

Hard honing gets easier

Martin Elliott of Delapena Honing Ltd explains how

The skills attrition in the art of honing could have been a terminal blow for the process and yet instead has driven innovation and transformation towards safety, quality and operational efficiency. With a move towards safer practice, easy, automated operation and the use of super abrasives, honing is growing in usefulness, responding to a much wider and harder range of materials and extending its potential into new applications.



Honing is now in a period of growth, thanks to the capability of the latest machines and continuous development of abrasives for an ever-expanding range of applications. Beyond just precision finishing, honing is now also a good way to remove material, to replace internal grinding and to create geometric integrity and an exact surface finish (holding tolerances down to a micron, with sub-micron adjustment), all to a consistent standard. This close tolerance finishing also means that reaming and hand polishing operations can be eliminated altogether. Indeed, new applications for honing appear every day.

Technology has transformed the process of honing and the latest machines bring affordable computer controlled efficiency and precision to a much wider audience. Conversational programming eases setup and a simplified operation improves not only safety, but also the rapidity of the process. In fact, honing is now suitable in a production

line, either in-cycle or in-process, which offers significant efficiency savings and an impressive return on investment. With improved process and speed of material removal, honing should now be considered for grinding as well as lapping, potentially one efficient process rather than the expense of two or even three.

Operation has become a stable, simple, clean and hands-free process, with workers protected by the improved safety features of sensor-controlled, failsafe, interlocking guards, which only allow operation once securely closed. Quick-release tooling makes for efficiency in operation, supporting an optimised process with reduced cycle time. This results in extended tool life and reduces the cost per part considerably.

Hands off

The most experienced and skilled engineers, dexterous in the art of honing by hand, are retiring from the industry and, whilst that means a loss of manual mastery, the loss of hand-honing skill has driven demand for intuitive programming and push-button operation. Operation is vastly simplified and auto-stop guarding means that the days of missing digits, once an inevitable 'badge of honour' for honing experts, are now a thing of the past. Setup is simplified and honing action can only be

initiated once guard doors are locked, keeping operators well away from the risk of harm.

Some world-class OEM's are driving safety parameters beyond single-layer safety procedures and demanding that additional layers of caging and guarding be added to the machines that handle larger and heavier parts. This failsafe approach can only be a good thing for the industry and for those working in it.

Honing can now rightly claim to be safe. It also boasts ease of use and measurable advantages, including the potential time savings, cost savings, efficiency savings and return on investment from using this process to transform a production line. Beyond those benefits, the scope for materials that can be honed is growing exponentially.

Hard choices

Use of the honing process is entirely application driven and new applications appear every day. The scope for materials that can be honed with the latest machines has vastly expanded: Aluminium, brass, titanium and hard steel can be honed as standard, with harder materials such as ceramics, glass, molybdenum and inconel also within honing capability. These more 'exotic' materials may require job-specific abrasives and these can be developed to order.



Markets such as aerospace and automotive work on the frontier of research and development, with a continuous drive to find lighter and stronger materials. This delivers a stream of challenging new materials and applications for honing, particularly as the tolerances required in technically advanced componentry are constantly being refined. The standard expectation is now two microns and part of the preference for honing is because this process can achieve this close tolerance work with ease and speed.

There is a move towards the use of super abrasives for honing, as costs have come down and new machine control systems allow the use of these harder abrasives. This affords improved tool life and better quality of finish, to impact not only return on operational expense, but also improved output. Super abrasives have also been developed to respond to the hard alloys now commonly honed.

The use of super abrasives also responds to the retirement of hand-honing. In days gone by, the operator would feel any inconsistency in hardness across the abrasive honing stick and make micro adjustments in pressure to compensate for this variance. This intuitive, sensory accommodation for lower quality abrasives is now lost and so better quality abrasives are advantageous for reliable and consistent finish.

Connected to the future

The world economic forum says that we stand on the brink of a technological revolution, in describing the fourth industrial



revolution. What that will mean for industry is yet to be fully understood, but for honing, the initial stages are already beginning as foundation steps for the Internet of Things (IoT). The latest machines are equipped for remote access, via the internet, for assistance, immediate diagnosis and rapid support. This connectivity could soon afford remote monitoring and an automated approach to preventative maintenance as a first step towards greater control, coupled with reduced human intervention.

The next step for honing will be to meet the true IoT definition of machines able to send and receive data. That would enable remote programming and control, freeing the need for programming at the site of the machine and instead allowing central siting for programming expertise. This will allow the specific honing expertise held by the few to empower manufacturing anywhere in

the world, which sounds like an exciting future for honing and a huge leap from the days when finite operational skill restricted the process. Precision honing is shaking off that legacy and embracing the liberating potential of the technical revolution. It signals best in class standards for everyone, wherever they may be in the world.

Delapena Group supports every aspect of improving surface finish, from feasibility on a part, to specification and new machine manufacture, to special tools and services that include subcontract honing, application development, process engineering, maintenance and training. Delapena Group has every facility required for honing and grinding, including an application centre, subcontract honing department, tooling refurbishment centre and a reverse engineering tooling centre.

The company has an impressive heritage that spans over 85 years and its name is used as a verb for honing in the engineering world. Today the company is recognised as a master in the grinding and honing market, operating internationally to offer complete solutions that include a range of technically advanced machines, plus the tooling, fixtures, abrasives and other consumables that optimise their performance.

Delapena Group is based in Cheltenham, Gloucestershire and employs 38 staff. It has 25 distributors and agents around the world and strategic relationships with CUMI and Engis Engineering Corporation.

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