Productive SolidCAM

From Idea to Product

How a Polish patternmaker prepares for the future

Today, computer aided design and simulation plays an increasingly important role for designing better products. However, in order to really test the final design, engineers need to produce concept models and functional test parts quickly and inexpensively. In the last years, new Rapid Prototyping technologies like 3D printers helped to speed up this process. 3D Printers create physical models directly from 3D files utilizing High performance composites or elastomeric material.

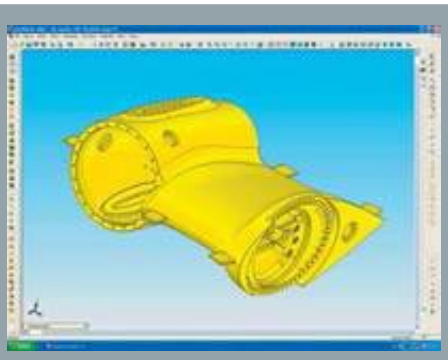
One disadvantage of the Rapid Prototyping technologies is, that the dimensions of the produced concept models are limited. What to do in a situation, where a model of a vehicle, e.g. a car body, or a complicated underwater casing of a ship drive has to be manufactured?

One option is, to scale the model down to a 1:3 scale, so that the dimensions then may fit into a 3D printer. Another option is to shape a complete car body in the original size by utilizing a special plastic material called “clay”. Here, the complete digital model of the car body can be milled in clay material using a standard CNC milling machine. The resulting model can be used for design studies or wind tunnel investigations.

However, these approaches are not suitable when conceptional models require:
- to have original size and
- to be resistant for mechanical failures and
- to perform functional tests

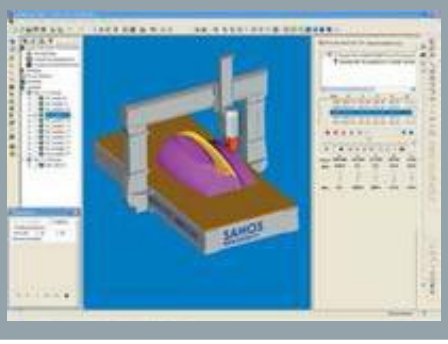
In this case, the ultimate solution may be to manufacture the models out of the traditional material – out of wood. This is a specialty of “Joszko Modele”, a leading patternmaker located in Ozimek, Poland.

Underwater casing of a ship drive designed in SolidWorks.



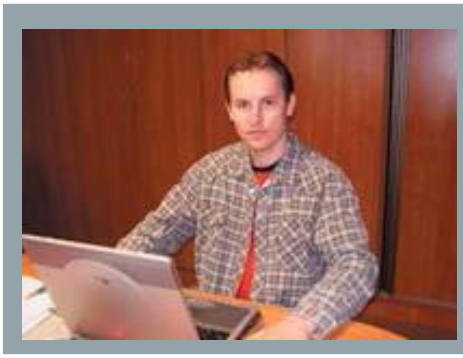
Wooden model of one half of the ship drive – produced by Joszko Modele

Simulation of the CNC Machining with SolidCAM



High Tech from Poland

Most of the large manufacturing companies in Europe cooperate with subcontractors, which are specialized in making prototypes and patterns for newly developed products. One of them is “Joszko Modele”. Founded in 1963 in Poland, the company has had only limited activities in the first years due to the political and ecomomical restrictions. There was not such a big demand from the large industrial customers, which generally where government owned and often had not to face competition. Therefore, the pressure of innovation in these companies was not too high, and thus the demand for prototypes and conceptional models was limited.



Paweł Nienartowicz, CNC Programmer, Joszko Modele

The liberalization starting in the 1980´s changed this picture dramaticly. Although Joszko Modele´s traditional customers, the Polish heavy industry, adopted the changes relatively slowly, Joszko Modele increased its business rapidly by exploiting new business opportunities in the Western European countries. The entrance of Poland into the European Community gave them a tremendous kick, as that Joszko Modele decided to open a subsidiary in Duisburg, Germany in order to serve its customers in Western Europe.

Pawel Nienartowicz , resonsible for the CNC Programming in Joszko Modele, states: “Now we have large opportunities across the whole continent. The large European market has many niches, which permit to choose the most suitable segment for us. On the other hand, we face more competition from companies, which have a higher technological level than Joszko Modele had. So we have been forced to implement the newest manufacturing technologies in our company.”

He continues: “The challenge for us was not only to automate our manufacturing processes by utilizing the best machine and software technology, but we had also to improve our internal quality procedures and to train our 25 people to use the new technology. One of our advantages is the access to young and motivated employees, which work for reasonable labour costs and are flexible to fulfill the time-critical demands of our customers.”

Changes, changes, changes ...

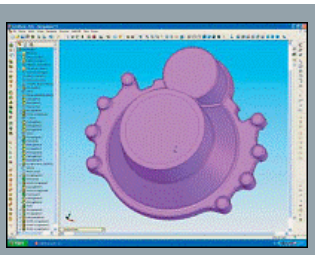
The company introduced the new manufacturing technology in the year 2005. Joszko Modele purchased a 5-axis CNC milling machine from the Czech manufacturer SAHOS, with dimensions of the working table of 3800 x 2200 mm. In addition, a first seat of SolidWorks+SolidCAM was purchased for computer aided design and manufacturing. The investment was partly financed by the EC Fund for Regional Development.
Pawel Nienartowicz: “We decided for SolidWorks+SolidCAM because our machine tool partner SAHOS is already using this combined solution very successfully. With SolidWorks, we have a mainstream CAD platform, which enables us to import all geometrical data from our customers and also to do design modifications if necessary. SolidCAM is seamlessly integrated in SolidWorks, so that our programmers can operate in the same window. In case we have to modify the design, we can update our CNC programs automatically.”

An important factor for Joszko Modele is the partnership between SAHOS and SolidCAM. This guarantees, that the post processors are already validated and that the data of the SAHOS machine are ready for machine simulation. Especially for 5 axis simultaneous machining, the simulation and verification of the toolpaths including the machine environment is essential to avoid collisions.

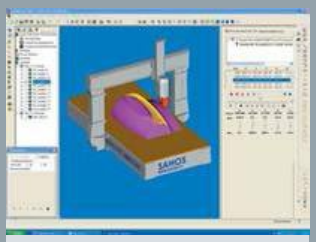
Assembly of the physical model after finish work.

Pawel Nienartowicz summarizes: “With our new 5 axis machine technology and SolidWorks+SolidCAM we are now internationally competitive in the wood and plastics manufacturing market.”

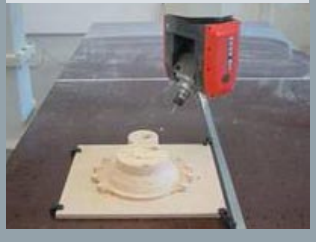
Steps of the production process



Casing of the reducer, before and after the finish.



Simulation of CNC Machining and cutting on a 5-axis milling machine.



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