

US High-Speed Rail Can Learn from Japan's Successful Earthquake Early Warning System

Mineta Transportation Institute: Detailed training also critical

San Jose, CA – May 4, 2015 – As California and other states move forward with high-speed rail plans, some have questioned the system's ability to withstand earthquakes. This is especially critical in California, an active quake zone. A new peer-reviewed research report from the [Mineta Transportation Institute](http://transweb.sjsu.edu/project/1225.html) says that valuable lessons are easily adapted from Japan's successes with its early earthquake warning (EEW) systems. [*Great East Japan Earthquake, JR East Mitigation Successes, and Lessons for California High-Speed Rail*](http://transweb.sjsu.edu/project/1225.html) is available for free download from <http://transweb.sjsu.edu/project/1225.html>. The principal investigators were Frances Edwards, PhD, and Daniel C. Goodrich, MPA, working with an academic and professional research team.

JR East, a Japanese rail company, has developed systems to mitigate the damage to its facilities and personnel, including an early earthquake detection system, retrofitting existing facilities for seismic safety, developing more seismically resistant designs for new facilities, and holding earthquake response training and exercises for company staff.

“These systems demonstrated their value in the Great East Japan Earthquake of 2011 and have been further developed based on that experience,” said Dr. Edwards. “Researchers in California are developing an EEW system for the state, and the private sector has seismic sensors in place. These technologies could contribute to the safety of the California High-Speed Rail Authority's developing system, which could emulate Japan's best practices.”

The JR East EEW system stops the train, prompting a response from passengers and staff. Detailed staff training in Japan was largely responsible for the subsequent lifesaving activities that moved passengers and staff out of harm's way. There were no passenger or crew deaths on any JR East trains, including the bullet trains. For this report, the types of training and exercise activities used in Japan are evaluated for applicability to California rail systems.

That disaster's impact and its three-fold aspects (earthquake, tsunami, and nuclear event) also provided valuable information for the California High-Speed Rail Authority's (CHSRA) system. The insights will be leveraged and adapted to build greater safety for passengers and crew.

The report explains the physics of seismic events before delving into the evolution of warning systems. It also describes the extensive training that JR East provides for its employees so they can assist during a disaster.

JR East provided reports rarely available to Western researchers on EEW system performance; seismic resistance and resilience research related to columns, piers and bridges; and staff training. The authors conducted extensive EEW research through the Berkeley Seismic Laboratory, at the sites of existing installed EEW systems, and structural engineering research on seismic resistance through private engineering activities.

The 74-page report includes a list of 12 figures and 11 tables for illustration. For a free, no-registration download, go to <http://transweb.sjsu.edu/project/1225.html>

Tweet this: @MinetaTrans report: Japan's 2011 quake has lessons in early warnings for #high-speed rail. Free download. <http://ow.ly/M26Bs>

ABOUT THE PRINCIPAL INVESTIGATORS AND THE RESEARCH TEAM

Frances L. Edwards, PhD, is deputy director of the National Transportation Safety and Security Center at Mineta Transportation Institute, professor of political science, and director of the MPA program at San Jose State University.

Daniel C. Goodrich, MPA, is a research associate with the Mineta Transportation Institute at San Jose State University and a lecturer in the Master of Science in Transportation Management and Master of Public Administration programs.

Margaret Hellweg, Dr.rer.nat., is operations manager at the University of California Berkeley Seismological Laboratory.

Jennifer Strauss, PhD, is external relations officer for the Berkeley Seismological Laboratory, serving as the head of the Earthquake Research Affiliate Program.

Martin Eskijian, MS, PE, is an engineer specializing in structural dynamics, reservoir engineering, and structural engineering/code development for marine oil and LNG terminals.

Omar Jaradat, PhD, PE is a registered civil engineer with Moffatt Nichol specializing in earthquake engineering, soil-structure interaction and non-linear structural analysis.

ABOUT THE MINETA TRANSPORTATION INSTITUTE

The Mineta Transportation Institute (MTI) conducts research, education, and information transfer programs regarding surface transportation policy and management issues, especially related to transit. Congress established MTI in 1991 as part of the Intermodal Surface Transportation Efficiency Act. MTI won national re-designation competitions in 2002, 2006 and 2012. The Institute is funded through the US Department of Transportation, the US Department of Homeland Security, the California Department of Transportation, and public and private grants. The internationally respected members of the MTI Board of Trustees represent all major surface transportation modes. MTI, the lead institute for the nine-university Mineta National Transit Research Consortium, is affiliated with San Jose (CA) State University's College of Business. Visit transweb.sjsu.edu

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Contact: Donna Maurillo
MTI Communications Director
831-234-4009 (24 hours)
donna.maurillo (at) sjsu.edu