

Honed to perfection

PES Report
Dave Tudor



In manufacturing, close working partnerships between customers and suppliers are worth their weight in gold – and that’s certainly the case with Hemel Hempstead-based precision subcontractor Subcon Drilling and honing specialist Delapena who have been working together for many years. In 2019 however, Subcon Drilling threw down the gauntlet to its longstanding supplier with a specific challenge. **Dave Tudor reports.**

As its name suggests, Subcon Drilling has its roots firmly entrenched in gundrilling and honing deep holes.

The process is often referred to as a black art – and that derives largely from the fact that historically, certainly on the honing side, it was a manual process relying almost entirely on the skill and ‘touch’ of the operator. It’s a hard subject to teach and even harder to learn.

Today, the process has become much more automated, but it’s still a discipline that most subcontractors won’t touch with a bargepole. There are many subcontract engineering companies in the UK, but comparatively few that will tackle machining deep holes in cylindrical components like drive shafts, accurately and over long lengths.

Subcon Drilling is one of the few. In May this year it celebrates 23 years in business. Headed up by brothers Dean and Scott Edwards as sales director and technical director respectively, the company has evolved both in size and operationally, employing around 30 members of staff and offering a range of services that now extend to CNC machining and turning.

“Much of our work then, and indeed today, is in the motorsport, F1 and high-performance supercar/hypercar sectors and our customer base is very loyal because we’re good at what we do,” Dean Edwards explains. “Drive and gear shafts, and other parts like anti-roll bars need to be as light as possible for obvious reasons and one way of keeping weight down is through the use of drilled holes.

“Then our customers started asking if we could turn the shaft ODs as well so CNC machining became part of our service offering. In fact, turning is probably the biggest section on our shopfloor now. We’ve become very proficient over the years at drilling and honing deep holes (up to 2m deep from one end of a billet) and turning long lengths.”

In the past five years or so, again through customer demand, Subcon Drilling has also added milling to its portfolio. It’s clear, from quick look around its two manufacturing facilities in Hemel Hempstead that the company is big fan of Haas machines – they’re literally everywhere.

In fact, just three months ago it purchased a UMC-500SS 12,000rpm 5-axis machine from the US-based machine tool giant and in the past couple of weeks a ST-25 big bore



Delapena UK sales manager Steve Hunt (left) with Subcon Drilling sales director Dean Edwards

turning centre with 10-inch chuck and 3m bar capacity has been installed.

Honing heritage

For Subcon Drilling, honing – which is the final process in producing a bore to the correct diameter, geometric cylindricity and finish – is a vital part of the equation and its longstanding partner of choice is Cheltenham-based Delapena Group, a company well-versed and experienced in designing and manufacturing not only honing machines, but also a full range of tooling, fixtures, abrasives, super abrasives and cutting oils.

Delapena has a rich honing heritage and pedigree – the business is nearly

100 years old and is represented in more than 50 countries globally. Headed up by group managing director Martin Elliott, this is a true UK manufacturing company. Practically everything its sells, it makes in Cheltenham.

The super abrasives side is particularly interesting. Part of the Delapena Group, Delapena Sintering is a department within the business dedicated to producing honing sticks using its own sintering process.

As we shall see, the highly successful outcome of the ‘challenge’ I mentioned at the start of this article is very much centred around the incredible performance of Delapena super abrasive

honing sticks produced using this sintering process.

The honing stone is one of the most important parts of the honing process because it operates at the business end of things in direct contact with the workpiece. Delapena Sintering offers a full service from analysis through to finished product as well as developing CBN and diamond super abrasives. It’s a scientific process as much as a practical one as depicted by the image on our front cover.

Delapena has the capacity to produce 250,000 honing sticks per year, many of which are bespoke with different chemistries, bonding compounds and compositions to suit specific customer applications. This is the case with Subcon Drilling.

“In terms of the machines we produce, we design and manufacture everything in Cheltenham,” reveals UK sales manager, Steve Hunt. “When Martin Elliott took over the business some years ago, he wanted to remove the ‘black art’ aspect of honing and manufacture machines that were powerful, but also user-friendly and simple to use, even for operators with little experience.

“Today we manufacture a range of both vertical (PowerHone E, PrecisionHone), horizontal (SpeedHone, ForceHone,



Steve Hunt (left) and Dean Edwards with the Delapena SpeedHone Cooper S honing machine featuring a 500mm stroke length



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SpeedHone Cooper S) and tube CNC honing machines. On the software side, we also developed iHone which offers an icon-based, conversational touchscreen interface that's really intuitive and easy to use.

"Aside from the machines, we're the only company I know of, certainly in the UK, that are really pushing sintering technology, hybrid stones and super abrasives to the max. The productivity gains, as many of our high-profile customers have discovered, are nothing short of staggering. They're initially more expensive than conventional abrasives but they last many, many times longer. Once you do the maths, it's a no brainer."

Challenging times

In 2019, Subcon Drilling's strong relationship with Delapena was really put to the test machining a special type of heat-treated, motorsport grade titanium used on anti-roll bars and torsion springs for some of its F1 customers. Dean Edwards takes up the story.

"Titanium is usually very tough and strong but this particular grade is hard as well," he affirms. "We've been working with this material for more than a decade but it's very difficult to drill and even harder to hone.

"We eventually nailed the drilling process but the honing was a nightmare. It was all manual, by hand, and it took upwards of an hour to process a single part. No matter what we tried – using

products from a number of different suppliers – literally nothing worked.

"The final product quality was fine, but the parts simply took too long to hone manually. To compound the problem, we make these in very large quantities. It became a real thorn in our side that impacted the entire business."

Around five years ago, Mr Edwards called in Steve Hunt to take a look at the problem and see if he could help? "I also set a challenge," he recalls. "If he could get the cycle time down to less than 20 minutes, I'd buy a machine from him."

The trust built up over many years between Dean Edwards and Steve Hunt really played a part here because effectively this became a turnkey project for Delapena involving a lot of expensive and time-consuming trials on the special grade titanium to ensure that any proposed solution would deliver.

"Through our pioneering work with sintering and super abrasives, plus the SpeedHone EAS horizontal honing machine that I had in mind, I knew we could solve this problem," Mr Hunt explains, "and as a valued customer I was delighted to be able to help Dean out."

Winning combination

Through a combination of a Delapena SpeedHone EAS horizontal honing machine and customised, tuned and tweaked super abrasive honing stones, not to mention extensive trialling, Steve Hunt not only managed to hit the 20-minute cycle time target – he totally annihilated it!

The new machine, along with adoption of the new super abrasives, was installed in 2019. The cycle time now per part has been slashed from an hour to just ten minutes. That's productivity on steroids.

But things didn't stop there. The NC-controlled SpeedHone EAS can hone diameters from 1mm to 80mm to a tolerance of 1µm with a stroke length of 250mm, but a year later, in 2020, Mr Edwards needed a machine with a longer stroke.

With all the groundwork done on the SpeedHone EAS and continuing to pulling out all the stops and go the extra mile, Delapena designed and manufactured a machine from scratch – the SpeedHone



A selection of Delapena super abrasive honing sticks

Cooper S with a 500mm stroke length – but there's a sad side to this part of the story.

"The SpeedHone Cooper S has a special place in the hearts of the Delapena family because it was designed by our long-serving friend and colleague, Richard 'Dick' Cooper before he sadly passed away from COVID during the first wave," Mr Hunt says.

"It was the last machine Dick designed so we were delighted to name it in his honour. Sadly he never got to physically see it, but we invited his family in which they really appreciated."

Dean Edwards has the final word: "We couldn't be happier with the service

we've received from Delapena over the years – but they've really excelled on the titanium honing issue.

"It's important to remember that it's not just about the machine and the super abrasives – Delapena also provided all the customised tooling as well and a phenomenal amount of application support. I think the results speak for themselves."

Delapena

www.delapena.co.uk

Delapena Sintering

<https://delapenasintered.co.uk>

Subcon Drilling

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