

# AMBIX CONSULTING, LLC

ADVANCING PRECISION INJECTION-MOLD DEVELOPMENT  
WITH SOLIDWORKS PLASTICS PROFESSIONAL



Ambix relies on SOLIDWORKS design and mold-filling simulation tools to shorten tooling development while maintaining quality for a range of injection-molded products, including the first responder protective helmet shown here from Cean Sports.

### **Challenge:**

Streamline complex injection-mold development to improve manufacturability, shorten development times, and reduce costs.

### **Solution:**

Implement SOLIDWORKS Plastics Professional injection-mold-filling simulation software.

### **Benefits:**

- Cut mold development time in half
- Achieved 95 percent first-shot success on molds
- Increased annual molded output from few thousand to 10 million parts
- Realized close correlation between simulations and production

Ambix Consulting, LLC is a full-service product development company with years of experience in plastics engineering, materials science, and industrial design, that delivers start-to-finish solutions to a diverse range of clients. The firm specializes in precision injection molding and demanding engineered plastics, and works closely with sister company Ambix Manufacturing, Inc. to support contract manufacturing.

President, founder, and owner Jeffrey D. Nicoll leveraged his extensive expertise in plastics failure analysis to establish Ambix Consulting in 2002. Since then, the company has grown substantially by moving beyond plastics failure analysis to become a full-service product development company, providing product research and development, industrial design, prototyping and functional testing, failure analysis, tooling design, and material selection, as well as contract manufacturing through Ambix Manufacturing.

Ambix implemented SOLIDWORKS® Professional design software and SOLIDWORKS Simulation analysis software in 2006 to support its product design and engineering services. As demand for Ambix's expertise in plastics and moldmaking increased, Nicoll decided to invest in an injection-mold-filling simulation solution to accelerate complex mold development.

"The historical approach to injection molding is to continue creating prototype molds and shooting samples until an acceptable mold is reached," Nicoll explains. "To avoid this type of project creep and provide the most efficient, cost-effective solutions to our clients, we sought to utilize injection-mold simulation software to resolve manufacturing issues up front, taking both time and cost out of the mold development process."

After evaluating mold-filling analysis solutions, Ambix chose SOLIDWORKS Plastics Professional software because it's easy to use, provides robust injection mold-filling simulation capabilities, and is completely integrated inside SOLIDWORKS CAD software. "Having our mold-filling simulation solution integrated inside our SOLIDWORKS design environment is extremely beneficial," Nicoll says. "In addition to avoiding import/export issues, it's simply more efficient and productive to use an integrated solution.

"We spend a lot of time in SOLIDWORKS—not just modeling

designs but also running SOLIDWORKS Simulation analyses and creating photorealistic renderings with PhotoView 360," Nicoll adds. "SOLIDWORKS Plastics Professional is a natural extension of the way we work."

### **GETTING IT RIGHT VERSUS TRIAL AND ERROR**

Since implementing SOLIDWORKS Plastics Professional software, Ambix has cut mold development time in half while increasing injection-molding manufacturing throughput from a few thousand parts to more than 10 million components annually. Nicoll attributes the company's success partly to the efforts of its dedicated employees and partly to working in an integrated mold design and analysis environment that parallels Ambix's approach to product development.

"I'm a stickler for getting molds right without compromising design intent," Nicoll says. "Our business model is to provide one-stop access to all the required services for product development and manufacturing, including industrial design creativity to enhance product aesthetics, engineering capabilities to resolve weight and structural performance issues, and tooling expertise to develop production injection molds while avoiding costly tooling changes and delays.



**"Our success rate is so high because we've validated close correlation between the results we get from SOLIDWORKS Plastics Professional and actual production, using photoelastic and microscopic analysis tools to confirm the software's simulation results."**

— Jeffrey D. Nicoll, President

"Rather than doing those things separately with many iterative loops and the attendant costs of physical trial and error, we do it all together, using SOLIDWORKS software solutions to design molds, simulate mold-filling performance, identify potential manufacturability and performance issues, and make the required modifications prior to investments in tooling," Nicoll continues. "Our approach provides efficiencies that enable us to deliver molds of higher quality much faster."

### **SIMULATION ACCURACY ENSURES FIRST-SHOT SUCCESS**

Using SOLIDWORKS Plastics Professional software has enabled Ambix to achieve a first-shot mold success rate of 95 percent. "Instead of discovering errors related to underestimating draft, not allowing for shrinkage, failing to identify air traps, having knit lines in critical areas, or creating stresses by placing gates in the wrong

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locations, we can use SOLIDWORKS Plastics Professional to resolve these types of issues before cutting a mold," Nicoll says.

"Our success rate is so high because we've validated close correlation between the results we get from SOLIDWORKS Plastics Professional and actual production, using photoelastic and microscopic analysis tools to confirm the software's simulation results," Nicoll adds.

### COMBINING AESTHETICS WITH MANUFACTURABILITY

Because SOLIDWORKS Plastics software operates within the SOLIDWORKS CAD environment, Ambix can take advantage of advanced design visualization tools to more effectively collaborate and communicate with customers to resolve design for manufacturability issues while retaining or enhancing design aesthetics.

"We sit down with inventors or designers who want to know if they can make a part or product cost-effectively, what design changes are required for manufacturing, and what the final piece will look like," Nicoll notes. "By working in the integrated SOLIDWORKS design environment, not only can we show customers part and mold designs, we can demonstrate why changes are necessary and visually back up recommendations on material selection and design changes through simulations. We can even provide a realistic representation of the final part using PhotoView 360 photorealistic rendering tools. By combining industrial design, mechanical engineering, and injection-mold manufacturing, SOLIDWORKS tools help us provide better service to our clients."

With SOLIDWORKS Plastics Professional injection-molding simulation software, Ambix can more efficiently and cost-effectively resolve manufacturability issues without compromising design intent.

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