



METAL CASTINGS

FANUC for Vullings

Task: Vullings, producer of spraying systems and products for turning and milling work, was looking for a new fast machine capable of processing small parts

Solution: By positive word of mouth about FANUC ROBODRILL reliability, the Company chose a α -ROBODRILL D21LiA5 equipped with a FANUC M-20iA robot with optical system integrated

Result: The machine controls possess computing power to run the cell so it no longer needs a separate PLC. In addition the ROBODRILL was equipped with a FANUC tilting table and a rotary table so that the machine is capable of 5-axis machining to face night shifts without human intervention



Robodrill and FANUC robots are essential in flexible automation

The machines in the workshops of Vullings Metaalbewerking in Horst, Netherlands are running 24 hours a day. The choice of machines, production organization, CNC programs: everything revolves around automation. Specifically, flexible automation, since even small series and unit products are manufactured in this highly automated work environment.

The Vullings site in Horst houses two companies. Vullings Systemen BV traditionally produce spraying systems for the horticultural sector, but they also design and manufacture customized equipment. Vullings Metaalbewerking BV is a subcontracting company that produces products for turning and milling work that are usually made of stainless steel and other more complex steels. Machining of plastics is also possible. "The two companies complement each other well," explains director Jeroen Evers. "Machine parts are made by the division Metaalbewerking and Systemen BV Vullings in addition to machines for third parties, systems that are used to automate the Metaalbewerking division."

7 days on 7, 24 hours a day

Launched 10 years ago, this automation concept is now integrated into all business aspects and now deploys five robots.

The machining centers are turning 7 days on 7 and 24 hours a day. During our visit, a Robodrill machine was busy making arms for Champion spraying systems. A FANUC robot picks the castings one by one from the feed conveyor and passes them to the machine. The optical system, positioned above the conveyor, tells the robot where the pieces are and how they should be picked up. Once machining of the spray arm is completed, the robot picks up the piece and places it on a discharge conveyor, where the optical system searches for a free space and tells the conveyor to



provide one. Operators check that there are sufficient castings ready by the end of the day so that production may continue during the whole night.

Pallet handling

"We started by automating two large machining centers," explains Frank Gijsen, the manager for automation of production processes. "Surrounding the machines, we built robot cells featuring FANUC R-2000iB robots and about 80 places for the products. The operators are responsible for the preparation of products and placing the parts on pallets. Robots bring the pallets to the machines and remove them. Smaller products are collected directly by the robots using a FANUC optical system, which are then placed on a conveyor."



20 years without failing

"Because relatively small products are often manufactured on existing cells, we looked for a new fast machine capable of processing these small parts," continues Jeroen Evers.

"We chose the Robodrill. We met with companies working with this machine, and someone told us that one of these machines had been working for 20 years and that they never had to call a FANUC mechanic. This is what really convinced us, because if you want to produce continuously, it is essential to have reliable machines".

"If you use all available time for planned production, you don't have any time left to make up for a production delay in case of failure."

Machine state monitoring

Vulling pays a lot of attention to preventive maintenance in order to ensure maximum machine availability.

Frank Gijssen: "The FANUC controls possess a machine state monitoring feature that we use to plan maintenance actions. Each notification from the machine is taken seriously for the good of the machine and to ensure it that does not break down unexpectedly. Oil and tools are also subject to periodic monitoring."

Milling on 5 simultaneous axes

For the α-Robodrill D21 LiA5, a robot (the M-20iA) was

installed with the FANUC optical system integrated in the robot controller. In this cell, which deals with smaller products, the machine and the robot are fully integrated.

"The machine controls possess enough computing power to run the cell. The robotized cell no longer needs a separate PLC," explains Frank Gijssen.

"On delivery, the Robodrill was equipped with a FANUC tilting table and a rotary table so that the machine is capable of 5-axis machining. The machine controls allow the 5 axes to be operated simultaneously".

The implementation of these 5 axes is a consequence of production without human intervention. At night, there is no operator to tighten the parts in a different position at intermediate machining stages.



Single-piece series

Frank Gijssen: "FANUC also helped us set up the machine for programming offline using a CAM system."

To succeed in this kind of flexible automation, and



this is the lesson that Vullings learned, all aspects of production must be tailored to suit each other.

Jeroen Evers: "When we receive an order for the production of a single piece, we see this as a series of one product. This means that if the same product would be repeated for a series greater than one unit, then it can be reproduced automatically.

CAM programs not only contain the production parameters for the machine, but also the robot manipulation data. We consider automation from the start, allowing production cells to work in complete autonomy."

An increasingly flexible production tool

Because automation concepts are largely implemented internally, the company manages to go further in its design, rendering an even more flexible production tool.

Frank Gijzen: "The goal is to achieve self-regulatory cells that possess enough information to make decisions. Because we also record data in the CAM programs such as the dimensions of the raw material, the production cell must be able to determine the products that must be manufactured based on small blocks placed on the conveyor. Naturally, you start from a production schedule, but if an operator inadvertently places too much of a product on the

conveyor, the machine must be able to decide which product to mill first before launching the next series that is ready slightly further on the conveyor."

Beside this, we make maximum use of the possibilities of the optical system and the computing power featured by FANUC controllers.

Highly technological machines

Vullings likes to disseminate knowledge of flexible automation as widely as possible. To this end, company visits are organized, especially for students. Jeroen Evers: "We sometimes think that automation is costing jobs, but the reverse is also true. We are aiming for people to discover our company and our way of working, precisely because it is difficult to find qualified staff. Machining metals often evokes negative images of hard and dirty work, although operators here work on highly technological machines. Thanks to the higher volumes that we achieve through automation, we need to hire more staff. We need people with experience in milling and turning, because about 20% of our production is related to very specific products that involve tasks which would not make sense to automate."

