

CHIPPING AWAY DURING THE FOURTH INDUSTRIAL REVOLUTION

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THE **ANCA** GROUP

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According to an entry in the Smithsonian¹, humans had developed crude toolmaking techniques by at least 2.6 million years ago. Chipping away at rocks made them smaller and sharper, offering various advantages to diet and defence in the lives of early man.

Tools for cutting and grinding aren't the latest idea, but some current trends show we're entering a new, particularly exciting age.

The invention of computer numerical control is much more recent than the first attempts at toolmaking, and was a serious step to turning things into an exact science.

It has allowed for ever-increasing levels of complexity in end products, the removal of guesswork and human error, previously unimaginable tolerance levels, and ever-greater output.

Since then, there have been needs from customers that have forced continued innovation by tool grinder manufacturers, including the uptake of new materials and composites, and constantly rising demands from end users for elegance and function in products. Consider the sleek aluminium backing of a smartphone - one component of a modern work of industrial art - and the manufacture of which is enabled by super-accurate tools.

Putting aside the impressive prowess of machine tool producers, the demands of their customers and their customers' customers will continue to evolve.

Machine manufacturers are rushing to develop solutions for a new age of production. Consistent with the flavour of what's called Industry 4.0, VDW (Germany's Machine Tool Builders' Association) recently said that digitalisation and networking are predicted to deliver a "quantum leap" in competitiveness², and would focus on this at the premier Hannover trade fair.

Overall, market research suggests global sales in machine tools will grow (at a slow rate³) in the near-term.⁴ One researcher on trends in the sector observed last year that the level of technology demanded is clearly increasing. Also, anecdotally, "commodity-type machines have fallen out of favor"⁵.

Among the trend towards smarter machines is the unmissable "Industry 4.0" push.

Industry 4.0 - including production trends such as robotics, networked machines and analytics making sense of what's collected by many sensors - is on the minds of machine tool makers. And for good reasons.

¹ <http://humanorigins.si.edu/evidence/behavior/stone-tools/early-stone-age-tools>

² <http://www.engineering.com/AdvancedManufacturing/ArticleID/14487/Global-Machine-Tool-Consumption-to-Rise-in-2017.aspx>

³ <http://www.engineering.com/AdvancedManufacturing/ArticleID/14487/Global-Machine-Tool-Consumption-to-Rise-in-2017.aspx>

⁴ <http://www.gardnerweb.com/cdn/cms/2016%20WMTS%20Report.pdf>

⁵ <http://www.mmsonline.com/articles/the-2016-world-machine-tool-survey>

ROBOTICS: NOW DELIVERING MORE THAN JUST PALLETS

Throughout various types of manufacturing, the uptake of robotics is hard to miss. The Industrial Federation of Robotics expects global unit sales of industrial robots to continue an annual double-digit percentage growth until at least 2019.

Factory robot makers are deliberately offering products designed to be more intuitive (Rethink Robotics' founder regularly compares his products to the iPhone) and flexible compared to previous generations of product.

Robots have been involved for some time in basic functions such as loading. It's reasonable to guess that as they become more usable they will find more and more uses in conjunction with machine tools. This will, among other things, help owners get more use out of their investment.

Robots are currently unable to “assume non-core processes” of such machines, offers one expert, but as “the machine tool is increasingly converging with the robot, they no longer stand side by side as separate components⁶”.

ANCA has successfully and recently integrated multi-robot production cells for several customers. These have allowed for extra workstations within the one cell; to add capabilities such as washing, metrology and laser etching; and for the production of more complex parts.

As robots will become more capable and cheaper, it is likely that they will be integrated with machine tools more frequently, delivering higher levels of automation, productivity and quality.

PRODUCTION GETS SMARTER WITH DATA

The demand for connectivity is also apparent among customers. As is the case in more and more parts of the industrial world, users are wanting to collect and make use of what was once “trapped data”, as well as monitor operations remotely and be alerted if there is an issue.

For some time, ANCA has offered in-process laser measurement and compensation, allowing for software-driven adjustments to maintain accurate tool geometries if there are issues like wheel wear and thermal expansion.

More recently, we added a Management Suite of software, delivering tool and wheel management, as well as sophisticated, easy-to-understand machine analytics through our Redax software.

The suite allows for easy data sharing between networked machines, as well as analytics to help identify and adopt the best ways of using these machines. Information becomes transparent throughout a team and can be accessed remotely by logging on via a smartphone, computer or tablet.

It also provides email and text alerts if production is interrupted: essential for confidence while running unmanned production.

It's been a long journey from chipping away at the earliest stone age tools to where we are now, in an era where we're past making tools by hand, and machines can talk to each other, talk to computers, and let you know when there's a problem.

Next I see that analytics will predict potential problems with the manufacturing process and self-correct to avoid the issue to keep production moving. The system will learn from the data of previous applications to inform future solutions. Essentially production will self-manage without reducing quality – it is an exciting prospect.

We're looking forward to chipping away in the current and Fourth Industrial Revolution, and to all the exciting possibilities it offers toolmakers and the works of art their innovations enable.

⁶ <http://www.messe-stuttgart.de/en/fachdental/journalisten/pressematerial/detailseite/text/amb-2016-robots-on-the-rise//detail/PressText/>