

APPLICATION SPOTLIGHT

MicroWIS™

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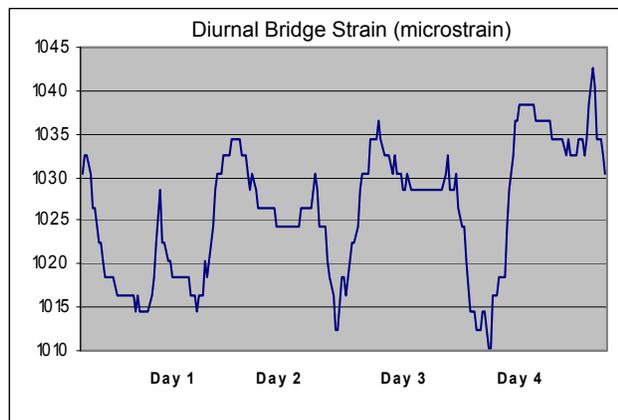
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In 2002, Invocon's Micro-miniature Wireless Instrumentation (MicroWIS) System was used by a university in Houston, Texas, to study stresses on a local bridge during the construction and testing. The application stemmed from concerns that significant portions of a bridge's useful life may actually be expended in the construction process due to inadequate support of its members during handling and installation.

To test this hypothesis, 112 MicroWIS units were mounted at key locations on the bridge to determine if stresses were greater than had previously been expected. The MicroWIS units were located inside the two main box girders and on temporary K-frames between the girders during the six-month construction process.



MicroWIS units mounted on K-frame

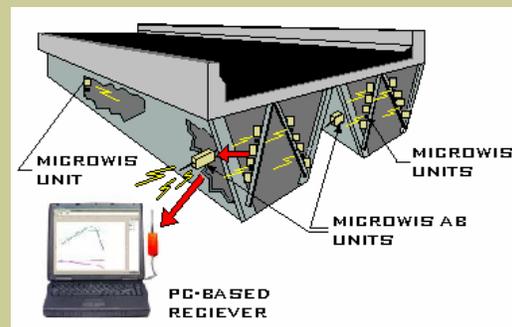


Strains produced by diurnal heating

Sampling at once per 8 minutes or once per 30 minutes (depending on the stage of construction), the units measured the strains induced on the beams by both mechanical loads and diurnal temperature effects. The temperature-induced stresses were used to interpret results of load testing that was performed using weighted trucks after the bridge was completed. During this testing, the MicroWIS units were wirelessly instructed to sample at once per 16 seconds.

Although MicroWIS units are capable of sampling at up to once per second, the lower sample rates were appropriate for the nature of the testing. It also enabled the data to be stored for a week or more (sample-rate dependent) before retrieval was necessary. The data was transmitted in real-time to MicroWIS Autonomous Buffer (MicroWIS-AB) units, where it was held for wireless download at the convenience of test personnel.

Wireless download capability was essential in this application. The box girders being tested were located 70 feet above the ground making direct access to the units very difficult. The wireless nature of this system greatly simplified the installation process and eliminated the risk of broken data and power cables during construction.



MicroWIS System Configuration