

# PROCAD TECHNOLOGIES, LLC

## IMPROVING INJECTION-MOLD TOOLING DEVELOPMENT WITH SOLIDWORKS SIMULATION PREMIUM



Using SOLIDWORKS Simulation Premium software, PROCAD TECHNOLOGIES can analyze the performance of injection-molded tooling, including the mold used to produce this chair, and optimize both product and tooling designs to improve quality, shorten cycle times, and reduce costs.

**PROCAD**  
**TECHNOLOGIES, LLC**

### Challenge:

Launch a plastics engineering and injection-mold tooling optimization consulting business to help clients resolve mold-tooling issues, accelerate tooling cycles, and streamline production processes.

### Solution:

Implement SOLIDWORKS Premium design and SOLIDWORKS Simulation Premium analysis software.

### Benefits:

- Achieved cycle time improvements of 10 to 50 percent
- Solved mold flashing, warping, and breakage problems
- Extended functional life of injection molds
- Improved part quality and durability

Robert Elwell established PROCAD TECHNOLOGIES, a full-service electromechanical product design, tooling engineering, and process optimization consultancy, to leverage his experience and expertise in plastics engineering and injection-mold tooling development to help clients resolve mold-tooling issues, accelerate tooling cycles, and streamline production processes. Today, PROCAD TECHNOLOGIES provides the full range of design, engineering, and product development services, but specializes in product and mold design, tooling engineering and process optimization, and materials analysis and recycling technologies.

In addition to designing electromechanical products, PROCAD TECHNOLOGIES can take product development all the way through manufacturing and help optimize tooling design and production processes. Elwell brings 30 years of plastics engineering and injection-mold tooling development experience to identifying and rectifying mold development and production problems and challenges.

When Elwell founded PROCAD TECHNOLOGIES, he needed a robust 3D design and analysis solution to quickly identify tooling issues and optimize molds for production. "Over my career, I've tried every 3D design and analysis solution, but I prefer SOLIDWORKS® software, which I've used since 1998," Elwell says. "SOLIDWORKS is more intuitive and provides the best value for the price. It does everything that I need to do faster, and the integrated SOLIDWORKS Simulation Premium finite element analysis [FEA] package gives me the nonlinear analysis tools that I need to quickly and effectively resolve mold production issues."

PROCAD TECHNOLOGIES standardized on SOLIDWORKS Premium design and SOLIDWORKS Simulation Premium analysis software because they provide a fast, easy-to-use solution for optimizing injection-molded tooling. "From the mold development and analysis functionality in SOLIDWORKS Premium—such as core and cavity, wall thickness, and draft analysis—to the nonlinear FEA simulation capabilities in SOLIDWORKS Simulation Premium, I have access to the tools that I need not only to help my clients overcome their injection-mold challenges, but also to help them shorten production cycle times," Elwell stresses.

## EXTENDING ENGINEERING ANALYSIS TO TOOLING

While many manufacturers use simulation during product design, PROCAD TECHNOLOGIES demonstrates the value of FEA for tooling development. "There are certain types of problems specific to injection molding—in the part and tool—that are likely to occur, such as flashing, warping, breaking, etcetera," Elwell explains. "By running FEA studies, we can identify and fix potential problems as well as improve performance and shorten cycle times.

"By bringing 3D visualization and nonlinear analysis to tooling development with SOLIDWORKS, we can pinpoint issues, such as the bending of a mold as a result of the higher pressures required to get many of today's exotic plastics to fill a mold," Elwell continues. "We can also recommend areas for improvement that can result in shortening cycle times by 10 to 50 percent. When you're shooting parts at high volume, being able to run a mold twice as fast can save substantial amounts of time and money."



**"From the mold development and analysis functionality in SOLIDWORKS Premium, to the nonlinear FEA simulation capabilities in SOLIDWORKS Simulation Premium, I have the tools I need to help my clients overcome their injection-mold challenges and shorten production cycle times."**

— Robert Elwell, Owner

## RESCUING A PROBLEM MOLD

A telling example of the benefits of using SOLIDWORKS Simulation Premium as part of tooling review was a project that Elwell consulted on before founding PROCAD TECHNOLOGIES, which involved a product with severe design and tooling problems. The company had invested roughly \$350,000 over two years in a product design and mold that produced parts that needed to withstand a six-foot drop test, but consistently shattered when dropped from six inches. "The runner and gate design on the mold were horrendous, disrupting the polymer, shearing the plastic, and producing weaknesses in the parts," Elwell recalls.

"I ran SOLIDWORKS Simulation Premium analyses and made corrections to the mold, and after three iterations, six weeks, and \$10,000, we had the problem fixed," Elwell says. "The customer could have saved two years and \$80,000 if the moldmaker had run simulations as part of reviewing the initial tool design."

**Focus on PROCAD TECHNOLOGIES, LLC**  
VAR: Fisher/Unitech, Pittsburgh, PA, USA

**Headquarters:** 3705 Bon View Drive  
Erie, PA 16506  
USA  
Phone: +1 814 520 5158

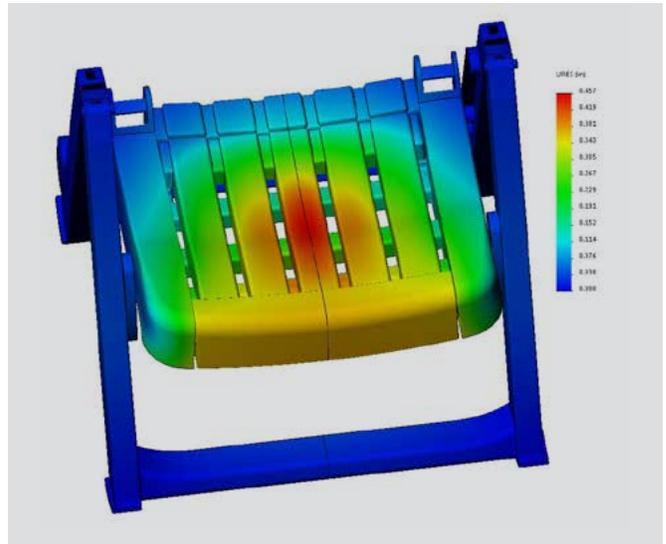
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### HELPING OUT MOLDMAKERS

PROCAD TECHNOLOGIES also uses SOLIDWORKS design and analysis tools to provide mold development and optimization services to mold and toolmakers. For example, in 2015 the company recommended changes to a moldmaker's mold before tooling was produced to extend the functional life of the mold. "We optimized a mold last year for a particularly picky molding/tool shop," Elwell recounts.

"They wanted to use a high-pressure material to produce parts with a physically weak mold design," Elwell adds. "A quick SOLIDWORKS Simulation Premium stress analysis showed that the mold would bend 0.006 to 0.008 inches and would result in bent and broken inserts. We redesigned the cavity in the weak area to make it stronger and sent a SOLIDWORKS Simulation Premium analysis report to the moldmaker, showing simulation results before and after the fix. This helped the moldmaker avoid what would have been a costly problem. The mold ran the very first time at 20,000 psi with no flash."



With SOLIDWORKS Simulation Premium, PROCAD TECHNOLOGIES leverages nonlinear analysis capabilities to help its clients resolve injection-mold tooling issues and improve production.

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