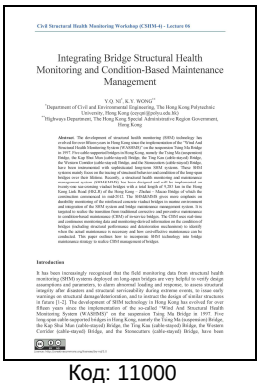
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Integrating Bridge Structural Health Monitoring and Condition-Based Maintenance Management

Берлин, Германия, 2012 год

10 стр; формат: 23,5 x 16 см; библиографический список: 20 единиц

The development of structural health monitoring (SHM) technology has evolved for over fifteen years in Hong Kong since the implementation of the “Wind And Structural Health Monitoring System (WASHMS)” on the suspension Tsing Ma Bridge in 1997. Five cable-supported bridges in Hong Kong, namely the Tsing Ma (suspension) Bridge, the Kap Shui Mun (cable-stayed) Bridge, the Ting Kau (cable-stayed) Bridge, the Western Corridor (cable-stayed) Bridge, and the Stonecutters (cable-stayed) Bridge, have been instrumented with sophisticated long-term SHM systems. These SHM systems mainly focus on the tracing of structural behavior and condition of the long-span bridges over their lifetime. Recently, a structural health monitoring and maintenance management system (SHM&MMS) has been designed and will be implemented on twenty-one sea-crossing viaduct bridges with a total length of 9,283 km in the Hong Kong Link Road (HKLR) of the Hong Kong – Zhuhai – Macao Bridge of which the construction commenced in mid-2012. The SHM&MMS gives more emphasis on durability monitoring of the reinforced concrete viaduct bridges in marine environment and integration of the SHM system and bridge maintenance management system. It is targeted to realize the transition from traditional corrective and preventive maintenance to condition-based maintenance (CBM) of in-service bridges. The CBM uses real-time and continuous monitoring data and monitoring-derived information on the condition of bridges (including structural performance and deterioration mechanisms) to identify when the actual maintenance is necessary and how cost-effective maintenance can be conducted. This paper outlines how to incorporate SHM technology into bridge maintenance strategy to realize CBM management of bridges.

Доклад. Конференция по мониторингу технического состояния гражданских сооружений (CSHM-4), «Системы мониторинга технического состояния сооружений, обеспечивающие продление срока службы сооружений». Ноябрь, 2012. Берлин. Германия.

Ключевые слова:

Содержание