

Thames Valley Guns

Armourers Report

Barrel Final Finish System

Introduction

I have been reloading for twenty seven years and people reload for different reasons, some reload simply because its the cheaper option, others because they are looking for that ultimate accuracy. I personally reload for number reasons, I thoroughly enjoy it and find it quite relaxing, it helps me learn, when ammunition is unavailable, to improve accuracy and lastly to improve the longevity of the rifles barrel. Ammunition is a fundamental part of a firearm system and to understand how a firearm works, you must thoroughly understand the component parts and the internal/external ballistics of your rifle's cartridge.

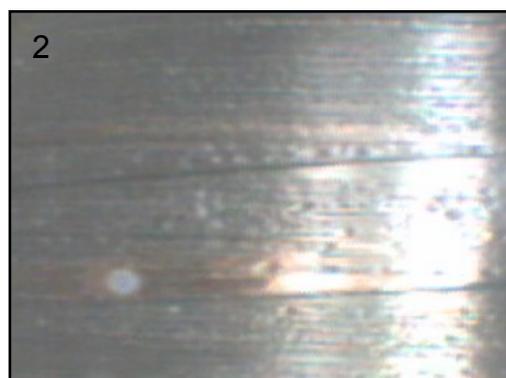
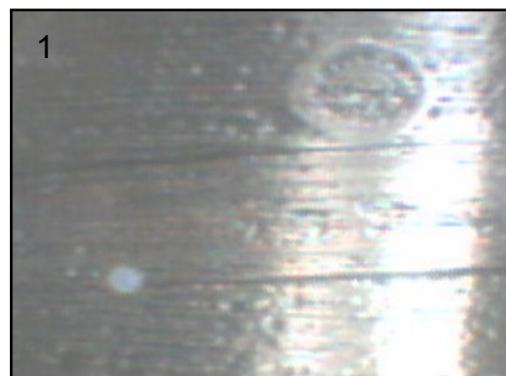
Reloading cartridges for modern rifles with common and popular calibres is relatively easy as all the component parts are readily available and there is plenty of reloading data available, however reloading for classic rifles is potentially more challenging and more knowledge is required. A good example is the Italian Carcano rifle in 6.5x52mm. Modern 6.5mm bullets are 0.264 but the Carcano 6.5mm bullet is 0.267 and requires a long round nose bullet to function in the Carcano's clip system and to feed effectively into the chamber.

Some classic calibres like the British .303 and the US 30.06 are shooter friendly cartridges but cartridges like the 7.5x54mm French and the Russian 7.62x54R can be more cantankerous, especially in the UK where there is limited components.

Classic rifles that I work on tend to be anywhere between fifty and a hundred years old and therefore by their very nature there is an element of wear, the trick of course is find a rifle with the minimum amount of wear. Barrel condition is always a balance, some wear is acceptable, even with mild pitting and discolouration, however one must accept that sooner or later, worn barrels that have seen excessive use are at the end of their effective lives and the only solution is a replacement barrel.

However reloading can help a classic barrel, milder loads help reduce wear and help extend barrel life. Identifying a suitable load/bullet combination can improve a rifle barrels accuracy. Lead bullets, not only extend barrel life but can produce acceptable accuracy in worn barrels that would be otherwise unsuitable for jacketed bullets.

As a result I reject many classic rifles because the barrels surface has been damaged by corrosive primers, poor cleaning or have been left in wet and humid conditions which causes the barrel to rust. The end result is a poor surface which tears at the bullets jacket and causes poor accuracy, however when I saw David Tubb's Final Finish System, I couldn't help wonder if I could use the abrasive bullets to salvage certain barrels and return them to an acceptable level of accuracy.



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LDT M14

In 2017 I purchased a UK compliant M14, manufactured by LDT in Luxembourg. Upon purchase from a local dealer I was informed the rifle had only fired a few rounds and therefore I was very disappointed when I discovered a very discoloured bore, that was pitted and had considerable tooling marks as can be seen in images 1 & 2 on the previous page. Challenging the seller, I was informed that despite the bore, the rifle shot surprisingly well and therefore I refused to complete the sale until I accuracy tested the rifle and confirmed his statement. When carrying out an accuracy test a few days later, the rifle did indeed shoot well with groups of 1.5" at 100yds, which I thought was quite reasonable for a iron sighted military rifle and therefore I concluded the sale.

Following the accuracy test I cleaned the barrel with a phosphor bronze brush and the usual oil and patches as I do with all my rifles. A few weeks later I entered the rifle into a local classic rifle competition, but after a twenty rounds the group size started to deteriorate, with groups extending to 2-3". Back in the workshop, a follow-up inspection with the bore scope revealed a rapid build up of copper deposits as the principle cause of deteriorating accuracy (image 3 & 4).

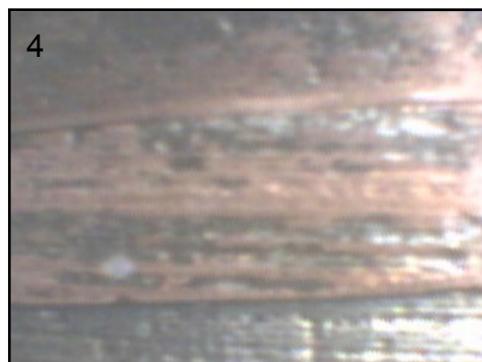
Therefore my earlier decision to purchase the rifle was a rash one and I was now lumbered with a nice rifle, poor barrel and a decision to make, what to do next.

I spoke with LDT about a replacement barrel, they where pleasant, even stated that these barrels and their condition was acceptable, but due to the limited production run for the UK, they where unable to help any further.

Barrel Final Finish System

One must bear in mind that not all new barrels, shoot well. The term, "you get what you pay for" is appropriate to barrels and some cheaper barrels may have tool marks and burring that damage the bullet or effect its consistent passage along the bore.

The final finishing system is designed for new barrels where accuracy is brought into question. It is a bore polishing process that uses different abrasive and polishing compounds impregnated into a series of bullets. The bullets are designed to reduce fouling, increase velocity and to improve uniformity within the barrel. The final finishing system consists of fifty bullets, broken down into five groups of ten bullets numbered 1-5. Group 1 is the coarsest compound with group 2 being less course and so on. Group five is the finest and are coated with boron-nitride and acts as



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burnishing bullet to apply a final polish to the bore.

The thought had passed through my mind that if the final finishing system could remove tooling marks or burrs, it may be able to improve certain classic rifle barrels that fall into a specific criteria. Some classic barrels can be pitted and discoloured but have seen little use such as my M14. This is because they have been stored in poor, damp and wet environments. When fired, the jagged edges of the pitting will damage the bullets jacket as it passes down the bore. Accuracy may be acceptable for the first few rounds but as the copper deposits build up, the accuracy deteriorates.

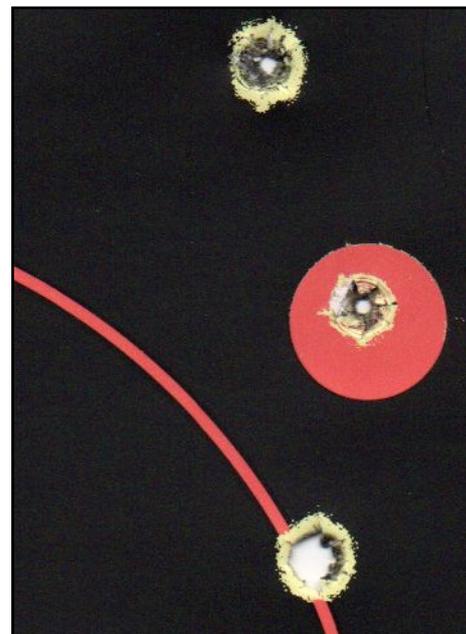
The target to the right is a classic example of my M14. Within 50rds the build-up of copper deposits were sufficient to open up the group from 1.5" to 2.75". The kits are available in various popular calibres, but for classic rifles I was particularly interested in .308, .303, 6.5mm and 8mm. The .308 is suitable for Springfield's, 7.62mm Enfield's, Schmidt Rubin's and the French MAS. The .303 goes without saying for all British, Australian and Indian Enfield's, whilst 6.5 & 8mm is suitable for most Mausers in those two calibres.

However before I go on to describe the actual process, I think its important to highlight what one is trying to achieve with this exercise. I am not trying to recover a hideously worn barrel and convert it into perfect barrel, that is simply not going to happen. Spare barrels are not always available and a new barrel may be prohibitively expensive, therefore what I want to achieve is to salvage a damaged barrel to a point where it can produce a decent group and therefore keep the classic rifle in service.

Constructing your ammunition

It would be my recommendation to give this process some thought before you start. Although not mentioned in the instructions, I prepared a 50rd MTM case and mark it in five groups of ten, to avoid any confusion. It is important, that you start with the most abrasive bullets and work your way down to the finest. In my case I removed the compound label of the original packaging and attached the label to the MTM case as can be seen in the middle image to the right.

The final finish instructions will guide you through the loading process but these are abrasive bullets so I would recommend that you load them using cheap brass or brass your about to use for the last time, the reason being is that the abrasive bullets will score the inside neck of your case. The instructions recommend you commence with a starting load as recommended by your loading manual, which in my case it was 35.3grns of N140 but I rounded it of to 36grns. This is because it is necessary for the case to obturate and not blow carbon/soot back into the action and potentially your face. Lastly seat the bullet as per your loading manuals cartridge overall length (COL), do not seat the bullet into the lands as it will cause excessive and potentially dangerous pressures.



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On the range

When carrying out this exercise, one must remember this is not a target shoot, therefore just put the rounds down range safely into a target and or a suitable backstop. It is imperative that you scrub the barrel after each compound group (every 10rds) as mentioned in the instructions. This is to remove the deposits, debris and abrasive that may remain in the barrel after each 10 round group, therefore it is important that you plan your range trip with the correct cleaning rod, phosphor bronze brush, patches and suitable bore cleaner. I also took a bit of carpet to lay the rifle on whilst I scrubbed the bore, therefore protecting the rifles stock during the cleaning process.

Another topic to consider with abrasive bullets is your magazine and feed ramp. Do not use them, feed the rounds one by one directly into the chamber by hand as you do not want to wear the feed ramp or damage the magazine in any way. A quick word of caution with Mausers, their extractors are designed to work in conjunction with the magazine, as you feed the round from the magazine it forces the rim of the cartridge up and under the extractor. If you hand feed, you must do this manually, do not place a round in the chamber and try and close the bolt. The extractor will not override the rim and you will break the extractor.

Having completed the five groups of ten rounds, I cleaned the rifle for the final time and headed back to the workshop for a proper clean before viewing the bore to ascertain the results.

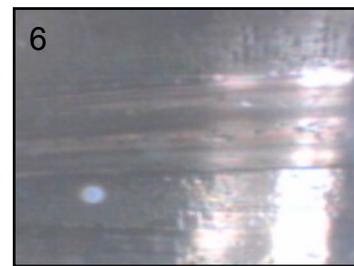
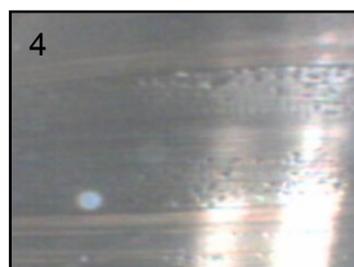
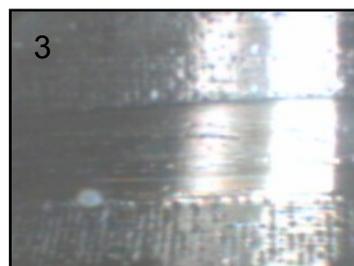
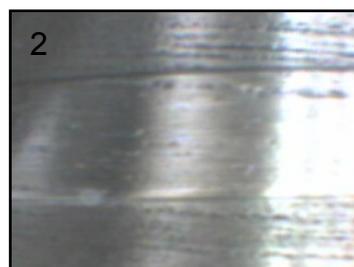
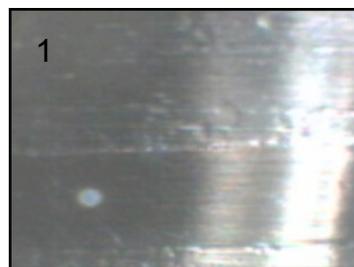
Bore scope Inspection and follow up range test

I must admit I was a little apprehensive before taking my first view of the barrel, with a number of questions running through my mind such as, was this going to solve my problem or had I damaged/ruined the barrel beyond repair?

My first impression was how bright and shiny the bore was in comparison to the dark discoloured barrel of before, it really was very bright. Examining the barrel through the bore scope, identified the lands as showing definite improvement with no jagged edges and a general all round better surface as can be seen in images 1 & 2. The grooves whilst bright had not improved as well as the lands and still suffered from considerable pitting and tooling marks, see images 2 & 3. Inspecting the barrel further and working from the lead (throat) to the muzzle, showed a good overall improvement and without any excessive wear.

I was really pleased with the results, However although the barrel definitely showed improvement it still had plenty of imperfections and only another trip to the range was going to tell me if accuracy had improved and the excessive copper fouling was a thing of the past.

Using the same ammunition as previous to obtain a fair comparison. The first rounds down range was to confirm zero. This is an essential task as the polishing process has removed a fine element of metal and therefore changed the dynamics of the barrel. Once zeroing was confirmed, I set about producing a group and to see if there was any build up of copper.



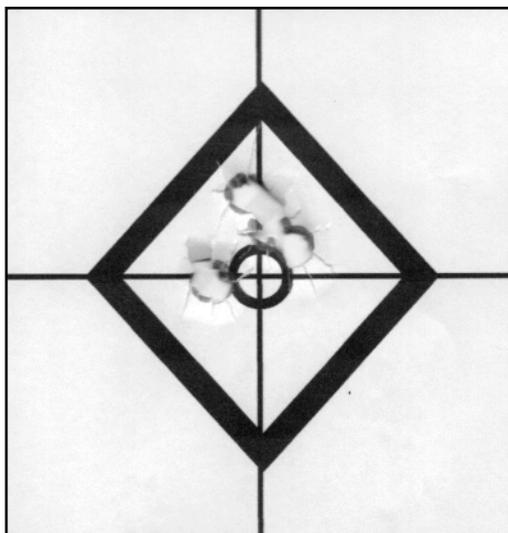
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Image 4, 5 & 6 showed some copper discolouration but no sizeable build up and best group size was a very acceptable 2" group with Ironsights. However, whilst first impressions were good, I felt further testing was required, because I was concerned that the discolouration seen in image No5 could lead to a further build up of deposits.

Therefore the next trip to the range, was to ascertain if there was going to be any further build up of copper deposits over a further fifty rounds, plus to maximise the rifles accuracy I fitted a period scope as shown above.

With the scope, groups improved and on average maintained an average of 25 - 45mm over the fifty rounds with no noticeable deterioration. In fact one group measured and a very impressive 15mm but this was a one off.



Summary

This report is not about polishing new barrels, for that exercise I have no experience and therefore cannot comment. As this is a polishing or finishing process it removes metal and therefore it is not for very worn barrels. However for old military classics where the rifling is strong, then the barrel final finish system by David Tubb is a very good tool when it comes to salvaging a poor barrel that would otherwise be consigned to the bin. I paid just short of £2000 for this rifle and therefore £50 on the final finish system is without doubt, worth every penny.

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