SHAPING THE FUTURE OF TOOL PRODUCTION:

OPTIMIZING PROCESSES WITH ADVANCED JOB MANAGEMENT AND DIGITAL INTEGRATION

ANCA
CNC MACHINES

CONTENTS

FOR OVER TWO DECADES, STEFFEN KLUTH, ANCA PRODUCT MANAGER, HAS BEEN WORKING ON THE QUESTION OF HOW TO MAKE THE PRODUCTION OF TOOLS EVEN MORE EFFICIENT.

Through daily exchanges with customers worldwide, he recognizes market needs at an early stage and makes a significant contribution to the development of forward-looking industry standards. His work has not only advanced individual companies, but has also had a lasting impact on the entire industry.

As a manager, he led software teams that revolutionized highly productive tool grinding and consistently focused on digital consistency in the tool industry. His strategic thinking and ability to combine innovative technologies with practical requirements have made him a key player in the digital transformation of the industry.

With his mix of technical expertise and direct customer focus, he has repeatedly succeeded in transforming complex challenges into practical solutions and convincing companies of real competitive advantages.

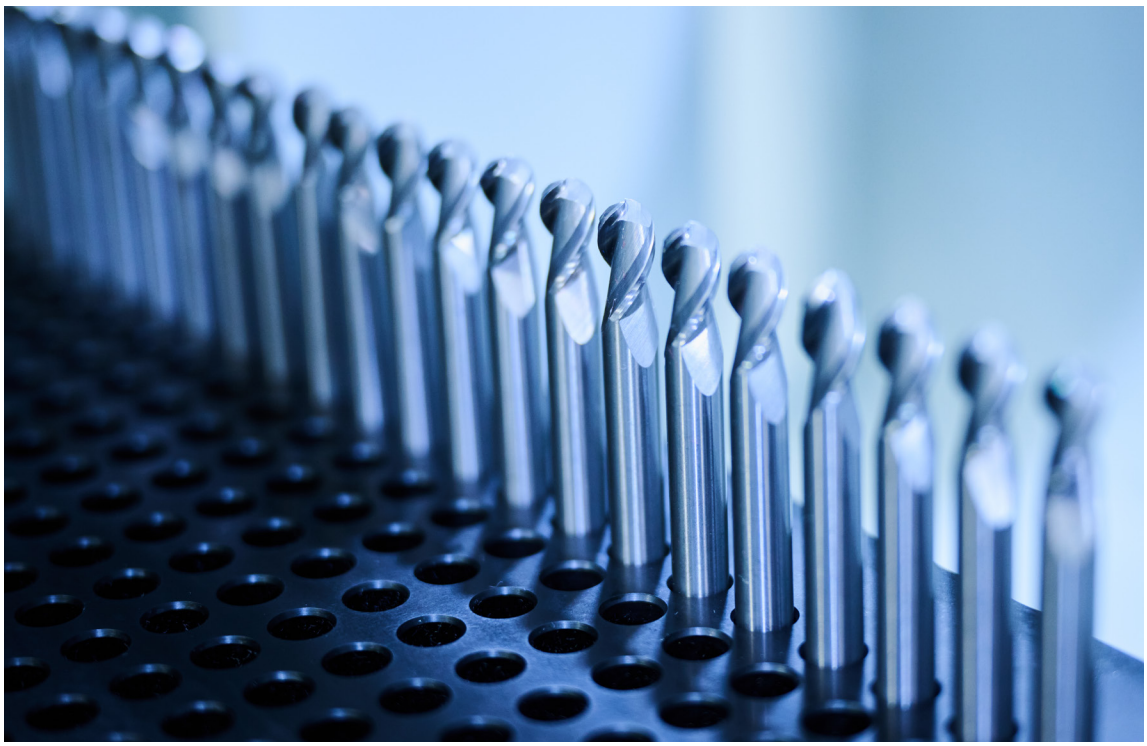
The manufacture and production of cutting tools is a high-precision process that is carried out either by tool grinding or laser ablation. These processes require exact compliance to specifications in order to guarantee the desired properties such as wear resistance, cutting ability or efficient chip removal.

In tool grinding, the tool geometry is formed by the combination of grinding wheels and the wheel path movement of the machine axes. The selection of the right abrasive is crucial in order to achieve the desired surface quality and dimensional accuracy. Regular measurements during the grinding process are essential due to wheel wear, temperature fluctuations, and other disturbances to ensure that tolerances are kept, and the tool meets the required specifications.

The manufacturing process places high demands on the machines and the skilled personnel. The challenge is to manufacture the tools in such a way that they meet the high demands of machining and have a long service life. This requires not only precise machines, but also a deep understanding of the material properties and machining processes.

In the manufacture of cutting tools, optical quality control processes are extremely effective in ensuring compliance with specifications and the high quality of the tools.

The optical systems use cameras and lasers to precisely measure the geometry and surface quality of the tools. The measurement can be carried out internally, i.e. in the tool grinding machine, or externally by a specialized tool measuring device.



TYPES OF MANUFACTURING AND PRODUCTION

The production of cutting tools can be broadly divided into two main types: “continuous production” and “one-off production”. Both have their specific characteristics and challenges. Regrinding comes as specialized production type on top.

Continuous Production

Continuous production is characterized by the manufacture of large quantities of identical tools. This production method enables high efficiency and cost reduction through the use of automated processes and machines. The tools are produced in standardized sizes and shapes, which ensures consistent quality. Continuous production is ideal for mass production where the demand for certain types of tools is high.

One-Off Production

In one-off production, on the other hand, the focus is on the production of individual tools that are specially tailored to the requirements of a particular customer or application. This production method requires a high degree of flexibility and adaptability, as each tool is unique. Customized production is often more time-consuming and costly, but offers the advantage of providing tailor-made solutions for special machining tasks.

Regrinding

Regrinding or reconditioning is an important aspect of the product life of cutting tools. By using regrinding processes, worn tools can be transformed back into an almost new condition. This extends the service life of the tools and reduces costs, as fewer new tools need to be purchased. During regrinding, the cutting edges of the tool are resharpened and any damage is removed. Modern regrinding machines and processes enable high precision and quality so that the tools largely retain their original performance characteristics.

CHALLENGES IN TOOL MANUFACTURING AND PRODUCTION

Manufacturers of cutting tools are facing several challenges today. The shortage of skilled labor is currently one of the biggest hurdles. Qualified workers are hard to find, which can affect production capacity and quality and lead to low machine utilization. This leads to an increased workload for existing employees and can limit the company's innovative strength.

However, higher machine utilization offers opportunities. By using modern machines and automation technologies, manufacturers can increase efficiency and overcome production bottlenecks. This often requires investment and careful planning in order to make optimum use of the machines.

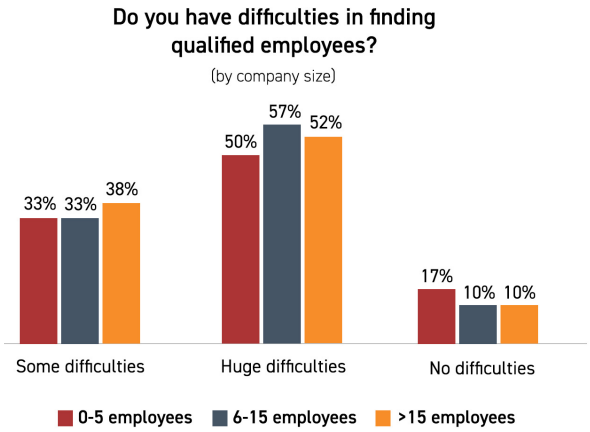
Competitive pressure and the ongoing price war in the industry are also significant challenges. Manufacturers must constantly reduce their costs and at the same time improve the quality of their products in order to remain competitive. This requires continuous optimization of production processes.

Process improvements and the introduction of digital tools play a crucial role in overcoming these challenges. By using Industry 4.0 technologies, such as IoT, digital worker guidance and augmentations systems, and Big Data, manufacturers can monitor and optimize their production processes.

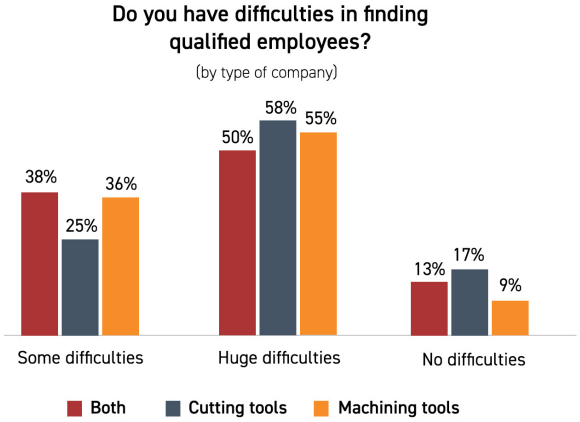
Production control and job management systems help to better utilize machines and speed up manufacturing processes. These technologies make it possible to analyze data in real time and make informed decisions, which ultimately leads to higher productivity, better quality and increased profits.

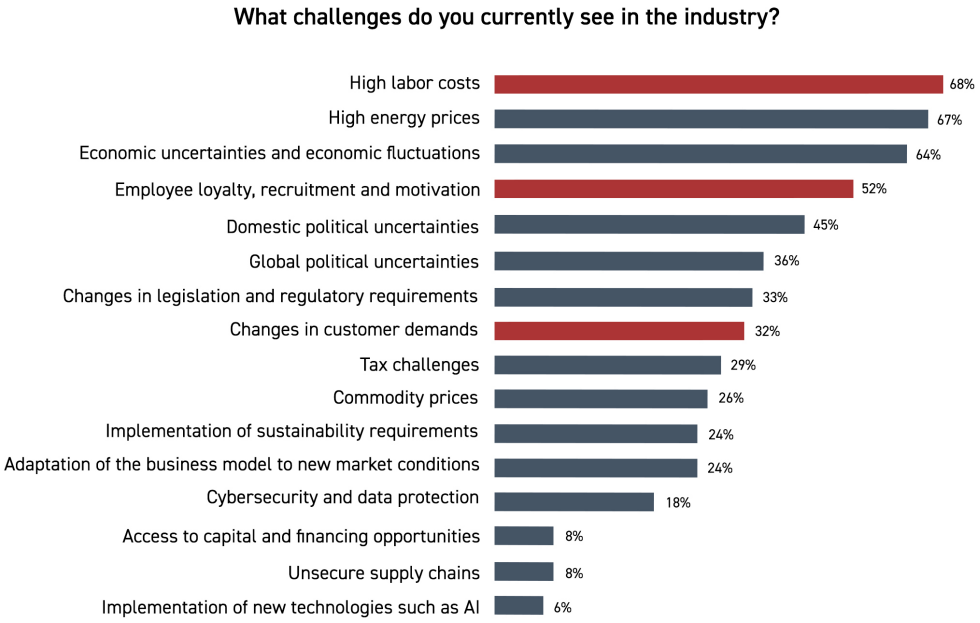
In summary, it can be said that manufacturers of cutting tools can significantly increase their competitiveness and profitability by overcoming the shortage of skilled workers and optimizing machine utilization through the use of digital technologies.

In a survey conducted by the FDPW (German Tool Grinder Association), almost 90 percent of companies stated that they had (at least slight) difficulties in finding qualified employees.



Furthermore, the companies surveyed stated that high labor and energy costs were currently the biggest challenge, followed by the increasing difficulty of retaining, recruiting and motivating employees.





Source: FDPW, Germany

JOB MANAGEMENT AND PRODUCTION CONTROL

Job management and production control are central elements in the optimization and improvement of manufacturing processes for cutting tools. Job management involves planning, monitoring and controlling individual production orders to ensure efficient use of resources and on-time delivery. Production control refers to the monitoring and optimization of the entire production process in order to manage quality, productivity and costs. Both areas are combined in modern systems and work together to ensure high precision and efficiency in production.

BENEFITS OF JOB MANAGEMENT AND PRODUCTION CONTROL

Job management and production control systems offer numerous benefits in the manufacture of cutting tools, which can be viewed from different perspectives:

Management Board:

- **Increased efficiency:** By automating and optimizing production processes, costs can be reduced and productivity increased.
- **Transparency:** Real-time data and comprehensive reports enable better decision-making and strategic planning.
- **Competitiveness:** Thanks to improved process control and quality inspection, companies can position themselves better in the market and respond to customer requirements.

Production Management:

- **Process optimization:** Job management systems help to plan and control production processes, resulting in better use of resources and less downtime.
- **Quality control:** By continuously monitoring and analyzing production data, quality problems can be identified and rectified at an early stage.
- **Flexibility:** Production managers can react quickly to changes in demand or production problems, which increases the company's adaptability.

Shopfloor:

- **User-friendliness:** Modern systems offer intuitive user interfaces that make it easier to operate and monitor the machines.
- **Error reduction:** Automated processes and clear instructions reduce the likelihood of operating errors and increase safety in the workplace.
- **Fewer routine tasks:** By automating routine tasks, machine operators can focus on more challenging activities, which increases their job satisfaction.

In addition, these systems offer the opportunity to continuously improve processes and integrate digital tools that lead to higher machine utilization and therefore more profit. Through the additional use of IoT and big data, production data can be analyzed in real time and optimization potential identified. This helps to better manage competitive pressure and price wars in the industry and to be successful in the long term.

USE OF MOBILE DEVICES IN THE MANUFACTURE OF CUTTING TOOLS

Mobile apps are already playing an increasingly important role in the production environment of cutting tools and offer numerous advantages for various players in the production process:

- **Real-time monitoring and control:** Mobile apps enable production managers and machine operators to monitor and control the status of machines and production processes in real time. This leads to a faster response time in the event of problems and more efficient production control.
- **Error and maintenance management:** By integrating maintenance and error logs into mobile apps, machine operators and maintenance teams can react quickly to malfunctions and carry out necessary repairs. This reduces downtime and increases machine availability.
- **Data analysis and optimization:** Mobile apps provide access to production data and analyses that help to optimize processes and identify bottlenecks. This enables production managers to make informed decisions and increase efficiency.
- **Communication and collaboration:** Mobile apps facilitate communication and collaboration between different departments and locations. Information can be exchanged quickly and easily, improving coordination and efficiency.
- **Training and support:** Mobile apps can also serve as training and support tools for machine operators. They provide access to instructions, videos and other resources to help with machine operation and maintenance.

Overall, mobile apps help to make the production of cutting tools more efficient, flexible and transparent. They enable better monitoring and control of production processes, improve communication and collaboration and support the continuous optimization of production.

TOOL MANUFACTURING AND PRODUCTION WITH ERP/MES

The interfacing of an ERP (Enterprise Resource Planning) and/or MES (Manufacturing Execution Systems) with job management and production control systems plays a crucial role in the modern manufacture of cutting tools. These systems enable seamless integration and optimization of production processes, resulting in higher efficiency and quality.

ERP/MES systems manage and coordinate business processes, including material procurement, inventory management and order processing. They provide important data such as production schedules, material availability and delivery dates. This information helps to plan production and ensure that all necessary resources are available.

Job management and production control systems, on the other hand, are directly linked to the production process and monitor production in real time. They record and analyze data such as machine running times, production progress and quality controls. This information enables precise monitoring and control of production in order to avoid bottlenecks and maximize efficiency.

Typical data exchanged between ERP/MES and a job management and production control system includes:

Production orders: ERP systems generate production orders based on customer orders and material availability. These orders are transmitted to the job management system, which takes over the detailed planning and assignment of tasks.

Material availability: The ERP system provides information on the availability of raw materials and components. This data helps the job management system to optimize production planning and ensure that all necessary materials are available.

Machine and personnel capacities: The job management system sends information about the availability and utilization of machines and personnel to the ERP system. This enables better resource planning and utilization.

Production status: The job management system continuously updates the ERP system on the progress of production orders. This includes information such as the current status, completed tasks and any delays.

Quality control data: Data from quality controls and inspections is transferred from the job management system to the ERP system. This information helps to monitor product quality and ensure that all specifications are met.

Cost and time recording: The job management system records the working hours and costs associated with each production order. This data is forwarded to the ERP system to support cost control and invoicing.

Machine data: Production Control Systems provide real-time data on machine conditions and performance to the Job Management System to optimize planning and control.

By exchanging this data, ERP and job management and production control systems can work together seamlessly to increase efficiency and transparency in the production of cutting tools. This leads to better planning, monitoring and optimization of the entire production process.

AIMS

AIMS (ANCA Integrated Manufacturing System) is transforming tool manufacturing with its modular, flexible design. By combining Manufacturing Execution System (MES) capabilities with job management and production control, it creates a seamless, efficient ecosystem that enhances productivity, reduces labor dependency, and minimizes waste.

AIMS Connect is the first step into digital manufacturing, linking machines and systems for transparent, verifiable processes. Its worker guidance system automates routine tasks, allowing skilled employees to focus on higher-value work. Each tool follows a structured job order process, ensuring consistent quality through defined compensation strategies.

Building on this, **AIMS Automate** creates a fully integrated smart factory that autonomously adapts to production changes. The AutoFetch mobile robot effortlessly manages tool pallet transfers, from raw materials to finished products, maximising efficiency and minimising downtime.

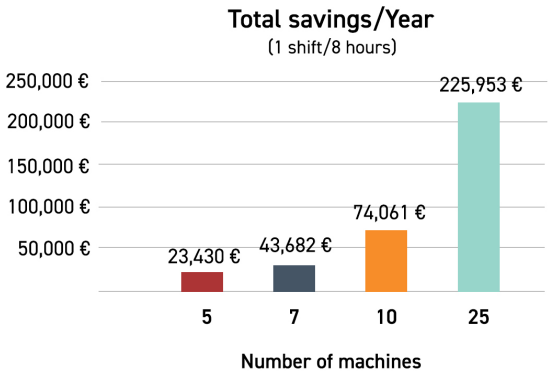
To ensure consistent tool quality, AIMS AutoComp provides automated in-process measurement and compensation, with machine learning insights and reports offering full visibility for continuous improvement.

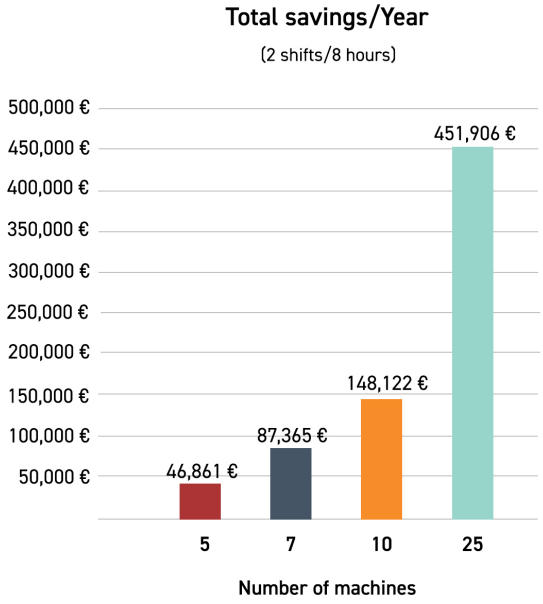
AIMS Ready equipment ensures ANCA machinery investments are future-proof, enabling seamless adoption of automated, lights-out production when the time is right. With an open, standards-based ecosystem, AIMS also supports third-party machine and process integration, offering unparalleled flexibility and scalability.

AIMS

NETWORKED PRODUCTION WITH MODERN JOB MANAGEMENT SUCH AS AIMS OFFERS A WIDE RANGE OF BENEFITS FOR TOOL MANUFACTURERS.

A production with AIMS that is optimally tailored to the requirements of tools not only promises smooth production processes and verifiable high production quality, but also enormous savings. With AIMS Connect, manufacturers can rapidly achieve savings in the five-figure range.





Since 2019, AIMS has delivered a proven, end-to-end tool manufacturing solution, integrating grinding, measurement, blank preparation, laser marking, and edge preparation for outstanding results:

60
hours of unmanned production

24/7
operational machines—no need for three shifts

18,000
manhours saved annually
for a 10-machine AIMS cell

6%
reduction in scrap with AIMS
AutoComp's precision automation

LEARN MORE

WHY CHOOSE ANCA?

Founded in 1974, ANCA is a world-leading manufacturer of CNC grinding machines, motion controls and sheet metal solutions, with over 1,000 employees worldwide.

We're pleased to have been recognized with more than 25 industry and business awards, including our induction into the Australian Export Award Hall of Fame. The Australian Financial Review recognized us as one of Australia and New Zealand's most innovative companies. We hold patents for many products, processes and components, from pulse and gap control for electrical discharge machining equipment to collet adaptors and clamping devices.

With global headquarters in Melbourne, Australia, ANCA exports 99% of products to customers across the globe, servicing 45 countries and delivering leading solutions from offices in the UK, Germany, China, Thailand, India, Japan, Brazil, Mexico and the USA.

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