Legacy

For over a century the University of Illinois at Urbana-Champaign (UIUC) has been among the leading academic institutions in rail transportation engineering. Talbot, Schmidt, Wright, Wetenkamp, and Hay are familiar and respected names in the annals of railroad engineering. All were UIUC faculty who made important and lasting contributions to the field. These individuals and their students represent both the legacy, and the enduring commitment of UIUC to railroad engineering.

Commitments

A vibrant program in railroad engineering continues at UIUC. UIUC has the strongest academic program in railroad engineering of any university in North America, complimented by the largest and most diverse program of research on the topic.

The UIUC Railroad Engineering Program recognizes the ever more important role of rail transportation, whether it be freight, passenger or urban transit.

UIUC is committed to further growth and development of its engineering teaching and research activity in support of the nation’s need for talented young minds and new technologies in this important transportation mode.

Objectives

As a first step in rejuvenating its railroad engineering program, Dr. Christopher Barkan (formerly with the Association of American Railroads’ Research & Test and Safety & Operations Departments) was hired in a new, full-time position to direct the effort following the retirement of Professor Ernest Barenberg.

Since his arrival, Prof. Barkan’s has had two principal objectives, broadening the railroad engineering research program that was already well established thanks to Prof. Barenberg’s efforts, and expanding the UIUC educational program. A more recent step in expanding the program was to add another faculty in rail engineering. J. Riley Edwards was hired as
a lecturer in Fall 2007. This new teaching position was made possible through generous funding from CN, CSX, Hanson Professional Services, and the George Krambles Foundation.

**Growth**

The base of support for the UIUC railroad research program has been broadened by building on its core strength as an AAR Affiliated Laboratory.

Over a dozen new projects have been initiated, supported by AAR, FRA, NSF, RSI, TRB and individual railroad and railway supply companies. UIUC research results have been presented to the railroad community at a wide variety of national and international conferences and meetings in the past few years, including AREMA, AAR, TRB, WCRR, IHHA and others.

**E D U C A T I O N**

**Classes**

The academic program has also undergone significant growth, expanding from one course in railroad engineering to the present number of four, with other new classes under consideration. Importantly, these classes are offered in the context of UIUC’s extraordinarily broad and deep curriculum in engineering education.

CEE 408—Railroad Transportation Engineering  
CEE 409—Railroad Track Engineering  
CEE 410—Railway Signaling and Control  
CEE 498RD—Railroad System Planning and Design  
CEE 598AR—Advances in Railway Technology

**Standards**

The UIUC College of Engineering is among the largest and highest ranked in the nation with 12 departments and over 400 faculty members. Admission standards for undergraduates are rigorous and expectations of faculty achievement are high. As such it is an appropriate institution to attract, teach, and develop the best and brightest minds in engineering and direct them toward the challenges of rail transportation.

**Continuing Education**

In addition to classes for matriculated students, UIUC recognizes the need for continuing education and distance learning options for the rail transportation community. To this end, UIUC has organized numerous conferences, workshops and short courses on railroad and related topics, and is interested in further development of these educational venues.
Faculty

UIUC has two full-time faculty positions in railroad engineering (held by Prof. Chris Barkan and Prof. J. Riley Edwards) and an adjunct position (held by Prof. Don Uzarski). In addition, there is a strong base of knowledge on railroad engineering topics among a number of other faculty, thanks to UIUC’s 25-year tenure as an AAR Affiliated Lab.

These individuals specialize in a variety of disciplines of direct relevance to rail transportation. They conduct research on new and emerging technologies, and equally important, they teach classes on engineering subjects that are vital to a well-rounded education for railroad engineering professionals.

The skills of these faculty complement the knowledge of the railroad faculty and they are a major factor in the overall strength of the UIUC railroad engineering program, which is fundamentally a multi-disciplinary, cross-departmental team effort at UIUC.

Challenges

Critical to the success of both UIUC and the rail transportation community is encouraging bright young students to seek education and pursue careers in railroad transportation, but there are several challenges.

By contrast to current, high-profile topics in engineering such as computers, communication, biotechnology, etc., rail transportation suffers from its low visibility with the general public, and a very limited understanding of the vital role it plays in modern society.

Perhaps even more important is the perception that rail transport is “low tech”. Ironically, rail transportation is undergoing technological revolution in a number of respects. Some of this involves use of these new technologies to rail engineering applications, while others are challenging, cutting-edge developments in traditional engineering fields that are vital to the ever-changing demands for rail transportation technology.

In either case, they represent exciting and rewarding challenges for eager and inquisitive young minds. The key is to inspire students’ interest by exposing them to these topics through classes, field trips, internships, visiting speakers, and research opportunities.

Establishment of a longer-term, reliable base of support for both the research and academic elements of the UIUC railroad program is vital to its continued success.
Attracting the most talented undergraduate students is enhanced by scholarships, conduct of research requires support for graduate students and faculty, development of new courses requires faculty time, classroom space and laboratory equipment.

**The Future**

**Industry Support**

An initial step in achieving industry support occurred when the George M. Krambles Foundation made a substantial donation to UIUC in support of its transportation engineering program in civil engineering with emphasis on rail transportation. The CN railway made generous contributions to support the rail program, its students, and teaching and research. Contributions have also been given by Hanson Professional Services, BNSF Railway, CSX Transportation, and Norfolk Southern to enhance the objectives of the Railroad Engineering Program.

The railroad and railway supply industries can help ensure that UIUC continues to educate a new generation of railroad engineering and transportation professionals by supporting the continued development of its railroad educational and research programs. There are three key ways to accomplish this: funding, internships and employment opportunities.

**Funding** - This is particularly important because it helps attract the best students to the program and provides the stability that enables faculty and students the time to concentrate on teaching, studies, and research in rail transportation engineering.

**Internships and coops** - These provide first-hand experience to students who are considering careers in rail transportation and help them develop understanding and interest in key aspects of the field.

**Employment opportunities** - There is a shortage of engineers in all fields today and the rail industry is competing with other industries for the best students who will receive many offers. It is vital that timely, competitive employment opportunities be available when graduates are looking for jobs, typically in the winter months for May graduates.
Summary  In short, if rail transportation is to have the talent it needs in the future, it must invest in education and research today. The University of Illinois at Urbana-Champaign has been teaching and advancing the field of rail transportation engineering for over 100 years, and is committed to continuing in this role in the 21st century.

W. W. Hay Collection

An important step in supporting the UIUC and North America’s railroad research program has been the establishment of the William W. Hay Railroad Engineering Collection at the UIUC Grainger Engineering Library. At its core is the UIUC railroad engineering collection that includes thousands of books and technical journals, some of which date back over a century and a half. Recently, the Transportation Technology Center, Inc. selected UIUC to serve as its technical library and donated over 6,000 volumes from the AAR and FRA collections, including many difficult-to-find industry and government reports from around the world. The Hay Collection is almost certainly the largest assemblage of railroad engineering technical literature of its kind in North America. A new, on-line, digital search and retrieval system has also been developed to facilitate location of references from the Hay Collection.

W. W. Hay Railroad Seminar Series

The UIUC Railroad Program organizes a bi-weekly seminar series featuring presentations on railroad topics by faculty, students, railroad industry professionals, and government officials involved with rail transportation. These seminars are open to all and are well attended by member of the university community and other from the region. Participation in the seminars is also available via the internet and the telephone. The Hay Seminar Series is sponsored by Norfolk Southern Corporation. For information on the series schedule visit the website: [http://cee.uiuc.edu/railroad/CEE/seminar.asp](http://cee.uiuc.edu/railroad/CEE/seminar.asp)
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