gas pressure within the barrel has dropped to a safe level. All of the various mechanisms in use today have to delay the breech opening before their cycling can occur.

The gas operated action vents off the high-pressure gases via a port (or ports) in the barrel wall, at a fixed point from the breech. This high-pressure gas is fed downwards where it then acts upon the forward part of the barrel piston shroud (which is attached to the barrel) and on to the front of a piston. The forces of this vented high gas pressure act equally in all directions, pushing the piston shroud (and barrel/gun) forwards, and set the piston in motion in a rearward direction. It is this initial rearward movement of the piston that unlocks the breech. Further rearward movement of the piston pushes the breech block open and ejects the fired case.

The shot and wads are well clear of the muzzle before the piston is able to unlock the breech-block. This is due to the inability of these fairly substantial components to react to the gas pressure more quickly than the time it takes for the shot to leave the muzzle.

As a result, the recoil pulse is reduced by the action of the vented



gas pressure pushing the gun forwards and by the unlocking of the breech block before the full force of the recoil can be transmitted rearwards through the stock (as in a standard shotgun). The recoil pulse is therefore softened up and spread throughout a considerably longer time period than that of the same shell when fired in a conventional double shotgun of identical weight.

It may be argued that some of the total gas pressure is lost by the action cycling, reducing both the velocity and recoil of the load. Yes it is (equivalent to a couple of inches of barrel length) but not by anything like as much as would be needed to reduce the felt recoil to the actual levels experienced in practice.

Felt recoil is what concerns us here, not the actual total mechanical recoil. The total recoil energy created by the firing of the shell cannot be lost, as it is still present, but a portion of it is damped by the vented gas pressure pushing the barrel (and the gun) forwards. The remaining recoil forces are effectively spread

throughout a longer time period, reducing felt recoil still further. This lowers the intensity of the 'spike' of the kick felt with a conventional gun, making it more comfortable for the shooter.

The various types of recoil-operated self-loaders can still effectively extend the time taken for the full recoil transmission to the shoulder, lowering felt recoil, when compared to a conventional double shotgun, but they lack the additional recoil reducing effect of the vented gas pressure from the gas port.

● I'VE RECENTLY STARTED SHOOTING FITASC. IN SPORTING CLAYS IT IS RARE THAT YOU ENCOUNTER A TRUE FLAT FAST CROSSING TARGET – BUT IN FITASC I'VE SEEN ENOUGH OF THIS PRESENTATION TO NOW KNOW ITS A TOUGH TARGET. BESIDES THE OBVIOUS (PRACTICE, PRACTICE), CAN YOU GIVE ME ANY TIPS – LEADS, COME FROM BEHIND OR SUSTAINED LEAD, SHOT SIZE, CHOKE, ETC.

Will says

Students show up for lessons and I ask about what targets are giving them trouble. The most common answer is usually "Flat, fast crossers – especially long ones". I reply (with a laugh) that they are not alone! When you consider that crossers take the most lead of any target we are presented with and that edgy crossers give you the least to focus on (and also have the smallest target surface to hit), its easy to understand why this target is so difficult for most of us.

So down to tips – edgy targets mean that you are impacting the hardest part of the clay, so I generally use the largest shot possible (7.5s) to ensure enough energy to bust the clay. Also, it means that you have a smaller surface to hit (an edge on clay has 1/6th the surface area showing compared to a full face clay), so I use a tighter choke than normal. If the edge on target has any distance to it at all, say over 30 yards, lightmod is a good choice – over 40 yards and I use improved mod or full.

Now, how to get the 'address' right. Since this target takes more forward allowance than other targets (such as quartering birds, going away or incoming), I find that coming from behind the bird means that you have to generate quite a bit of gun speed to get far enough in front of the bird –

making it hard to maintain focus on the clay. Maintained lead can help get the speed right, but how do you know how much to lead it? I find pull away offers the most advantages on this type of target. Insert on or slightly in front of the bird. I then like to match the speed of the bird briefly, to get gun speed under control, and lock my focus on the target. Then gently apply pull away until your subconscious sees what it wants and pull the trigger.

Properly done, you won't even remember pulling the trigger. When practicing this, start out close (assuming the club will let you move ahead of the shooting station), and work your way back a couple of steps at a time. You'll soon find that flat edgy crossers aren't nearly as hard to break, once you get over the fear and attack the target with a plan.

● I AM A BABY BOOMER AGE FEMALE AND AM 5' 4" AND WEIGH 105LBS. DURING THIS PAST YEAR, I STARTED SHOOTING SPORTING CLAYS. WHAT MAKE AND MODEL OF GUN DO YOU RECOMMEND FOR ME? ALSO WHAT ARE THE STEPS I SHOULD TAKE TO BECOME A GOOD SHOOTER?

Bob says

Thanks for including your height and weight. Although I don't





usually like to recommend a brand name, in this case I would suggest a Beretta 391 RL, 12 gauge with 28 inch barrels. I'm not suggesting that this is the best auto, but they do seem to be the most popular among our sporting clay shooters. We are choosing this gun because of weight and the fact that it has low recoil. The stock on this gun was also designed with you in mind and comes with more ready adjustments. I feel this gun would serve you well until you are ready to move into a more expensive over/under.

I would recommend you shoot only 1oz light loads. The next step is to see a good coach who understands gun fitting – or better still, see a certified Point of Impact Fitter (Montana Gun Fitting Academy certified). The reason being, your gun was made for a

man and will not fit you or your technique by a mile. Fit and technique must come together. One without the other will only bring about frustration and you will be totally unable to reach your full potential.

Do not at this time buy a custom made stock unless you have cash to burn or just want a beautiful stock! As you continue to shoot, your technique will change – which results in different stock requirements. So make sure the changes are done with adjustments built in – such as an adjustable comb, adjustable butt pad and adjustable length of pull. As you perfect your style, the gun can now be adjusted to fit you.

After you have developed good technique, then it would be wise to have a custom stock made to fit just you. Be careful about the fitter.

A well fit stock is a very important part of your future success – and pleasure.

A good coach is a must. A couple of things to look for in a coach are: Do they communicate well, so things are totally understandable? Do they explain your fit? Will they explain good technique and why it is important? If you get more than one 'No' to these questions, then take your gun and move on to the next coach.

As and when you practice, it is imperative that you get correct information. Be careful where the information comes from. It seems attractive ladies are given more information than old goats like me!

Most important is to have faith in yourself and your ability. Seek good council and keep it simple.

● I SUBSCRIBE TO 5 "SHOTGUN" MAGAZINES AND YOURS IS BY FAR THE BEST PUBLICATION OUT THERE. I ONLY WISH IT CAME OUT MONTHLY! WHAT IS THE DIFFERENCE BETWEEN 7/8 OZ FROM A 20GA GUN AND 7/8 OZ FROM A 12GA GUN IN TERMS OF THE ABILITY TO BREAK TARGETS (ALL TYPES) AT ALL DISTANCES?

Tim says

Firstly, the most obvious difference between the two gauges with the 7/8oz load is the length of the shot column. The 20 gauge column will be appreciably longer than the 12 gauge. If we take 7/8oz of shot for each gauge it will have the following dimensions:

- In a 12 gauge with a standard bore diameter of 0.729 inch 7/8oz of shot will have a column

length of 0.604 inches.

- In a 20 gauge with a standard bore diameter of 0.615 inch $7/8$ oz of shot will have a column length of 0.847 inches.

The 20 gauge shot column is a full 40.3% longer than the 12 gauge, with the same number of pellets in the load but being subjected to far greater firing stresses. There will simply be a higher number of pellets in the stack, with their increased weight bearing down on the lower ones. This will be further increased with the shock of firing, with the damaging effects on the shot being amplified considerably.

Even with equal breech pressures, velocities and the same size and grade of shot, longer shot columns generate more pellet damage due to increased barrel wall abrasion and raised compression forces on the bottom

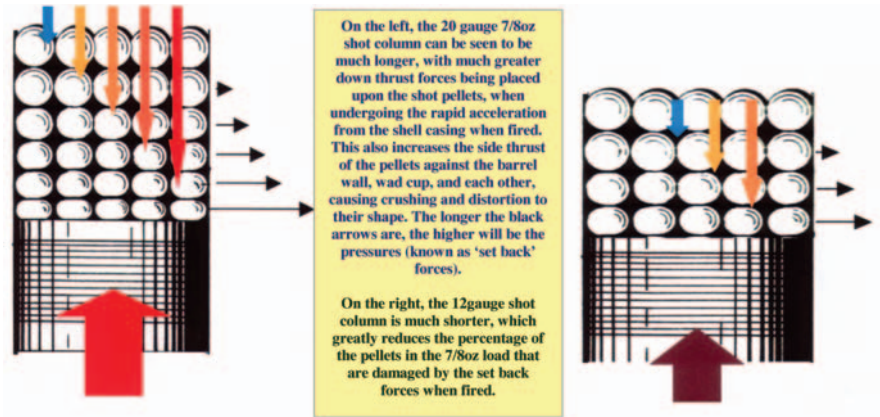
layers of pellets (the rapid acceleration of the shot inside the shell upon firing known as 'set back' forces). This damaged shot from the longer 20 gauge column does not fly as truly as the more perfect frontal shot

layers, and will open up the pattern spread to a greater degree (with a higher percentage of 'Fliers') than from the shorter 12 gauge column. The reality with the 20 gauge $7/8$ oz load is that it will have a higher breech pressure, that is also more sustained than the 12 gauge so as to be able to attain an identical velocity. This compounds the shot damage percentage and will lead to a wider spread and less evenly distributed pattern from the same

degree of choking in both guns. A lower velocity and pressure loading with the $7/8$ oz 20 gauge will effectively tighten up the pattern spread and reduce the numbers of fliers. But the 12 gauge $7/8$ oz load will always have the edge, unless the 20 gauge shell's velocity is reduced much further to the Sub-Sonic level. This extreme measure will certainly tighten up the pattern, but will require going to a larger shot size to maintain

downrange pellet striking energy – thus reducing the pattern density.

The pattern performance of the $7/8$ oz 20 gauge load with its attendant higher pressures, longer shot column and equal velocity (when compared to the 12 gauge) will inevitably suffer as a result of the increased pellet damage. More choke could be used to attempt to redress the balance, but this is not really a cure as yet more pellets may be compromised as a result of



a tighter choke constriction. Although the resultant pattern spread will in the main be tighter (apart from the stubborn fliers), the quality of the pellet distribution within it is most unlikely to reach the 12 gauge level. A better plan is to use harder shot (with a higher percentage of antimony hardening agent) for the 20 gauge loading, as it is better able to resist the damage caused by the rapid acceleration of the setback forces.

It must be appreciated that the extreme width of the spread of a shotgun charge is really the result of the expected pellet damage for a given weight of shot, length of column, breech pressure and velocity level. This has a far greater bearing on the resultant pattern than merely the degree of choke that happens to be installed at the end of the barrel.

● **I HAVE AN OLD BERETTA 682 WHICH I HAVE SHOT FOR SEVERAL YEARS. IT DOESN'T LOCK UP TIGHT ANYMORE AND THE TRIGGERS ARE GETTING VERY SLOPPY. SOMETIMES THE SECOND SHOT DOES NOT FIRE. SHOULD I JUST RETIRE IT OR CAN IT BE REPAIRED PROPERLY? THE OLD GUN AND I HAVE BECOME GOOD FRIENDS SO I HOPE YOU CAN HELP.**

Bob says

Firstly, I understand the “old friend” sentiment – so keep it and fix it. This is a fine gun and can be totally rebuilt for less than the cost of a new gun. You and your old friend can still shoot together.

The barrel locking lugs that protrude through the front of the receiver and lock the barrels into position have probably become worn from use. Beretta makes oversize lugs that can be replaced and it will be as good as new.

The trigger not firing the second shot can come from a couple of things. This can also be repaired with new parts and will make the gun as good as new.

All over/under guns that are used in competition should be checked by a competent smith once a year for worn parts and weak springs. The gun should be totally disassembled, cleaned, inspected, lubed and reassembled. This is just normal P.M. maintenance. Now your gun is ready to serve you well for the next season.

Back to your gun. It is worth rebluing, refinishing the stock and replacing internal parts. Now you have a new “old friend” and haven't broken the bank. Good luck and good shooting.

● **FOR AN UNHINDERED AND SMOOTH MOUNT I CUP THE FORE-END IN MY HAND WITH ALL FINGERS WRAPPED AROUND THE WOODWORK. HOWEVER, I NOTICE THAT SOME PEOPLE POINT OUT THE TARGET BY EXTENDING THE INDEX FINGER UNDER OR ALONG THE FORE-END – CAN THAT REALLY IMPROVE SCORES?**

Will says

Splitting off your pointing finger from the rest and pointing it forward along the wood of your fore-end has a couple of noticeable

benefits. First, it helps prevent canting of the gun (dramatically). When all of the fingers are cupped under the fore-end, the tendency is to ‘roll the wrist’ in the completion of the mount. This causes canting of the gun right at the end of the gun mount – resulting in bad form that can lead to dramatic point of impact difficulties.

Some folks feel that with your pointing finger ‘pointing’ at the target, you get a natural ‘pointing sensation’ when engaging the target. This may help, but from my experience, the advantage of not canting the gun is more significant.



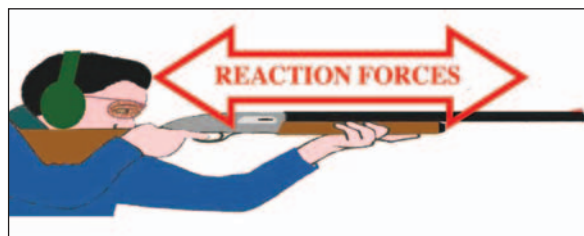
● WHAT ARE THE EFFECTS OF THE VELOCITY OF A SHELL ON THE ACTUAL AMOUNT OF RECOIL GENERATED, AND HOW MUCH FASTER WOULD A SHELL HAVE TO BE TO DOUBLE THE RECOIL?

Tim says

Recoil with shotshells is firstly a function of the velocity of the projectile(s), and secondly the weight of the shotgun in which it is fired. An allowance also has to be made for the weight of the powder and wad. The first is the amount of available energy that is pushed back in the opposite direction to the flight of the shot charge, as a direct result of Newton's law – "To every action there is an equal and opposite reaction". The second consideration is the 'felt' recoil, or 'perceived' recoil, which is subjective and is variable depending on the individual shooter or gun.

To answer your question, we must look to the first consideration, which is the 'mechanical' or 'physical' recoil produced by firing a shot shell with a given shot weight, at a certain velocity, and in a shotgun of a specific weight. To take a fair average, the weight of our shotgun will be taken to be 8lbs. We can now establish the recoil force of the shotgun in foot-pounds of energy. The weight of the shotgun will directly affect this, as a heavier gun will have a lower recoil energy level with the same load and velocity. The actual recoil velocity (the speed of the rearward movement to the shoulder) of the shotgun in feet per second, is also dependent on the weight of the shotgun.

So to show a typical example, if we take our 8lb shotgun and fire a first barrel 1¹/₈oz load with a three foot velocity of 1200 feet per second, the recoil energy will be 20.4 foot pounds, and the rearward



THE TOTAL REARWARD RECOIL VELOCITY POTENTIAL IS RELATED TO THE VELOCITY AND WEIGHT OF THE SHOT CHARGE, AND THE MASS OF THE SHOTGUN. GAS OPERATED AUTO LOADERS CAN REDUCE THIS BY THE MECHANICAL ATTRIBUTES OF THE ACTION CYCLING, THAT SPREAD THE RECOIL OVER A LONGER TIME PERIOD; REDUCING THE EFFECT.

recoil velocity of the shotgun to the shoulder will be 12.8 feet per second. If we then go on to fire a second barrel 1¹/₈oz load, but this time with a three foot velocity of 1145 feet per second, the recoil energy will now be 18 foot pounds, and the rearward recoil velocity will be 12 feet per second.

As might be expected, the slower 1145fps second barrel load has less recoil, but although it only has a 3.75% lower three-foot velocity, the recoil energy is actually 11.8% less! However, the shotgun's rearward recoil velocity is down by 6.25%. We can see that the relatively tiny drop in velocity of the load has had a much greater effect on the total recoil energy than might have been supposed – at least by an initially casual consideration.

If we now fire the slower second barrel load in a lighter 7lb 1oz shotgun we can see another change in the dynamics of the recoil. Firstly the recoil energy is now exactly the same as the faster 1200fps load in the 8lb shotgun, but the rearward recoil velocity is higher at 13.6 feet per second (plus 13.3%) – being more of a function of the gun's lighter weight.

However, to complete the picture, if the faster 1200fps 3ft load is fired in the lighter 7lb 1oz gun, and compared with the heavier 8lb gun, then the recoil energy will go to 23.1 foot pounds (plus 13.3%) and the gun's rearward recoil velocity will be 14.5 feet per second (also plus 13.3%).

So the lighter gun should have similar recoil energy with the

slower load, but might have more 'felt' recoil for some shooters because of the gun's higher recoil velocity: auto loaders can reduce this effect to advantage.

The recoil energy of a typical high speed sporting clays 1oz shell with a 3foot velocity of 1300fps in an 8lb shotgun is 19.9 foot pounds, with a rearward shotgun recoil velocity of 12.6 feet per second.

To double the recoil energy to 39.8 foot pounds with this shot weight, we would have to have a 3 foot velocity of 1677 feet per second (1808fps at the muzzle). The rearward gun velocity would be up to 17.9 feet per second; a 42% increase.

Clearly this is not a load that would be suitable for clay target shooting. It would have identical recoil energy as a 1¹/₈oz hunting

load with a 1170fps 3 ft velocity.

Other examples of virtually doubling the recoil energy would be the Sub-Sonic 7⁷/₈oz, 1oz & 1¹/₈oz loads with 1000fps three-foot velocities, when compared to the same shot weights with 1300fps three-foot velocities (see graph).

