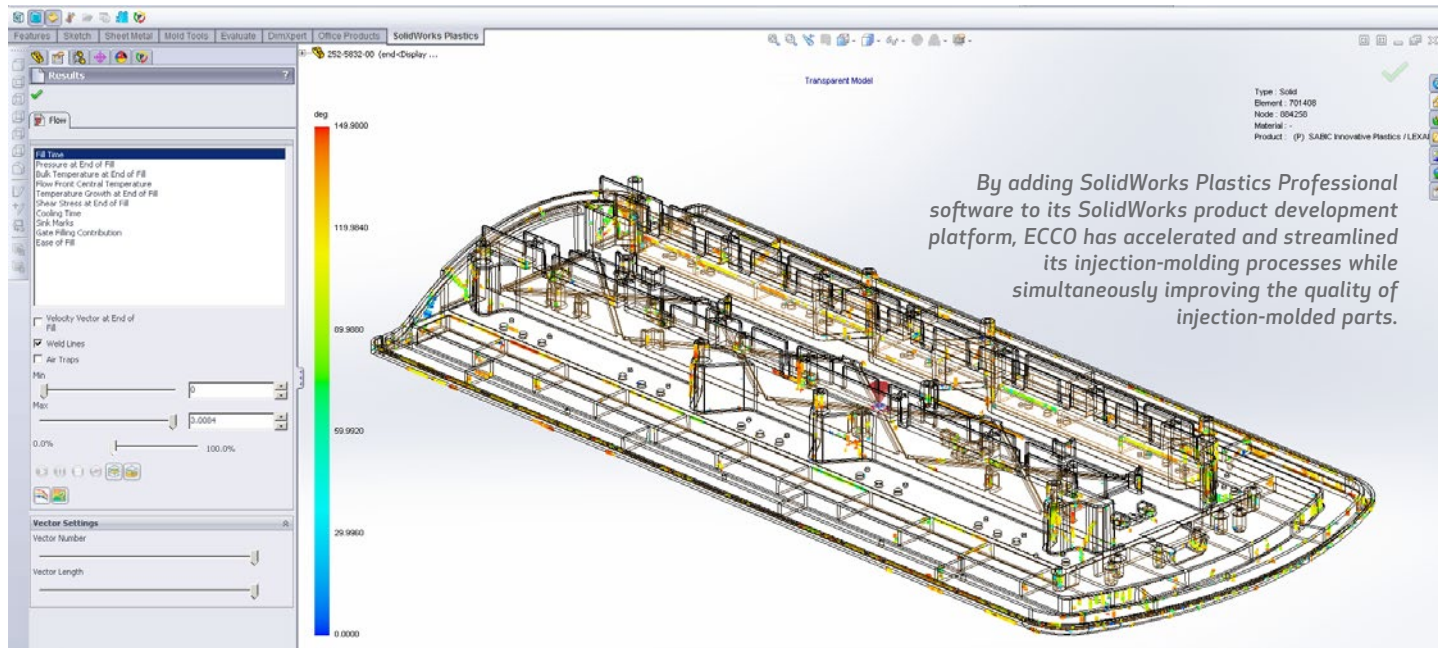


ECCO

Optimizing emergency light lenses and components with SolidWorks Plastics



By adding SolidWorks Plastics Professional software to its SolidWorks product development platform, ECCO has accelerated and streamlined its injection-molding processes while simultaneously improving the quality of injection-molded parts.

As the world's largest manufacturer of emergency warning products, ECCO (Electronic Controls Company) depends on the development of high-quality, injection-molded plastic parts. The company's backup alarms and warning lights for commercial vehicles—and red and blue warning lights for emergency vehicles—typically operate outdoors, where they are exposed to all types of weather. In such an environment, ECCO often prefers to use plastic parts because they don't rust. With light lenses, using plastics for optical components is a necessity.

Since implementing SolidWorks® Professional and SolidWorks Premium design software in 2001, the Idaho-based company has realized dramatic productivity gains, cutting design cycles and expanding its product offering. The implementation of the SolidWorks Enterprise PDM product data management system in 2010 produced additional benefits. In 2012, ECCO turned to Dassault Systèmes SolidWorks Corporation for a solution for optimizing the manufacturability of plastic injection-molded parts.

"Prior to 2012, we relied on our tool manufacturer to spot and address injection-molding issues," recalls Mechanical Design Engineer John Aldape. "However, when we received glass-filled nylon alarm enclosures with surface-knitting issues, we decided to investigate mold-filling simulation technology. We wanted to independently assess how a mold would fill and where knit lines would be, instead of waiting on iterations with the toolmaker."

ECCO obtained SolidWorks Plastics Professional injection-molding simulation software. "The software showed us enough that we knew it would be valuable," says Mechanical Design Engineer Nick Thompson. "SolidWorks Plastics is easy to use, simulates how the plastic will fill the mold, and shows how the molded part will look. We realized that we could use it to avoid manufacturability issues."

"We also foresaw how SolidWorks Plastics would help us refine the production of optical components, such as lenses," Aldape adds. "We want our parts to be smooth, clean, and structurally sound, and we believed SolidWorks Plastics would help us achieve those goals."

Challenge:

Evaluate mold filling of plastic injection-molded parts during product design to eliminate mold-related manufacturing issues, enhance lens optics performance, and improve product aesthetics.

Solution:

Implement SolidWorks Plastics Professional injection-molding simulation and analysis software.

Results:

- Minimized iterations with moldmaker
- Eliminated mold-related production issues
- Optimized parts for stiffness and mold filling
- Improved lens optics and product aesthetics

Simulating mold filling saves time and money

ECCO uses SolidWorks Plastics mold-filling simulations to optimize plastic injection-molded parts on the front end, which saves time and money by minimizing iterations with the moldmaker on the back end. The company still values the expertise of its tool manufacturer, but having access to mold-filling simulations during design keeps potential manufacturing issues to a minimum.

"Although we still leave things like mold inserts, sizes, forms, and the presses required to the toolmaker, being able to visualize how the plastic will flow in the mold gives us greater control over how the final part will look," Aldape notes. "If we didn't have SolidWorks Plastics, we wouldn't have as much confidence in the manufacturability of a design. It helps us avoid going back and forth with the moldmaker after the fact, which saves time and reduces costs."

Increasing the flow of plastics in molds

ECCO first used SolidWorks Plastics to develop a new base for its four-foot and six-foot emergency light bars. After using SolidWorks Simulation structural analysis results to increase the stiffness of the base by adding ribs, fins, and ridges, Thompson used SolidWorks Plastics to simulate mold filling, which led to additional design changes to optimize manufacturability.

"The light bar base was the largest injected-plastic part that we have made," Thompson says. "With SolidWorks Plastics, I was able to modify the design to improve the flow of plastic in the mold. I added a large post for the injection sprue and ribs heading out from the post to serve as runners to improve flow. Instead of having to go back and add runners, which would have resulted in a delay, I had already done it. All the moldmaker had to do was change a gate dimension."

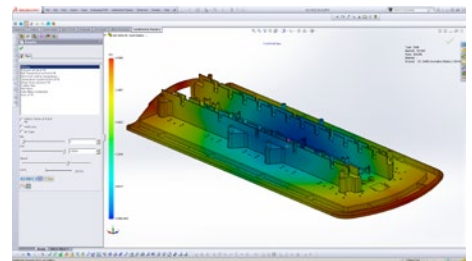
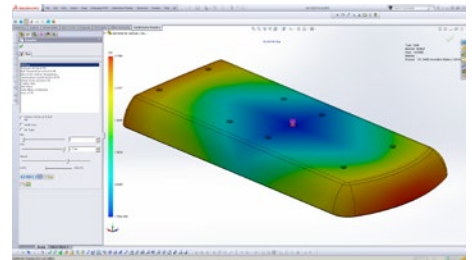
Improving lens optics and product aesthetics

Many of ECCO's products require plastic injection-molded optical components that serve as protective lenses. With SolidWorks Plastics, the company's designers can make sure that there are no mold-related parting or knit lines marring the critical optical areas where the light shines through. ECCO designers also use the software to improve the overall aesthetics of injection-molded components by positioning knit lines where they are less noticeable.

"The appearance of knit lines is a concern," Aldape stresses. "When knit lines land in the functional, fine polish area of optical components, they obscure light. When they are noticeable in any component, they detract from product aesthetics. With SolidWorks Plastics, we can position knit lines where they are hidden by a feature or textured surface, which enhances the overall look of our products."

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John Aldape
Mechanical Design Engineer



With SolidWorks Plastics Professional tools, ECCO engineers can efficiently simulate mold filling, enabling them to optimize and speed up manufacturing.



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