

A Reliability-Based Bridge Management Concept

seminar given by Dr. Daniele Zonta
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Abstract

Since 2004, the Autonomous Province of Trento (APT) has adopted a Bridge Management System (BMS) entirely based on reliability concepts. The system operates on the web, and includes sections for (1) condition state evaluation, (2) safety assessment, and (3) prioritization. Currently, condition evaluation is based mainly on direct inspection, and acknowledges the general rules of the AASHTO Commonly Recognized Standard Element system. Normally, the system estimates conservatively the prior reliability of each bridge, based solely on inspection data. If the condition of a bridge is cause for concern, a more formal reliability evaluation is made, using multi-step procedures of increasing refinement. Decision-making is driven by a principle whereby priority is given to those actions that, within a certain budget, will minimize the risk of unacceptable events over the entire network and within a conventional time span. The system is potentially capable of automatic receipt of data streams from a permanent monitoring system, although this option has not been fully exploited by APT so far. Current research addresses the integration of a construction technology based on precast concrete elements that are instrumented during the prefabrication process. Bridges built using this technology will allow for real-time reliability assessment within the BMS framework. The decision to replace in the near future all or part of the direct inspection work with automatic processes was not rigidly defined at the outset, but depends on technology and economic issues. In this seminar we illustrate the operation of the APT-BMS and discuss the feasibility of its technological development, referring to a number of practical cases.

Biography

Daniele Zonta achieved his Doctorate in Structural Mechanics at the University of Bologna in 2000. He worked as a Post-Doctoral researcher at the University of California, San Diego, in the period 2000-2001. Since 2002 he has cooperated with the Autonomous Province of Trento in the development and operation of a Bridge Management System, including aspects of reliability, technology and decision-making. He is Assistant Professor of Structural Engineering at the University of Trento, teaching structural and bridge design. His research activity includes: Bridge Management; Life-cycle Reliability Evaluation; Structural Condition Monitoring; Sensor and Information Technology; all as applied to civil infrastructure. He is author of over 80 technical publications.

Info

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