

The glass with the 3D finish



Everyone knows that a car can no longer be developed without 3D-CAD. But a wine glass? Schott Zwiesel has been proving for many years now that modern technology and creative craftsmanship are absolutely not mutually exclusive. In this case, it was the creative people themselves who opened up the path for CATIA software to enter the design office and integrate designers in the company processes.

Schott Zwiesel, which returned to being an autonomous group of companies in 2001, is well-known for beautiful glasses such as those in the ‚Diva‘ and ‚Audrey‘ lines, for exclusive design à la Enoteca or TOP TEN, and is successful with glasses used in restaurants. In the past fiscal year, revenues were 46.5 million Euros, with the export share of 59% being very high. 25% of this international success is based on business in America; 10% based on glasses which go to Asia and the Pacific region; and additionally deliveries are made to 70 countries, with 50 distribution partners offering worldwide customer service.

Schott Zwiesel achieved market leadership producing drinking glasses on machines rather than hand made job-lot production. It is however becoming increasingly difficult to see the difference. According to Josef Finger, head of CAD/New Media, the deployment of CATIA is responsible for the best part of this:

„At the start, I was not exactly thrilled. As a designer, working on a computer? That seemed to be a contradiction. Perhaps, however, our success can be explained by the fact that we regarded CAD from a less technical point of view.“

2D-CAD was introduced at Schott as early as the mid-1980s. With CADAM, technical drawings were created for machine construction. Inadequacies in the workflows led to calls for 3D-CAD. CATIA by IBM was installed. Involving product development was more difficult than assumed in the beginning – until

1993 when management were able to convince designer Josef Finger to devote himself to the task.

Team formation for new processes

Josef Finger worked with the mold-makers on his machine which had CATIA installed. He wanted to get to know the processes located downstream of engineering design, and to understand why it had not been possible so far to implement so many designs.

The practitioners, technicians, and mold-makers were the quickest to be convinced. As soon as the first spatial models of new glasses were available, the implementation in NC programs for computer-controlled production of the corresponding shapes was almost child's play. Instead of having to enter these programs based on the drawing, they could now be derived automatically from the CATIA model.

Over and above this, however, the designer was now able to trace closely when and at what positions certain designs led to manual reworking of NC-produced shapes. He was able to prove to the mold-makers that the change was better and faster directly on the 3D model – with the huge plus of a 100% match between engineering design and product.

Very quickly, the first results also roused the curiosity of colleagues in engineering

design. One after the other, they came to see how they could solve problems using the new system. Here, Josef Finger convinced even more people when he began to use the software and conjure up things that had never existed before in that form.

Learn innovative conjuring with 3D

It was not previously possible to show images of virtual objects. Back in the mid-1990s, computer models, even using shaded representation, could hardly be compared to the quality of a photo. What might be acceptable as a technical product is completely unsatisfactory when what is primarily involved is beautiful design and its effect on the ‚eye of the beholder‘.

Josef Finger devoted up to eight hours per week to the subject, attended training courses, made contact with the IBM partner T-Systems Competence Center CAD/CAM (formerly Debis system house), demanded the impossible and astonished software developers and employees in his own company alike with his particular method of application: „With stubbornness and energy, even Version 3 of CATIA, which did not even have proper rendering yet, led to results that advanced our business considerably.“

With short lead time, the design engineers were now able to present illustrations of product design proposals from which customers could choose before they placed an order. Changes were no problem, implemented at the drop of a hat. When the order was placed, the glasses were manufactured, packed, and delivered very quickly – and that at favorable terms.

The areas of design, mold-making and production, which used to work separately, were seen to be growing into a team. The separate, successive processes merged into a product creation process. With the switch to CATIA V4 at Zwiesel in 1996, this development was intensified.

The board of management views this improvement in product development, acquisition, and order fulfillment as one of the most important reasons for the success of Schott Zwiesel in the last few years.

Significant improvements in the product development process

„Computerized product development

means that differentiation features of individual products can be developed in a striking manner and substitution developments avoided,“ says Dr. R. Hartel, Chief Executive. „Manageable variety as well as multiple use of shapes in different goblet and style variants help to reduce operational costs and still meet current market needs.“

Even the briefing of external designers for a new product now takes account of the overall process. Reference dimensions for the height of the stem or the relationship of the goblet to the base ensure smooth implementation.

The draft design is handled by the internal designers. Their task – capturing the character of the initial design as exactly as possible but at the same time ensuring technical feasibility – is a tightrope walk that the experts in Zwiesel are mastering. On the basis of the CATIA model, it is then more or less a routine task to use the suitable scale of the white-wine glass to also create champagne goblets and glasses for red wine, water or distilled liquors.

Calibration marks to indicate the volume of the drink for gastronomy products can be automatically calculated with CATIA, then added to the model. The exact amount of glass, important for the right configuration of the machines and the greatest possible reduction in residual glass during production, also comes at the push of a button from the specific weight and can be read from the model. A primary advantage, however, remains the presentation of virtual drinking glass models, which can no longer be distinguished from photos. To this end, Josef Finger used CATIA to set up an individual, virtual photo studio. The design engineers can use this on the screen to set sources of illumination, choose background images, and place designed glasses in this ‚photo studio‘ for ‚exposure‘.

Virtual photos for market research

Significant improvements have also been achieved in market research. „The quality of the created pictures is so good that they can be used as the basis for market surveys, for example,“ says Dr. Andreas Buske, board member. „It used to be the case that we needed either the glass itself or real photos. Frequently, including the case of the ‚Audrey‘ line, this method has led to great success.“



Last year, Telekom and T-Systems brought Schott Zwiesel to ,CeBIT and Systems' with a virtual glass construction kit to present visitors on the Internet with finished glasses and enable them to use different elements (goblet and stem) to compose the glass they wanted. Within one working day, it was possible to send the visitor the individually manufactured glass.

„We are working on Pipe dreams at full steam,“ says Josef Finger in describing this scenario. At the Ambiente designer fair in Frankfurt, the Schott booth was also an attraction with this presentation. Within one hour, it was possible to hand visitors virtual photos of ,their glass' – designed online using CATIA. Even the competition were attracted – and astonished: in this industry, engineering design with 3D-CAD is still a foreign word in many places.

A lot of energy was invested in the development of a new technique for lettering and ornaments. Schott Zwiesel is working with research institutes on a method to enable the use of a laser technique. As the engraving – in contrast to printing – does not wear, and as there is considerably greater flexibility even for job lot production, decorations of this kind can be used to achieve good results.

Today, even ground crystal glasses come with a ground structure that originates from the 3D model. This is considerably more precise, but above all leads to the repetition accuracy that characterizes the precision and quality of Schott Zwiesel products.

Accuracy that pays off in many ways

This accuracy – this match of engineering design, shape and glass – pays off in many ways: even though a new tool shape is required after an average of 4 million glasses, this leads neither to a change in the appearance or

quality nor to problems in production. At Schott Zwiesel, traditional craftsmanship is linked to state-of-the-art technology and continuous research and development. The still relatively young crystal glass ,Tritan', for which the manufacturer has a worldwide patent, is a good example of this. The highest resistance to breakage and dishwasher resilience are the most important properties.

CATIA can be used to bring machine-based glass manufacturing up to the quality level of hand-made glasses. Josef Finger is convinced that this is not far away now.

CATIA V5 already plays an important role. The first projects carried out have convinced all those involved, above all because CAD has now become so simple. Tricks such as those of Josef Finger, however, are not part of the standard installation.



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