

Tools of the trade

What's better than a well-stocked toolbox? One that is used to make guns, of course! James Longthorne takes us through the tools that he's been using since he was a boy

Having been trained as a toolmaker I must say that modern gunmaking isn't just about using CNC machines, although these are a necessary commodity when it comes to modern production. When it comes to finishing or prototyping new ideas, by far the quickest way to visualise your ideas is to turn to trusted methods and hand tools – this can be far more useful than 3D printing.

It is much quicker to heat-bend and file a piece of metal (like a piece of metal for a trigger guard, for example) to a rough shape rather than draw it and then programme a CNC to make one. The human eye is very quick to adapt to the shapes we see. When producing a part by hand, we can design, adapt, redesign and readapt as a continuous process, always being able to view

the final product as it exists in real time and space – we can revert to 3D printing once this is done, if necessary.

When designing by hand, we are not limited by any constraints and can 'design on the fly'. To do this we have to have a very good knowledge of the tools available and how to use them.

The ultimate tool test

As an apprentice toolmaker, a common test, and one considered to be the ultimate test, was to produce a 1" steel cube (25.4mm), and then cut a 1"sq hole exactly in the middle of a steel plate that is ½" (12.7mm) thick x 2"sq (50.8mm). The cube must then fit in every direction through the square hole with no more than 1thou (.025mm) clearance in any direction on any surface.

As an apprentice, at the time I had no idea why this was so important. It is important because when it comes to jointing of an action or fitting of the sidelocks to the action, it can't be done manually unless you have these skills.

The only power we were allowed to use was a pillar drill to drill a hole in the plate in the middle of the square; the rest of it had to be achieved using a hammer, different chisels, files, emery paper and polishing stones. It was basically an exercise



Best-quality tools ensure the best results

Apprentice toolmakers acquire their skills manually rather than relying on power tools



'When producing a part by hand, we can design, adapt, redesign and readapt as a continuous process'

‘The first side-by-side double-hammer action was shown to me by my inspirational high school engineering teacher – a true maverick’

to check skill level and patience!

Apparently, French chalk and lamp black were to be my friends, but it wasn't put into context as to why I would need them at that early stage. In actual fact, it is difficult to make guns without them. French chalk prevents the files from 'clogging' as when they 'clog' with metal chips, deep scratches and gauling of the surface metal can occur. Lamp black, quite often portrayed as an iconic gunmaker's tool, is used to check the fit of metal-to-metal or metal-to-wood. As toolmaking apprentices, we actually used 'micrometer blue' in preference because this is more accurate, being a lot thinner than lamp black, in the region of 2 microns, whereas lamp black is approximately 15 microns, so the accuracy of the fitting surfaces have to be more accurate to get the transference of the 'blue' from one surface to another.

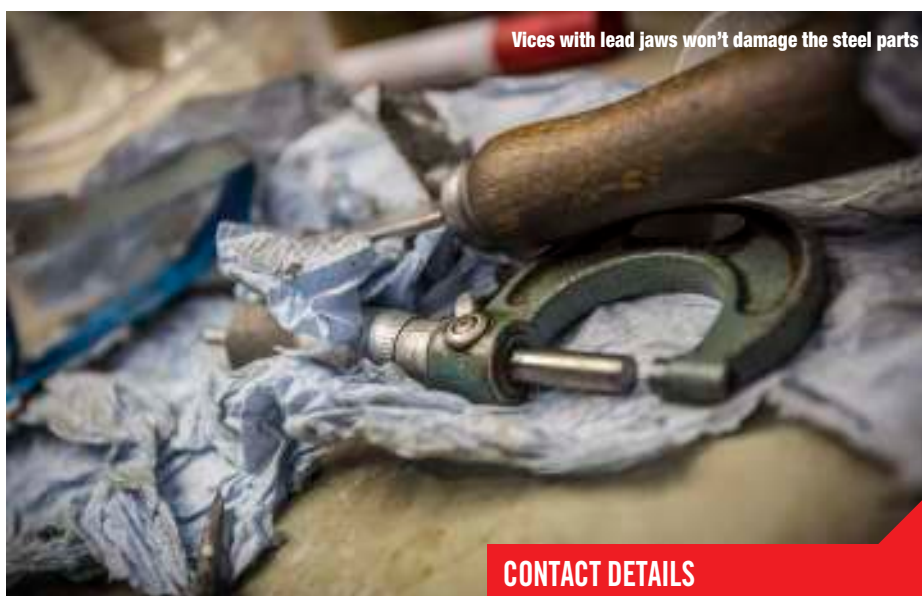
Vices and files

Another essential tool is a good vice with lead jaws, lead being a softer base metal that grips the steel parts without damaging them. We use copper and rawhide hammers for the same reason in that when they are used they don't damage the steel parts.

There are numerous types of files and they all have their uses, but for intricate work I favour good-quality swiss needle and riffler files; the better the quality of the tools you use, the better the quality of the finished component.

I was extremely lucky to have had a mentor from a very early age – 13 to be exact – when I first started high school and realised then that my future was in engineering. And in fact the first side-by-side double-hammer action was shown to me by my inspirational high school engineering teacher – a true maverick who identified my passion and encouraged me from that day forward. Never to be forgotten, he was also to become my daughter's godfather and has sadly passed on.

Here at Longthorne, we are hoping to foster the same passion in our future apprentices. We want to make our apprenticeships exciting... we don't need a toaster to toast bread – it's all about how you see the world. ■



Vices with lead jaws won't damage the steel parts



Lamp black is used to check the wood-to-metal or metal-to-metal fit

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