Improving the daily grind. Grinding, milling and shot-blasting get the robotic touch at MGG Tegelen.

Saw blades live longer with help of robots.

Anyone who has ever worked with a band saw machine knows that it requires manual labor to get the best results. As the machine is used, the saw blade becomes blunted, requiring the operator to make more and more corrections as time goes on. A robot working by itself just follows its program, and as the band becomes worn, instead of making corrections, it just carries on with the program and the finished pieces become increasingly imprecise.

So, it’s not surprising that Dutch foundry MGG Tegelen could produce manually approximately 300 products with one saw before it became blunted or broken, yet after switching to a robot, the performance was actually lower initially, with a maximum of 150 products being produced before the saw blade no longer functioned properly. But MGG Tegelen wasn’t content to leave it at that. The company, located in the eastern Netherlands, specializes in aluminum sand-core die casting and gravity casting products. Rather than going back to doing the application manually, MGG Tegelen worked to improve the support system of the saw. By making some key adjustments to the speed and the robot program, MGG is now able to produce a thousand products or even more with a single saw blade.

How did MGG Tegelen manage to increase from 150 to 1,000 products? The key was simple: The process was changed so that the cuts alternate each time between the left and the right side of the blade, which allows the blade to wear evenly and thus last significantly longer.

In 1998, the first grinding robot was introduced at MGG. The robot was centrally located in the cleaning area, and the product was brought to the various cleaning stations for sawing, deburring and milling processes.
Since then MGG has, through careful development and fine-tuning of its robot concept, made vast improvements that have resulted in higher production and greater efficiency. What started as one grinding robot has now become five, with the capacity to handle 50 percent of the total production. The robots have functioned so well, in fact, that there are plans to extend the number of grinding robots to increase the capacity to about 80 percent of the production. The company has truly earned the title of “grinding robot specialist.”

Milling is also an area where the company has developed its robot expertise in a number of ways that have resulted in improved results. One big problem was dealing with burring and other irregularities in the grade of the casting. Robots are traditionally not well prepared to deal with irregularities such as burring. So, to anticipate this, MGG created a tool to measure the amount of electrical current generated when the robot is deburring the piece. More burring means more electric current. So, if the robot senses more current, it slows down, enabling the milling to remove the burr with more precision.

The accuracy of the cleaning process is dependent on several items. Besides the irregularities, the casting has deviations within limits of 2 mm. The robot itself has a certain accuracy and inflexibility and finally of course the tolerance within the gripper. Altogether this may result in an unwanted product deviation. By using a 3D sensor, the deviation is measured.

“As the robot knows the routine and we have measured the deviation, the robot knows how to correct the offset and the cleaning process can start accurately,” says Geert Valckx, managing director of MGG Tegelen. Due to highly accurate cleaning, MGG has eliminated the need for manual correction and visual inspections, allowing it to start the next production process, shot blasting, directly after the cleaning cell.

The grinding robot places the part on a table after it has eliminated the grades completely. A second robot picks up the part and hangs it in the shot blasting machine. The machine turns 180 degrees so that the part is in the range of the shot-blasting wheels and the machine starts shot-blasting the part. The part that is coming out is now in reach of the handling robot. The handling robot takes the part out and removes the shot-blasting grid. After finishing the job, it puts the part on a slide table so that the operator can check the part and the next steps in the process can be carried out. The new shot-blasting cell was installed in May 2005.

While the switch from manual cleaning – sawing, milling and shot-blasting – to automation with robots hasn’t been without its difficulties, the end result is that production cycle times have increased significantly and MGG is required to keep fewer products in stock. The bottom line is that robots have increased production and saved the company money. “Looking back on the first grinding robot, we were able to clean small products in big series. Now, with all the improvements done and all the experience built up, MGG is also able to clean big products in small series,” says Valckx.

Benefits:
− Return on investment for MGG’s purchase of a grinding robot that can work in three shifts has resulted in payback time of approximately two years.
− Production increased from 300 to 1,000 parts per saw blade.
− Manual checks are no longer needed for the cleaned product.
− Fewer products needed to be kept in stock.

MGG Tegelen
− A part of Hayes Lemmerz International Inc.
− Founded 1945 by Sjraar Giesen.
− Based in Tegelen, the Netherlands.
− Yearly turnover of more than 100 million euros.
− Aluminum sand-core, die casting and gravity casting products.
− Production includes five ABB IRB 6400 robots.

ABB Robotics
www.abb.com/robotics