

Senior Students Flush Out Innovative Solutions

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SENIOR STUDENTS FLUSH OUT INNOVATIVE SOLUTIONS

Horwitz, Inc. is a full-service specialty contractor in the Twin Cities that provides design-build, installation, and ongoing support for HVAC, plumbing, and electrical markets. They have been looking for a simplified way to transport and correctly position their massive, complex commercial restroom plumbing.

Who did they look to for a solution? Four senior engineering majors at Dordt, who turned this senior engineering design idea into a fully functioning prototype that can traverse jobsite conditions while still being versatile, compact, reusable, and easy to operate.

The trick is lifting multiple large, heavy units simultaneously, says Professor of Engineering Dr. Jeff Gladstone, who serves as the design project's faculty adviser. "The company currently must send multiple employees out to a job site for this task, which is expensive. Plus, the supports are long, skinny, and awkward. So having a machine to help with this task would help Horwitz out immensely."

THE COURSE

Senior Design serves as a program capstone experience incorporating Dordt Engineering student outcomes of faithfulness and responsibility, fundamentals, design, communication, context, teamwork, experimental development and analysis, and lifelong learning.

Experientially, Senior Design provides an opportunity to "engage real-life engineering design with a focus on the process and education of experience, recognizing that learning occurs as much or more from mistakes than from success," says Professor of Engineering Dr. Ben Saarloos ('99), who coordinates the Senior Design classes.

Dave Landstra, the team's project manager, kept that in mind as he delegated tasks to his teammates Nathan

Patterson, Matthew Bokhoven, and Levi DeGroot based on their individual strengths. "One of my goals was to give my team members experience doing a range of different tasks and allowing them to take ownership and responsibility for what they were doing," he says.

The team has been level-headed and methodical in their approach to finding a solution, adds Gladstone. "They have done a great job in not letting any major details get away from them throughout the project. They haven't hung onto bad ideas; they have pivoted to come up with the best solution they can."

Bokhoven says there were multiple times throughout the project where a design looked good in a 3D model but didn't work in the actual prototype. They learned that "parts won't be perfectly cut or dimensioned according to the model."

One interesting solution the team came up with was how to power the prototype. "The customer wanted it



"It was great to physically build a prototype and see our design go from concept to reality," says Dave Landstra.

to be battery operated, so the team decided to use what they could find at a hardware store," says Gladstone. "They found battery packs and did the calculations to determine how much energy was in one battery pack, and how much energy would be needed to lift the system multiple times a day."

"To me, the most interesting part of the project's need is the ability to make our solution modular," explains Patterson. "The company installs carrier groups of different lengths from 10 to 25 feet, depending on what size restroom the building requires. The variation in size forced us to think outside the box."

This, along with the need to lift the units uniformly, led the team to implement synchronized actuators. These devices produce linear motion by converting energy. "Each 'truck' has four actuators, and the carrier group we tested requires two trucks," says Patterson. "We used a control box that connects the actuators, which allows each truck to extend at the same rate."

In short, they spent two semesters and many hours to create a prototype that actually works and could provide excellent cost savings for the client.

"What I've enjoyed most about my senior engineering design project is the ability to make a difference for a company with a group of classmates," says DeGroot. "I have learned how to take a model and make it into a real-life prototype. It has also been interesting to assemble and weld a model based on the needs of the project."

"It has been a joy to work alongside my team members on this project," adds Landstra. "This project has been a lot of work, but I'm glad I was able to be part of it, and I am grateful for the practical experience that I gained from it."

SARAH MOSS ('10)



The MBA program is 100 percent online and can be completed in as little as two years.

DORDT'S MBA PROGRAM FOCUSES ON BUSINESS FROM A CHRISTIAN PERSPECTIVE

For those interested in earning a faith-based Master of Business Administration (MBA) degree, Dordt's new MBA program is a great fit, says Professor of Business Dr. Tim Klein ('05).

"What the business world needs right now is Christian leaders to step in and make a difference," he says. "In the last few decades, we have seen a growing number of cases of unethical and illegal behavior that has rocked the American business world. Greed and a decreasing regard for fellow humans demonstrate the need for a new kind of business leader who can firmly stand on biblical principles when it comes to pursuing business interest."

The MBA program is geared toward working professionals in business or organizational leadership seeking higher levels of training in areas such as Christian leadership, management principles, accounting, marketing, project management, human resource management, business law, and entrepreneurship.

Joe Bakker ('07), dean for online, graduate, and partner programs, thinks

that the flexible format will be a major benefit. "Our professors designed the MBA program to work with a busy person's schedule," he says. "Also, the program of study allows room for students to choose some electives based on their interest."

Vice President for Academic Affairs Dr. Leah Zuidema is excited that a Christian worldview is embedded in every aspect of the MBA program and that there are experienced business professors at the helm.

"In this MBA program, everything about the course—the curriculum, the instruction, the activities, the interpersonal interactions—is based on a Reformational worldview: God created and sustained everything, and his law and plan for human flourishing applies to everything. This should impact every level of operating a business, so that we are, as our mission statement says, 'working toward Christ-centered renewal in all areas of life,' including in the business world. I'm confident that this MBA program is going to make a difference for our graduates and all the people that they serve."

SARAH MOSS ('10)



MORE INFO

For more information about the program, visit dordt.edu/MBA.