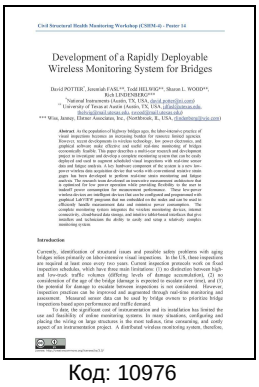

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Development of a Rapidly Deployable Wireless Monitoring System for Bridges

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As the population of highway bridges ages, the labor-intensive practice of visual inspections becomes an increasing burden for resource limited agencies. However, recent developments in wireless technology, low power electronics, and graphical software make effective and useful real-time monitoring of bridges economically feasible. This paper describes a multi-year research and development project to investigate and develop a complete monitoring system that can be easily deployed and used to augment scheduled visual inspections with real-time sensor data and fatigue analysis. A key hardware component of the system is a new low-power wireless data acquisition device that works with conventional resistive strain gages has been developed to perform real-time strain monitoring and fatigue analysis. The research team developed an innovative measurement architecture that is optimized for low power operation while providing flexibility to the user to tradeoff power consumption for measurement performance. These low-power wireless devices are intelligent devices that can be configured and programmed with graphical Lab VIEW programs that run embedded on the nodes and can be used to efficiently handle measurement data and minimize power consumption. The complete monitoring system integrates the wireless monitoring devices, internet connectivity, cloud-based data storage, and intuitive tablet-based interfaces that give installers and technicians the ability to easily and setup a relatively complex monitoring system.

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Ключевые слова:

Содержание