Ansys

CASE STUDY /

Ansys + CEVT

"The SPEOS model is easily scalable and the design can be reused in other areas such as indicators. It can easily be adopted into new projects and designs with small tweaks, saving an estimated 80% development and validation time for each future project."

Joel Hake.
Concept Engineer / China Euro Vehicle Technology (CEVT), Sweden

CASE STUDY

China Euro Vehicle Technology (CEVT) is an innovation company focused on key automotive areas, including exterior lighting. Optical engineers at CEVT rely on Ansys' physics-based simulations to meet and exceed design challenges. The resulting technology solutions are used to test innovative concepts in new car models and in discussions with expert suppliers. Simulation speeds up innovation and validation to push boundaries for what is possible both in-house and in supplier relationships.

CEVT reduces automotive exterior lighting concept development time by 80% using Ansys SPEOS

/ Challenge

Exterior lighting is a critical security function of any car and must follow strict legal regulations to guarantee road illumination and safety. In addition to meeting ECE international regulations, exterior lighting design teams also need to consider several other factors, sometimes competing, when creating new systems. Slim, elegant lights are in high demand for the styling and brand attribute they give to a vehicle, but reducing size must be balanced with keeping the time and costs of design and manufacturing down. Combining all these demands is challenging but also inspiring for the engineers at CEVT.

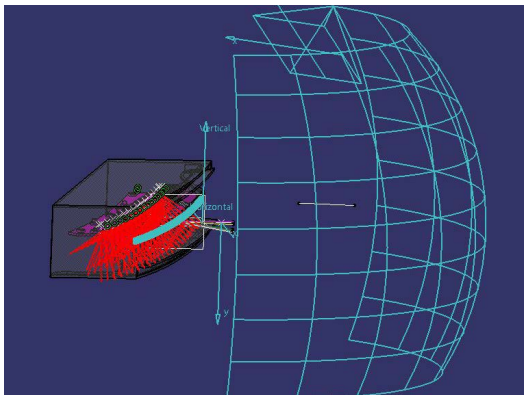
/ Technology Used

Ansys SPEOS

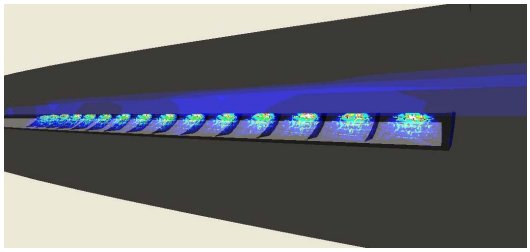
/ Engineering Solution

CEVT engineers used SPEOS to build, iterate and validate a very small reflector — only 8 mm high and 32 mm deep with a light output opening of only 5 mm high — for a brake light. Using optical simulation enabled them to test many options and fine-tune the design in low resolution before final validation and manufacturing of the prototype.

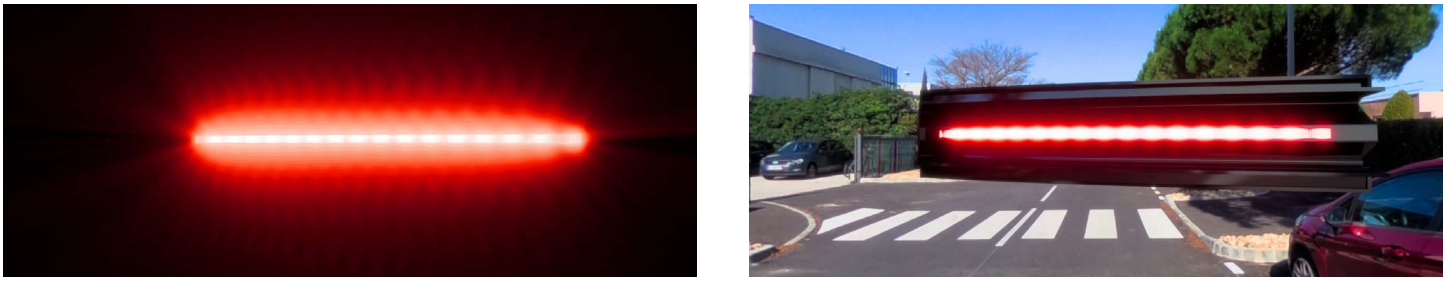
The initial model contained only three reflectors that were combined and tested to ensure that the light came out through the opening in a controlled and homogeneous way. This small prototype was then made scalable by locking the ends of the reflectors in a master-slave relationship. This enabled the engineers to change one factor in the model without having to redo the ends, thus making it of scalable length. Only then was the rest of the reflector built and adjustments made to angles of individual reflector mirrors to ensure legal intensity demands. They also simulated how the light projected outside the car and what it looked like to other cars behind or passing it.



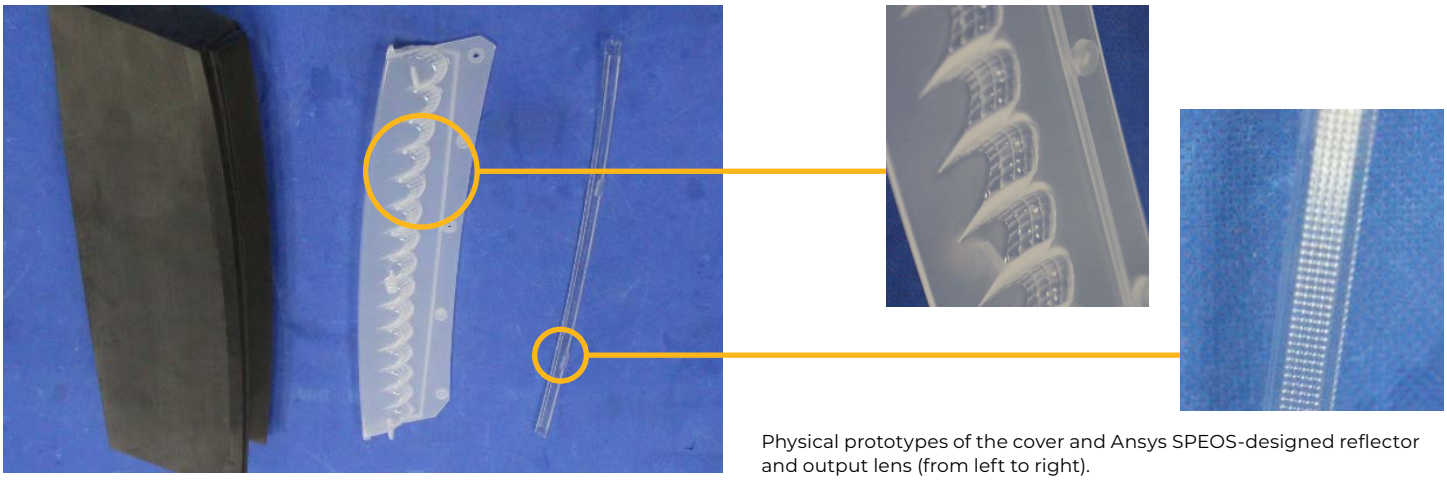
Optical light simulation set up in Ansys SPEOS.



Preview of the light distribution on the reflector's surface.



Accurate visualization of the lit system with Ansys SPEOS Human Vision – at night and in daylight.



Physical prototypes of the cover and Ansys SPEOS-designed reflector and output lens (from left to right).

/ Benefits

SPEOS simulations of the initial design make it possible to perform many quick iteration loops before putting on the final lens and going through legal certification.

SPEOS-generated virtual prototypes extensively replace the costly physical prototyping phase, ensuring that the only physical prototype produced will be correct and standard-compliant, again saving time and money.

Simulation software is increasingly used across design projects at CEVT to push innovation, not only in-house, but also in supplier relationships.

Final prototype assembled with light on.

/ Company Description

China Euro Vehicle Technology AB (CEVT) is an innovation center employing some 2,000 people, focused on finding smarter mobility technologies. With its world-class engineering expertise in the heart of the Swedish automotive cluster, the company has grown very quickly since its start in 2013. CEVT is owned by Chinese global mobility technology Zhejiang Geely Holding Group and develops next-generation technology solutions through modular development, ground-breaking virtual engineering, software systems development and continuous innovation for its global brands such as Geely Auto, Lynk & Co, Volvo Cars, Polestar, Proton and Lotus.

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