

THE DRIVERS OF CNC 5-AXIS MACHINING TECHNOLOGY DEVELOPMENT - CONTROL AND AUTOMATION

An expert commentary

This issue focuses on the technological advancement of 5-axis machining, machine controls and automation of manufacturing operations in the machining industry. What is driving these topics, what are the next steps and where are the opportunities for manufacturing companies to respond to the increasing demands of their customers?



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Pliening, Germany, May 2019: The development trends in 5-axis machining, control and automation processes are influenced by practical constraints in Germany. Take 5-axis machining, for example: Designers today have CAD-D3 design tools at their disposal that enable almost any shape. Whereas in the past we were comparatively limited at the drawing board, today there are hardly any limits to creativity and the parts to be manufactured are often highly complex. Let's take the well-known example of a lever for power transmission: In the past, a piece of flat steel was drilled with two holes and then placed in the right position. Today, this

lever has a significant design, is aerodynamic as well as flow-, power- and weight-optimized. Contract manufacturers can hardly avoid 5-sided machining or even simultaneous machining of free-form surfaces. An increasing number of components can no longer be produced in any other way in the required quality and under the existing cost pressure. If you are constantly producing components that require more than 3 setups, you should make a future-oriented decision to invest in a 5-axis machine, because each clamping operation is detrimental to precision, time and costs.



Easy-to-operate control system

The topic of control follows the state of the art. We have not yet reached the point with Industry 4.0 where we can access a black box called "Manufacturing" for an order, which, fed with all the data, automatically runs the manufacturing process so that we

only have to remove the finished component. The control still has a significant influence on the efficiency of the production process. The more complex the tasks, the more the control system should support the operator and facilitate the work on the machine. The shortage of skilled workers also plays a role here, making it necessary for manufacturing companies to survive on the market even with less skilled workers. A control system that can be learned quickly and is easy to operate creates advantages here.

From a practical point of view, automation also meets the requirements of the manufacturing industry. Shortages of skilled workers and deadline pressure promote the integration of autonomous processes. At the same time, this sustainably reduces operating errors. The example of the automotive industry is a good illustration of this. For large companies, errors and delays in production are simply too expensive. The small manufacturer is additionally squeezed by the labor shortage. The possibility of having a machine, which is available anyway, work in a second or third shift using loading robots is very lucrative for both. If we look around the Netherlands, digitization and automation are increasingly an integral part of production there.



Control and automation

Overall, technological advancements in 5-axis machining, control and automation present an opportunity for manufacturing companies to respond to the increasing demands of their

customers. As an application engineer for a machine tool manufacturer, I am therefore increasingly tasked with providing process-comprehensive advice. In doing so, it is important to take into account the expertise on the customer side, what is technically feasible and developments on the market. At HURCO, we see a benefit in understanding technological progress as an opportunity in partnership with our customers and will also demonstrate this at the coming trade fairs.



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