

Rail engineering outreach for all ages

University of Illinois at Urbana-Champaign

By Adrian Diaz de Rivera, AREMA Student Chapter President, University of Illinois at Urbana-Champaign

March 2019 marked the 99th year the College of Engineering at the University of Illinois at Urbana-Champaign hosted Engineering Open House (EOH), a massive two-day STEM outreach event featuring hundreds of student-run exhibits and demonstrations. During the event, thousands of grade school and high school students, families, and members of the general public from all parts of Illinois visited the campus. Since 2005, there has been a railroad engineering presence at EOH organized by members of the University of Illinois at Urbana-Champaign AREMA Student Chapter with support from the Rail Transportation and Engineering Center (RailTEC). According to Professor Chris Barkan, executive director of RailTEC, “My objective, and I think the Student Chapter’s as well, is to educate people about railroad technology and help them appreciate the importance of rail transportation in North America.”

This year, the AREMA Student Chapter put on 10 exhibits in various areas of rail engineering. As part of a group of exhibits on signaling and train control, a team of engineers from Canadian National’s (CN) Signals and Communications department showcased the railway’s train control system, a digital signals testing environment

and a dispatching display with a real-time feed of trains operating on CN’s Champaign subdivision. Nick Robinson, Positive Train Control System Validation Engineer at CN, commented, “It’s nice to see kids engaged in all the engineering aspects. It’s been a lot of fun interacting with people. You get to see different personalities [and] teach people about signaling and how the dispatcher moves trains.” The AREMA Student Chapter was also fortunate to host a Special Agent from the CN Police Service who displayed a full-size grade crossing signal to promote grade crossing safety as part of Operation Lifesaver (OLI). The OLI presence tied in well with an exhibit by signals hobbyist Dan Kuchta who had a working model grade crossing signal that used real railroad relays and components to activate crossing arms, flashing lights and bells as a miniature train approached. Meanwhile, a student-run exhibit used LED signals, breadboards, miniature relays, custom-machined train wheelsets and far too many batteries to demonstrate how track circuits and automatic block signals work.

The newest addition to the EOH rail section was a high-speed transportation exhibit put on by several employees of the Central Japan Railway Company (JR Central) to educate people about magnetic

levitation technology and the company’s Superconducting Maglev (SCMAGLEV) system. JR Central is currently constructing and promoting the SCMAGLEV system on the Chuo Shinkansen project planned to link Tokyo and Nagoya by 2027. The exhibit included a toy maglev train, educational videos, model train sets, an electromagnetic train made of coiled copper wire and batteries and a demonstration of a conductor cooled by liquid nitrogen that allows it to float above a track of magnets. In the real-life SCMAGLEV system, liquid helium is used to cool superconducting magnets to produce a magnetic field strong enough to lift a train. “This is a very good opportunity for us to promote our technology to people in the United States. STEM education is very important for children to think about future transportation systems,” said Rikuhei “Ricky” Daimon, Deputy General Manager of JR Central’s Washington D.C. Office. “Our SCMAGLEV system is brand-new technology but the principle is very basic so it is easy to understand the science and technology [behind it].” Unsurprisingly, the exhibit was a big hit with visitors. Taking advantage of this excitement, the newly-formed student chapter of the Midwest High-Speed Rail Association (MHSRA) used



The University of Illinois at Urbana-Champaign AREMA Student Chapter put on multiple rail engineering exhibits for the public at Engineering Open House 2019.



University of Illinois at Urbana-Champaign AREMA Student Chapter member and RailTEC graduate student Stan Chang uses a model to demonstrate the concepts behind automatic block signals.

their booth to educate the public about passenger trains and high-speed rail in the United States. Over the past academic year, the AREMA Student Chapter has closely coordinated activities with the MHSRA to further expand rail transportation opportunities and voices on campus.

Other exhibits organized by the AREMA Student Chapter included a full-size track panel accompanied by track tools and fastening systems meant to show how track is built and maintained. A popular feature of the track panel exhibit was a display of personal protective equipment such as Illinois-orange hard hats and high visibility vests that kids could try on. In another corner, a puzzle taught visitors about the freight that trains can carry while a separate exhibit had kids race against each other to transport intermodal containers by ship, train, and truck to a terminal. Lastly, a near-life-size projection of Dovetail Games' Train Simulator allowed people to take turns operating a Metra train from Chicago using a mini control stand.

Over the years, connections made through AREMA events and conferences have resulted in fantastic industry support for the University of Illinois at Urbana-Champaign AREMA Student Chapter. In previous years at EOH, Norfolk Southern brought in their mobile locomotive engineer training simulator while BNSF displayed a hi-rail vehicle. Besides exhibits, Hanson Professional Services annually sponsors a group of high-achieving Springfield high school students from under-represented minorities to attend EOH. RailTEC faculty and AREMA Student Chapter members act as tour guides welcoming the group to campus. Beyond EOH during this past academic



CN Special Agent Jeffrey Price educates a group of kids about grade crossing safety as part of Operation Lifesaver.

year, the AREMA Student Chapter held general meetings with organizations such as Kiewit, Quandel Consultants, Union Pacific, Holland LP, Railroad Development Corporation, and WSP. Last semester, the Terminal Railroad Association of St. Louis hosted student chapter members on tours of Mississippi River rail bridges while BNSF took students on a tour of Corwith Yard in Chicago. This semester, Kiewit hosted members on a visit to CTA's Addison Red line station where rehabilitation work was being performed for the Red-Purple Modernization Project.

Thanks to the hard work of the entire University of Illinois at Urbana-Champaign AREMA Student Chapter board and members, and with the generous support of the rail industry, RailTEC, and advisor Tyler

Dick, this was another successful Engineering Open House and year for the chapter.

The above article from the University of Illinois at Urbana-Champaign AREMA Student Chapter was chosen as one of two winners of this year's AREMA Student Chapter Article Competition for RT&S. This is the third year the Student Chapters have been given the opportunity to showcase their activities and research to the greater AREMA membership through writing for this publication. The work of University of Illinois at Urbana-Champaign is an example of how the AREMA Student Chapters are investing in furthering their education and the railroad industry. If you have questions about AREMA Student Chapter activities, please contact scc@arema.org. ■

FYI

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