

Success Story

Specialised expertise – highest quality

hyperMILL® enables complete milling of impellers: Customers of Polygona AG, based in Jona, Switzerland, testify to the excellent technical level of their impellers, even though the company began production only two years ago. Polygona’s debut in this...

...industry was able to succeed thanks to assistance from a machine tool manufacturer and OPEN MIND Technologies AG as their CAD/CAM supplier.

An impeller is a propeller that is enclosed in a ringshaped housing. It is sometimes referred to as a shrouded propeller. By lowering the induced media resistance (air, water, etc.) on the blades, the casing increases the propeller’s efficiency. Blade wheels of this sort are used in energy generation, compressed air generation or ship propulsion, to name but a few examples.

Closed impellers are becoming increasingly important. Yet manufacturing them demands the greatest level of expertise and highest functionality from the CAM system and machine tools.

Polygona AG was aware of this when they steered into this business two years ago. Founded in 1976, the company had previously focused primarily on the manufacture of high-precision polygons that are in global demand, with customers even including Formula 1 racing teams.

“We only dealt with turbine blades in the past when we installed polygons into the hub area for power transmission”, says John

P. Giger, Polygona’s managing director. “That was”, he continues, “a stressful job that entailed major risk, because, during polygon machining, the expensive turbine blade could be damaged.”

To improve the situation for Polygona, Giger and his colleagues considered manufactu-



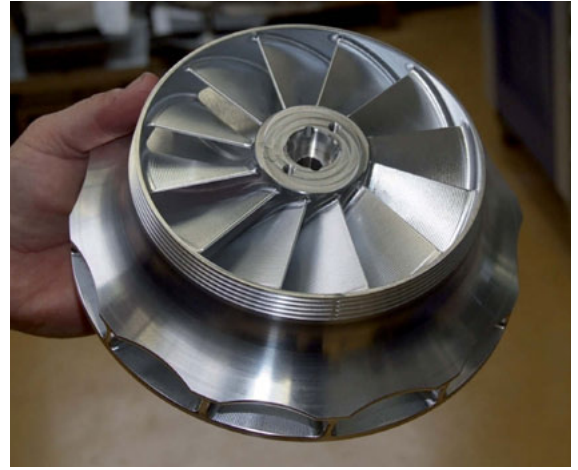
About Polygona

Polygona has more than 50 years experience in the polygon profile production. Main segments of its components are in turbine and cooling plant, compressors, motor sports (several F1 teams, Le Mans Series, DTM, Rally and others), medical technology, mechanical and electrical industry, engineering and construction of recycling machinery and many others.

> www.polygona.ch

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John P. Giger, Managing Director



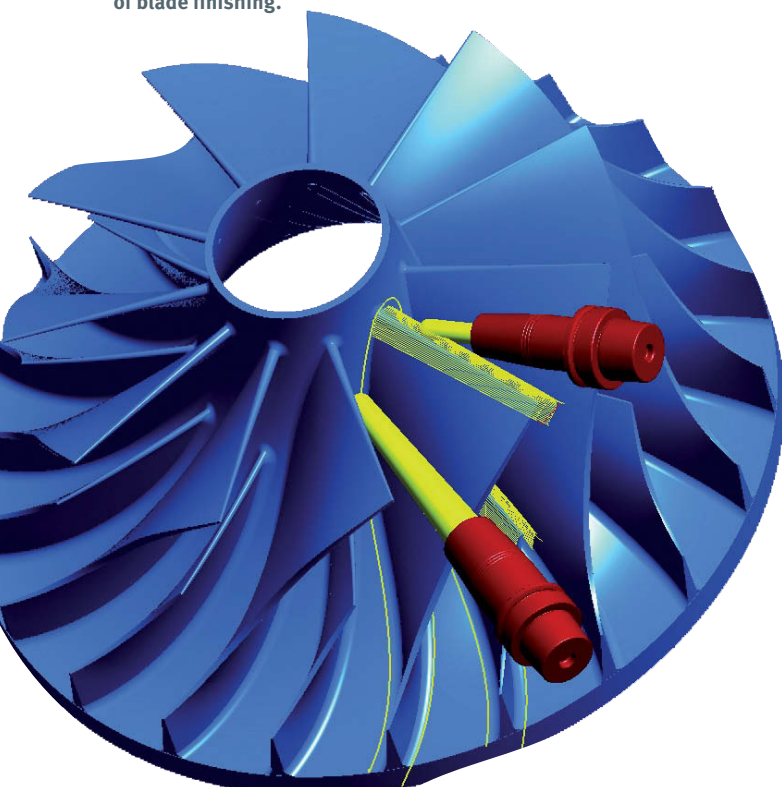
ring complete impellers themselves. There were a few limiting factors that had to be considered:

- Motivated and qualified employees who were nonetheless inexperienced in this particular area had to be able to figure out the required technologies quickly.
- The processes had to be designed in such a way that allowed for offering products at a competitive price.
- Customers needed to be found who were willing to give a new entrant a chance.

“With regard to that last point, we started to ask our turbine blade customers whether they would start buying complete impellers from us”, remembers Giger.

Initially, one customer gave Polygona a chance. Provided Polygona was able to deliver a functioning impeller prototype within about three months, this customer agreed to sign a contract for guaranteed order quantities.

OPEN MIND’s *hyperMILL*® provides a special package for machining impellers and blisks. The image provides an example of blade finishing.



Finding the right partners

Polygona then began to look around for partners that could help them to expand the new business, and they found a Swiss machine manufacturer and OPEN MIND Technologies AG as their CAD/CAM supplier.

Polygona managed to produce the blade prototype within the allotted time and signed a contract with the customer.

OPEN MIND played a major role in this business because the CAM producer from Wessling in Germany not only offers a first-class CAM system, *hyperMILL*®, but also a special module for milling impellers and blisks.

hyperMILL® is a CAM system for milling, drilling and mill turning machining. All machining projects, from 2D and 3D to 5-axis and 5-axis simultaneous machining, can be programmed using one programming interface.

OPEN MIND extended this basic system by developing a multiblade package. It helps to make milling these kinds of turbine blades as simple as possible for users.

With this package, all strategies required for machining impellers and blisks are easily defined. In addition to general applications such as roughing, hub finishing and blade finishing, the machining strategies also include more specialised applications.

Automated functions keep the number of parameters that need to be defined to a minimum, and owing to the self-explanatory, intuitive graphics-based user interface, the purpose and function of each parameter is readily understood.

Next, the advantages of *hyperMILL*®’s feature technology can also be leveraged for machining impellers and blisks. Complete machining sequences that have already been run successfully for similar jobs with the same material can be imported via drag-and-drop. Modifications or programming variations therefore only require a few clicks of the mouse.

Users greatly benefit from this kind of approach, a full basic package plus a supplemental package, as OPEN MIND makes clear: “A special package dedicated exclusively to impellers may provide good capabilities, but it doesn’t allow for any other application. A general 5-axis system, on the other hand, means a higher workload and, ultimately, much longer manufacturing times. Our solution provides both: the flexibility of a general system and the performance of a specialised system.”

Experiences

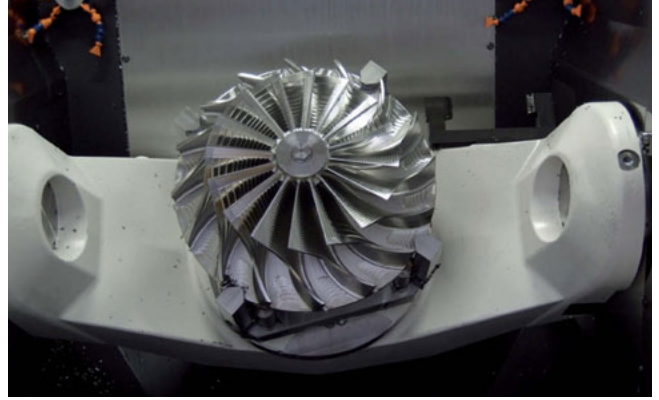
“Our experiences with *hyperMILL*® and OPEN MIND have been very positive”, says John Giger. “We were able to familiarise ourselves with the system very quickly in order to reliably generate NC programs, and we were then able to mill the parts ourselves on the machine”, remarks Thomas Beutler, Team Leader for Simultaneous Milling at Polygona.

Additionally, technical feasibility became so much clearer thanks to this solution. We were actually able to completely mill the impeller – all the way through to fine finishing. In this process, the system’s simulation options played a major role, as did the resulting collisionfree program, confirms Giger: “Ever since starting to work with *hyperMILL*® two years ago, we have never had a single collision.”

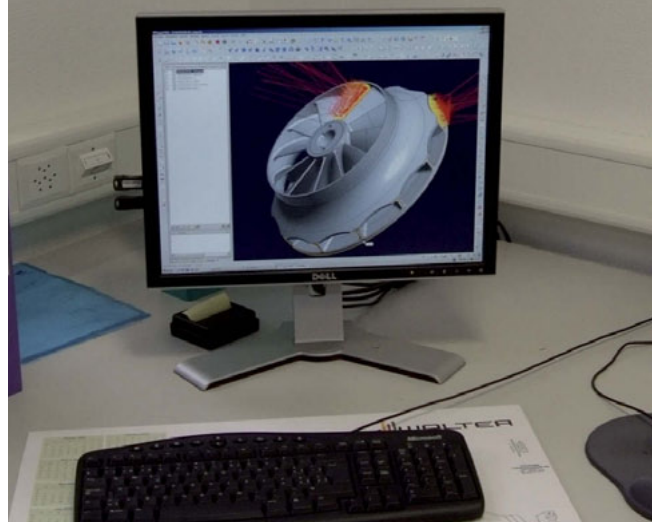
With help from their partners, Polygona has managed to achieve a truly impressively high level of quality that has been confirmed by customers, and “we are competitive in terms of pricing”, says a satisfied Giger.

The market has reacted positively to the company’s high performance. Starting with the first customer two years ago, Polygona now almost has 10. And already orders are starting to pile up since the company is operating at full capacity.

Giger believes that this points to outstanding prospects for the future. “We will continue to grow! We are already completely booked out today, which is why we have to upgrade, both our CAD/CAM software and our machines.” ■



A completed impeller. The diameter range at Polygona AG runs from 0 to 800 mm, and up to 250 mm for closed types.



At Polygona *hyperCAD*® and *hyperMILL*®, as well as the special package for impellers and blisks are installed.

About OPEN MIND Technologies AG

OPEN MIND is one of the world’s most sought-after developers of powerful CAM solutions for machine and controller-independent programming.

OPEN MIND designs optimized CAM solutions that include a high number of innovative features not available elsewhere to deliver significantly higher performance in both programming and machining. Strategies such as 2D, 3D as well as 5-axis milling/mill turning, and machining operations like HSC and HPC are efficiently built into the *hyperMILL*® CAM system. *hyperMILL*® provides the maximum possible benefits to customers thanks to its full compatibility with all current CAD solutions and extensive programming automation.

OPEN MIND strives to be the best and most innovative CAM/CAD manufacturer in the world, helping it become one of the top five in the CAM/CAD industry according to the NC Market Analysis Report 2015 compiled by CIMdata. The CAM/CAD solutions of OPEN MIND fulfil the highest demands in the automotive, tool and mould manufacturing, production machining, medical, job shops, energy and aerospace industries. OPEN MIND is represented in all key markets in Asia, Europe and America, and is a Mensch und Maschine company.



We push machining to the limit

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