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Harvey Stenger, the University at Buffalo engineering school dean, left, walks atop two 72-foot concrete girders for test bridges in Ashford, with Andre Filiatrault, director of the school's earthquake research center, Calspan executive Thomas Pleban and earthquake center researcher George Lee.

Sharon Cantillon/Buffalo News

These ‘bridges to nowhere’ may help avert future disasters

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In a Town of Ashford field, thousands of feet away from the closest residence and disconnected from any roads, will stand Western New York's own “bridges to nowhere.”

But the 250-ton, 7-foot-tall twin spans won't be used as political fodder in any upcoming campaigns. Instead, they will find life as an earthquake testing ground.

The University at Buffalo and Calspan are collaborating to build the two bridges, a \$750,000 project

funded primarily by a \$400,000 state grant, that will aid research to prevent bridge collapses during disasters and help restore the country’s aging infrastructure.

Starting next summer, once a week for five years, a device connecting the two spans at Calspan’s field testing site will push them apart and then release them, simulating an earthquake. The stress from the bridges’ bearings will be recorded each week, as weather and time take a toll on the structure.

Andre Filiatrault, director of UB’s Multidisciplinary Center for Earthquake Engineering Research, said this is the first project where bearings on a real-life bridge will be monitored over a period of time.

“These kinds of testings are very important because you can’t do it in a lab,” said Filiatrault, also a professor of civil, structural and environmental engineering at UB. “No one has ever done this at this scale over a large period of time.”

The earthquakes will be the same intensity each week, he said. The goal of the project is to monitor how the wear and tear affects the bridges over time.

Internet lines and surveillance cameras will allow the weekly tests to be administered from the earthquake center at UB’s Amherst campus, 40 miles away.

Western New York’s four seasons, varying temperatures and temperate climate are ideal for the project, Filiatrault said. The site’s weather station will provide data for each weekly test.

If the project took place in a region with less diverse weather, like California or Florida, the results could not be applied to bridge code revisions across the country. But since the region gets a taste of all types of weather, the conclusions from the project will contribute to bridge revisions everywhere, he said.

“This bridge is going to have an incredible educational aspect to it,” Filiatrault said.

Undergraduate engineering classes will take field trips to the site to study the structure and design of the bridges, while two to three graduate students will conduct extensive research at the site each year.

While Filiatrault said there’s always a risk of collapse when simulating an earthquake, the controlled setting, and the equal intensity of each simulation should minimize the odds of the scenario.

Dynamic Isolation Systems provided the bearings for the project, and Hubbell Galvanizing near Utica donated the girders, which cost nearly \$300,000.

In addition to lending its 681-acre site for the experiment, Calspan will give engineering support services to the project.

Thomas Pleban, executive vice president of Calspan, said the company has used the remote testing grounds for a variety of projects in the last 30 years, including work for the defense department. He said Calspan is glad to be a part of the project, as the site has seen less activity in the last five years.

The initiative is the latest in a series of partnerships between Calspan and the university.

“I can’t stress how collaborative this is,” Pleban said.

It’s also the next era for MCEER, founded in 1986 as the first National Center for Earthquake Engineering Research.

“This next chapter enables us to take all of our knowledge in earthquake engineering research and see how it’s applied to other hazards,” said Donald Goralski, MCEER’s chief of staff.

Goralski said earthquake research data from previous disasters helped in the investigation of the 2005 Interstate 10 bridge collapse in New Orleans during Hurricane Katrina, one in which winds and storm surge were the key culprit. The Ashford testing grounds may become home to additional multi-hazard research, such as enhanced sensor technologies to monitor bridges, in the years to come.

“There’s knowledge in the earthquake engineering field that can be transferred,” he said.

Any of the project’s conclusions from the wear-and-tear monitored on the bridges may also help provide solutions for the nation’s rapidly aging infrastructure, which received a D in a recent report from the American Society of Civil Engineers. The fatal Minneapolis bridge collapse in the summer of 2007 added an extra push to find solutions to the growing problem.

“This is very much in tune with the needs of the country’s aging infrastructure,” Goralski said. “A lot of

the bridges are reaching or will be reaching their life span over the next couple of decades.”
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