

News & Analysis

MEMS Sensors Secure Structures

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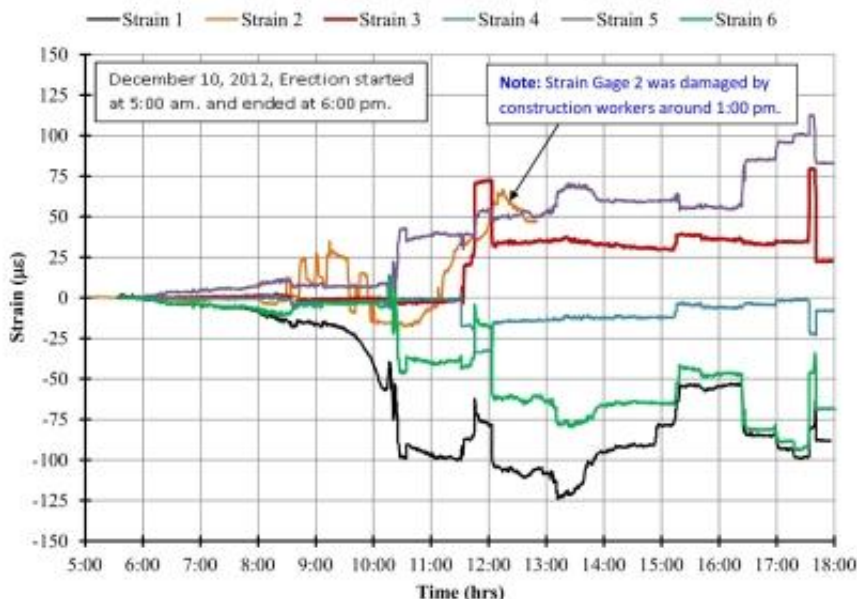
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PORTLAND, Ore. -- Injuries from collapsing bridges, buildings, and other structures can often be prevented with high performance wireless micro-electro-mechanical systems (MEMS) sensors and smart monitoring software, according to Resensys LLC.

Resensys is an infrastructure-monitoring firm based in College Park, Md., which currently has 20 installations as widely dispersed as bridges on the mid-Atlantic I-495 corridor to various structures in Illinois, California, Canada, Indonesia, and Japan.

"We get interest from engineers monitoring a wide variety of structures worldwide," said Mehdi Kalantari, Resensys president and chief technology officer, in an interview with EETimes. "We heavily customize our sensor complement for every structure using very high-precision devices such as inclination sensors that can detect one thousandth of a degree deviation."

The stakes are huge. In the US alone, there are more than 70,000 structurally deficient bridges, according to the Federal Highway Administration. In fact, the American Society of Civil Engineers recently gave the US a D+ on its annual infrastructure [report card](#).



Sensors on the Morgan Street Bridge over Rock River, Rockford, Illinois, tracks strain on different parts of the structure during construction operations. (Source: HBM Engineering Group)

Resensys's structural health detection system uses both MEMS and conventional sensors in its wireless SenSpot modules to detect strain, vibration, displacement, deformation, tilt, inclination, acceleration, temperature, and humidity. Hundreds of SenSpot modules then aggregate their streaming data using ZigBee to a SeniMax wireless node connected wirelessly using cellular technology to a datacenter. Resensys's SenScope software (pictured) then analyzes the data streams for abnormalities, and sets off alarms when structures exceed safety specifications. In most cases, these early stage alarms will pinpoint maintenance needs that repair engineers can take care of before there is a danger to civilians using the structure, according to Resensys.

SenSpot modules and SensiMax aggregators, which can be either battery or solar powered, are also being used in avionic and other applications. Resensys is a startup of the University of Maryland Technology Enterprise Institute (Mtech) with funding from the Maryland Technology Transfer Fund, the SAIC VentureAccelerator Competition, and the National Science Foundation (NSF).

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