

# Some Thoughts on the Combat Shotgun

---

## Background

The use of multi-projectile small arms in combat can be traced back to the beginnings of firearms. However, the first military use of the shotgun, as we know it today, probably occurred during the campaigns of the American West during the 1860s and '70s. They were used with great success by the US Army in the trench fighting of World War I where the Winchester Model 1897 pump shotgun gained its fame. Shotguns were also used by the US Marines in the Pacific jungle fighting during WW II and by the British during the 1950s in Malaysia. In the Vietnam action they became popular for counter-ambush use and for defense of fortified hamlets.

The modern fighting shotgun, or "riotgun," is typically a pump action or semiautomatic 12 gauge shotgun with a 18 to 20 inch cylinder bore barrel. They are frequently fitted with extended capacity magazine tubes. In the most common configuration the combat shotgun is fitted with nothing more than a simple bead front sight. However, the "rifle sighted" versions commonly called "deer" or "slug" guns are also in general use and are much superior as we shall see.

Shotguns have an imposing appearance when viewed from the muzzle due to their large bore diameter. The large size of their cartridges implies "power," and the sound of a pump shotgun being operated gets everyone's instant attention. Because of these traits, a great deal of myth and misinformation has grown up around the riotgun.

If one is to believe the media, a charge of buckshot from a typical riotgun spreads out to about six feet in diameter at the muzzle. It then roars down range with an effect just slightly less than a tactical nuclear device. On the other hand, some say that the riotgun is only a very short range weapon with limited use and effectiveness. The truth, it turns out, is somewhere in between.

---

## The Effectiveness Dilemma

At this point a brief discussion of small arms "effectiveness" is in order. When talking about the effectiveness of any small arms system, it should be noted that the military looks at effectiveness in a different light than the law enforcement or civilian user. The police officer or civilian is interested in the immediate termination of the actions of the individual shot—the proverbial "instant incapacitation." The military on the other hand was for a long time, and probably still is, primarily interested in simply making the enemy soldier no longer combat effective by creating a wound that will require immediate medical treatment and hopefully the use of several other enemy troops to help the individual who was hit.

Thus they considered that an "effective" hit was one that delivered approximately 53 foot pounds of energy to the target rather than one that instantly shuts down the target. While a shot pattern from a

cylinder bore typically opens up about 1" per yard of range, a good riotgun with a load of #4, #1, or 00 buck can provide several, if marginal, hits on a full length human target out to about eighty yards at that range when *directed with a good set of sights*, but one does not get "instant incapacitation." If viewed in this military perspective the 12 gauge riotgun firing buckshot can be "effective" on individual targets at that range. Thankfully this attitude is being replaced with the proper mindset. (As the famous Patton quote goes, "... making the other dumb bastard die for HIS country."

The table below shows the average results of firing at fifty and seventy-five yards at a full length human silhouette with typical standard (non-premium) rounds of #4, #1, 00, and 000 buck from cylinder bored, rifle sighted, riotgun. Note: most of the hits at 75 yards were very "marginal."

Loading	Avg. Number of Hits (Full sized humanoid target)	
	50 Yards	75 Yards
	27 pellet 4 buck	10
34 pellet 4 buck	6	2
16 pellet 1 buck	6	2
20 pellet 1 buck	7	4
9 pellet 00 buck	3	1
12 pellet 00 buck	4	2
8 pellet 000 buck	1	0

Less anyone thinks that only one or two pellets of buckshot will effectively turn off an attacker, consider what is actually striking the target. A pellet of 00 buck is essentially a 54 grain, .33 caliber projectile that is traveling between 1000 and 1300 feet per second. This puts the effectiveness of each pellet of #4 buck at about the .22 rimfire level and 00 buckshot *at the muzzle* somewhere between that of the .32 ACP and .380 ACP cartridges, none of which any serious person will bet their life upon. The table below gives some interesting data.

Shot Size	Pellet Diameter (in)	Pellet Weight (gr)	Sectional Density	Velocity (fps- 20" bbl)	Individual Energy (ft lb)	Number of pellets in loading	Total Weight (oz)	Total Energy (ft lb)
000	.36	70	.077	1265	250	8 in 2¾"	1.3	2,000
00	.33	54	.070	1295	200	9 in 2¾"	1.1	1,810
0	.32	48	.066	1200	155	12 in 2¾"	1.3	1,860
1	.30	40	.063	1215	130	16 in 2¾"	1.5	2,080
4	.24	20	.052	1260	70	27 in 2¾"	1.2	1,890
#6 Shot	.11	1.9	.022	1290	7	280 in 2¾"	1.25	1,970
.32 ACP	.31	71	.104	900	130	-	-	-
.380 ACP	.35	90	.102	950	190	-	-	-
38SPL +P	.35	158	.177	890	280	-	-	-

At 75 yards a 00 buck pellet is only traveling at about 830 f/s and has only about 85 ft lb of kinetic energy. At 100 yards the kinetic energy is about 70 ft lb. In addition, shot, because of its spherical shape (and thus low sectional density) has inherently poor penetration compared to a conventional bullet, especially if deformed by intervening material. (#4 buckshot is especially known for this problem.)

Buckshot ammunition has been undergoing a lot of change in recent years. The "premium" buckshot loads with their hardened and/or plated pellets generally give better performance than standard loads because the pellets don't deform as much. The new "reduced recoil" loads and especially the new

controlled shot loads like Federal's "Flight Control™" wad loads can give very small buckshot patterns at extended ranges.

## A Penetrating Study

To determine what kind of penetration could be expected the following data was obtained from various published and International Wound Ballistics Association (IWBA) sources. The #6 birdshot load of copper plated hardened shot (2¾" - 1¼ oz - 3¼ Dram) that is often recommended as an ideal solution for the in-home scenario was fired at five yards to discover the effectiveness of that loading at in-house/across-the-room ranges. All other penetration data was obtained at seven yards. It is generally accepted by those involved in the wound ballistics field that a *minimum* penetration of twelve inches of 10 percent ordnance gelatin is one of the criteria needed to provide reliable incapacitation of a human assailant.

12 Gauge Penetration Tests 10% Gelatin		
<u>Load</u>	<u>Number of Pellets</u>	<u>Penetration @ 7 yards</u>
000 Buck	8	14" - 16"
00 Buck	9	13" - 15"
1 Buck	16	12" - 14"
#4 Buck	27	9" - 11"
#6 Shot (Hard shot)	280	4" - 6" (@5 yd)
1 oz Foster Slug	-	18"
450 gr SABOT Slug	-	21"

As can be seen from the table, the often recommended standard 4 buck load is lacking in penetration. This has been confirmed by data from numerous field experiences and is especially true if the target has any "give" to it such as a loosely fitted leather jacket. The #6 shot often recommended for home protection also gives marginal penetration. To ensure adequate penetration under all conditions you should stick with 1 buck or larger shot although the #6 shot will probably suffice for the initial in-home encounter at "across the bed distances," where the shot charge is still essentially a single mass, when backed up by a buckshot round.

Several recent tests for terminal ballistics at 50 yards revealed some interesting data. For the most part penetration remained the same with #4 buck giving about 9 inches, 00 buck giving about 14 inches, and 000 buck giving about 15 inches. While you may not "knock 'em off their feet" if you hit them you will definitely get their attention.

In addition, shot's spherical shape doesn't give a very good ballistic coefficient (00 buck has a nominal Gs coefficient of about .071 (approximately .045 G<sub>1</sub>) compared to .104 G<sub>1</sub> for a 71 gr .32 caliber FMJ bullet or .390 for a 150 gr .30 caliber spitzer) and the velocity drops off rapidly as you can see below.

Performance of 00 Buckshot	
<u>Range</u>	<u>Velocity</u>
0	1290
50	1060
100	780

Since the shotgun with slugs is frequently used against "hard" targets. Penetration tests were done, using standard NATO steel test plates. Buckshot loads are shown for comparison and the results are given in the table below.

**12 ga Penetration Tests**  
SAE 1010 .138" steel plate

<u>Load</u>	<u>7 yd</u>	<u>25 yd</u>
000 Buck	N	N
00 Buck	N	N
1 Buck	N	N
4 Buck	N	N
1 oz Foster Slug	P	D
450 gr Sabot Slug	P	P

P = Penetrated  
D = Dented  
N = No Effect

While not tested the Breneke type slugs give increased penetration in both soft and hard targets.

### Slugging It Out

Contrary to popular belief, the shotgun with conventional Foster slugs is not hopelessly inaccurate. The myth of the "inaccurate" slug probably got started by those individuals trying to hit a target with shotgun equipped with a front bead sight only. The average fighting shotgun, (eighteen to twenty inch cylinder bored barrel) using good ammunition and fitted with proper sights, can easily, group five shots into ten inches or less at 100 yards, and inside of four to five inches at fifty yards. While this is not tack driving performance it is more than adequate for use against human assailants or deer sized game out to 75 to 100 yards.

New slug designs such as Federal's TrueBall Forster type slugs and the Breneke slugs of both the original one piece "Classic" design and their new "Black Magic" slugs provide greatly improve group sizes in most smoothbore guns with some guns giving 3 - 5 inch 5-shot groups at 100 yards.

Most people think that the trajectory of the 12 gauge rifled slug is close to that of a mortar, and since they don't think they could hit anything past 25 or 50 yards (which is probably true if they don't have a set of sights on their shotgun) they zero for slugs at 25 yards. Unfortunately, this short zero severely limits the effectiveness of the slug firing shotgun. Surprisingly, a slug's trajectory is quite flat out to about 125 yards (assuming the proper zeroing range). The biggest limitation of the shotgun slug is that penetration and trajectory drop off drastically beyond 125 yards due to velocity loss, so its maximum effective range is probably about 125 yards. (I still wouldn't want to be hit by a slug at 200 yards though!)

**12ga Foster Type Rifled Slug (G1 = .109)**  
(20" barreled riotgun with ghosting sights)

<u>Range</u>	<u>Velocity</u>	<u>Zero = 75</u>	<u>Zero = 100</u>
0	1440	-1.0	-1.0
25	1320	0.7	1.4
50	1200	1.1	2.5
75	1120	±	2.1

100	1050	-2.8	±
125	1000	-7.6	-4.1
150	950	-14.6	-10.4
200	880	-36	-30
250	820	-69	-62
300	770	-114	-105

A problem with slugs at the longer ranges is their reduced hard target penetration due to velocity drop and generally soft lead construction. However, even at 100+ yards they will take any opponent out of the fight unless they are behind heavy cover. During a course I attended students had no problem consistently hitting humanoid sized steel targets at ranges up to 100 yards. The resulting impact left no doubt that an assailant would have been deactivated. I have an acquaintance who can regularly hit an 18 x 30 silhouette at 300 yards with his ghost ring sighted 870 and I have been able to hit at 200 yards, but this is not something to rely on.

The sabot subcaliber slugs that have become popular tend to give erratic grouping in smooth bores. They are really designed for use in shotguns with rifled choke tubes or fully rifled barrels. Fired from weapons so configured, 100 yard five-shot groups of under four inches or less are quite common. Unfortunately the rifling plays havoc with the patterning of buckshot. One problem commonly reported with the sabot slugs, especially in a smooth barrel is that about ten percent of the time the sabot fails to separate cleanly causing a really wide flyer.

## Training

The question is often raised about why even bother with the study of the shotgun when most folks with any training would CHOOSE to grab something other than a shotgun when the brown stuff hits the fan. Besides the fact that they are "issued" to many people one of the "nice" things about a shotgun is that they are politically correct in most locations (i.e. "sporting") even with a "sighted slug barrel" and thus may be more readily available to many people. Proper doctrine demands that the most efficient use of all different firearms be explored and perfected--thus the technique of the shotgun.

In 1992 I took a course on the combat use of the shotgun at Gunsite. There I learned first hand just what can be accomplished with a properly configured and handled riotgun when you know what is going on.

The modern technique of the shotgun is based on three principles:

- The fitting of proper sights and their use.
- The "zone system" of ranging.
- The proper selection of ammunition and the knowledge of the shotgun's performance (patterning and grouping) with the ammunition being used.

**Sights** - The typical fighting shotgun has been historically fitted with the standard bead front sight as used by generations of shotgunners for wing shooting. While this arrangement may work well for the wing shot, it does not work effectively in the antipersonnel role. A bird or clay target can be brought

down with relatively few hits by small diameter pellets. Thus, a wing shot merely points the shotgun at the target using the bead as a reference, follows through, and relies upon the spread of the shot to get a hit.

However, the termination of the actions of a human assailant requires the delivery of a powerful blow. Therefore, what is needed is to deliver the maximum blow possible by obtaining the maximum number of penetrating hits well centered on the target. To accomplish this consistently requires the use of sights and a method of determining optimum engagement distances for the shotgun.

The single front bead sight so common on hunting shotguns and many riotguns is for all intents and purposes useless for this purpose since without a rear reference precise aiming is impossible. While typical open rifle sights as found on commercial "deer" or "slug" barrels are usable, the most effective sights are the type now generally called "ghost ring" sights. The ghost ring sighting system is really nothing more than a thick flat-topped front sight blade used with a large opening, thin rimmed rear aperture sight mounted close to the eye. In use it is amazingly fast and precise and most serious users of the combat shotgun have their weapons so fitted.



However, an interesting discovery about sights was made during the class that I attended. The factory "open" type rifle sights fitted to most sighted shotguns can be greatly improved as to speed of acquisition and *practical* accuracy. Simply replace the narrow bead-topped front sight blade with a wider (.1 to .125 inch) flat-topped blade. Then, mill the rear sight flat across the top and open the notch to a square shape much like a pistol sight. The resulting sighting system, while not the equal of a ghost ring, is far superior to the original sights in speed of acquisition. This would seem to be an ideal solution for organizations that can't afford to equip all of their shotguns with the ghost ring system.

The "red dot" sights such as the AimPoint and Eotech are becoming very popular on fighting shotguns as of late because of their fast acquisition, the ability to keep both eyes open, and use in poor lighting. Several agencies and military units have adopted them for shotgun use.



**The Zone System** - While the use of sights will enable a target to be hit, a method is needed to help determine the optimum engagement distances for the ammunition used. The zone system sets up bands of weapon performance versus ammunition selection. The first or "A" zone extends from the muzzle to about seven to 10 yards, where the pattern has typically expanded to between four and seven inches. Within this range the shot charge is effectively a single projectile and it is quite easy to miss a human sized target unless sights are used.

The "B" zone extends from the end of the "A" zone to that range where charge of buckshot has spread to about the width of the human torso (about twenty inches). This occurs at a range of between twenty to thirty-five yards for most weapons. Since the shot charge is spreading out the pattern must be centered to effectively turn off an assailant. While hits can be obtained without proper sights, it is just as fast and much more positive to do it with sights. At the course that I attended the maximum range for the "B" zone for a given ammunition was determined by the range at which the shotgun would consistently knock down a 10 inch diameter steel lollipop target with the buckshot used. (One student's shotgun would consistently drop the target at 35 yards and about 50% of the time at 40 yards! That's patterning!)

Past end of the "B" zone, at thirty-five yards or so depending on the individual weapon, even with modern buffered loads and hardened buckshot the shot charge usually spreads so much that the majority of pellets may not strike the target that is aimed at. This area is called the "C" zone and this is where the rifled slug comes into play. At the course that I attended one of the techniques taught is a "select slug" drill that teaches the rapid switching to a slug round with a shotgun loaded with buckshot when a C zone target appears. While the approximate distances of the zones can be memorized, many of the students used the width of the thick ghost ring system front sight blade as a reference for the B/C break point but once practiced a couple of times you get a feel for when it's time to switch and it becomes automatic.

Some folks may comment at this point, "Why not just use slugs for everything and forget about buckshot" and some folks actually do that. Unfortunately, there are a couple of flies in the ointment with this approach. First, the use of buckshot is mandated by many organizations with slugs reserved for "special" use. Second, slugs will shoot clean through most soft targets so they must be employed carefully for general use.

The biggest problem with both buckshot and slugs is that their performance is highly individual weapon dependent, which brings us to the third principle.

**Ammunition Selection** - Several noted gunsmiths who are familiar with shotguns have stated that the patterning or grouping ability of shotgun barrels is 1/10 gunsmithing and 9/10s magic. Barrels with effectively identical internal and external dimensions and chokes will give widely varying performances with different shot sizes, loadings, and brands. This is especially true with slugs where a barrel can show a three to five inch difference in group size simply by changing the brand of slugs.

Because the performance of a given barrel is so dependent on the particular ammunition trying to document patterning or group testing is a waste of time. However, using the same brand of standard

00 buckshot in a variety typical unmodified riotguns I have observed 25 yd patterns ranging from 4¾"(!) up to 25", and 5-shot slug groups using standard Foster type slugs ranging from slightly under 3" to over 7" at 75 yards.

The current "reduced recoil" Federal and Remington "Tactical" buckshot loads give greatly reduced pattern diameter in just about every weapon they are fired in because of the lower pellet deformation. However, there are always exceptions. Thus, it is extremely important to zero and pattern *your* shotgun with the *actual* ammunition that *you* will be using. This will allow you to determine the performance of and the appropriate zones for your combination.

---

## Some Odds and Ends

### Extension Magazines

Besides the barrel itself, another item that can affect patterning and group sizes is the hanging of extension magazines on the shotgun. A poorly fitted extension magazine or one with a misaligned clamping strap can drastically alter your weapon's performance. During the class I found that a misaligned clamp was moving my point of impact over eighteen inches to the left with both slugs and buckshot. It also opened the shot pattern by almost three inches and the fifty yard slug groups by three to four inches!

Even with a properly fitted extension magazine and clamp, the tension of the clamp screw can alter your point of impact. Always replace the clamp in exactly the same position and tighten all screws to the same tension each time. If your shotgun is so fitted, check its performance with and without the clamp. You will no doubt be surprised at what happens.

If the extension tube is properly manufactured and fitted very tightly there is really no reason to have to use the clamp. However, it does serve to keep branches or other debris out of the space between the barrel and magazine tube when creeping through the woods and as a sling mounting point. If your extension tube has a tendency to work loose a set screw can be added to hold the tube in place. I usually add a 1-rd extension to my shotguns (why, good question-I just like the look maybe). This doesn't require a barrel clamp and provide a good sling attachment point especially with a side mounted sling.





However, most fighting shotguns are fitted with a sling and thus need the clamp. If your clamp is one of the one-piece units like the Remington factory one or the Uncle Mike's one piece you might want to try this trick. Adjust the upper part of the clamping strap to give a 32nd of an inch or so of clearance (the thickness of a matchbook cover works fine) on either side of the barrel when the bottom half is very tight on the magazine tube. You may also want to carefully fit a piece of steel tubing over the clamp screw and between the sides of the clamp to prevent over tightening. This modification has worked very well on several shotguns I am familiar with.

Except possibly for prolonged military engagements, extension magazines do not provide any real tactical advantage especially if one learns the "shoot one - load one" drill. They are probably best avoided, but unfortunately they are the "in" thing these days just like high capacity magazines in semiautomatic pistols.

As far as "home defense use" is concerned, one recommended technique is to have the shotgun stored with a single round of  $2\frac{3}{4}$ " -  $3\frac{1}{4}$ " Dram -  $1\frac{1}{4}$  oz of #4 or #6 shot (preferably a loading using plated or hardened shot) in the magazine which will not "set" the spring and the hammer down on an empty chamber. Several rounds of buckshot are attached to the shotgun in a side saddle carrier. When needed, the action can be racked when the shotgun is picked up chambering the load of #4 or #6 for immediate short range indoor use and the magazine can then be loaded with buckshot while waiting for the festivities to commence. While the penetration of the #4 shot is limited, at in-house ranges it will effectively be a frangible slug and should do the job without hitting your neighbor's house.

### **On-gun Spare Ammunition**

Some folks like a butt cuff for spare ammunition and they work fine, but they make shooting from the weak side shoulder difficult and uncomfortable. Side saddles work fine too but be careful because some shotguns are sensitive the tightness of the screws attaching them to the gun. In addition, some recoil operated shotguns can be adversely affected by the additional weight. Check to be sure things work as you expect.

One side saddle design that seems to be gaining favor is the flexible strips attached to the side of the receiver. Spare, fully load strips can be conveniently carried in the ubiquitous M16, 30 round magazine pouches. Once source for these is Esstac, <https://esstac.com/shotgun/>.

### **Barrel Porting**

Barrel porting can help to mitigate recoil, but with gas-operated, short-barrel shotguns reliability can be affected as the bleed barrel pressure. Porting is not recommended for gas-operated shotguns unless the gas system is modified to ensure proper functioning.

### **This n that**

Of what use are slugs, ask some...  
I think this question sorta dumb..  
They work on bad guys, don't you  
see?  
Especially the Brenneke!

Will it do the job up close?  
Yes, it will, one shot at most!  
Can you slug them in a car?  
Yes, you can from near or far!

Pump gun or automatic..  
I won't give you any static!  
If shotgun armed you be  
Load it with slugs, Two..No! Three!

Pull your gun in nice and tight.  
Focus hard on your front sight!  
Now you know just what I say,  
Practice "Select slug" everyday!

Jon Matej

---

### **Summing Up**

I think that we can agree that the riotgun is not the proverbial "death ray," nor is it a useless very short range only weapon. When properly employed with ammunition of known performance it can provide its user with the ability to control their environment in a 100+ yard radius with almost complete certainty. While other firearms may be better suited for some tasks the shotgun has the advantage of being more politically correct in most areas, and a good shottist should be well familiarized with multiple firearms types.

Remember, that while the data I have presented here is apparently typical, there will be exceptions to the performances discussed. *Test your own weapon and ammunition to be sure.*

As far as I'm concerned there is no real need for using 3" ammunition in a defensive scenario as the extra power really isn't needed and recoil becomes a problem.

In spite of the above I keep getting asked what ammunition I like best so here goes.

#1 Buckshot 2<sup>3</sup>/<sub>4</sub>" reduced recoil - Federal LE/H132 1B or Federal PD132 1B  
00 Buckshot 2<sup>3</sup>/<sub>4</sub>" reduced recoil - Federal LE/H132 00 or Federal PD132  
00 Buckshot 2<sup>3</sup>/<sub>4</sub>" full load - Federal LE/H127 00 or Federal PFC154  
2<sup>3</sup>/<sub>4</sub>" Slug reduced recoil - Breneke THD 1 oz 2<sup>3</sup>/<sub>4</sub>" SL122THD  
2<sup>3</sup>/<sub>4</sub>" Slug full load - Breneke Classic Magnum 1<sup>1</sup>/<sub>8</sub> oz SL122CLM  
Breneke Green Lightning Heavy Field Short Magnum 1 1/4 oz SL122HSFGL  
Breneke Special Forces Short Magnum 1 1/4 oz SL122SFM  
Breneke Special Forces MBPM 1 3/8 oz SL122MBPM (hardened projectile a.k.a.  
the "car killer.")  
3" Slug full load - Breneke Black Magic Magnum 1<sup>3</sup>/<sub>8</sub> oz SL123BMM (Aka.the "dinosaur killer" for  
when you're hunting T-Rexs, or clearing buffalo out of your back yard.)

Your mileage my vary.

---

Please email comments to Fr. Frog by [clicking here](#).

---

| [Back to Fr. Frog's Home Page](#) |

---



Updated 2021-10-16