Smart Sensors Development for Bridge Monitoring

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Dr. Chang's research experiences relate to earthquake engineering and multiple hazard for buildings and bridges include seismic behavior and retrofit with fiber reinforced polymers (FRP) of conventional reinforced concrete columns, development of seismic isolation and energy dissipation systems and health monitoring systems, and seismic behavior of precast segmental concrete bridge columns. In addition, he has been involved in the development of design codes and guidelines related to seismic design of buildings, bridges and highways in Taiwan. His current research interests include structural control, innovative bridge bearing systems, innovative structural and geotechnical health monitoring systems with advanced sensor technologies and the seismic behavior of precast bridge columns.

Abstract

The civil engineering community is becoming increasingly interested in monitoring structural behavior and in assessing its corresponding integration. Severe floods resulted from the typhoon or storm events can cause great damages due to the bridge scouring. Bridges subject to periods of flood/high flow require monitoring during those times in order to protect the traveling public. The proposed fiber Bragg grating (FBG) sensor and wireless MEMS scour-monitoring system can measure the processes of both the scouring/deposition and the variations of the water level. Several experimental runs have been conducted to demonstrate the applicability of the system. The experimental results indicate scour-monitoring system with that the Zigbee sensors network and FBG sensors have the potential to be applied in the field.