



A new system for milling using a 6-axis rigid robot takes the prize in the Netherlands.

When rigid is better

> In 2004, the Netherlands-based robotic specialist wwa spotted a way to improve foundry production that others may have overlooked. Rather than using a traditional and expensive CNC (computer numerical control) system for milling, it could optimize the process by using 6-axis robots instead. Four years later, the company has changed to a system that has not only improved production, but actually received awards: When demonstrated at the Techni-Show in Utrecht, The Netherlands, the system garnered two prestigious awards: It won the silver from the “Innovation” jury, while the attendees gave wwa the first prize.

wwa is located in Best, a relatively small town in the Netherlands that is near Eindhoven. It was at the Eindhoven University of Technology that the company recruited 21 students in order to develop specialist software that would translate (parse) the commands of any CAD/CAM system to those of ABB’s robots – an

open systems model. It’s open because the regular proprietary model is based on the use of a particular CAD/CAM system, which therefore places constraints on the manufacturing process.

>FACTS

WWA highlights

- There are three principals – Jean Jacques van Broekhoven, Dennis Meijer and Marc Robben
- Current staffing is 19, to increase in 2009
- Extensive know-how in automated production processes
- Delivers cost-effective turnkey projects in short timeframes
- Has worked closely with ABB to test the IRB 6660

By Bob Emmerson
Photos Ruben Keestra

wva's model allows customers to choose the optimum system for every manufacturing process and it has been remarkably successful. Marketing started in March 2008 and four solutions, known as flexible production centers, were sold in a few weeks and the order book is filling up.

WVA was formed in January 2000 and the initial focus was on the automotive industry, but that market became highly competitive, hence the decision to stop and develop and market flexible production centers. However, the experience and knowledge gained by working in that area allowed the company to develop automated production lines and to market turnkey solutions. Moreover, these solutions have been developed in short time spans, typically a few months, and at very competitive prices.

Milling machines are robust and precise but expensive. They have a maximum of five axes, so the reach is limited and this has an impact on the production of complex products. Robots can have six axes so complexity is not an issue and often it is possible to work with one fixture.

In addition, a 7th axis can be added and this extends the reach on one side to more than 20 meters. Most robots are not good milling machines because they lack the requisite rigidity, which means that they are less accurate. ABB therefore developed the new IRB 6660 to match the rigidity and accuracy requirements of the milling process.

Robots also have another limitation: they can overshoot when changing from straight-line milling to a curve. This means that the output of the CAD/CAM system has to be fine-tuned manually, e.g. the speed has to be reduced in advance. This facility has been built into wva's software.

Optimization comes from the fact that wva has created a "best of both worlds" solution. For example, the robot can change tools or have more spindles and it can pick up the part to be milled and remove it; the robot can also invert the part. This eliminates the need to have an expensive CNC system, so there is a significant cost saving. The company's flexible production centers (FPCs) are also ideal for applications where long parts have to be milled or where other or additional manufacturing processes are required. For example, FPCs work equally well with a grinding process as well as for water-jet or laser-jet cutting.

Around 25,000 hours went into the development of the FPC software. Twenty-one students participated in the initial phase. The objective was the realization of a groundbreaking manufacturing concept – one that has significant cost and flexibility benefits. There is no comparable system on the market, which means that wva can market FPC systems worldwide. The company will therefore move into much bigger premises in Q3 2009, the new location being close to Eindhoven's International Airport. ☉



Solution highlights

- Works with long production lines, e.g. 20 meters or more
- Flexible, spindle/tool changer
- Robot code is generated by the FPC from the CAM file
- Milling by 5 axes simultaneously
- No manual programming is required – this means no need for developing specialist software or employing expensive specialist staff
- Faster ROI because of lower price of robot systems compared with 5-axis CNC machines.
- Robots can be used for loading/unloading cell
- Correction of the dynamic behavior of the robot for more accuracy

