

Rail and Transit Program

The Rail and Transit Program at the Rutgers Center for Advanced Infrastructure and Transportation (CAIT) develops innovative research and technology solutions to improve the safety, resiliency, and efficiency of the nation's rail and transit systems.

Located along the Northeast Corridor, Rutgers CAIT has the opportunity to conduct real-world research that can benefit commuters, businesses, and the rail and transit industry every day. As the **only** university initiative addressing rail in the New York and New Jersey region, the CAIT Rail and Transit Program is a **one-stop-shop** for all technology and workforce development needs in a unique and busy location. A team of expert researchers and experienced engineers allow CAIT to take on the pressing challenges that the industry faces in asset management, technology development and evaluation, resiliency, risk management, and workforce development.

From turning big data into useful information to support data-driven asset management, to studying Positive Train Control (PTC) for safety improvements, CAIT faculty and staff have expertise in a range of disciplines. Their work turns into real results too. CAIT has collaborated on projects with the Federal Railroad Administration (FRA), Pipeline and Hazardous Materials Safety Administration (PHMSA), Class 1 railroads, transit agencies, consulting firms, and many others.

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and Transportation

PROGRAM HIGHLIGHTS

- Big data, AI, and, Asset Management
- Intelligent Connected Railroad Technology
- Education and Workforce Development
- Collaboration with the FRA, Class 1 railroads, transit agencies, consulting firms, and others

ABOUT CAIT

- CAIT is the USDOT Region 2 University Transportation Center focused on improving the durability and extending the life of transportation infrastructure
- CAIT has more than 100 full-time and affiliated researchers, 500 students in research, and 47 full-time professional staff

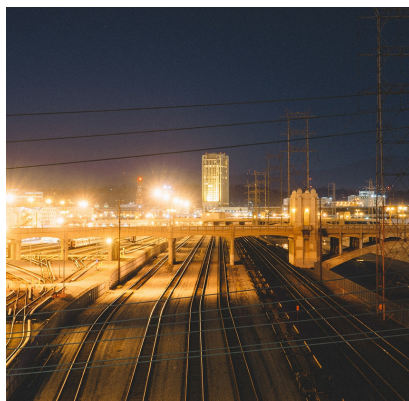
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Program Highlights



Big Data, AI, and Asset Management

Each year, major U.S. freight railroads spend billions on infrastructure management. In order to make data-driven asset management decisions, these companies need to know the status and life cycle of their railways.

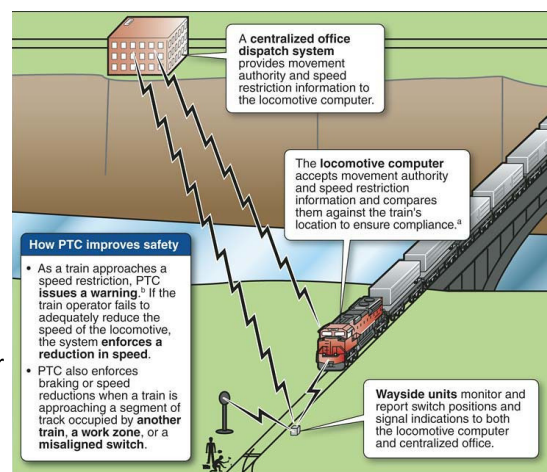
The Rutgers CAIT Rail and Transit Program is analyzing Big Data to do just that. By using machine-learning algorithms to transform this data into infrastructure failure information, the team is creating a data-driven risk prediction model that can identify “high-risk” locations on rail corridors, informing owners before asset failures occur. This will help them better manage their assets, and the research framework can be applied to other areas of transportation too. Currently, researchers are collaborating with the FRA and others.

Intelligent Connected Railroad Technology

Self-driving cars tend to be in the spotlight these days, but the U.S. rail industry is heading toward increased connectivity, intelligence, and automation too. At CAIT, researchers have developed advanced sensory networks, wireless communication technologies, and automation technology to help improve transportation safety and efficiency.

As an academic institution, Rutgers has the unique capability to thoroughly evaluate new technology, using its extensive research network to ensure a new product works and is worth the cost.

CAIT research on wireless communication, sensor network optimizations, and cyber assurance are just a few examples of this. Rutgers CAIT also has research on evaluating PTC technology. Industry collaborations in this area currently include the FRA, Amtrak, and more.



Risk Management and Resiliency

Safety is a top priority for rail owners, especially ones transporting hazardous materials. Researchers at CAIT are helping them make informed safety choices through developing an Integrated Risk Management Model to predict transportation risks associated with tank car design, population density, and other factors.

On the resiliency side, CAIT is developing a simulation model to estimate service disruption and recovery. Projects like this help to inform the future of safety and resiliency policy in the industry. Rutgers CAIT is working with FRA, PHMSA, and other stakeholders in this area.

Teaching Tomorrow's Workforce Today

Rutgers CAIT has the capability to train the next generation of rail engineers. The Rail and Transit Program is currently the only academic rail initiative in the New York and New Jersey region, at a time when reports show that the industry is undergoing a “brain drain” as experienced workers are retiring at high rate.

CAIT, with access to numerous faculty and educational resources, has the capability to address workforce development issues and prepare students to become future leaders in the transportation industry. Over the last five years, the program has already introduced more than 200 students to rail education. As the Rail and Transit Program continues to grow, more opportunities will arise for new research, but also to keep the pipeline of rail workforce development going.

