



UIUC students organize an annual event called "Engineering Open House" to interest and educate young people in all aspects of engineering. For the past several years, Norfolk Southern has visited with its locomotive simulator and allowed students to try their hand at the throttle.

Railroads once enjoyed strong relationships with the academic community. It's time to rebuild them.

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At a recent railroad job fair at the University of Illinois, there was good news and ominous news. The good news was that, despite the recession and current low traffic levels, 13 companies, including major freight and passenger railroads and a number of railroad engineering firms, participated. All were hiring, perhaps not at previous levels, but hiring nevertheless. More than 50 students attended and there was so much interest among them that most of the companies stayed past the end of the event to discuss internship and employment opportunities.

The ominous news was one railroad's top-priority hiring goal. In addition to its ongoing need for new civil and mechanical engineers, it hopes to hire more than 30 signal engineers to assist with PTC implementation. This number of jobs is

exciting; however, the idea that there might be 30 graduates nationwide with the appropriate education enabling them to quickly play an effective role without extensive additional training is stunning—and this was just one railroad's need! Some might correctly argue this is an extraordinary situation, brought on by the PTC mandate. But for a number of years we have been hearing from the industry about its need for railroad engineering and transportation professionals, and its difficulty finding interested, qualified individuals. This demand will substantially increase in the future.

It is instructive to consider the situation in the highway sector. Recruiters seeking individuals knowledgeable in highway signaling and even ITS (Intelligent Transportation Systems, the highway equivalent of PTC) would have little difficulty finding hundreds of qualified

candidates familiar with highway traffic control system theory, design, and technology. Why is there such a disparity between rail and highway?

The answer is simple: Highway transportation engineering is a well-established element of the curriculum in many of the nation's university programs. Nearly all major engineering programs teach introductory transportation engineering, but despite the word "transportation" in the title, the content of these classes is almost exclusively highways. In addition, many offer advanced highway engineering and transportation classes. It is not unusual for there to be up to half a dozen faculty whose expertise and research is focused on some aspect of highway transport.

By contrast, only a handful of U.S. colleges and universities have even one class focused on rail or employ faculty specializing in rail.

The implications are profound, for society as well as for the rail industry. Besides the difficulty finding graduates

EDUCATION

interested in railroad jobs, transportation professionals at the local, state, and federal levels also have little understanding of rail. When rail projects arise, there is often poor understanding of the exigencies of railroad infrastructure and operations. Our nation's over-dependence on highway transport and public resistance to many new rail projects is rooted in widespread ignorance about where, when, and how rail contributes to the nation's transportation needs. Given the scarcity of rail content in current educational programs, this is not surprising.

It wasn't always this way. Railroads once enjoyed strong relationships with the nation's academic community. Classes were taught and research was conducted on campuses nationwide. Following World War II, these relationships began to fade. The rail industry's declining fortunes in the latter decades of the regulated era was one reason. Railroads also began outsourcing many functions, reducing their need for new personnel. New technologies further diminished railroads' hiring needs.

Although these changes were essential to the industry's financial survival and recent resurgence, a casualty was the nearly complete loss of a relationship with the academic community. Railroads curtailed much of their campus-based research programs and substantially reduced hiring. This neglect led faculty and college administrators to perceive railroads as an obsolete, possibly dying industry with little relevance to society.

Meanwhile, development of air and highway systems offered exciting new challenges and opportunities to academia. State and federal DOTs soon grew to rely on universities to conduct research and educate students to meet the burgeoning need for new talent in these fields. As aging faculty expert in rail transport retired, young faculty with air and highway transportation expertise replaced them. A key ingredient of success for faculty and administrators is a strong, vibrant program of sponsored research. So while railroads were exiting college campuses, public- and private-sector highway transportation interests were filling the void. Large amounts of funding were invested in educational programs and research on air and highway transportation topics. These funding policies continue to this day.

The result is a close relationship between the organizations sponsoring highway research—FHWA, state DOTs, etc.—and the academic transportation community. Transportation faculty have become thoroughly invested in academic careers centered on highway-oriented research. This has affected course content, so generations of students have been immersed in highways to the near-total exclusion of rail. The loss of rail-oriented research had a more insidious effect. Besides losing the benefit of innovations that might have developed, it also fostered the impression that railroads were not interested in technology advances—reinforcing the perception of railroad obsolescence.

Recent positive changes in the U.S. rail situation suggest



Several of Chris Barkan's past and present students were shown the latest in concrete tie designs by representatives of Vossloh at the FAST track at TTCL as part of this year's AAR Annual Research Review.

that a new course of action is needed. The freight rail renaissance will renew as the economy recovers, and expansion of passenger rail will continue, increasing the need for expanded infrastructure and well-educated personnel to plan, design, build, operate, maintain, and manage all of these new activities. Rail infrastructure, rolling stock, and train control technology is at a dynamic stage. Accommodating new demands for safety, speed, service, capacity, sustainability, and energy efficiency will require the best that industry, government, and academia have to offer. Innovative solutions are required. New talent is needed to apply new ideas and technologies. Yet, industry and government is largely neglecting the potential role of academia in helping rail transportation fulfill its potential in the 21st century.

At the University of Illinois at Urbana-Champaign, we are fortunate to be one of three AAR-sponsored Affiliated Labs, and we also receive support from other industry sponsors. A handful of other schools have funding from FRA and other sources, but the nation's rail system needs much more. There is roughly a 100:1 ratio of highway to rail academic funding in the U.S. The rail industry is accustomed to competing with the highway sector for traffic, but it must also compete for faculty and students interested in transportation education and careers.

The rail community will benefit from a dynamic "infrastructure" of college faculty and students working in close partnership with industry and government. Such a relationship will enable railroads to take full advantage of all that the academic community can offer in developing solutions to today's challenges and creating opportunities. It will foster development of a new generation of faculty and help them motivate and educate students in the principles of rail transportation and prepare them to meet the exciting challenges of the new railway age.