THE RIGHT WAY TO PROGRAM AND SIMULATE 6 AXES

The portal milling machine FZ100 by Zimmermann is the first to permit 6-axis milling using an innovative 3-axis milling head. To be able to perfectly program and simulate this type of machine, CENIT AG developed special functionalities for the CATIA V5 environment.

Huge working space, enormous dynamics, maximum machining performance, perfect surface quality – these features characterize machinery made by Zimmermann. The company's goal: to offer each and every client the most economical solution. „For us, the milling head is the brain of the milling machine. That's why we asked ourselves: What if we tried using more than the traditional two head axes? What would such a head have to look like?" says Dr. Rudloff, Technology Director at Zimmermann in explaining the origins of the 3-axis M3ABC head. „We were immediately fascinated by the answer, and the associated benefits motivated us to go ahead and implement the concept. Today, our M3ABC milling head is a ground-breaking technology that gives manufacturing enterprises, particularly those from the aerospace industry, a major efficiency boost in their milling processes."

Zimmermann decided to integrate the M3ABC into its FZ100 portal milling machine. This machine opens all-new dimensions in productivity when machining aluminum, composite and modeling materials, as well as in HSC processing of steel and cast iron. Traditional 2-axis gimbal heads, used in 5-axis simultaneous operation, are incapable of providing such a productivity impetus or approximating the 3-axis head's flexibility. A typical example from the field of aircraft assembly – a structural component with slightly inclined lateral walls – offers a particularly clear demonstration of the performance boost, which can attain 75%. All angles can be machined by way of minimal rotary movements: no more repeated, pirouette-like retreat motions of the C-axis after each cycle. The M3ABC generates high, consistent feed rates in corner sections of conical pockets and thus greatly reduces tool wear. In short: it saves plenty of time and money.

An absolute prerequisite for exploiting any new machine technology is having the means to program it correctly. That's why CENIT AG developed the special FASTPOST postprocessor for programming under CATIA V5. Now Zimmermann's users can precisely program 5- and 6-axis work, e.g. 5-axis settings for „soft" contours or 6-axis simultaneous machining when working on sharp 2-dimensional curves (here a 2-axis gimbal head would have to pirouette frequently). Depending on the requirements at hand, CENIT's postprocessor, custom-designed for 6-axis work, offers the following strategies:

- FZ100 programming with manual selection of the 5 out of 6 axes needed for the individual processing steps.

"Our innovative 3-axis milling head is the right answer to many optimization issues for efficient milling processes. CENIT AG offers a high-performance, CATIA V5-integrated tool for programming and simulation",

Dr. Hilmar Rudloff,
Technology Director at Zimmermann

ZIMMERMANN
PORTAL MILLING MACHINES

Spezieller FASTPOST Postprozessor ermöglicht Programmierung unter CATIA V5

- Automatic selection of the 5 out of 6 axes needed for the individual processing steps.

- Automatic selection of the configuration of the 5 out of 6 axes needed for the individual processing steps, with „intelligent transition" from one axis configuration to another via a look-ahead functionality.

The NC programs generated in this way can also be simulated realistically thanks to CENIT AG's FASTCONTROL VNCK Adapter. „We quickly homed in on CENIT as a solution partner, because CENIT's expertise is universally acknowledged in the CATIA V5 world and in the field of complex 6-axis machines", is how Dr. Rudloff explains Zimmermann's decision in favor of the CENIT solution. „Also, CATIA V5 is the industry standard in aircraft assembly, so that CATIA V5-based programming solutions are well accepted in the field."

The FASTCONTROL VNCK Adapter is used to precisely simulate 6-axis processing. The adapter is one component of a Machine Tool Implementation Kit (MIK), which acts as a mediator between CATIA V5 and the Siemens VNCK. In this respect, important aspects of a consistent CAD/CAM process under CATIA V5 are:

- the 3D machine model,
- the postprocessor, and
- control via the Siemens VNCK

The NC program from the FASTPOST postprocessor is converted into simulation data by the VNCK and integrated directly into CATIA V5 via the FASTCONTROL VNCK Adapter - operation being identical to that of the FASTCONTROL controller emulator. Since the Virtual NC Kernel (VNCK) relies on the same movement generation algorithms as the 840D control, the movement behavior resulting from the NC program and all its potential subprograms is reproduced faithfully. This enables more precise time predictions and improved collision avoidance by correctly reproducing feed rates, tool changes, acceleration, and approach and disengagement behavior. An additional benefit is a reduction of run-in times on the physical machine, because optimization work is now done on the computer.

Before the NC programs are relayed to the physical FZ100 machine, they are subjected to in-depth analysis via FASTCONTROL. Since the FZ100 machine was faithfully reproduced geometrically, the ISO code can be simulated reliably. This verification offers security and guarantees a rapid transfer of the ISO code to the machine.

Using CENIT AG software, machine manufacturer Zimmermann can offer its clients a range of solutions perfectly tuned to the new technology. Supported by standardized methodologies, the crossboard solutions FASTPOST and FASTCONTROL, developed in cooperation with Zimmermann, can immediately be used productively by customers.

The „intelligent" postprocessor and – where required – simulations ensure that no additional programming work is needed on the part of the user. The customer thus gains a productivity and flexibility boost without suffering any increase in complexity.

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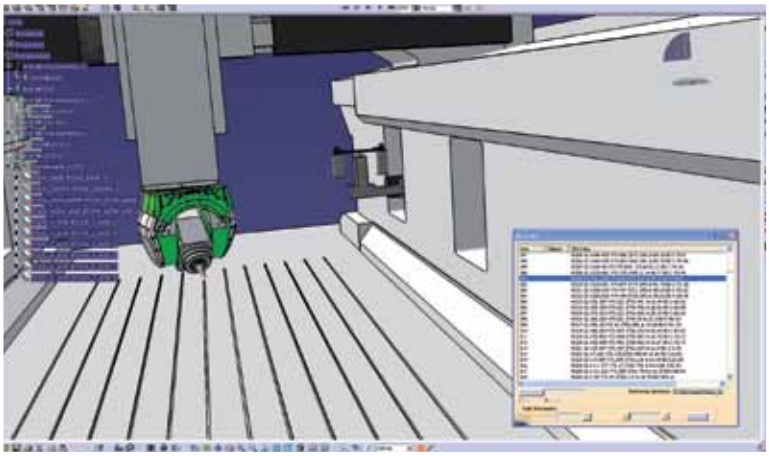

► PROFILE CENIT AG

CENIT AG has been a consultancy and software specialist for the optimization of business processes in Product Lifecycle Management, Enterprise Information Management, Application Management Services and Business Optimization & Analytics since 1988. CENIT currently has over 720 employees world-wide and its customers include Allianz, BMW, Daimler, EADS Airbus, LBS, Metro, AXA and VW. A large number of customers are medium-sized enterprises, particularly in the financial services, automotive and mechanical engineering sectors, such as Dürr, ISE and Emil Bucher.

CENIT is headquartered in Germany (Stuttgart), where it is present in all the major cities. It also has a branch near Detroit to cater for the American market. CENIT is also represented in Switzerland and since 2006 in Romania. With the foundation of another subsidiary in Toulouse CENIT stresses its reputation in the aerospace industry. The internationality of CENIT's business gains more importance with a further consistent expansion of these subsidiaries.

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