



Breaking the mold

After its initial move into automation, a ceramic-casting company plans to integrate more robots into its factories.

Text: ABB Robotics **Photo:** Frederic Meyer

In the Swiss city of Winterthur, attentive pedestrians can still spot old manhole covers with the Wolfensberger imprint. This family company, founded in 1924, has not manufactured such mass-produced goods for many years. But while other leading Swiss foundries, like those of Sulzer or Rieter, have allowed their furnaces to go cold amid the flood of cheaper products from overseas and turned their attention to other business activities, Wolfensberger has evaluated lucrative niches and developed the necessary expertise.

Thus, when a customer requires large quantities of high-quality parts pro-

duced by ceramic-precision-casting processes, the company with its manufacturing facility in the town of Bauma is virtually without competition. With a process called Exacast, Wolfensberger can produce complex castings with thin parts, precise dimensions and extremely smooth surfaces. Compared with other casting methods, this process requires just a fraction of the post-processing costs – fine-quality casting, but for finished products weighing up to 400 kilograms. This also made a convincing case for ABB Turbo Systems, the world market leader for turbochargers for large diesel and gas motors. Wolfensberger has

supplied nozzle rings to ABB Turbo Systems for more than 30 years – some 35 different types with diameters from 180 to 1,000 millimeters, about 7,000 items per year. Contractors for the construction of goods vehicles are among Wolfensberger's most important customers.

"In the years up to 2009 the market boomed, fueled by the enormous worldwide need for new ships and trucks," says Kevin Schmidhauser, Head of Procurement and Marketing and the great-grandson of the company's founder. "We continuously expanded production, without much time for further development of production methods. Day-to-day business had to go on."

Then came the financial crisis, with a decisive impact on the world economy. In 2009 the volume of global transport declined by 12 percent. Nobody was ordering ships and goods vehicles.

"At Wolfensberger we began to review the production processes in order to reduce both costs and processing times and thereby remain competitive," Schmidhauser says. Lean management was the order of the day. "And strategically we decided to move away from costly manual individual processing to developing series production."

Since mid-2014, two ABB robots have worked side by side in the pro-



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Kevin Schmidhauser, Wolfensberger

duction of molds for ceramic-precision-casting. In the process the first IRB 6640 lays the permanent model made of silicon mounted on a tower shelf on a workbench. The second IRB 6640 places a supporting mold made of chamotte on the permanent model to cast the gap with a ceramic sludge, which is an ethanol mineral mix. The first robot then takes these molds again and lays them one after the other on the purpose-built tower shelf, where the sludge hardens for around 20 minutes. The first robot then lays the molds with hardened ceramic on the workbench and demolds these and passes over the hardened half-molds to the other robot, which lays these on a flame carousel to burn.

“This is the first step to automation of the repetitive workflow in the ceramic casting production line,” explains Peter Streit, team leader Technical Services and Projects at Wolfensberger AG. “Further development will follow, the assembly of the casting mold from the half-molds using robots.” The production of castings should then last for two hours instead of several days as with predominantly manual work in the past.

Integration partners are sought for programming the robots, in this case Elwitec GmbH in Wetzikon and Robofact AG in Gossau. After training from ABB, Wolfensberger staff members are now capable of adapting the programs.

Just a few hundred meters away, an ABB robot is in use in the second Wolfensberger manufacturing facility in Bauma. Castings are further processed on this site, which started operating in 2003. Since January 2015, an IRB 4600 has



Discussing solutions. Alain Känel, Sales Engineer, ABB Robotics Switzerland (left) and Peter Streit, team leader Technical Services and Projects, Wolfensberger AG.

been operating here sandblasting retarder parts – components for truck brakes. With ceramic micro balls as blasting material, the surface of the piece of machinery is thereby compressed, a process that was previously carried out manually.

“In this work process the time gained through automation is less important than the accuracy of the process itself,” says Daniel Jaeggi, Lean Manager at Wolfensberger. “With the help of robots, the part of the nozzle ring to be processed can be blasted at the same angle without a gap under the same pressure.” Process control can also be improved by using robots.

As with all newly established production processes, the whole system still has room for improvements, such as reducing the loss of blasting material. But the ABB robot performs its work per-

fectly, Jaeggi says. “It has been proven that compared with other competitive products, ABB robots have good programmability, which simplifies many things,” he says. “Furthermore, there have been no breakdowns recorded due to technical shortcomings so far.”

As with precision-casting, further automation stages are being developed for sandblasting robots. “I would calculate that in the medium term 10 to 12 robots will be integrated in the casting and processing methods,” Schmidhauser says. Wolfensberger supplies around half of its products directly to the eurozone, and significantly more indirectly as it supplies products for processed and exported systems in Switzerland. The strong Swiss franc means that increases in productivity are more important than ever.

“A weak euro versus the Swiss franc causes us problems,” Schmidhauser says. “On the other hand, our customers in Germany have the advantage of being able to use dollars and can open up new market sectors. I think that the fast availability of delivered parts in the necessary quantity will gain in importance. Therefore, we will implement further automation solutions so that we can produce faster here and with higher quality.”

Wolfensberger AG

Wolfensberger offers the performance spectrum of precision and sand casting for around 100 steel and iron casting materials as well as chip removal. It employs about 210 people in its manufacturing facilities at Bauma in Zürcher Oberland. At the moment, this innovative family-owned company is promoting the development of a molding and casting process for manufacturing thin-walled steel castings using sand-casting processes.