

Robot-driven machining is now a reality

Le Créneau Industriel has been unstinting in its efforts to develop an industrial robot-driven precision machining solution with its partners. It is striving to maintain the familiar workflow of the machining industry, while meeting its increasingly more demanding technical performance levels. To achieve this, the Savoie-based company has opted for the SINUMERIK 840Dsl numerical control system to run its machining robot, with both Siemens and Stäubli providing their active support to the project. An industrial demonstrator is now operational for cutting honeycomb parts and a robot-driven unit to machine composite structures for the aerospace industry will be available by 2018.



Le Créneau Industriel, which means “the Industrial Niche” in French, sums up the company’s strategy since it was launched in 1978. Its goal is precisely to design and develop innovative machining solutions to differentiate itself from the competition in very specific market segments.

Identify emerging needs, be a pioneer in their field and design breakthrough solutions

Over the years, the enterprise has always remained faithful to its original strategy: staying at the forefront to provide added value to its customers and moving on to new endeavors when the market matures and when products become commoditized. This has guided its action to create value through technical differentiation and innovation. *Le Créneau Industriel* entered the field of aeronautics in the Nineties by developing a new

solution for trimming multilayer aluminum sheet metal. This disruptive technology considerably enhanced productivity by doing away with the need to screw on or unscrew aluminum parts. About 50 units were sold to aeronautic suppliers throughout the world.

When the aerospace industry began to look at composites, *Le Créneau Industriel*, driven by its innovative culture, developed a five-axis

machine to process these demanding materials.

It notably entered the North American market with a multi-spindle drilling machine for composite parts used in jet-engine nacelles. This solution features a 21-spindles head, with accurate individual control of each spindle throughout the drilling process, resulting in cycle times of under a second. This inventiveness led to an order from a European aeronautic company to design a versatile machine capable of combining high-speed and ultrasonic machining of honeycomb parts. This new challenge facilitated the move from aeronautics to spatial industry, with the development of a high-accuracy (a few micrometers) drilling solution, used today by several manufacturers in this area, for making large-size satellite panels.

Innovation: the DNA of the company is to stay one step ahead of the competition

“Our expertise is completely focused on machining process,” asserts Laurent Combaz, CEO of the company since 2012. *“We combine the best solutions for programming,*



cutting tools and machining strategy optimizations.” Eventually, the machine simply carries the process. In such a way, why robots would not carry it? Laurent Combaz replies: *“I can confirm that robots are becoming more precise and will progressively gain ground in the world of machining. That is why we decided in 2015 to focus on the development of robot-driven machining solutions.”*

Le Créneau Industriel is working with major partners to develop automation, robotization, tooling and machining techniques

To ensure its success, the company continues to work collaboratively with major partners, specializing in automation, robotization, tooling and machining techniques. For its robots, it has opted for very robust Staubli systems and for numerical control, it has chosen Siemens whose NC SINUMERIK are used in its machines since 1998.

“Siemens numerical controllers have become our standard simply because they are alone in providing the performance levels we require, enabling us to stay a step ahead of the competition,” says Laurent Achard, a lead R&D engineer.

By combining numerical controller and a robot, *Le Créneau Industriel* is once again at the forefront. Operators can stay in their usual environment, with an unchanged Human/Machineinterface, Cartesian programming and ISO code. Begun at the end of 2015, close collaboration between the partners has led to the successful development of a machining robot fully programmed and controlled by a SINUMERIK 840D.

Once the robot is efficiently controlled by the SINUMERIK 840D, the challenge is to achieve the required level of accuracy for aerospace composites



From left to right : Bernard Mauclere, Product Manager, Siemens - Laurent Combaz, CEO, Le Créneau – Bruno Botton, R&D Manager, Le Créneau – Thierry Franchino, Sales Manager, Siemens – Laurent Achard, R&D Engineer, Le Créneau.

Several players have been activated to collaborate in two key areas: increasing the absolute accuracy of the robot (once again with Stäubli and Siemens) and the optimization of the machining process to reduce mechanical stress on the robot (PRECISE France for the end-effectors and CARBILLY for cutting tools).

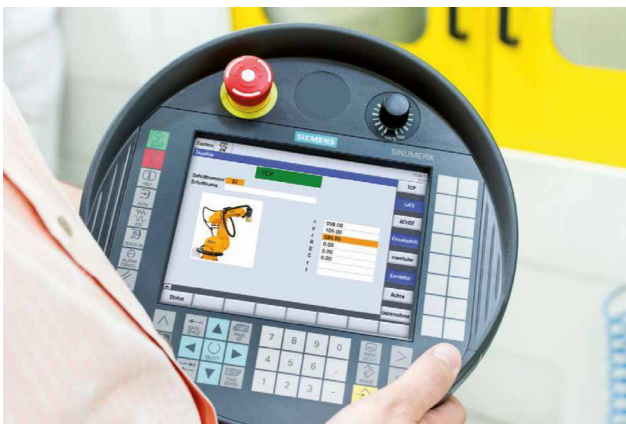
This collaborative R&D project is being supported by public funding (French government + Auvergne Rhône-Alpes Region) which have enabled a reinforcement of the R&D team, with a PhD student from the ENSAM University in Lille focusing on the absolute accuracy of the

robot and correction of deviations due to the machining process.

Le Créneau Industriel began by focusing on the design of a robot-driven unit for machining honeycomb parts, combining mechanical and ultrasonic cutting techniques, thus leveraging its acquired knowledge in this type of processing. Major efforts have been made to improve the accuracy of the robot, as well as on the architectural and kinetic design of the robot-driven unit for industrial use.

“Several trial runs and tests were carried out to strengthen our expertise in robot-driven machining,” reports Bruno Botton,

in charge of R&D. To convince manufacturers of the many advantages of this solution (reduced floor space, flexibility, easy integration in production lines, etc.), an industrial demonstrator for honeycomb machining has been operating since March on the Anancy site of the company. It is available for trials and for making samples of parts or pre-series. Work is continuing to widen this offer by launching robot-driven solutions for machining composite parts.



LE CRENEAU INDUSTRIEL IN SHORT

Providing pioneering turnkey machining systems for complex processes since 1978, *LE CRENEAU INDUSTRIEL* offers worldwide innovative and robust solutions on multi-axis machine and robot.

Its mission is to guarantee its customers to stay one step ahead of their competitors with a customized machine/process combination, its reliability and integration into physical and numerical industrial workflows.

<http://www.creneau.fr/>

<https://www.youtube.com>



Proudly supported by Auvergne-Rhône-Alpes

