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FOR GLOBAL OPERATIONS
UNIVERSITY OF MICHIGAN

Beneath the Surface: Uncovering the Market for Flow Surface Preparation Waterjets

Flow

In an industry dominated by abrasives, New York-based American Industrial Partners (AIP) collaborated with a team from the Tauber Institute for Global Operations at the University of Michigan to identify key market opportunities for its water-based technology.

In 2014, AIP acquired competing waterjet manufacturers Flow International Corp. and KMT Aqua-Dyne to merge into Flow Surface Preparation, the current leading developer of ultra-high pressure (55 pounds per square inch) waterjet technology and market leader in water-based surface preparation. This method utilizes water to slice through a variety of materials including glass, metal, and granite. Its main advantage is that it doesn't create heat so it can be used with composite materials, including plastics, which can melt when cut with lasers or torches. But despite its market leadership and numerous benefits in performance, environmental impact, safety, speed and cost, Flow Surface Preparation captures only a small fraction of the multi-billion dollar global surface preparation industry—an industry dominated by abrasive blasting.

The company envisioned growth of $35 to $70 million over two to three years through organic growth and acquisitions. To help achieve this goal, its leadership group brought in a student team from the Tauber Institute for Global Operations at the University of Michigan. The team included Shrikant Chothave, pursuing a Master of Supply Chain Management degree; Master of Business Administration (MBA) degree student Ray Gonzalez; and Zach Mandell, working toward BSE and MSE degrees in Industrial and Operations Engineering as part of the Engineering Global Leadership Honors (EGL) program.

L to R; Zach Mandell (EG BSE/MSE-IOE '16), Ray Gonzalez (MBA & MS Natural Resources '17) and Shrikant Chothave (MSCM '15). Photo by Shrikant Chothave.

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> —Zach Mandell

"The Tauber team was tasked with outlining a detailed path for Flow Surface Preparation to grow the market for water-based surface preparation, a niche segment within the billion dollar surface preparation industry," said Mandell.

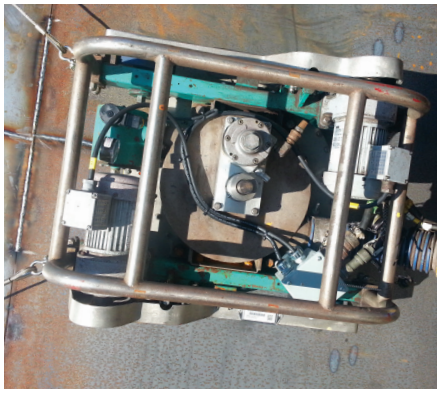
As part of their project, the team performed market research and interviewed customers to more clearly articulate Flow Surface Preparation's value proposition and add key segments to its addressable markets.

"Surface preparation is a niche and highly technical industry, made even more so when using ultra-high pressure waterjets," said Mandell. "Benchmarking cost and performance was difficult because there was no industry standard for coating type or surface preparation equipment, and customers and competitors typically didn't disclose performance and cost data," said Mandell.

"The team had to get up to speed quickly on the nuances of surface preparation, requiring extensive independent research. Because information on this subject is not readily available, the team compiled data from industry studies, U.S. Navy reports, and even company promotional material to benchmark performance and cost. These benchmarks enabled apples-to-apples comparisons between Flow Surface Preparation's products and other surface preparation methods."

In order to determine the added benefits of using Flow Surface Preparation's ultra-high pressure waterjet technology, the Tauber team tested over 30 samples against lower pressures from competing manufacturers. Preliminary results indicated that the Flow Surface Preparation technology was capable of preparing surfaces with 22 percent greater efficiency.

"The team also helped translate Flow Surface Preparation's benefits for its manual and automated products into a single metric, cost per square foot, which could be more easily understood by its customers," said Mandell.



Above: The HydroCat

They reassessed product design and supply chain strategy and worked with Flow Surface Preparation staff to develop a two-year product road map for its automated solutions. This was an area that had been historically neglected by the company and plagued by significant reliability issues, poor user friendliness, and high capital costs—despite being a key driver for the future. The team employed a disciplined approach to address the company's engineering process by breaking down product material bills part by part and identifying changes with the potential to reduce downtime by 50 percent and cost of goods sold by 25 percent. They then created a 12-month plan and guided a three-year road map to bring the product to an order of magnitude difference in performance and effectiveness.

Another issue the team addressed was determining how the company could further develop its automated crawler product, the HydroCat, in order to address the majority of the market that did not use water.

"In order to better compete in the market, Flow Surface Preparation's products needed to compete better from a cost and productivity standpoint. We worked with the most senior technologist at the company in exploring the application of wet slurry technology, a mixture of abrasive and water, which had been invented at the company and used for decades," said Mandell.

"Although Flow International had a history of leading innovation in ultra-high pressure waterjet technology, its HydroCat surface preparation robot had not been updated in almost 20 years. The product needed significant upgrades in user friendliness, reliability, and production speed, but little to no resident knowledge remained."

The Tauber team created a two-phase implementation plan. Phase 1 involved sourcing changes for critical HydroCat subcomponents. Phase 2 will include the development of a revolutionary new technology. Overall, the Tauber team's work directly affected both the short term and long term plans for Flow Surface Preparation and AIP in investing and executing in this key market.

"The project was an entrepreneurial, multi-disciplined experience, encompassing many different aspects of what an industrial business-to-business company faces," said Mandell. "In the office, we sized market opportunities and identified target segments, engaged in product design, and conducted financial analyses on bill of material costs and projected sales. We also went into the field to better understand the market and our customers. We visited shipyards, operated equipment, met with workers, and interviewed customers at job sites.

"Our team got involved in many of the challenges a business faces. By the end of the project, we were not only technical experts in Flow Surface Preparation's products, but also able to guide strategy related to supply chain, product development, and market expansion."

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About Tauber Team Projects

Each two to three person Tauber Team consists of graduate Engineering, MBA, and/or MSCM students. Along with receiving high-level corporate support from the sponsoring company, each team is advised by a College of Engineering and a Ross School of Business faculty member and overseen by a Tauber Institute Co-Director. The projects begin on-site in May and continue for 14 weeks. Students present the results of their projects and compete for over $40,000 in scholarships at the U-M Tauber Institute's annual ***Spotlight!*** event, held each September in Ann Arbor, Michigan. ***Spotlight!*** provides outstanding opportunities for students and corporate partners to establish relationships while exploring innovations in operations and manufacturing.

The 2015 Tauber Team Projects resulted in $500 million in savings according to sponsoring company calculations, an average of $14.3 million per project over three years.

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