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PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

11

ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

AFTERMARKET DROP-IN PARTS

PUBLIC APPROVAL OF HUNTING HIGHEST SINCE 1995 • PRECISION BARREL FITTING, PART EIGHT • RECYCLING AR-15 ...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 131

DIGITAL ARCHIVE EDITION

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FROM THE ARCHIVE

Public Approval Of Hunting Highest Since 1995

BY AMERICAN GUNSMITH EDITORS NOVEMBER 2014

ORIGINAL PP. 2

The National Shooting Sports Foundation reports that a recent survey shows 79 percent of the American public approve of hunting. This marks the highest level of support for hunting since 1995, according to data compiled by Responsive Management, an independent research firm. The nationwide scientific survey showed the public's approval of hunting rose five points in the past year and is up from 74 percent in 2011.

The survey, initiated in February 2013 using random digit dialing and supplemental cellular telephone sampling, was the fifth in a series of similar surveys by Responsive Management to track trends in public approval of hunting since 1995. Support for hunting has remained generally consistent during this time—73 percent in 1995; 75 percent in 2003; 78 percent in 2006; 74 percent in 2011; and a peak of 79 percent in 2013.

Mark Damian Duda, executive director of Responsive Management, is still looking at survey results to better understand why approval has increased. Said Duda, "Approval of hunting among Americans is fairly stable and bounces between 73 and 79 percent.

The reasons for this increase are still unclear, but it is probably related to the increase in hunting and shooting participation." Added Duda, "Since 2006, hunting participation has increased by 9 percent while shooting participation has increased 18 percent since 2009. Other studies we have conducted on public opinion on hunting show that the strongest correlation for approval of hunting is knowing a hunter, over and above demographic variables or anything else.

With the increased number of hunters in the field and sport shooters at the range, it is possible that this is being reflected in this uptick in support for hunting." One thousand Americans 18 years old and older were surveyed to achieve a sampling error of plus or minus 3.00 percentage points. More than half (52%) of those surveyed strongly approved of hunting. At the other end of the spectrum, 12 percent of Americans disapprove of hunting.

Another 8 percent neither approve nor disapprove (Note: This total does not equal 100% due to rounding). Responsive Management specializes in public opinion research on natural resource and outdoor recreation issues and has conducted numerous surveys for NSSF.

ORIGINAL SOURCE PAGE

2

FINISHING

Precision Barrel Fitting, Part Eight

Part Eight is the last to appear in this series, but are you certain you've finished the job?

BY CHICK BLOOD NOVEMBER 2014

ORIGINAL PP. 3-5

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By now you have become familiar with John Hinnant's book as I've picked a pathway through it. Hopefully you have completed any trigger work, rejoined barrel to receiver, returned the action to the stock, test fired the result of your labors with great success and are feeling real good about calling the rifle owner with news of the gun being finished. Not so fast my friends.

If you have been hired by a demanding and knowledgeable hunter who insists on the ultimate in accuracy, you will be asked to blueprint the rifle first. There is nothing unusual about this request from those seeking record trophy or large, dangerous game and all words spoken by you regarding additional cost are not likely to cause a change of mind. Such hunters, male or female, will merely seek out another 'smith eager to finish the job you started.

Blueprinting Defined Mercifully, I'll spare you the time I wasted looking for a definition on the web. It appears on page 163 of

John's book. He quotes a letter published in 1996 by S. L. Wormsley, Jr, then Associate Technical Editor of American Rifleman, "Blueprinting a rifle action encompasses the steps a gunsmith takes to eliminate machining errors, ensure all dimensions are to proper specifications and to align all critical action surfaces with a standard reference point.

Usually, this point is the hole in the receiver body for the bolt. Blueprinting would involve setting up the receiver in a lathe with the axis of the bolt hole on centers.

The set up would be used to reface the receiver, the locking lug seat and, in a thorough job, recut the barrel threads inside the receiver ring." Wormsley continues to mention that to achieve the totally thorough job just described it should first be determined that the bolt hole itself is straight, round and of consistent diameter. On the right, the tool is shown positioned to cut internal receiver threads of a Model 700.

It can also be used with classic Winchester M70 actions but is not intended for Winchester push-feed models. diameter. It is then made clear that a failure to comply with making that determination could result in a necessity to perform significant corrective measures on the receiver. I think you are beginning to gain a fair idea of why blueprinting, whenever requested, can be no simple request to satisfy.

Blueprints And Blueprinting Since way back when there was a telephone hot line I received quite a number of calls and, presently, receive emails from members wanting working drawings to fabricate replacement parts for a variety of guns. I've had to turn down every request. Manufacturers refuse to provide blueprints and American Gunsmith has never had them inventoried. Both those facts remain true but perhaps—just perhaps—so does hope.

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I, your humble and obedient Technical Editor, came across something on the web: The-Blueprints.com. They claim to have over 66,000 available on line. Guess who couldn't resist finding out more about this? Right! Turns out The-Blueprints.com is an Amsterdam-based outfit. They offer more than 66,000 blueprints and 11,000 vector drawings but they're not exclusively for rifles. You want to build a car, overhaul an out-of-production handgun, or build a World War I combat plane? How about a tank?

Interested in knowing more? There's a hitch. You can't download any blueprints or vector drawings until you have registered a screen name, password and subscribed to a newsletter using a credit card. To tighten the hitch

the lengthy "terms and conditions" legaleeze never mentions cost. That omission prompted me to remain in the just-shopping-around category and break off the web site visit. If the company or group offering the merchandise were US-based I might have moved further into a relationship.

I avoided doing so. Due to a couple of totally-separate-from-this-article but bad prior financial experiences, I no longer release my credit card data for offshore consumption. I therefore leave any decision to make The-Blueprints.com part of your operation entirely up to you. Besides, I 072" major diameter.

It reams 0.005"-0.010" from M700 minor thread diameter and all the threads from a push-feed M70. quit building airplanes when

U-Control model kits and familiar-to-me glow plug engines powering them vanished from my local hobby shop. Traditional Blueprinting I want you to re-read the definition Mr. Wormsley provided in his letter.

Be sure to add his later comments on On the right the tool is shown as it would be applied to truing the receiver. the bolt to the effect it must be installed in a lathe, have front and rear lugs trued, along with its bolt nose and face trued. There's more. Firing pin protrusion gets checked. Inside the bolt and outside the striker are polished. So are the locking cam surfaces, receiver feed ramp and extractor cam on the receiver bridge.

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On bottom, a carbide bolt face burr with tooling block. Both are employed in blueprinting a receiver. An electric, variable speed hand drill drives the burr in performing the clean-up. Any dedicated High Power rifle competitor has very likely come up against a Master-classified opponent sending bullseye hit after bullseye hit down range from a Remington 40XBR. By the way, the "BR" stands for "Bench Rest" and that rifle was introduced in 1969.

Its receiver is based on the Model 700 except it has been heat treated to between 41 and 46 Rockwell and had its larger outside diameter ground true between centers. Since their introduction 40XBR rifles have been produced exclusively in Remington's Custom Shop. They have always been individually blueprinted. They still are. I hope you're not getting discouraged but if you yearn for more disheartening words you'll find them on pages 152-200 in John Hinnant's book.

Therein he itemizes the traditional method of blueprinting turn bolt actions and reveals the high degree of machinist knowledge and skill required to execute it.

Smile For Good News Thanks to Dave Manson and Manson Precision Reamers (manson- Additional Reading and Sources Reference Author/Publisher Date/Contact The Complete Illustrated Guide to Precision Rifle Barrel Fitting John Actions and Triggers Stuart Otteson amazon.com "Blueprinting" Shooting Times November 2003 "Lathe Installation & Check Procedure" Precision Shooting May 1991 Precision tooling Manson Precision Reamers reamers.com, the need for extensive training in order to blueprint actions has been greatly lessened.

Dave's successful career as a toolmaker, manufacturing engineer and sales representative with Clymer Manufacturing (clymer-tool.com, 877/REAMERS) dates back to 1981, a relationship that only concluded when he started his own company in 1998.

To put it mildly, Dave's specialized tooling has revolutionized blueprinting and is used to perform the following operations without a lathe: Recut the receiver lugs square to the bolt way and to the same height, recut those same lugs 0.010" oversize in diameter, true the front receiver ring, and

ream a Remington-style recoil lug. A fifth element, the Manson Bolt Face Truing Kit, enhances a gunsmith's ability to achieve exactly what the kit title says.

It consists of a precision fixture, the tooling block and various face-cutting carbide burrs. An electric, variable speed hand drill is used to drive a burr to clean up and square up a bolt face to the axis of a bolt and bolt raceway. The instructions accompanying Manson tooling is detailed and, as instructions go, easily understood. While it isn't unusual for a single well-performed blueprint job to take a day to one and a half days on a lathe, Dave's tooling makes completing three in one day feasible.

In his current catalog tooling is listed for 144 rifle and handgun calibers. Wildcat cartridge tooling is not on the list but is available. I will not here, elsewhere, or ever dispute John Hinnant's comment, "Any perceived concerns these tools will not produce a blueprinting job equal to the traditional method will have to be proven to this writer." This writer, too, Mr. Hinnant. AG

TOOLS & FIXTURES

Recycling AR-15 Barrels

Because you wouldn't trade in your car just because of a flat tire.

BY JOE CARLOS NOVEMBER 2014

ORIGINAL PP. 6-10

A long time ago I remember shooters talking about gun barrels only wearing out at the back with claims that a shotout barrel could be pulled off of a bolt gun and given anew lease on life. A gunsmith would cut another thread on the rear of the barrel and remove the same amount from the back, then run the chamber reamer back into the barrel and reestablish correct headspace, making it as good as new. Some of the guns allegedly were .22s and others were centerfires.

I figured that anyone shooting out a deer rifle either had to be way outside the law or the worst shot on the planet. I made it a point to ask everyone repeating this claim if they actually knew anyone ever doing this and the answer was always a reluctant, "no." I began to wonder if this recycling was real or just more "encyclopedic error," something that has been repeated so often that nobody questions it but that may not be born of any real, provable fact.

My interest in firearms at the time was limited to hunting and legally filling my game bag. Such pursuits are not as ammo intensive as competition shooting so I had no guns with shot-out barrels on which to test the "recycling" theory and the idea just lay dormant in the back of my mind for a few decades. In the early 1970s I was shooting Practical Police Combat (PPC) matches.

Cops were still carrying revolvers and it was quite common to hear the same rumor about cutting anew thread and reusing shotout revolver barrels but, again, I was unable to actually find anyone who ever claimed to have done so. As an aside, if you shoot lead bullets and light powder charges through a revolver, the barrel can last 200,000 rounds so not many folks ever

really shot one out. This is much higher longevity than most rifle shooters can even imagine.

Fast forward to the late 1980s when I was competing with the Army Reserve Marksmanship Program and wearing out at least one M14 barrel a year. Remembering the "recycling" theory I took a good hard look at the M14 platform and figured that any attempt to recycle barrels for that gun would have to move the gas port rearward more than Mother Nature ever intended, perhaps making the whole notion untenable. I put the recycling theory back into mental storage for a spell.

The M14 wasn't the only service weapon the Teams were using. The Combat Team tried the M14 for a season or two but found it to be cumbersome and too heavy in recoil to be competitive against the foreign teams using various assault type rifles firing 5.56mm. We initially switched to the M16A2 and iron sights, but as successful foreign military teams began using issue optics, we tried mounting the issue Trijicon ACOG to the A2's carry handle.

The scopes tended to jar loose and were way too high to establish any kind of cheek weld, resulting in troubling parallax. Use of the A2 uppers was short lived and the flat top became the best solution. Courses of fire were evolving to be more realistic and to better prepare soldiers for modern warfare. Time limits were getting much shorter and there were many quick engagements where targets appeared at random across a frontage and then quickly disappeared.

The US competitors were at a distinct disadvantage with the full length 20" flat top against some of the foreign bullpup de-

signs used by the British, Australian and other teams. Some of us dropped the 20" uppers for shorter 14.5" M4 flat tops and found the carbines to point faster. Since we were using ACOGs there was no accuracy penalty with the carbine's shorter sight radius.

First Attempt During all these gun changes I was using a 1:12 twist Krieger 20" chrome-moly barrel with an HBAR contour for training that shot issue 55 grain FMJ ammunition really well. The combination of slower twist, tall 0.218" land, cut rifling, quality Krieger barrel steel, an original chamber with a short free bore, minimal cleaning rod damage, and slightly cooler burning ball powder used with the 55 grain issue load allowed me to go into five figures on my round count before accuracy started to deteriorate.

In all fairness, combat rifle targets tend to have slightly more generous scoring rings than National Match bullseye targets. This is because most combat courses of fire are of much shorter time limits and rack grade military firearms shooting issue ball ammo are not as accurate as match guns. I believe the slightly larger scoring rings of the combat targets allowed me to get a few thousand extra rounds from the parent Krieger barrel.

This was right around the time some were switching to carbines, so I decided it was time to try the barrel recycling theory. I figured that at over 10,000 rounds the original barrel had paid for itself so even if the new barrel failed to work out I was still ahead of the game. The only risk was the machining time and work. I set very few rules for the project. The one rule that I refused to vio-

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This is a “parent” barrel eligible to be cut down and recycled. Next is a 16" recycled carbine barrel with mid-length gas tube shown with cut off “stump” to the left. The fluted 20" barrel is not a “parent” candidate because the flutes extend too far rearward. The 20" A2 barrel with skinny GI contour is too thin to rechamber.

Below that, 20" barrels can be recycled to a 14.5" M4 length for use by customers possessing an NFA-legal lower. late was to invest no more machining work in the project than it would take to make a carbine barrel from anew fresh blank. I cut 5.5" off the back of the barrel, rethreaded it for the extension, and chambered it. The outside 1" fat contour of the parent barrel was turned down to issue M4 skinny specs under the handguards. A fresh crown job, a dip in the Parkerizing tank and I was done.

The parent barrel already had the threads on the front for a flash suppressor. I followed that by properly mounting the barrel in a flat top upper receiver. For the specifics on how to do that see my article, “The Relationship Of Barrel Extension Diameter To Accuracy In The AR-15” in the March and April 2013 issues.

Next, I fired a normal ten round break in, cleaning after each shot, as detailed in my article, “Gas Gun Barrel Break- In” in the October 2014 issue and “Barrel Break-in for AR-15 Competition Rifles” video on the American Gunsmith blog. Really, all I was breaking in was the new throat of the

chamber. After that the gun was ready for a trip to the test shed. Velocity loss was about 150 fps.

A handy estimate of velocity loss is 25 fps per inch of barrel, which I have found to be fairly close in shorter 14 to 20-inch lengths but not so much in the longer Match Rifle lengths. The bigger concern was accuracy. The new carbine barrel shot groups every bit as tight as the parent barrel had when it was new. The only monetary expense was to purchase the shorter (9.75") gas tube.

I was very pleased with the project and still haven't worn that carbine barrel despite getting a second 10,000 accurate rounds through it when the Army Reserve Team needed anew armorer and I gave up competitive shooting to help my teammates. Getting an expected, accurate 20,000 round count out of a blank that goes for about \$300 today was time and money well spent.

Depending on your shooting discipline, its accuracy requirements, and the type of ammo shot you may not get the kinds of round counts I enjoyed on my maiden barrel recycling venture. Characteristics of the parent barrel such as quality of barrel steel, button rifling vs. cut, land height, and land-to-groove ratios will all enter into the longevity equation. Cleaning practices will also be key to how long your barrel will last. Especially important will be your chamber selection.

If you select a chamber with significant freebore, expect accuracy to deteriorate quickly on both parent and recycled barrels. My “AR-15 Chamber Selection” series in

the July through September 2014 issues goes into this further. There are many factors influencing barrel longevity, as detailed in my “Barrel Wear Out” articles in the June and July 2014 issues. Too Much Gas! What I experienced with my very first break-in round was predictable and expected: Greater felt recoil.

Felt recoil in any semi auto is the product of two reactions. The first occurs due to the acceleration of the bullet down the barrel, which is present in all firearms. The second recoil pulse is unique to self loaders and is caused by the bolt carrier sent to the rear by gas impinging on the bolt in the AR-15. That movement is usually stopped when the back of the buffer hits against the rear of the buffer tube and can't go further.

The compressed buffer spring pushes the carrier forward and eventually into battery, causing another jarring sensation. This cycling occurs quickly and during the same period as normal recoil from the accelerating bullet that all we shooters feel is “kick” moving us off target and delaying following up shots. Cutting 5.5" from the parent barrel increased felt recoil because I moved the new chamber closer to the gas port still in the same place and size.

In a regular 20" barrel the expanding gas from the burning gun powder has roughly 13 inches before reaching the gas port but reaches the port of an M4 much earlier (about 7" in front of the rear of the chamber) when it has greater pressure. The earlier impingement of gas on the AR bolt makes the gun want to unlock

RECYCLING AR-15 BARRELS CONTINUED

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From top, AR-10 barrels can be recycled if the gas port is located two or four inches forward of normal placement and remains full diameter far enough forward to accommodate the new chamber. Next, a 26" AR-15 barrel with gas port two inches forward eligible to become a parent barrel. Below that is the same barrel after recycling, now 24" and used with a standard length gas tube. A 20" Service Rifle barrel made by recycling a shot-out 26" parent barrel.

Finally, a 26" Match Rifle barrel recycled down to a 16" carbine length, which works provided the excess gas is controlled. Above Center: Adjustable gas blocks, adjustable front sight housings and adjustable gas tubes can be used to compensate for excess gas when recycling. Some of these devices are called "cyclic rate reducers" and perform double duty reducing ammo consumption in full autos. and cycle sooner than full length barrels.

Called "dwell time" (how long the bolt remains locked up), issues regarding the short barreled ARs wanting to extract too soon were problems in getting reliable carbine function. Designers working on the carbine found that not only was the timing of the gas an issue but so was its volume, which is what barrel recyclers are concerned with.

The factory carbines now have a small gas port size of 0.063" where full length 20" barrel ports range from 0.093" up to nearly 0.1" depending on who is drilling and their preferences. When full length barrels are chopped

and recycled to carbine lengths, more high pressure gas meters through fat gas ports than is needed and this causes the carrier to slam hard to the rear increasing felt recoil. Not to worry, there are solutions!

Dealing With Excess Gas I do not claim to be the first gunsmith to recycle an AR barrel. When I started my first project I looked at what others had done with regard to gas. Some used the existing gas port as a sort of pilot, drilling a considerably fatter hole centered on it, female thread tapping the hole, then screwing an appropriate-sized plug into place, likely coated with Loctite and dressed to the top contour of the barrel.

This plug doesn't have to be pretty, just functional, because it is going to be covered by either a gas block or front sight after drilling a carbine-appropriate 0.063" port. The combination of being screwed in place, Loctite, and the gas block or front sight holding the plug captive ensures that it remains secure. Advantages of this approach are invisibility and you end up metering the true amount of gas that has been proven optimal for carbine function.

From a dollar standpoint it is cheap but not from a labor perspective. The approach I commonly use is an adjustable gas block. These are particularly good if one will be mounting optics and many have a section of Picatinny rail on the top, allowing detachable front sights to be mounted. Brownells also lists front sight housings that adjust for gas flow and adjustable gas tubes.

Derrick Martin's The Complete Guide to AR-15 Accuracy details inserting a set screw through the front of the gas tube to make adjustable tubes. Another option is to accept more gas and slow down the buffer so it doesn't impact the buffer tube as strongly. A simple way to do this is substituting a heavy buffer spring. While these do effectively slow the buffer, they also speed it up forward travel, adding to that component of secondary recoil.

There are also buffer replacements, such as those resembling miniature automobile shock absorbers. The ones I have tried work well. It's important to test fire any time changes to the original firearm design are made. Other Recycling Opportunities While my first attempt at recycling AR barrels resulted in an M4 barrel, the National Firearms Act may raise legal concerns for barrels that short for your customers.

I was using mine with an Army Reserve Team-issued M16 lower so I was fine but it may be illegal for most of us to assemble such short barrels on civilian-owned AR-15s, so most of our short recycled barrels will be 16". These will use mid-length gas tubes measuring 11.75". Longer AR barrels can be recycled in some cases. Some 26" barrels can be shortened two inches as many of us drill our gas ports that far forward of standard barrels.

This increases dwell time, lengthening the time the bolt stays locked up, which may help with primer retention when shooting

RECYCLING AR-15 BARRELS CONTINUED

ORIGINAL PAGE 9

hot loads. Locating the port further forward necessitates a 17-1/8" gas tube (I get mine from White Oak.) When recycling a 26" match rifle barrel to the shorter 24", go back to a standard 15-1/8" gas tube. When locating gas ports on match rifles two inches forward it is common to drill them just a tad fatter because gas pressure is supposed to drop off as the port is moved further from the chamber. Mine are drilled to 0.106".

This is a very subtle departure from the standard 0.093" and shooters will be hard pressed to notice an increase in felt recoil when 26" barrels are recycled to 24". What about velocity loss? While the prediction of 25 fps per inch of barrel holds fairly true in tubes in the carbine to standard length, the velocity gains from longer barrels is less pronounced. My chronograph tests found an average of increase of only 27 fps total, not per inch, from a 26" barrel compared to 24" when testing a variety of ammo.

Obviously, going from a 26" match rifle barrel to a recycled 24" will shorten sight radius. Those concerned about that can attach a "bloop tube." Note it's well documented such tubes change barrel harmonics and can increase or decrease group size. This can be compensated for by adjusting loads or varying the torque of the barrel nut. Some of the very high-end extension tubes have integral tuners that may be faster and more user friendly, but are fairly expensive.

If you don't want to recycle a shotout 26" barrel, you can cut 2" from the back and 4" from the front and end up with a 20" Service Rifle barrel. My match rifle barrels are contoured to a short 1.5" section at the very end of the barrel turned down to 0.750" for attachment of the front sight. Behind that the barrel is fatter. This would need to be turned down to the normal 0.750" Service Rifle contour for attachment of the A2 front sight.

I suppose if you wanted to you could also recycle a 26" barrel all the way down to 16" carbine length (cut 2" off the back and 8" from the front) but you would need to be very aggressive in controlling gas flow due to the gas port of the long barrel being way too big for a short carbine barrel. General Rules The parent barrel has to be thick enough to contain the chamber. When cutting down 20" barrels, the back of the shortened AR-15 barrel needs to be a full inch for chambering purposes.

Twenty-inch match-grade Service Rifle barrels often have an HBAR or CMP contour an inch thick under the handguards and stepped down to 0.750". This can be left at full thickness to the end of the handguard or turned skinnier just forward of the chamber at the preference of the customer. Standard issue A2 contour barrels are not candidates for recycling because they go skinny right in front of the original chamber.

Although I have never done so, AR-10 barrels should be candidates for recycling as long as they meet the minimum diameter to hold the chamber. That diameter is fatter than an AR-15 because of the bigger cartridges fired and the AR-10s I've built have been nearly 1.2" in diameter around the chamber area. It is very common for AR-10 match rifles to have their gas ports located two to four inches forward, making them candidates for recycling.

AR-10 match rifles often have 24" to 30" barrels, though the Army Marksmanship Unit is having success with 20" lengths for long range Service Rifle events. While AR-10s are chambered in a variety of calibers, Service Rifles must use an issue cartridge. Parent barrels need to be .30 caliber to be recycled to 20" length. Any time you are evaluating a potential parent barrel for competition thoroughly research the match rules to ensure compliance.

For example, the National Rifle Association and Civilian Marksmanship Program have very rigid requirements

Service Rifles. Extending gas ports or front sights, increasing overall barrel length or contours forward of the handguard from the as-issued specs is forbidden. However, the gloves are off when competing in Match Rifle events and modifications are common. Selecting Parent Barrels Let's be very clear about the objective of recycling.

You are starting with a "shot out" longer barrel and end up with a shorter one. That must always be done by taking some off the back of the barrel where throat erosion, roughening, and fire cracking has caused the loss of accuracy. This will necessitate rechambering. In my article on AR chambers I made it clear to polish every AR chamber and detailed how. Glen Zediker's stellar The Competitive AR15 Builders Guide also covers this.

While some shooting disciplines, such as revolver shooters, may only require shortening the back of the barrel by the amount necessary to cut one additional thread, the minimum rear cut off amount for Stoner platforms is two inches. I have a few criteria when selecting parent barrels to cut down. First, I want an original barrel that shot well when new. I confess to never having tried cutting down a poor shooting barrel as I considered it too risky.

As a military armorer, however, I had a large volume of shot-out parents to select so I could afford to be choosy and hedge my bets. I do a thorough job of bore scoping and cull any parent that is pitted even if it was still shooting fairly well. Pitting up near the crown always discouraged me the most. I look at the gas port erosion and am leery of anything jagged. All gas ports erode and look unsightly but that doesn't seem to harm performance. I don't worry about deep gas port erosion.

Remember, the groove is about the same diameter as the bullet. Anything below the groove in depth is not going to touch the bullet anyway. I look at the forward stopping point of fire cracking to be sure that my proposed rear cut off amount is

RECYCLING AR-15 BARRELS CONTINUED

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going to remove all the cracking. Most all bore scopes magnify so it is sometimes difficult to estimate how far forward fire cracking extends in terms of inches. If in doubt stop the scope at the last point of cracking and put a little witness mark on the scope with a Sharpie where it intersects with the rear of the barrel. Then just pull the scope out and lay it along side of the barrel until the witness mark lines up again to see where the fire cracking ends.

Gain twist barrels can be candidates for recycling but you need to consider what bullets the customer intends to fire. The front of the barrel is key as the last twist rate before the bullet exits determines the RPM and ability to stabilize. I prefer rear cut offs that allow me to use readily available gas tube lengths. You need not necessarily follow that example, however, as cutting a section of gas tube to a custom length to match your specific project is simple.

I've carried out a fair number of these AR barrel recycling projects and always ended up with good accurate end products that saved my customers a lot of money. No complaints to date. Regarding money, let's say you invest \$100 worth of shop time in the machining.

Assuming you started with a premium brand barrel in the first place, you can easily mark up a recycled barrel and sell it for \$200. If the customer started with a new premium barrel blank and had you do the same amount of work he would end up with a total investment of \$400. So, on a recycle project the customer will think you are a hero for saving him \$200.

The customer could start with a brand new "low bid" barrel blank and bring the bottom line cost down some but based on my experience with hundreds of such blanks I would put my odds on getting better results with the recycled premium barrel. Low priced blanks are not a bargain as you may have to go through ten of them to find a really good one. The Army Reserve paid for the other nine.

On a team of mostly of High Masters, what could I do with the rejects? "Repetition does not transform a lie into the truth" as Franklin D. Roosevelt once said. Just because a barrel company says their barrels are "premium" or "match grade" along with wild accuracy claims, that doesn't make it true. Star Trek fans know the 239th Ferengi Rule Of Acquisition: "Never be afraid to mislabel a product." I've scientifically machine rest tested hundreds of AR barrels over the decades.

In my experience, the number of barrels that shoot honest ten shot groups with quality match ammo in excess of MOA greatly outnumbers those shooting MOA or below, especially when assembled on uppers using conventional "hurry up" methods. Buyer beware! Speaking of costs, as the Armorer for the Army Reserve Marksmanship Program for over a decade I found very cost effective ways of doing things.

Of the big military shooting teams, the Army Reserve was comparatively the "poor kid on the block." Using innovative techniques like recycling AR barrels helped me stretch a limited budget which ulti-

mately comes from taxpayer wallets. Most of us, at the lower levels at least, try to be good stewards of taxpayer money and since I experienced no accuracy loss with recycled barrels I believe I did justice by my shooters and the taxpayers.

With regard to funding, the skills that shooting team members gained and demonstrated with those recycled barrels were passed on to your sons and daughters serving in the military who were put in harm's way since 9/11. Members of both reserve component shooting teams (National Guard and Army Reserve) conducted classes and ranges at power projection platforms that Soldiers mobilized through on their way to face combat.

I am sure that the superior training that these Soldiers received in marksmanship helped save numerous lives. Remember, the cost of one cruise missile will fund an entire military rifle team for a year! You now have an interesting new tool to put in your gunsmithing tool box. Not many customers will approach you to recycle an AR barrel because they don't know to ask.

If recycling is something you're interested in, educate your customers, perhaps by making a recycled barrel and displaying it with test targets at your shop or gun show table. I would never sell a recycled barrel as new and telling potential customers you do this will have them asking about it. The novelty of the whole process will likely encourage more potential buyers than it will discourage. AG

HISTORY

Computers In The Shop

BY WENDELL DEANER NOVEMBER 2014

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As any of you know who have been following my articles in American Gunsmith, I probably come off as a crusty old dinosaur mired in the past glory of the early 19th century. However, looks, as well as the written word, can be deceiving. Just catch some of the propaganda on your TV or local newspaper and you'll understand what I mean.

I'm going to admit here and now that I am a computer junkie and have been since the 1970s when I bought my first one, an AT&T machine (bet you didn't know they made them) that I paid almost \$3,000 for! For that kind of juice I got a computer that wasn't on the Internet (didn't really exist yet) had two 5¼ inch floppy disk drives (no hard drive) and was only used for word processing and games that I could afford. It didn't even come with a printer. I bought a daisy wheel letterquality printer later for about \$400.

Man, have the prices come down. I threw that computer and printer out in the trash one day while shedding a tear over the exorbitant expense they represented. But life goes on, and after I don't know how many machines later, I am now on my latest desktop and laptop and am planning to update my system at the beginning of the new year. One thing I am sure of is that you get a hell of a bang for your buck nowadays compared to the poor suckers like me who didn't know they were "investing" in planned obsolescence.

Just like the "pocket" calculator I bought while I attended college that I thought would help me understand all those fancy scientific formulas for only \$400 (sure beats a slide rule) but that's another story. That baby ate batteries like a crocodile eats

swimming wildebeests and came with an adapter to allow you to plug it into a wall outlet. Today you can buy a solar powered lightweight powerhouse for about ten bucks.

Not only have computers and calculators become imminently affordable but printers are also a world apart from how they started out. Remember dot matrix printers? Does your printer still use expensive ink cartridges? I bought a laser black and white printer for less than three hundred dollars. The printing cartridge is supposed to last for about 5,000 pages and a replacement costs less than \$100. Oh, happy days! I'm even "wasting" my cartridge to print such mundane items as recipes.

Have you joined the informational age in your shop, and if not, why not? What's it good for, you say? Here are a few examples of how a computer system can not only increase your efficiency but also actually save you money. For starters, inventory control, billing, and sales. If you stock regular items and want to know when they are getting low, scanning the bar code on your register can record that information and can automatically order a replacement for you at whatever level you desire.

Want to be reminded of how long an item has taken up space on your shelves? Maybe it should be a special order instead of a regular dog. Let's put something else in there that will move in a reasonable amount of time. Selling an item too high? Lower the price ten percent and now it's flying out the door? Computers can keep track of all sorts of inventory problems. If you're a one man operation with no inventory except your tools you probably don't need this function.

Are you cash and carry, still handwriting estimates and receipts? What about that dusty rifle in the back your guy forgot (and you forgot) that was supposed to be picked up two months ago? Your computer would flag that for you. I like a printed and itemized receipt; it looks 100 times more professional than a handwritten yellowed scrap of paper. How about when the widow comes in and wants an estimate on getting rid of all those old guns her husband had cluttering up the house?

Printing an estimate from the book and showing her how much you would charge on a legitimatelooking form would go along ways to make sure she felt more confident placing them in your hands rather than the guy down the street who handed her a grimy sheet of notebook paper. OK, maybe you're telling yourself that's fine for a big shop, but what about the guy who has a little place and a few loyal customers, or a fellow who views gunsmithing more as a hobby or a favor to some of his friends?

I could probably be considered more like the latter myself but I still have plenty of use for a computer. In fact, I don't see how I could do without one. Numrich Arms (gunpartscorp.com), Midway USA (midwayusa.com), Mc Feely's (mcfeelys.com), Grizzly Industrial (grizzly.com), Brownells (brownells.com), Graf & Sons (grafs.com) and many others all put out master catalogs displaying parts and tools. Most of the manufacturing companies that make holsters, stocks, grips and darn near everything else have a catalog.

And, almost all of them have a website. Believe me when I tell you I can probably find that part you need ten times

COMPUTERS IN THE SHOP CONTINUED

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There are many like it, but this one is mine. It only takes a little space in a corner of my shop. Admittedly, it has some clutter but it is a working office. Pictures of grandchildren are optional. Documents, receipts, pages of books, etc. all can be duplicated easily. It even does double duty as a copier. This one was a steal at less than \$100. faster than you can. The customer could stand there waiting all day but some of them won't.

You can spend your day typing up a snail mail letter to receive a catalog, lick a stamp and wait for a month or two before the requested catalog is delivered. When it comes you can leaf through page by page looking for apart or a tool, calling your order in and generally wasting your time where a computer gets you there in seconds.

Isn't it frustrating to meticulously search a catalog for just that right part you need and then calling or writing your order only to find out they don't stock it anymore, or the price is twice what you told the customer it would be? The website is in real time. If the part is out of stock the website will generally give you that information and also when, if ever, they expect to have it available. They usually even allow a backorder if you have the time and are so inclined.

Order and forget it, as soon as they have it, it's on the way. When you do place an order online your business records will be simplified. Simply print a receipt (or place it in a separate file) and it will all be ready for you at tax time. You will even receive messages about when your order was shipped and in

many cases be able to track it through the UPS or another delivery site to know exactly when to expect it at your door. Forget about anything but a laser printer.

They are so inexpensive you can't afford not to own one. Another advantage of a computer in your shop is that many of the company's websites, such as Hodgdon Powder (Hodgdon.com), have links to information such as loading data immediately available. If a customer comes in and tells you he "only" put so many grains of powder in the gun before it blew up and you find it's about five grains over maximum according to the manufacturer, it gives you some telling information a lot more quickly than pulling down a

COMPUTERS IN THE SHOP CONTINUED

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manual from your bookshelves that may or may not be up to date. What if your customer wants to trade in his old deer rifle on one of those big blasters that got so much press last year? A quick check on the manufacturer's website tells you that gun is no longer cataloged. Fair enough, they can make whatever they want, but at least you can inform your customer that it may take a little more time than usual to find one; then get on the computer and search. Speaking of searching, Internet sales are red hot.

If you want to sell a gun, or buy one, you can probably find something on Gunbrokers.com or GunsAmerica.com, among others. Not only do these sites have guns but also about everything else imaginable that could be used by shooters and sportsmen.

You can still find a lot of stuff on EBay.com, but they are a little prissy about what they sell (semi-auto magazines, for instance, due to the bad press they received after some of the more tragic mass shootings.) A lot of people are into using old, collectable receiver sights and sometimes an online auction is the only place you can find one for an antique firearm. Forget the malarkey you've heard on the news and even from some of the people on our side.

INTERNET SALES ARE REGULATED THE SAME AS ANY OTHER, maybe more so. You cannot bypass background checks that are required in your state. The process requires that you send a copy of your dealer's FFL to the seller before anything happens. All firearms are shipped to a licensed dealer and the transaction is then completed the same as if you bought the gun from them. Most of the dealers I know are pretty reputable bunch; they like to have a signed FFL come with the gun.

None of us want to get into trouble with the BATF. What irks me is the way this stuff is reported on TV, implying to the general public (on purpose to bamboozle them) knowing nothing about it that you

can just get on your computer and have an AK-47 shipped right to your door. The other side uses every trick. For once I'd like to see them called on it. Regardless, if you deal in trades or used guns, or if you just want to increase your sales by moving a few guns on the Net, it's easy to do.

All it takes is a digital camera and a little computer skill and you're in business. You will be reaching thousands of potential customers, not just the ones who frequent your shop. Speaking of digital cameras, almost everyone has one nowadays. It's difficult and much more expensive than it used to be to get old-fashioned film processed. The new cameras are relatively much less expensive than they used to be and are very user friendly.

All of them come with software that allows you to add images to a file and has all the information about how they work available online. You can either take a small memory card the size of a tiny cracker to a department or drug store and have prints made or use a site such as Snapfish.com and get prints, enlargements, cards, books, etc. mailed right to your door—cheap, too! If you have a bore scope, most of them can be had with a digital camera adapter that will record any spot on the bore that is of interest.

Gradient Lens Corporation (gradientlens.com) makes the Hawkeye which is especially useful for gunsmiths. They are not inexpensive but are well worth the cost. They even offer a system that can be plugged into your computer so you can actually watch the progress of the scope in its travels through a bore on your computer screen.

Sometimes, when taking down an unfamiliar gun that I don't have a schematic for, or one is not available, or even if I have one, I like to take digital pictures of how the parts fit together and what goes where. A digital camera shines for this kind of help. You can take as many pictures as you want without running out of film and can in-

stantly determine if it is the picture you want by seeing it on the camera's screen as soon as you snap it.

These pictures can be printed and/or put into a file on your computer for future reference. For customer service, diagnosing problems or whatever, pictures can be burned to a CD and given to your customer to view at their own satisfaction. This kind of preparation has saved my bacon more than once. Another reason to take pictures is to be able to show your customer what was wrong with the firearm you repaired or what you will have to do to repair it.

A record like this is a wonderful thing, not only for customer relations but especially for legal reasons. If the trigger was already screwed up by someone who didn't know what they were doing, by all means document this fact. This kind of factual information could really make your day in court. Judges and juries rely on hard evidence like photos and written copy. Lame excuses don't go over very well. What about computers out of the shop? Isn't this article about computers IN the shop?

Yeah, but these points are also relevant. A laptop gives you a lot of freedom. If you just want to get away from the grind and noise of the shop and go outside on a nice day. A little solitude, a little fasting (well, maybe that's too much), a cool drink and relax in the shade while you take care of business. If you have a wireless Internet connection (very common) you can access the Net away from the confines of your shop. Usually your laptop can pick it up as long as you don't wander off into the daisies.

Also, the laptop can go where you do. Take it to the local shooting match. Your range might even have wireless Internet access. If you're loaded with the appropriate software a portable computer will still allow you to rule a small part of your world. Running for 6-8 hours on batteries, you can finish almost any match before a recharge is needed-

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com, Webster's New Twentieth Century Unabridged Dictionary is still useful. ed. Load data is at your fingertips, so are pricing and billing questions, add new or potential customers to your database; trajectory tables are no problemo, on and on. Load up a CD with digital pictures of work you've done. You can display them on a computer screen to show your customer exactly what you are talking about and for examples when it comes to modifications or work they might want done.

Pictures are better than vague, "Stop by the shop sometime and we'll see." You can seal the deal right at the range. That makes you the guy with the answers. Who do you think will get the most traffic and build their customer base, you with the power of the computer as an aid or Joe Blow sitting ten benches down who dispenses homilies and hearsay without any backup? When the match is over you can go back to your shop and download The books shown are not available online.

Both have their place. all the data from the day into your main system to use as needed. Flag a call to the guy you met at the silhouette match who might want a gun built. The computer will remind you. Did you promise more information when you had the chance to do some research? Do you want to put the

new contacts on your mailing list? All of these things and many more I'm probably not even aware of can be easily handled by these fantastic machines. Throw away all your books and printed material.

If you have video on gunsmithing, dump it. Not! The Internet, no matter what our young millennial friends tell us, does not contain all the information in the world, or even all that is worth having. There is a big gap between what we can learn on the Net and what we have to dig for. Many have lamented that the day of the book is over. I disagree. You still can't download a PDF copy of the 1965 Shooter's Bible. All the wisdom of Jack O'Connor, Jeff Cooper, and Warren Page is not in the ether.

How many millions of books have come before us? I asked a young kid who Doc Holliday was. All I got was a blank look. Yeah, you can learn about him online, but let's also read and watch good movies as well. During the last Presidential election cycle I conducted a small, but telling, experiment. I asked an eighth grader and a friend who is seventy years old to name the man who was currently serving as our Vice President (Biden). Neither one could tell me.

Then I asked who Mitt Romney was. "Is he the Vice President?", my older friend asked. This is the same man who will not touch a computer as if it were a snake. He says it is because he doesn't know how to type. Do you need to know how to type to use a mouse? He is incredibly afraid of anything new, an affliction called neophobia (I just looked it up online.) He is also about the most uninformed person I have ever met.

As Flounder was admonished by Dean Wormer in Animal House, "Fat, drunk, and stupid is no way to go through life, son." Well, stupid, anyway. I will still haunt used book stores and search out obscure tomes until the day I leave for the Happy Hunting Ground (hopefully.) When everything is on the Internet I will get a chip implanted in my brain so I don't even have to use a keyboard or voice to access whatever I want. I hope that day never happens and if I'm long gone before then I'll be glad.

Using the power of the computer to increase our knowledge, customer service, sales and prosperity can only be a good thing. What's neat is that you can embrace as much or as little as you please. All it takes is perseverance and determination. After the first few steps you will wonder why you hadn't done it sooner. AG

RIFLES

Barrel Chamber Bevel And Case Head Position

An often overlooked area of the rifle involves the chamber mouth of the barrel in connection with case head projection.

BY NORMAN E. JOHNSON NOVEMBER 2014

ORIGINAL PP. 15-17

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Here I will address an incident where a shooter experienced a partial case head blowout that released brass fragments into his face and right eye. At the time, the man was shooting a relatively small .224 caliber cartridge chambered in a Model 700 bolt action rifle. The load was well under maximum with no sign of excessive pressure noted on any of the previously fired cases. Cartridge headspace was normal. Extraction was normal and primer pressure signs were unremarkable.

The case separation appeared to be a fortuitous occurrence and there may not have been anything he could have done to obviate the unfortunate accident, however, upon further examination the rifle and damaged cartridge revealed the apparent causes leading to the ruptured case head. While there can be several causes of cartridge case head leak or blowout, I will isolate the more likely ones surrounding this particular incident.

Even with normal cartridge headspace, complete enclosure of the case in the chamber is not normally attained because some case head protrusion is required for normal extraction. Therefore, the case rim must protrude sufficiently for the extractor to lock onto the case rim. This is accomplished in different ways depending on bolt face and extractor design. On some firearms the case rim extends well beyond the chamber rim, exposing a greater portion of the case head.

In such a case, part of the case head is not surrounded or enclosed by the chamber wall, leaving it weaker to some degree. The farther the case head protrudes, the greater the chance of case head rupture. Notwithstanding, cartridge case ruptures can occur for reasons which must be identified and corrected where possible. This picture shows a case head blowout at the juncture of the chamber rim near the base of the case web. Note the deep recess for the bolt head used on the Remington Model 700 series rifle bolts.

This feature enshrouds the bolt head and chambered cartridge in a ring of steel in the event of case head rupture or separation. As seen here, cartridge case rupture can occur, causing gas leak along and beyond the bolt. protrudes, the greater the chances of case failure, particularly if higher chamber pressures exist. This, combined with a deeper bevel at the chamber mouth further increases the likelihood of case failure.

This is particularly true where an inherent defect or weakness exists in the case head or case wall, in the web portion of the case distal to the head. Of course, excessive cartridge headspace would further compound the problem. But this was not noted in the earlier incident. As I further studied the aforementioned incident of case blowout, the chain reaction essentially

BARREL CHAMBER BEVEL AND CASE HEAD POSITION CONTINUED

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Such a ring is a definite danger sign of impending case head blowout or separation. Though this circularly beveled portion of the chamber is only a few thousandths deep and little in increased diameter, this is where the case head ruptured.

While this slightly oversized bevel may not be the cause of the aforementioned case rupture, it must be viewed as a contributing factor. Involved the following: A weakening in the case wall near the web, followed with excessive peripheral chamber bevel at the point of case blowout, and then the case being subjected to maximum protrusion. On left, Model 700/40X with recess for bolt head.

Note the slightly varying degree of chamber mouth bevel with center barrel showing slightly more than barrel at left.

Barrel on right is from a Model 112 series Savage bolt action rifle. Here the chamber is flush with the end of the barrel shank with a much greater chamber mouth bevel, yet the cartridge head can be chambered more fully. This barrel design does, however, enclose more of the case head within the actual chamber walls despite the greater amount of peripheral bevel.

Where greater strength is required, there is much that can be learned about barrel, chamber and cartridge construction that can be ap-

plied by both the gunsmith and the shooter for safer shooting. Regular monitoring of incipient pressure sign through fired case inspection is a good place to start. Beyond the chamber bevel as a result of bolt face design.

Even though the case head on a Remington Model 700 style rifle is enshrouded by the recessed bolt face, it does extend out beyond the perimeter of the chamber entrance into the chamber mouth bevel. A closer look clearly showed that the partial case head blowout did take place precisely at the juncture of the chamber mouth where it is beveled. Had this case head been allowed

BARREL CHAMBER BEVEL AND CASE HEAD POSITION CONTINUED

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to enter more fully into the chamber surrounding the area where the case head had blown out, it is unlikely this particular case head would have ruptured. I cite this example as there are rifles, by design, whereby the cartridge case head has less extension beyond the chamber mouth during bolt lock up. Such a design would likely have prevented this particular case blowup. No other fired cases in the lot showed any sign of defect.

There did appear a contributing cause, as I shall point out, leading to this particular case head rupture. Chamber Bevel Close Up As the accompanying pictures clearly reveal, the blown out case head involved the juncture immediately adjacent to the bevel of the chamber. This shear area just forward of the inner case web extended 0.170" forward of the base of the cartridge where the case wall begins to taper and thin.

It was difficult to discern if this particular case would have ruptured had it not been for the 0.020" of chamber bevel added to the 0.150" of case head protrusion on this particular style rifle. While I have witnessed a good number of case head cracks and actual separations involving other rifles, this is an isolated incident where the case metal sheared precisely at the periphery of the chamber bevel. I have conducted extensive research in cartridge case head separation in the past.

One of my works appeared in the 1997 Precision Shooting Annual entitled "Case Head Condition Affects Bullet Behavior." I have also used X-ray as a means of monitoring case head condition, one work which was published in the May 1969 issue of American Rifleman. Modern rifles have gas bleed-off ports to divert gas leak. However, these were of little help in this case where the path of brass particles was forced parallel to the bolt by ensuing gases.

The brass particles actually etched the stock wood immediately rearward of the bolt shroud as well. I believe the scope ocular lens housing served in preventing further divergent gas and particles from reaching the shooter's eye. Lessons Learned As a cartridge is loaded into a chamber there is little to guide it aside from the magazine follower, the bullet, and/or the taper of the case shoulder. In many instances cartridge case taper is minimal.

Therefore, some degree of bevel or chamfer is applied at the periphery of the chamber entrance to help prevent brass shaving or case jamming as the cartridge is chambered. This bevel or chamfer varies among manufacturers and gunsmiths and even with identical barrels of a given manufacturer. The degree of chamber rim bevel must, however, be kept to an absolute minimum. Where excessive bevel does exist, it can present a danger as was experienced here.

Being aware that such a condition can exist should be observed by the gunsmith and, if identified, be corrected. Close observance of correct cartridge headspace is also required. Conclusions As gunsmiths, we should know that excessive chamber rim bevel can present a danger and keep this to an absolute minimum. This is particularly true where the case head extends farther out into the bolt face, or where excessive cartridge headspace exists.

As remedial action, where excessive chamber mouth bevel exists, the barrel can be set back one thread and refaced before applying only minimal bevel to the chamber. Being observant of incipient case head stretching or signs of excessive case stress are also important. These can be precursors of pending problems. Beyond this, as gunsmiths, there may be little we can do to obviate problems of this nature but we must remain vigilant nevertheless.

MAINTENANCE & REPAIR

Aftermarket Drop-In Parts

"Drop-in part" doesn't always mean "drop in to your gunsmith's shop with your parts" and can be used for custom work without machining and only minimal fitting.

BY ROBERT K. CAMPBELL NOVEMBER 2014

ORIGINAL PP. 18-22

Not counting the many handguns I have worked with and repaired over the years, I have built perhaps twenty-four custom 1911 handguns for personal and family use. For the most part when building these pistols, as well as a few competing types such as the Beretta 92, I have done so without access to a drill press or lathe. For the most part I have relied upon custom grade parts advertised as drop-in.

The majority of the parts used have actually been easy to fit but more than a few have required some fitting, just as the maker cautioned. I think that overall the availability of these semi custom parts is positive. After all, I have acquired more than a few batches of GI parts that tested both my skill and my religion! Lets take a look at this major resource for 1911 fans. The most common part that we replace, either from wear or from a desire for increased performance, is the barrel.

When it comes to drop-in barrels there are options beyond the 1911. I have purchased after market barrels for the Browning High Power, Beretta 92, and the Glock with excellent results. I have used Kart, Bar Sto, Jarvis, Ed Brown and Wilson Combat with good results. Most, but not all, were simple drop-ins. I have enjoyed good luck with two barrels in particular. One was a Clark Custom barrel used in a .460 Rowland conversion.

This barrel provided high precision and dropped in every mil-spec handgun in my safe, although not some of the tightly fit-

ted custom guns. In the second instance I looked for an inexpensive barrel for a well used Ithaca 1911 picked up for a song. After a week or so of study, I contacted Sarco and obtained a Roto barrel. In this case the barrel fit right in the GI slide. Absolutely no fitting was required. This barrel improved the accuracy of the old warhorse immediately.

There are more than a few shot out .45 caliber barrels and the Roto barrel is one answer. It is nice when we don't have to do fitting but sometimes we do. I ran across a Colt .38 Super with various problems. I wished to optimize this pistol and ordered anew Bar Sto barrel. The drop-in was not quite a dropin. While Bar Sto will fit the barrel for a reasonable price, I decided not to ship the slide and barrel but to fit the barrel myself.

While not particularly complicated, barrel fitting requires attention to detail. Remember, the 1911 began manufactured since 1911 and there are bound to be differences in dimension despite the best intentions and blueprints. To me, drop-in means minimal fitting. For the best results from a premier barrel maker, order a gunsmith fit barrel from Bar Sto Precision. Most of the time the drop-in barrels are a great option but the consumer should be aware that they may need gunsmith attention.

It is simpler to obtain a drop-in for one of the European pistols. This was proven out when I obtained a .357 SIG caliber barrel for the .40 caliber Glock. The Bar Sto unit

in .357 SIG simply dropped in but just the same gave outstanding results in the pistol. Coupled with Novak sights, the Glock became a fifty yard pistol rather than a 25 yard pistol. Oversize match grade pistol barrels are different breed. They are purposely oversize, requiring considerable work to allow them to slide into the locking lugs.

While they offer superior accuracy potential, drop-in units can also give good results. I seldom offer or order a gunsmith fit barrel except for a pistol with consummate match in the slide and frame to insure maximum accuracy potential. I have not ran across a dropin pistol barrel yet that wallows in the slide or is of excess dimensions. And that is quite a statement considering my broad experience with the type.

When drop-in barrels do not quite make the first fit in the slide, it is usually the barrel hood at fault. The hood must be carefully fitted by polishing away material. The locking lugs may be overlarge as well. A simple rule of thumb is to check fit with a slide stop. With the slide removed, seat the barrel properly in the frame, complete with a link. Insert a slide stop into the slide stop opening and through the link. If the barrel moves upwards, some fitting will be required.

When purchasing a drop-in barrel you are ahead of the game to order a complete barrel and bushing set. The outer diameter is OK if the old bushing fits your new barrel.

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When care is taken in selection they are often satisfactory. This one was fitted by The Action Works. I have definite ideas on the best quality in pistols and pistol parts. When building a pistol it is best to check with the manufacturer of the frame and slide for parts compatibility. Recently, I acquired a Rock River Arms frame and slide for a special project.

Since Rock River thinks highly of the Smith and Alexander beavertail and cuts their frame for this application, it made good sense to use the same, especially since the Smith and Alexander unit is among the best of the

breed. When it comes to the slide lock safety, this is one part that you cannot drop in and I wouldn't want it any other way. This part has to be fitted for proper function and for proper clearance against the sear.

It is a shame to run a pistol with a wonderfully sharp trigger action and then ruin it with a rough feeling slide lock safety. The 1911 is a main focus of attention when it comes to drop-in pistol parts but the Browning High Power also has its share of fitting. As an example, the Cylinder and Slide Shop safety I prefer for the High Power is usually applied to the HP with a minimum of

fitting. The same goes Are they all Novak sights? Are they all the same cut? Be certain before ordering. for the FM pistol.

The Hungarian FEG, on the other hand, will leave a gunsmith scratching his head. The Browning parts will fit but they require a bit of finesse and wrangling to figure out. Sometimes we do not wish to order a drop-in part and might actually need an oversize part. An example is an oversize slide stop. Sometimes there is slop in the fit, especially when using a non standard slide and barrel. I have found

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The Bedair solid rod works well, as does the Laser Max unit. Others have sometimes not fit properly. Fitting is often in order. an oversized slide stop a great aid when using single shot upper units in calibers as diverse as .22 Long Rifle and .44 Magnum. Extractors do need to be fitted and I have used Ed Brown extractors in top end pistols with excellent results. Extractors can be a problem as the 1911 relies upon the extractor for proper function in the feed cycle.

I have used Wilson Combat extractors for many years and have never had a problem. However, recently I diagnosed a problem in a 1911 that surprised me. The culprit would have seemed to be brass shavings in the extractor tunnel but it turned out the extractor was contacting the tunnel, affecting function. A bit of polish on the extractor on the bump behind the claw cured this problem.

When it comes to adding a trigger, hammer and sear my advice is to purchase a complete kit or at least purchase all of the parts from the same maker. I am not pushing one over the other and have enjoyed excellent results with Wilson Combat, Ed Brown, and Nowlin. Most of us order from Brownells and your life will be much easier if the parts are in sync with the other! Sometimes a drop-in unit is OK as far as fit goes but changes the geometry of your lockwork.

That nice new trigger or hammer now has the sear and grip safety out of whack. When it comes to hammers, it is fairly common for aftermarket hammers to rub on the slide of a stock 1911. I do not understand the advantage of this type of tolerance, but it is a fact. Before installing it, I place the hammer in the naked slide to be certain no work is needed for the hammer to clear the slide and strike the firing pin.

Trial and error is critical in everything we do but there are certain runs of handguns that seem to have tight slide dimensions around the firing pin stop. There are those who 40 and .357 SIG, the barrel is usually a drop-in unit. feel comfortable adjusting tension on the sear spring. At one time, a special sear spring was manufactured that featured a twisted spring hand on the left side. It turned out that when installed in my pistol, it would sometimes connect the disconnecter and prevent the firearm from firing.

Given this problem, I took this sear spring out and threw it away. It did give a nice action but it didn't work properly. A lot of folks don't understand the action of the sear spring and this is the last part you should go cheap on. Problem is, there is often some adjustment needed for perfect function and this is a place where finesse is needed. The left rear (long leaf) of the sear spring contacts the sear.

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This is correct for the 1911. Grips often need slight fitting, usually around the magazine release. While a lighter tension here can produce a lighter action, too light tension can allow problems, such as the hammer following the slide down in recoil. The middle leaf resets the trigger. I once put together a 1911 that fired once, and the trigger was very nice, but it didn't reset until I racked the slide three times!

The far right or short leaf maintains tension on the grip safety and is an important part in the scheme of things. The inside of the 1911

is not delicate as this is among the most rugged handguns ever produced but certain rules must be adhered to. One of these is that when a truly light trigger action is desired we must fit an aluminum or similarly-light trigger. The decrease in weight makes it much less likely the trigger will bounce the sear in recoil and fire the pistol when we do not wish it to.

Almost all triggers, drop it or not, must be fitted or they will not glide smoothly in the frame. Only GI triggers do not require fitting and we seldom use these any longer.

Concerning non-1911 type pistols, there are These two caps are slightly different designs. many aftermarket parts advertised as drop-in that are not easy fits. One of my friends recently purchased a full length guide rod for his Glock.

Advertised as a high quality unit designed to tame recoil and keep the recoil spring straight, the unit quickly was beaten on the end. I have seen 1911 full length guide rods do the same thing. The Clark system seems to be the best all around, with its robust two piece construction. The full length guide

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Original caption: Top: Since Randall introduced the full length guide rod many have come and gone and all do not fit properly., Italy, is purposely over size for fitting. While sometimes difficult to find, these are good parts. rod used by Hindman as part of the .45 Super conversion is also very robust. Quite a few units get banged into the locking lugs, could present a liability issue and just don't look right. I examined the guide rod my friend put in his Glock.

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It was precipitously beaten and I felt it had no place in a defense pistol. I am not certain we need full length guide rods at all. In the case of the .460 Rowland it appears to be effective and the Clark unit is first class. As far as other units, I don't see what can be done to help those drop-in parts as the dimensions are the problem. There are a number of drop-in sight options available. Caspian makes a very nice adjustable sight that fits in their custom slides with a minimum of fitting.

There are a number of sights that fit in the standard dovetail. I have used a set from MGW (Maryland Gun Works) requiring the front sight be staked on, a straightforward operation. The rear sight is a simple matter and these sights work well. The front and rear sight are normally sold as matched pairs but some sights are sold as rear sights only. They look similar to the Novak, having a large body over a small piece that slides into the dovetail. A screw through the body locks these sights down.

OK as far as it goes but when the sights are installed with the standard front sight, the pistol inevitably shoots four inches or so above the point of aim at fifteen yards. drop-in they are, but less than satisfactory. Even something as simple as grips can re-

quire fitting. They almost always fit the grip frame but sometimes the screw holes do not exactly fit over the bushing and must be reamed out carefully.

On one occasion, the supplied grip screws were too long and protruded into the magazine well, binding the magazine. My overall view of drop-in parts is they are more likely to drop in a GI type pistol rather than a high grade production piece. As an example, recently I acquired a nice Caspian slide with sight cutout and front cocking serrations and set up for an external extractor. It is all top grade and modern. I expected to do some fitting.

I first tried it on my High Standard G Man, and it would not budge on the rails. I also tried it on a friend's Wilson Combat pistol as a lark. No. While these pistols really didn't need anew slide, both are top grade pistols. Part of the rationale behind the new slide was to have a permanent home for my .460 Rowland conversion, complete with high grade adjustable sights. I tried the slide on a Parkerized mil-spec Springfield, a stainless steel version of the same as well as a Rock Island Armory pistol.

Perfect fits in all regards. The pistols that needed an upgrade could get it. Top end pistols, held to tight tolerances in the first

place, will probably not be the most fertile ground for drop-in parts. But then, who needs to add parts to these type of pistols? We must keep drop-in parts in perspective and understand the customer's wants.

As an example, the addition of a drop-in Bar Sto barrel for Glocks always results in increased accuracy but a drop-in 1911 barrel will normally not be as effective unless the original barrel was quite worn. Drop-in parts can be used to change caliber, such as converting a .40 Smith and Wesson pistol to .357 SIG or a .45 ACP to .400 Cor Bon or .460 Rowland.

The customer must understand that only a true fitted barrel will give optimum performance, however, a modest improvement can be realized more easily with drop-in options. A true custom beavertail will look and feel best but require fitting and cutting the slide, while a drop-in version may be good enough and much less expensive to install. My experience with drop-in parts has been positive. While they may not give the results of true match grade parts, they can often come close.

When a reputable supplier is chosen and care taken in handgun selection, the combination can result in increased performance at a modest price. AG

MEASUREMENT & INSPECTION

Reader Forum

BY AMERICAN GUNSMITH EDITORS NOVEMBER 2014

ORIGINAL PP. 23-24

Lug Lapping I have an old (2007-8) Weatherby Vanguard, a pre-MOA model. After reading the article "Precision Barrel Fitting, Part Two" in the May 2014 issue I inspected the bolt lugs on this rifle and found some wear indicating the contact points. I have fired several hundred rounds through this rifle and am happy with the accuracy. It shoots MOA or thereabouts with factory ammo and better with handloads despite the wear indicating much less than full contact with the lugs.

I am reluctant to do anything to it because it "ain't broke" although I did inspect it thoroughly and full contact is not indicated. It sounds like you may have missed some pertinent-to-your-query information that appears in the article. Included area couple or three key paragraphs on performing the operation and a drawing from John Hinnant's book to serve as a guide for making your own bolt lapping tool.

If that thought doesn't appeal to you, Brownells offers ready-made bolt lapping tools but none are listed for a Weatherby. Talk with a Brownells Tech to determine if one of the tools they offer can be substituted. If not, you have little choice beyond taking a DIY approach. Martini Cadet Stock I have a Martini Cadet barreled action chambered in .310 Cadet which I want to restock.

I have acquired a stock, however, the stock is not bored for the screw that holds the stock to the action and I have been unable to find any instructions about how to do this particular job so that the action and the stock are together properly. I wonder if you could help me any in either to reference some article or other instructions or to let me know directly. Walter J. The barrel of your Cadet Action should be wearing a stud on its lowermost surface. The stud is the stock screw stud.

It has been internally threaded to accept the stock screw. Coat the lower surface of the stud with an indicator fluid such as Dykem. Locate the position of the stud on the upper surface of the barrel with a red wax marker. Before the indicator fluid has dried completely position the barreled action in the stock as far to the rear as it can go. Place an old sock or similar padding over the red mark. Tap smartly down on the padding three or four times to assure good contact between the stud and the barrel channel.

Tap once or twice more on each side of the red mark but retain the padding over your points of impact. Joe If good contact has been made there will be a distinct stain in the barrel channel remaining after the barreled action is lifted free. This stain indicates the position of the stock screw stud. Locate stain center and drill a very small hole down through the exact center of the barrel channel. Do not enlarge the hole to accept the stock screw at this time. Check out alignment first.

Seat the barreled action in the stock. Insert a toothpick or short length of straight wire into the hole you have drilled. If the toothpick or wire top out in the stud screw hole you're lined up. Remove the barreled action and enlarge the alignment test hole to accept the stock screw. Once again, rejoin the barreled action and stock. You may have to nudge the action slightly fore or aft to perfect the alignment before installing the stock screw. Remington Nylon 66 I recently picked up a Remington Nylon 66.

It is in good condition except for the stock. Is there away to bring back the luster and remove minor scratches on the plastic stock? Charles The Nylon 66 rifles we've seen had a glossy black stock. For minor scratches, there are plastic polishes available at auto parts outlets and sold to clear

up headlight lenses. For scratches too deep for these polishes to eliminate we recommend refinishing the entire stock with a gloss black coating.

One we like a great deal and have worked with frequently is Dura Coat duracoat-firearm-finishes.com). Their #41 Gloss Black ought to look great on a 66 and one of their Shake 'N Spray finishing kits (\$29.95) could probably redo half a dozen pretty badly scarred stocks. When you speak with them be sure to mention the one you're fixing up is plastic.

Dan Wesson I found your article at gunreports.com entitled "The Return of the Dan Wesson Model 15" and read it with interest as I am a great fan of the Dan Wesson revolver and remain hopeful it will return to production. I was confused by something in your explanation of removal for the front sight. "However, if you can eyeball both ends of the pin you can drift it out after you back out the front sight retaining screw. The smallest Allen wrench on the takedown tool is intended for this purpose.

With the pin and screw both removed, grasp the blade (#5) in your padded pliers and pretend you're the most gentle dentist in the world." Why bother removing the pin? I have three Dan Wesson Model 15-2s and if I remove the front sight retaining screw, I can always remove the front sight blade with a bit of persuasion. I say a bit of persuasion because I've always found that they tend to stick because of gunk build up and maybe a tad of corrosion will hold the blade in place. Am I missing something?

Mark We believe what happened is a simple engineering change made either by CZ or the new Wesson group in Norwich whereby a pin was added

READER FORUM CONTINUED

ORIGINAL PAGE 24

as extra security against the front sight insert shooting loose or being knocked off. A pin was definitely present on the revolver when it was featured in American Gunsmith April 2010. Zabala Shotgun I am a newcomer at this “shootybangy” lark and have just acquired three shotguns. One of them is a Zabala 12 gauge side by side. Actually, I was given this one as only one of the barrels worked and the rear trigger had seized.

The latter problem I have fixed as it was only the safety actuator arm being loose and fouling the trigger mechanism. The former requires an expert. Upon removing the firing pin retaining housing I dropped out the pin and found the detent spring munched up and the firing pin in two pieces. The model number is M 19 P, serial number 203XX if that’s any help. Could I either order or fashion one with spring? What would you estimate the cost to be?

As a newcomer we feel it an obligation to advise you to explore the Internet on any firearm, be it gift or otherwise, of which you have never heard. Though not newcomers, we were forced to do so as we were preparing this response. Firstly, we do not order or manufacture parts for our member/readers. Secondly, the Zabala is of Spanish manufacture, has no US distributor at this time and is not highly thought of concerning quality.

One comment we came across referred to it as “The bottom of the barrel in double barrels.” However, Marlin once approached Zabala to produce an L. C. Smith 28 gauge clone for them so we choose not to take the previously quoted opinion very seriously. Unfortunately, Marlin had been acquired by the Freedom Arms Group along with several other American manufacturers. At present, the only way you could inquire of Marlin would be through Freedom Arms. They are located at in New York City.

Their phone is probably listed under Cereberus Capital Management and will be answered accordingly. Gary Remington Model 4 I was recently given a Remington

Model 4, a rolling block, solid frame, single shot rifle chambered in .22 caliber. I am of the opinion that she can be rescued and returned to the ranks of the shootables.

However, the old girl has a few problems, like a broken stock (I’m sure I can splice a piece on to fix it), sewer pipe barrel (maybe this can be fixed with a severe scrubbing or relining?), stuck firing pin (what is the protrusion supposed to be?), and worst of all, the hammer won’t wait until I pull the trigger before it falls (perhaps rehoning or reshaping the engagement steps will help?) I am hoping you can point me in the right direction. Who can I contact for a take-down guide, or even an exploded view?

The Numrich website lists parts but no schematic, so I don’t know what, if anything, she is missing. And who can I contact for answers to the above questions? Jim Arguably, such rolling block rifles went along way to keeping Remington Arms alive during hard times in the past. We did an article on the model several years ago but reprints are no longer available.

Your best source now, including a schematic, appears in the The NRA Guide to Firearms Assembly (hard cover edition.) From your description it sound like your rifle is in rather poor condition. A new barrel may be needed along with several replacement parts such as the hammer, trigger and firing pin.

If the Remington Custom Shop in Ilion, NY is still turning out rolling blocks on special order, securing those parts, and any others discovered to be missing, should not present a major problem and will open the door for a factory response on trigger pin protrusion, which we assume would be 0.060 but that figure should be confirmed.

If Remington can’t fill the need for parts, call Brownells, request a free copy of their parts source list for out-of-production firearms and prepare yourself for a search of the aftermarket. AG

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