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VisualMILL, the CAM Software for Mold Construction

The Company

Lenord + Bauer is an international specialist for sensor and automation technology. The portfolio of the company contains sensors for speed and length based on the principle of magnetic measurement as well as intelligent control and drive systems, focused mainly on the production of customized solutions.

The Task

A bachelor thesis had to be written about the design of an injection mold that enables an encapsulation of electronic components by low-pressure casting of hot melt adhesives. Individually matched to the application shapes and contours should be possible. It is to be expected that customer-specific forms will be required in greater amounts.

To be able to offer this flexibility, a process should be implemented in the company that enables the production of customer-specific forms in-house and in a very short time. As there are mainly sculptured surfaces a CAM system is absolutely necessary.

Why VisualMILL?

Different CAM solutions were checked for their suitability during the preparation - from freeware like FreeMILL to paid version of other manufacturers. VisualMILL offers a trial version in an uncomplicated way. The advantage: the whole process of CAM simulation through to post processing can be tested to determine if the software meets the individual requirements.

But buying CAD/CAM software is always a question of costs. Very high prices are not uncommon. These versions often include features the user does not require. At Lenord + Bauer 3-axis milling machining is planned. VisualMILL offered us the perfect package without the need of ordering more features like 5-axis milling capabilities.

Startup Phase

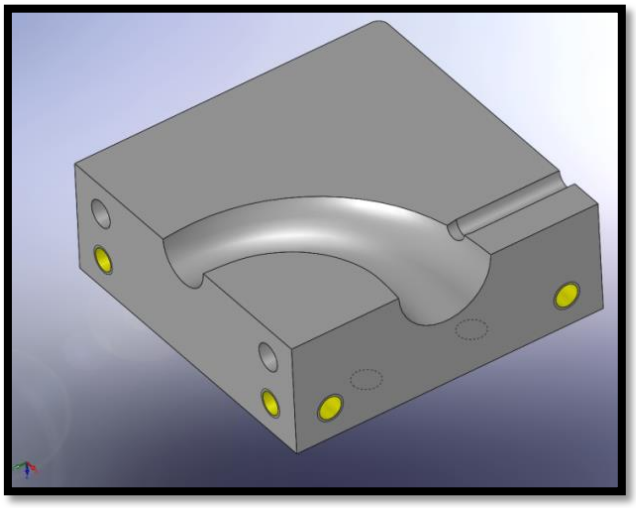
After the startup phase of the new software with samples and online training material, realization of the particular work piece started. VisualMILL was integrated as a SolidWorks plug-in into the existing CAD software. Simulation of the different manufacturing steps and simultaneously adaptation has become far easier.

The startup phase showed that the software is very easy to use and first results can be done very fast and without any training courses. In the internet there are lots of English-speaking tutorial videos that support you while doing first steps with the software.

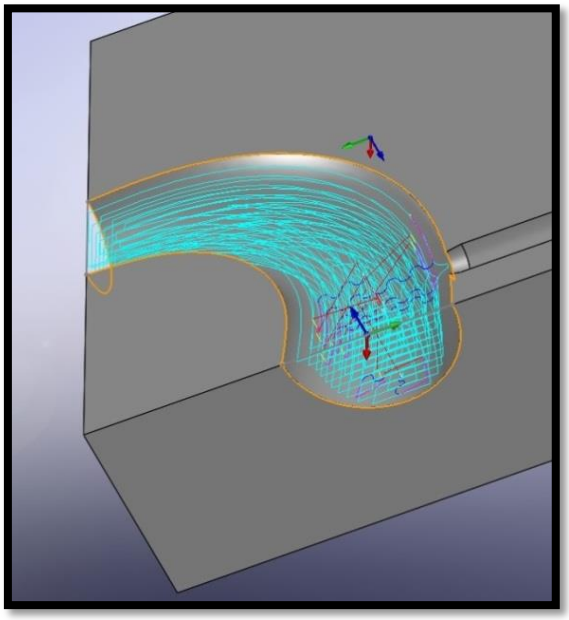
For queries, the German telephone support was very competent and helpful.

VisualMILL in Action

Prior to the actual start, tools were defined and entered into the knowledge base of VisualMILL. In this way different parts can be handled with the same tools. At the same time it ensures that the tools of the simulation process are later used in the manufacturing process. Even the technological data of the tools can be fed into the system.



The picture above shows the designed 3D geometry. The shape is a 90° bent cone, which tapers along the curve. The G-code programming solution for that geometry is limited. With VisualMILL, the machining operations for roughing and finishing were done. The desired traversing path and other safety margins could have been always changed to get the optimal tool paths.



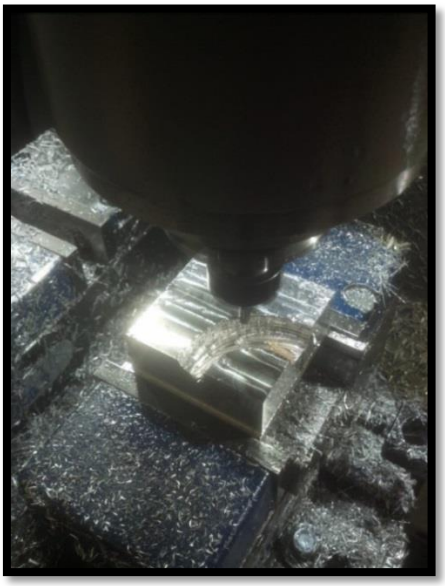
The picture above shows VisualMILL's tool path for the inner contour.

After process simulation, including collision control, the G-code was generated using the integrated and open post processor. First, the control system Siemens Sinumerik 840D couldn't accept the G-code faultlessly. Reworking the G-code was necessary. Since VisualMILL offers open post processors to its customers, it was particularly adapted for this application to reduce rework. The generated CNC program had approximately 9000 lines of code; therefore only processing with large cut depth was planned.

Creating Swarf with VisualMILL

Once the control system processed the code successfully we started the machining process. First it was an uncomfortable feeling to start and trust in the software after programming manually for many years. While machining the first work piece, every movement of the machine was watched meticulously while being prepared to intervene.

After successful completion, skepticism vanished. Machining of the second work piece was truly more relaxed, also with great success.



The picture above shows the DMU 35, milling the cavity only with coordinates from VisualMILL. The duration of processing was approximately 20 minutes.

The Result

The milling result was satisfying on the first sight. The mold insert was not yet in use. On a trial basis a mold of the surface was done to analyze adhesion and surface texture.

On the picture below you can see the first prototype of the 90° mold insert. The grooves stem from the depth of cut of 0,2mm to reduce machining time for the trial.

What's next?

Within the next weeks the prefabricated parts will be done to check the performance of the shape. For this purpose more insets will be created with VisualMILL.

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