Progressive RAILROADING

CRISI-funded project will help train rail tech professionals of the future

https://www.progressiverailroading.com/RailPrime/details/CRISI-funded-project-will-help-train-rail-tech-professionals-of-the-future--73456

By Julie Sneider, Senior Editor

December 11, 2024

"The best engineers are the people who not only understand theory, but they also can merge theory with reality." — Professor Allan Zarembski

As director of the Railroad Engineering and Safety Program at the University of Delaware, Professor Allan Zarembski has been sparking engineering students' interest in the railroad industry for over a dozen years.

A professor of practice at UD's Department of Civil, Construction and Environmental Engineering, Zarembski's background includes expertise in railroad track engineering and railroad safety, derailment analysis, wheel-rail interaction, rail problems and maintenance. He also has served as the director of UD's conferences on rail technology, data and analytics.

Now, thanks to a recently announced grant from the Federal Railroad Administration, Zarembski hopes he and others in the academic realm can help attract even more students to consider careers in rail technology, either as researchers or as employees of public or private sector employers.

Earlier this year, the FRA announced that UD would receive a $14.5 million grant through the Consolidated Rail Infrastructure and Safety Improvements (CRISI) program, which includes funding for projects that develop safety programs, workforce development and training.

The lead institution for the project, UD will use the funds to develop a center for hands-on training to help educate the "next generation railroad technical workforce," according to the grant announcement. UD Professor Monique Head is the project's principal investigator, and Joseph Palese, a UD research assistant professor in railroad engineering, and Zarembski are the project's co-investigators.

"What's really exciting about this grant is that we are training the next generation of railroad researchers." — Professor Monique Head

The project involves creating hands-on training, learning sessions and data sharing at the FRA's Transportation Technology Center (TTC), operated by ENSCO Inc., in Pueblo, Colorado. The TTC offers over 50 miles of test track at its nearly 52-square-mile site for training, education and research. On the property is the high tonnage loop (HTL), a 2.7-mile loop of track used primarily to study long-term wear on train components and rail infrastructure.

Currently, the HLT is inactive but will be activated by ENSCO for the project, according to Zarembski. The HLT is a great location for real-world testing, adds Head, who has completed track testing and monitoring there for a previous FRA-funded project.

Other university partners involved in the project are Oklahoma State University, Morgan State University and Michigan Technological University. The private sector partners involved are OptiFuel Systems, AP Sensing, Global Rail Group, Loram Technologies Inc. and ENSCO. The partners will provide the 20% nonfederal funding match as required by the CRISI grant program.

The genesis behind the project proposal was that engineering students at universities, particularly at the graduate level, receive limited hands-on training on a railroad as part of their education and/or research, says Zarembski.

“Very seldom do they ever get onto the railroad because it’s a dangerous environment and railroads don’t want untrained individuals there,” he says. “So, one of our issues was, how do you train engineers both in the theory and the practice of the railroad given that practical limit?”

The TTC creates a realistic railroad environment where the research, development and testing of rail infrastructure and equipment can be performed far better than what can be taught in a university laboratory, he notes. Trains will operate on the HLT, which will enable students to learn the practical side of safety requirements and operational aspects of working with and around trains.

The project will take place at the FRA’s Transportation Technology Institute, operated by ENSCO Inc., in Pueblo, Colorado. The TTC offers over 50 miles of test track, including a 2.7-mile, high-tonnage loop (shown) used to study long-term wear on train components and rail infrastructure. ENSCO.com

Moreover, the project will allow engineering students and researchers to work alongside industry partners to collect and access data on railroad operations and infrastructure. Although for-profit railroads collect massive amounts of data from their own operations, they're reluctant to share that information with researchers outside their own organization, according to Zarembski.

Head, whose background is in structural engineering, is interested in conducting research on monitoring railroad deflections through the use of digital image processing and other advanced technologies.

"What's really exciting about this grant is that we are training the next generation of railroad researchers and doing it side-by-side with industry partners," says Head. Both the industry and academic partners will have access to the data generated by the project — "which is huge," she adds.

The data will be entered into a repository available for future research efforts.

"One of the constant complaints of new people trying to get into the rail research world is that railroads won't give them information," says Zarembski. "So, by having our own testing and instrumentation, we'll get all this data and set up a database for researchers to draw upon without having to fight with the railroads."

Although the grant contract has yet to be worked out with the FRA, Head and Zarembski envision the project will entail two month-long workshops at the Pueblo site to be offered in the summers. The sessions will combine classroom instruction with on-the-field training that will be taught by rail industry professionals. It's anticipated about 30 undergraduate and graduate students will be enrolled per session.

The workshops, training and research opportunities will occur over a three-year period, which Head hopes will begin in 2026.

Engineering students from across the country may apply to participate in the sessions. While some may have taken railroad engineering courses on campus, they'll get to see railroad engineering in practice at the TTC.

"I think the best engineers are the people who not only understand the theory, but they also can merge theory with reality," says Zarembski. "When we train engineers like that, I think we've really accomplished something."