

PATTERNS-BACKBORING, SCREW CHOKES

Dear Technoid:

Interesting thing happened...maybe you can give me the technical rationale: I took my screw choke, backbored Browning Citori field gun out and shot some patterns with it to compare to my old style solid choke Remington 3200 skeet gun. Here's the part I don't understand...The Browning is an Invector-Plus, which is backbored. The barrels look like drain pipes compared to my 3200. Next to the Browning, the 3200 looks like a 20 gauge. The 3200 (26 in.) is marked skeet/skeet and the Browning (28 in.) has cylinder bore screw-in chokes in both barrels. The patterns from the skeet Remington 3200 had significantly more spread and were quite larger than from the cylinder bore choked Browning!! How can that be? Is it the 2 inch difference in length...I wouldn't think so? The Browning has a larger bore and more open chokes. I would have expected it produce a much larger pattern than the 3200, but the opposite was the case. Can you explain?

Regards,

Mike

Dear Mike:

I don't know if I can explain, but I will sure try to make up something that sounds plausible. Remember the Technoid's motto: Often in error, but never in doubt. Pull on your barnyard boots. Sometimes you need them when the Technoid tries to explain things.

As to the cylinder bore 3200 having larger patterns than the cylinder bore screw choked Citori:

It would be easy to dismiss it by dragging out the old canard "different shotgun just plain pattern differently. No two barrels are the same." This may well be the case, but I don't think that it is. I think that there are other reasons at work here.

First of all, dismiss barrel length as the cause. Barrel length changes, within normal bounds, have no effect on pattern. Long barrels do not shoot "tighter" than short barrels.

Does back boring make a difference? The Remington 3200 has bores in the .726" area. That is what my early 3200s measured. The Invector Plus Japanese Brownings are "factory backbored" and have enlarged bores right around .741-2" in the ones I have measured. Of course, these guns are not actually "factory backbored", they are built to overbore specifications. This has been going on for 100 years.

The question is whether overbore dimensions produce tighter patterns than standard 12 gauge dimensions. Proponents of the overbore argue that overbore barrels do produce "better" patterns because the large bore results in a shorter shot column, thus less shot set back and deformation. This translates into a greater number of undamaged lead pellets and thus fewer flyers and a tighter and more predictable pattern.

This is probably true to some extent. The big question is- is there enough difference to matter? From personal experimentation I believe that extreme variations in bore diameter for a given shot charge do indeed matter. Example: International skeet and Olympic trap now are required to use 24 gram loads- roughly equivalent to 7/8 oz. As this is your basic 20 gauge target load, one would think that many of the elite Olympic shooters would go to 20 gauge guns.

No one does. Everyone, but everyone, stays with the 12 gauge and shoots those tiny little loads down those big barrels. Although the 20 bore barrels will handle 24 grams well, the 12 bore barrels handle it better. Because the shot column of the 24 gram load is so much shorter in the 12 bore barrel, the patterns are more uniform. I believe that this is the same case when a given barrel is backbored.

Obviously, backboring from .725 to .742 is only a tiny change when comparing the .615" of the 20 bore to the .729 of the 12. I would question whether this tiny change makes any practical difference. The question is the same with barrel porting. Yes, we know that porting works in theory and in the ultra high pressure rifles and pistols, but is there enough of a change when applied to the low pressures of the shotgun to be measured? Marketeers will tell you "yes". Practical experience has shown me "no".

The problem with testing a backbored barrel against a regular barrel is that you really have to do a before and after on the same barrel. Individual barrels differ so much that you cannot really reliably compare Browning's product to Remington's. The forcing cone area is a case in point. A man at Purdey's once told me that when fine tuning the patterns on their guns, they do as much work in the rear forcing cone area as they do in the choke area. There are many ways to influence patterns.

Backboring is by no means universally approved for improving patterns. The Browning corporation feels that their barrels perform best with a backbore of around .741". Seminole Chokes and several other after market backborers are absolutely convinced that backboring of .735" is optimal and that nothing more helps. They also advocate long forcing cones, Browning leaves theirs short. Beretta does not backbore (their bores are actually quite tight), but does lengthen cones.

Krieghoff pioneered the backbore craze in the Model 32 from the late '50s. Their target guns always had bores of around .735". However, they also make a pigeon gun called an Ulm. Pigeon shooters want really tight patterning guns. When Krieghoff made barrels for their pigeon gun they made them underbore! They felt that they got tighter patterns with bores of around .721". Italian pigeon guns (and these guys take their pigeon shooting seriously) have always been bored tight.

So, there is a great deal of divided opinion on whether backboring is just the latest craze, or whether it actually does anything. As to whether it is the larger bores that make your Citori shoot tighter- maybe, but I doubt it.

There is another other aspect of the question that many do not consider. Modern mass produced screw chokes, like the Browning Citori Invector Plus, are made to, shall with say charitably, production tolerances. What concerns me most here is not the actual degree of choke (you can keep measuring mass produced chokes until you find one that is correct), but the step or gap at the back of the choke.

Mass produced screw chokes often have a BIG step at the back. If the bore of the gun is .741", the i.d. of the rear of the choke is often very much larger than that. This is done so that there is no chance of the rear of the choke protruding into the barrel, catching the shot charge, and blowing out. Early Perazzi MT-6s were notorious for this. Dirt would get under the choke and slowly push it out into the bore. When it got out far enough you suddenly had the choke added to your shotload. It made for an occasionally interesting pattern. Perazzi has corrected this and Briley sells proper chokes for the early MT-6s, but be ware of unintended barrel alterations if you buy an early one.

Being super cautious, Browning and many of the other companies, leave quite a step between the barrel and the rear of the choke. The choke often does not come back up to bore diameter for an inch or more- especially with the currently faddish "long" chokes. This recessed area at the rear of the screw choke can act like a "jug" choke and actually tighten your pattern.

The practice of jug choking is older than dirt. It is simply this: Barrels are often cut off and shortened by one person. The individual likes the short barrels, but now notes that he has also cut off the chokes. He wants some chokes added back in to his now cylinder bore barrels. In the days before screw chokes, the gunsmith would simply hone in a circular recess about an inch back from the muzzle. The depth of the recess would depend on the thickness of the barrel steel at that point. The recess or "jug" might be over an inch long.

This would, in effect, give the gun back some of its lost choke. The shot would travel down the cylinder bore barrel, enter the relieved jug area and expand to fill the jug. The shot load would then continue forward and be squeezed down back to the original cylinder bore dimension just before it exited. This practice could add up to one degree of choke to the gun.

I think that one of the reasons that your modern screw choked gun is patterning tighter than the older solid choke gun is because of this jug effect.

One final possibility. Browning makes a ton of "backbored" barrels and a ton of Invector Plus chokes. Every choke has to be able to fit into every barrel. Browning admits to the possibility of barrel variance of .005" and there must be at least that in any given choke tube. With a ganging of tolerances, your "cylinder bore" choke could possibly be as much as .010" off. That would definitely affect patterns. You really have to get a bore mike and measure these things.

So- this has been a very long answer to a short question. That is just what happens when you scratch the surface of some of these situations. You are paying me by the word, aren't you?

Best regards,
Bruce Buck
Shotgun Report's Technoid