

Film lens company launches new products twice a year with Solid Edge efficiency and Majenta PLM technical support



Cooke Optics

Industry

Precision camera lenses

Business Challenges

- Respond to customer demand for new specifications
- Accelerate new product introduction
- Increase production

Keys to Success

- Choice of synchronous technology and ordered environment
- Smooth transition between 2D and 3D perspectives
- Share data easily within the company and with suppliers
- Work closely with Majenta PLM

Innovation twice a year

Rumour has it that various Hollywood stars have owned a set of Cooke lenses. That's not surprising given the fact that these famous film camera lenses are known for delivering a warm and natural effect, the 'Cooke Look'. Not only do actors and actresses want to look their best, directors of photography strive to make their mark with distinctive shots, which means that lenses made by Cooke Optics are in constant demand from those both behind and in front of the camera.

The company has been designing, developing and manufacturing lenses since the late nineteenth century and at the 2013 Academy Awards® of Merit for Scientific & Technical, it was recognised for its contribution to motion pictures. Cooke lenses, which are all hand built, have a reputation for being accurate, reliable and easy to maintain. Designed for artistic creativity in various filmmaking scenarios, they ease the technical challenges of shooting a movie. If, for example, a lens iris opens faster, it lets more light into the lens and filming can begin one hour earlier in the morning.

Demand from around the world means that fulfilling the order book is a constant challenge. In addition, customers expect to see innovative developments every spring and autumn at the two major film industry fairs.

Solid Edge is intrinsic to the overall development process. The 3D CAD software is provided by Majenta PLM, which also provides a range of technical services. These include bespoke consultancy, guidance on hardware, regular training opportunities, automatic updates and helpdesk support.

Precision and productivity

The manufacture of glass has a longer lead-time than metal work and the Cooke design team has to manage a range of complex parallel processes as it works towards a target deadline for both. As Paul Nettleton, senior designer, explains, "The engineering challenge is complicated. Each lens has about 15 different elements. These have slightly different curves that need to be set apart from each other at precise distances. In addition we are creating complicated profiles to suit the system design."



Solution

Provision of Solid Edge with bespoke consultancy, customised training, automatic updates, specialist hardware and continuing technical support from Majenta PLM.

Business Impact

- Twice yearly launch of new and improved products
- Accuracy to within 20 microns
- Speedy and efficient design process
- Industry recognition for innovation

“The partnership with Majenta works really well; our hardware and software are up to date; we are regularly going on courses and we are getting help when we need it,”

Steve Pope, Engineering Manager, Cooke Optics Limited

Once the optical specification is confirmed, the mechanical engineering team has to design the glass to that prescription and create the metal casing that holds the lens in position. They need to achieve tolerances of less than 20 microns. Paul Nettleton notes: “At this stage we liaise closely with our optical specialists as we work through potential clashes until we all agree on the design. Some of Cooke’s components have complex geometries so there are lots of reference planes and this is where Solid Edge is very helpful with features such as tangents. Calculating the weight of the components used and showing their 3D movements all aid the design process.”

Cooke designers find that both the synchronous technology (ST) and ordered environments within Solid Edge play their part. Dave Payne, Designer, is an avid user of ST, after attending a Majenta PLM two day training course. He describes synchronous technology as ‘a super feature’. “I am, for example, really impressed with assembly editing. In one move I can steal geometry from another model. However I would definitely use an ordered environment to create a saw tooth pattern in metal or edit a chamfer. What I might do is to have a base feature that is ordered and then move into ST, for example when I receive IGES files for the glass design I will use ST to create the radius. Using the two approaches together means you have right tools for any job.”

Design and View in Both 2D and 3D

One of the huge benefits of Solid Edge is the ease with which everyone can move between 2D and 3D. Paul Nettleton again: “With a new design we start with 2D, turn it into 3D and then move back to 2D. Our designs are so complicated that we cannot simply refer to the 3D models. We use the model for geometry and the drawing for the tolerances. Because I can spend a month on a concept design layout, where not one thing is finalized, I am still heavily reliant on the 2D profile. In fact much of our work goes on in the 2D environment and Solid Edge is excellent for that.”

Drawings are particularly important to suppliers, for example when they are programming for CMM (Coordinate Measuring Machine) inspection. Drawings are also crucial at the assembly stage. Staff members do not look at the CAD model, they rely totally on drawings and these are so complex that large format prints have to be made in order that fine details can be seen properly.



Cooke shares 3D PDFs with metal suppliers who have a Solid Edge viewer. STEP files are exported from Solid Edge for CMM inspection for quality control.

Integrating Parallel Processes

In order to meet targets every process has to overlap. “We have to confirm the glass design so that we can start manufacturing while we are still designing metal,” says Steve Pope. “Likewise, I have to begin designing the tooling when we still do not know about interfaces. From start to finish there is lots of reworking and everything has to come together perfectly when it’s all ready. This requires a totally integrated approach to design and development and that’s what we have with Solid Edge.”

Each development project takes about one year yet the company continues to bring out a new design every six months. Recent improvements include anamorphic lenses that allow widescreen shooting on standard 35mm film; illuminated focus rings; and the use of distinctive black anodized aluminum coating. Every design is an evolution of a previous one, built on the digital data within Solid Edge and the skill of Cooke’s designers, who are always learning. “We have all gained knowledge from Majenta PLM’s training,” observes Paul Nettleton, who attended a specialist course on the rendering and animation application KeyShot run by Majenta PLM.

A partnership for success

“Although we have to be speedy, efficient and precise we do not have major issues,” comments Steve Pope. “That is because we can anticipate and plan using Solid Edge; it is part of our success story. Likewise, Majenta PLM assists us in developing our skills and keeping up to date with software and hardware. When we needed new workstations Majenta helped us out with specification guidelines and arranged for supply and installation.”

Paul Nettleton concludes, “Everything works well. We feel that we are in partnership with Majenta and Siemens and we have good lines of communication. We can ask for technical assistance whenever we need it. Over the years we have experienced quite a few companies and Majenta definitely provides us with the best service.”

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