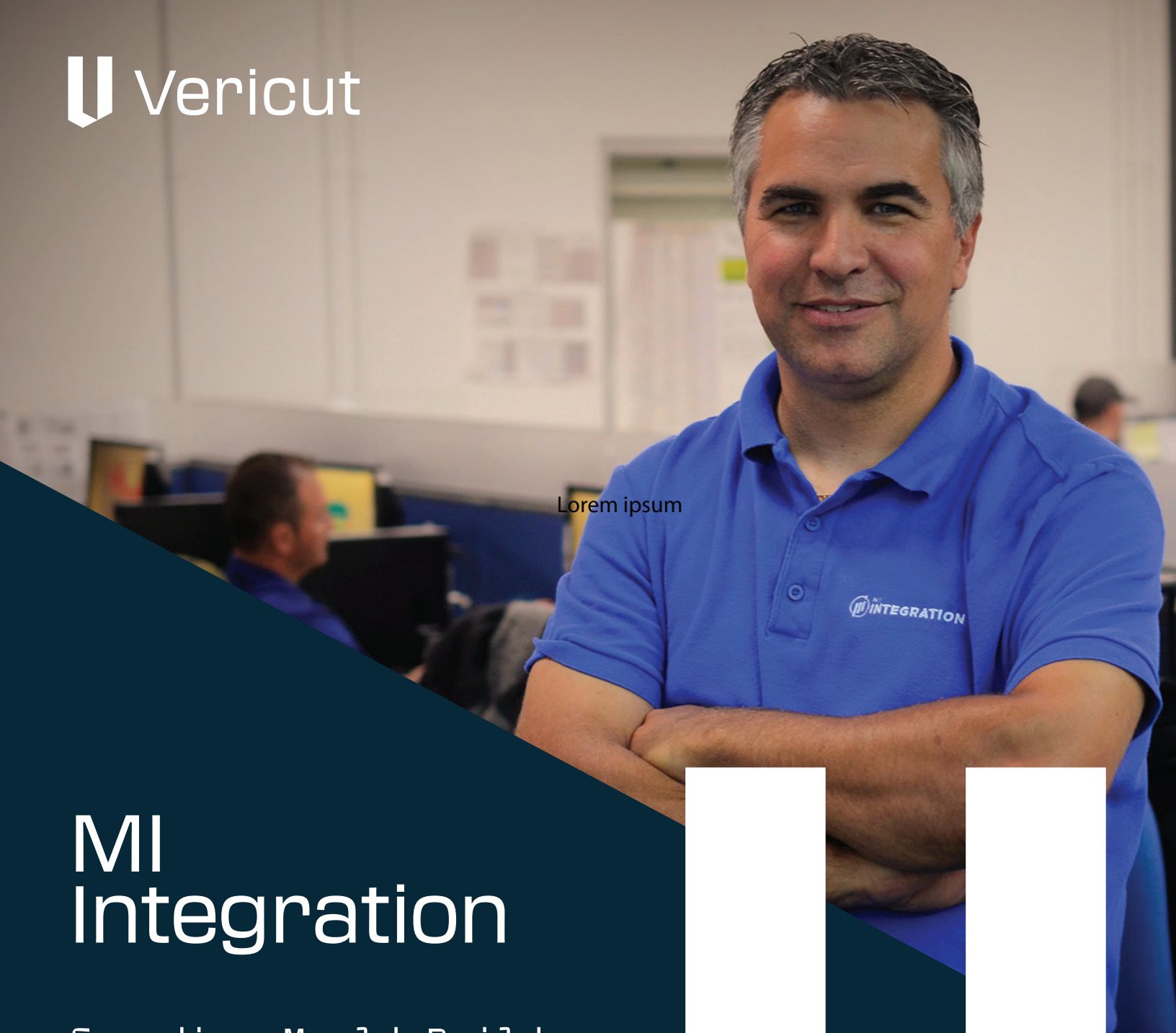
Vericut



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MI Integration

Canadian Mould Builder Eliminates Collisions with Toolpath Simulation

User Story

Challenge: Replacing too many spindles due to collisions during deep cavity and large part work.

Solution: Implementation of Vericut toolpath simulation and optimisation software

Results: Collision and over-travel prevention, machine production, and downtime and expense reduction.

Canadian Mould Builder Eliminates Collisions with Toolpath Simulation

Byline: Edited by Mouldmaking Technology

Machining is a challenging vocation no matter what you produce. Aerospace shops deal with some of the toughest metals imaginable. Tool and die makers often meet tolerances best measured in microns. Medical manufacturers face complex, three-dimensional part geometries. Now take all three, throw in some deep pockets and long tool overhangs, and you understand the life of a mouldmaker.

Granted, there's a fair amount of overlap among each of these machining specialties, and it's probably a little unfair to lump people into buckets in this manner, but the fact remains that mouldmaking easily ranks among the most demanding of all the manufacturing disciplines.

Someone who can tell you all about it is André Chamberland, CNC programmer at M.I. Integration in Sherbrooke, Quebec, who said one way to make mouldmaking life a little bit easier is by eliminating the possibility of a collision between a cutting tool or toolholder and an extremely expensive mould base. The tool he uses to accomplish this is Vericut toolpath simulation and optimisation software.

Taking on Industrial Mouldmaking and More

The M.I. is short for moules industriels, which in Chamberland's native French means industrial moulds. That description, though accurate, pays short shrift to the breadth of mouldmaking-related services this 30-year-old company performs. In 1989, husband and wife

Vericut

team Claude Houle and Francine Guay opened their own shop, one that specialised in sealing products for the automotive industry.

Moules Industriels quickly gained a reputation for its high-quality products, and in 1997, the two created a thermoplastic injection division—M.I. Plastech—to better service their clients in search of a turnkey moulding solution. As demand rose, they moved the moulding business to a new factory (also in Sherbrooke) in 2002, launching M.I. Integration four years later to act as parent company to the two divisions.

Today, M.I. Integration employs more than 340 people and boast four facilities, two in Mexico and two in Canada. Francine Guay stepped down as president in 2014 and passed that role to her son Vincent Houle, with her daughter Marie-Claude Houle acting as vice-president of the board.

Protecting Machines and Avoiding Collisions

The company's growth has not been smooth sailing. Chamberland will tell you that sometime in 2010, management grew tired of replacing spindles on its Huron CNC machining centers. "We were experiencing way too many collisions, mainly because of our deep cavities and big parts, some of which measure 30" x 40" across and up to 10" deep," he says. "We needed a way to protect our machines, and reduce the downtime and expense that comes with crashed spindles. For example, there've been instances where we replaced eight spindles in a single year, each one costing us a day or two of downtime, or even three to four weeks if a replacement spindle wasn't readily available. After looking at the available options, we chose Vericut toolpath simulation and optimisation software."

Chamberland says there was more to the decision than simple crash avoidance. He and the others there wanted the ability to simulate actual post-processed machine code. They wanted to see the entire machine, the spindle,

fixtures, and toolholding, not the partial view provided by their CAM software, and to know quickly whether there would be an overtravel condition if the program was placed on another machine tool. And lastly, they needed toolpath simulation software that could read the output from their Cimatron mouldmaking software.

Vericut has done all that Chamberland and the other six programmers at M.I. Integration have required, namely preventing all crashes except the ones caused by “human-related setup errors” such as using a shorter tool than the one defined during simulation, or placing a fixture in the wrong position.

Always on the lookout for improvement opportunities, the team then took Vericut one step further by automating its program simulations. This eliminates the time spent watching the toolpaths—something they already do in Cimatron—and provides a simple thumbs up, thumbs down message from the Vericut server, along with an indication of what tool and program line is causing the problem if one exists.

“I guess we’re a little unique, because we don’t run Vericut on our personal computers,” he explains. “Instead, we developed an interface that communicates with Cimatron. When we first got Vericut, this was unavailable, so we wrote our own. All we have to do now is indicate which posted program to verify, enter in the fixture location and the machine to be used, and the software then creates a batch file that is sent to a queue on the server.”

When complete, Vericut sends an email to the responsible programmers, telling him or her whether there were any collisions or other errors. The interface leverages standard Vericut functionality to capture images of problem areas, and also sends a picture of the simulated part along with a link to a video, which can be checked with Vericut Reviewer. If changes are needed, the programmer requests access to the software and the server makes the licence available, allowing him or her to correct the problems with tool lengths or overtravels described earlier.

“Vericut has been very useful in preventing collisions, over-travels and other mistakes such as gouging or uncut material that we would obviously prefer to eliminate from our mouldmaking processes,” Chamberland says. “This has become even more important as we adapt to five-axis machining with our new DMC 125 U duoBLOCK machining centers from DMG MORI; machines that, due to an unfamiliar axis configuration and machine control, present MI-Integration with greater crash potential than their older machining centers. We are also looking to integrate the new force optimisation module. This uses physics-based modeling to analyse and optimise the cutting conditions based on the material, slowing down where needed and speeding up when possible. The result is significantly shorter cycles times along with much greater tool life.”

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