

Narrowing the information gap

Railroad engineering has been sidelined in universities for several decades, but it's making a comeback

Most colleges and universities teaching engineering haven't been paying attention to railroading. But they're starting to.

In recent issues of *TRAINS*, we've highlighted Norfolk Southern and CSX's new corridors, as well as Union Pacific's triumph over a massive mudslide. Interest in transit is high and growing. As of 2006 (the latest date for which statistics are available from the American Public Transportation Association), no fewer than 3,362 miles of rail transit were in proposal, planning, design, or construction phases across the U.S. All these projects require degreed engineers — preferably trained specifically in railroad engineering. But where will they come from?

Here's an example of an effort to build up the human side of a big part of the evolving railroad technology field.

In the decades following World War II, railroads curtailed hiring people or funding research, thereby stunting their relationships with higher learning. At the same time, colleges and universities stopped teaching railroading or conducting rail-related research and focused on the rapidly growing new field: highway transportation engineering. In less than two generations, a huge information gap formed.

The American Railway Engineering and Maintenance-of-Way Association has been working with the few colleges and universities that are still teaching railroad engineering (notably the University of Illinois at Urbana-Champaign and Michigan Technological University) and has been reaching out to those that don't.

In 2006, AREMA and Pasi Lautala, then



From the subgrade to the engine, its computers, and signaling systems, engineering touches every part of railroading, and the need for engineers is growing. *TRAINS*, Kathi Kube

a graduate student working on his PhD at Michigan Tech and now the director of its rail-engineering program, surveyed colleges and universities teaching engineering to see if they included railroad engineering or were interested in adding it. More than 50 expressed interest.

In response, AREMA's Education and Training committee asked the University of Illinois at Urbana-Champaign Railroad Engineering Program to organize a symposium to introduce faculty to railroad engineering and encourage them to incorporate the topic into their curricula.

University of Illinois Professor and Rail Program Director Christopher Barkan and Lecturer J. Riley Edwards worked with AREMA and a small group of professors from other universities teaching rail engineering to develop a program and invited the institutions on AREMA's list. The Railroad Engineering Education Symposium, held June 9-11, attracted 29 professors representing 26 colleges and universities, and railroad industry representatives.

Participants learned about the state of the industry, its infrastructure, motive power, traffic control systems, intermodalism, passenger, and transit developments. They also toured Norfolk Southern's yard in Decatur, Ill.

"It was very successful," Edwards says. "[AREMA's training and education committee] has long had a goal of conducting this event and we are thrilled that it happened and gratified that we could help."

The University of Wisconsin-Madison already offers continuing education courses in railroad engineering (as does AREMA), but does not offer rail engineering to its undergrads. Teresa Adams, professor of civil and environmental engineering at Madison, says she plans to incorporate material from the meeting into her university's engineering courses.

"With gas prices increasing the way they are and the volume of freight on highways doubling from 1998 to 2025, we have to make sure we're preparing the workforce for the future and to work across multiple modes," she says. "The challenge will be fitting it into an already jam-packed curriculum."

Sonya Cooper, professor and head of the department of engineering technology and surveying engineering at New Mexico State University, says the timing was perfect. An accreditation representative suggested adding rail and air to existing highway engineering classes to be more global, so New Mexico State was already planning to add a rail component. The materials provided will be easy to incorporate, she says, adding that the symposium showed her all the areas the university could include rail in other courses.

New Mexico State offers four applied engineering technology courses with heavy emphasis on lab work. Their senior year, students from each of the engineering disciplines (civil, mechanical, electronics and computer, and information) are brought together to complete a small design project. Railroad engineering, she says, would be

perfect for such a project because it incorporates all the disciplines.

Just as an accrediting agency encouraged New Mexico State to add railroad engineering to its curriculum, a state politician has done the same for Penn State Altoona.

State Rep. Rick Geist is a rail enthusiast and has supported rail projects in his state. He also has been encouraging Penn State Altoona's chancellor to add railroad engineering into its curriculum. Chancellor Lori J. Bechtel-Wherry listened.

In late June, the college hired a consultant to formulate a railroad engineering major course of study. It likely would include classes in railroad history, business, and mechanical, civil, and electrical engineering. "We're really impressed by how excited the railroad industry is," says Associate Professor of Engineering Andrew Vavreck. "We think we can [graduate] more than 20 students a year."

The college would need to have labs and facilities, as well as faculty with railroad experience, but Altoona is well suited for such an endeavor. NS's major locomotive shop is located there, and the Railroader's Memorial Museum plans to expand and build part of a roundhouse, Vavreck says.

"We'd like to expose students to the real railroad life and maybe work with real railroad systems. A lot of people retired from the industry could help teach," he says. "It's the perfect storm for us."

If the consultant can complete the study in six months and planners can get the proposal through the system in 2009, Penn State Altoona might be able to start admitting students into its railroad engineering technology major as early as 2010. "Given the level of excitement, I'm pretty optimistic," he says.

Optimism for railroad engineering programs is, indeed, running high these days. Symposium attendees expressed their appreciation for the event before it ended, and agreed to meet again in two years to discuss progress and lessons learned, as well as begin a listserv to encourage one another and share information.

The training and education committee had set a goal of getting railroad engineering into 10 additional colleges and universities by 2010. "Given the turnout at [the symposium], if we have a one in three success rate, we can do that," says Dallas Richards, chairman of the training and education committee. It seems to be mainly a matter of getting the word out to academia.

"We didn't know the U.S. freight rail industry was the envy of the world," UW-Madison's Adams says. "That's pretty impressive."

Yes, it is. Welcome aboard.



New Mexico State University Professor Sonya Cooper considers rail. Joseph Storch