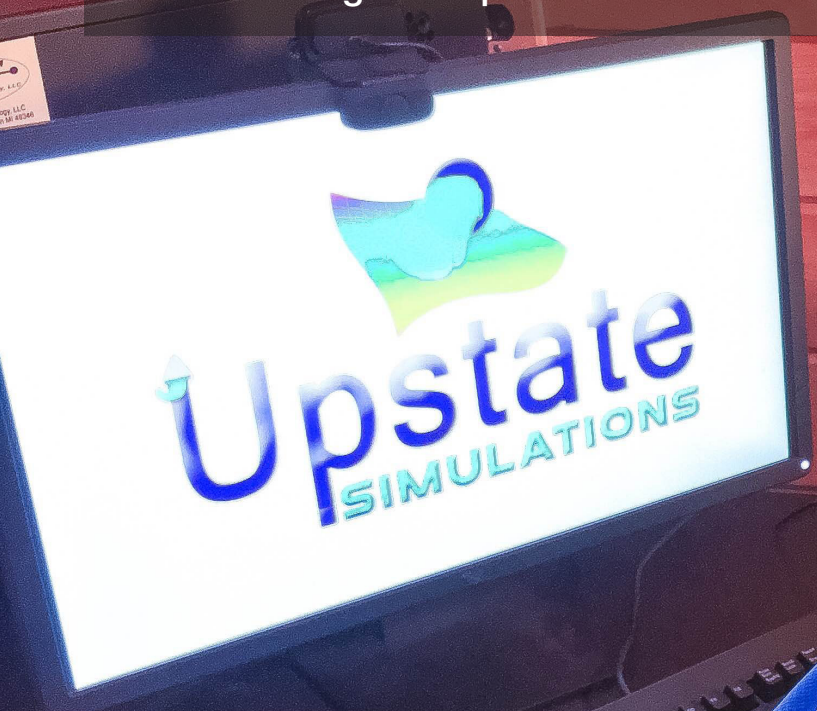




Upstate Simulations

“ The surgical precision of taking the data from VISI and putting it into a way that your customer can understand it is very helpful — from the designers, manufacturing engineers, all the way to the technician dialing in the process. ”



VISI is acknowledged as one of the world's leading CAD/CAM software solutions. It offers a unique combination of fully integrated surface and solid modelling, 3D tool design, and comprehensive 2D, 3D and 5-axis machining strategies with dedicated high speed milling routines.

The Artful Science of Mold Simulation

Upstate Simulations masters the art and science of mold design with VISI Flow

An ounce of prevention may be worth a pound of cure, but when the art and science of injection molding is at play, that pound of cure can very quickly become a ton. If you ask Rich Bryan, owner of Upstate Simulations of Canastota, New York, laying the vital groundwork for a successful production launch before the tooling hits the shop floor is guaranteed to prevent financial loss.

"Many companies go into the tooling build and launch their product into production despite any problems that may arise, and that just ends up taking longer," says Bryan, a long-time mold-simulation professional who branched out on his own. "Mold simulation can take care of exposing not only part design issues, but many production issues down the line, as well."

Production challenges arise, Bryan explains, when designers and manufacturers fail to recognize the complicated array of variables that affect the performance of the tool and, ultimately, the quality of the customer's final product.

"Design to final product is typically a 10-month span," he says. "When you get to production and have a problem, you may lose six to 10 weeks. You're supposed to launch the project next month, and you're stuck."

There are many rules to the game and most desired designs violate those rules simply because it comes down to the intended functionality of the new product. The PPAP date, or the finish line, never moves." Materials, shrink rates, action, cooling and the longevity of the project are just a few of the variables that mold designers must consider. Molds have also become increasingly complex as materials, equipment, and CNC software have evolved.

"It can cost tens of thousands of dollars changing a mold to correct a quality issue, not to mention the cost per hour sampling and adjusting process variables on the shop floor. Don't forget about time, either; we cannot buy time," Bryan says. "More than likely, the root cause of your issue would have been identified and solved utilizing plastic flow simulation technology. Whether it is a design problem or a process variable change, why have your production staff shut down production, change over, just to experiment, sample, and attempt to solve an issue after the fact? You're wasting that precious production time, and using up your precious capacity. You are only tightening up your process window when you process around an issue, and will only create headaches for the production team. The bottom line is you're losing time and money."

To help Upstate Simulations identify and improve the designs of new and existing products, it utilizes the VISI Flow mold-simulation solution, by Vero Software. The analytical tools within VISI Flow assist Bryan in detecting potential manufacturing snafus — such as welding lines, air traps, pressure drops, and undesirable gate location — and computes the maximum possible time frame for corrective measures. "VISI has capabilities that can assist you in each step of the design, and process settings, during launch," he says. "It offers establishing the optimal settings for the desired quality expectations of your product."

Offering a big-picture view of the numerous variables at play in the molding process, VISI delivers in-depth analysis that predicts the behavior of each element under specified conditions. For instance, how fast or slow should you be injecting the plastic into your part? Rheology studies can be used to establish optimal flow rates for your resin. All this guess work is taken out with flow simulation. The optimal fill time and viscosity are calculated within the software.

If the mold has too few vents, trapped air will create burn marks. Unsightly weld lines are identified to allow the team to determine if the aesthetics of the part is acceptable. It's VISI's job to identify the potential for mishaps before the mold makes it to the shop floor. "Using VISI Flow, you can predict where the trapped air will be," Bryan says.



About The Company:

Name: Upstate Simulations

Business: Mold simulation services

Website: upstatesimulations.com

Benefits Achieved:

- Accurate prediction of mold performance before it hits the shop floor
- Extensive materials database aids in accurate simulation
- Management of every variable of the molding process

Comments:

"The surgical precision of taking the data from VISI and putting it into a way that your customer can understand it is very helpful — from the designers, manufacturing engineers, all the way to the technician dialing in the process."

Rich Bryan, Owner



"If you have a complex design, there are many different areas where you could have trapped air. Analyzing the simulation before you go to series tooling will eliminate having to go back and add additional vents, or insert areas of the mold.

This, of course, means that you have to spend the time and money to change the mold, reassemble and test it again, which all adds up to wasted time and money."

With integrated computer-aided design, manufacturing, and engineering analysis capabilities, VISI runs data exchange between the design and the analysis of the manufacturing environment in which that design will be placed. In so doing, the software pinpoints hazardous design flaws, and suggests better choices.

"I can run flow simulation under certain molding conditions, such as water temperature, fill times, and pressures. I can use different type of resin to see how it performs," Bryan says. "Every mold is unique, and has been designed to achieve the optimal quality expectations for the life of the product. Utilizing flow simulation is necessary, as it will simulate actual production conditions by taking every factor into consideration."

In some instances, Bryan is able to correct a problem by simply adjusting the process variables, negating the need for the mold to be redesigned and retested. "With VISI, you can go into the process parameters, make changes, and establish what the optimal process settings should be," he says. "All of this can be completed off the production floor so that you utilize production time for production. This is where we earn our money and why you started your business. Are you a sample facility, or production facility?" Mold design is an increasingly tricky prospect when considering the variables at play, and how each affects the others. In addition to its pre and post production analysis tools, VISI analyzes the project's runner and cooling systems, as well as its filling phase, shape phase, and thermal phase.

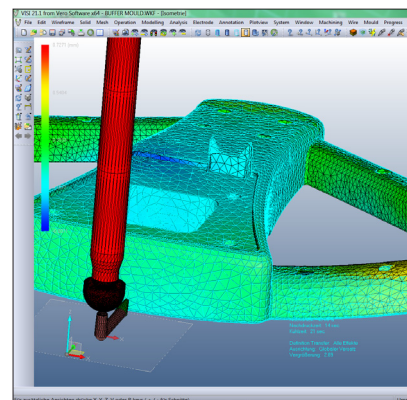
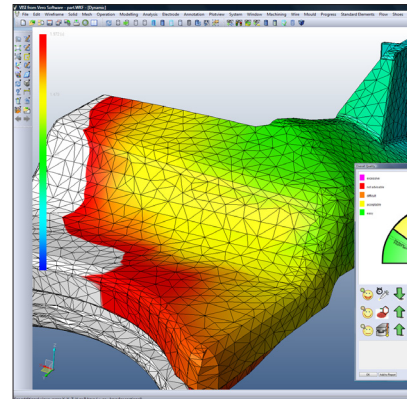
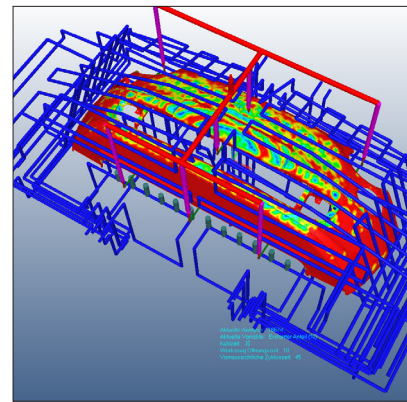
Filling simulation delivers a visualization of how a component will be filled by the plastic melt front, which helps in identifying cavity balance, and other issues. This also allows the operator to analyze variables such as pressure, temperature, shear stress frozen skin, fiber orientation, clamping force, and more.

"If I change one variable, I can observe immediately the ramification of the change, and adjust settings as needed. When you change one variable, it can adversely affect your process. The key is that you can make changes in the software and see the results right in front of you." The shape phase helps the designer to see and measure the final product after processing the values for the filling, holding and freezing molding phases. Thermal analysis delivers consideration of all possible thermal effects related to heat exchange among plastic and blocks, as well as hot and cold runners, and mold inserts with conductive materials.

As Upstate Simulations performs mold analysis for a wide range of customers and purposes, Bryan finds the customizable nature of VISI Flow simulation an asset. "There are different levels of simulation that you can do with VISI," Bryan says. "As a simulator, you need to tailor your flow to the audience, to who will need to see and understand it. The surgical precision of taking the data from VISI and putting it into a way that your customer can understand it is very helpful, from the designers, manufacturing engineers, all the way to the technician dialing in the process. Everything that you do is fed into a report that you can show the customer."

When it came to choosing a flow simulation software, Bryan chose VISI Flow because of its strong support capabilities and versatility, though additional factors included its extensive materials database and its ease of use as compared to other brands that he'd reviewed. "What really made me choose VISI is the support. It's guaranteed by the team at TST (Tooling Software Technology) Software that support will be provided within 24 hours — and they are always willing to help if you need them. The team at TST typically will address your concern and help you within a few hours."

As a mold simulator, it is Upstate Simulations' job to identify where the issue lies, and to present the best possible solution. Their ability to come to the rescue quickly is linked to its expertise and choice of software. "The key is that I can make changes in the software and see the results right in front of me," Bryan says. "All of the guesswork is taken out if you use VISI Flow simulation."



VISI
2000 Town Center
Suite 1730
Southfield, MI
48075
United States

tel. (800) 280-6932
web. www.visicadcam.com

visi

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