

Using wireless sensors to monitor bridge safety

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This is principal investigator and chair of the University of Texas Department of Civil, Architectural and Environmental Engineering, Sharon Wood, and University of Texas Department of Electrical & Computer Engineering professor Dean Neikirk. Credit: Erin McCarley

University of Texas (UT) professor, Dean Neikirk, will be field-testing a new bridge monitoring system within the year. The project is a collaboration between industry, government, and academia that will provide real-time monitoring of dangerous bridges and reduce inspection costs for all bridges.

According to the American Society of Civil Engineers, deferred maintenance has left one-quarter of the nation's bridges deficient. Congress mandated 2-year inspections in 1971, but at least 17,000 bridges did not meet the requirement in 2008, including 3 out of every 100 freeway bridges. More alarming, the average age of America's

bridges is 43 years out of an average 50-year life span.

"Most bridges have already been built," says Neikirk. "Our project will develop simple, low-cost equipment that can be used to retrofit existing construction as well as in new construction, but we are primarily concerned with ensuring that bridges do not fail without warning. Most aging bridges do not necessarily require replacement, they just need to be monitored for signs of corrosion and wear."

Neikirk and principal investigator and UT Civil, Architectural, and Environmental Engineering Chair Sharon L. Wood are developing a network of low-power wireless sensors capable of capturing and transmitting data to a central location. They already have working sensors, a data collection methodology, and specifications for sensor placement. Researchers are working on (1) powering sensors with solar, wind, or traffic vibrations instead of batteries, (2) ensuring the sensor output is compatible with National Instruments (NI) equipment that will be collecting the data and that NI equipment is rugged enough for outdoor use, and (3) preventing the steel structures from interfering with the radio signals used to transmit data.

"We are resolving the last few technical issues before our field-testing begins—probably within the year and probably in Texas," says Neikirk. "We hope that the immediate effect will be ensuring Texas bridges are inspected more frequently and for much less money. We also hope to partner with a commercial developer who can take this technology and help make it commercially available."

Source: University of Texas at Austin

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