Editorial

According to the U.S. Federal Highway Administration (FHWA) Report on the Status of the Nation's Bridges, the primary considerations in classifying structural deficiencies are the bridge component condition ratings. The National Bridge Inventory (NBI) database contains condition ratings on the three primary components of a bridge: the deck, the superstructure, and the substructure. Condition ratings have been established to measure the state of bridge components over time in a consistent and uniform manner. Bridge inspectors assign condition ratings by evaluating the severity of any deterioration of bridge components relative to their as-built condition, and the extent to which this deterioration affects the performance of the component being rated. These ratings provide an overall characterization of the general condition of the entire component being rated; the condition of specific individual bridge elements may be higher or lower. Based on the FHWA criteria, the requirements for the classification of deficient bridge, a bridge structure must be of bridge length, and had not been constructed or had major reconstruction within the past 10 years. In "Profiling structurally deficient bridges in the United States: sampling bridge performance data for qualitative trends", Battista et al. identify statistical trends between several qualitative and quantitative performance criteria that correlate to higher or lower prevalence of structural deficiency in US bridges. Bridge structures are subject to continuous degradation, which requires an ongoing screening to give an early warning if the bridge becomes unsafe. In recent years, many investigators explored shifting the instrumentation from the bridge to a passing vehicle to collect indirect measurements for the bridge responses. In "Drive-by bridge damage detection using non-specialized instrumented vehicle", El-Hattab et al. introduce a new method in the drive-by bridge inspection concept, which employs the acceleration measurements of a non-specialized vehicle to identify the change in the bridge responses due to structural damages. The study includes two damage indices; namely, the vehicle acceleration spectra and the change in the bridge displacement. In "Influence of railings on load carrying capacity of concrete slab bridges", Fawaz et al. present the results of a parametric study investigating the influence of railings on the load carrying capacity of simply-supported, one-span, multi-lane reinforced concrete slab bridges. The paper concludes that railings tend to stiffen the concrete slab and increase the load-carrying capacity of the bridge superstructure, which is most significant in bridges with one- and two-lanes. Reliable deterioration models for forecasting the condition of bridge elements, systems, and networks are essential components of any bridge management system. Estimating deterioration transition probabilities is the basis of the popular Markov chain deterioration model. Transition probabilities have been produced in the literature by statistical and probabilistic analysis performed on available bridge inspection and condition data. The available data may be limited or inconsistent with the Markov chain transition period. In addition, the conventional probability theory has limitations when applied to problems with a stochastic nature such as bridge deterioration. In "Assessing transition probability of bridge deterioration using Dempster–Shafer theory of evidence", Abu Dabous introduces a method based on the theory of evidence for bridge deterioration modeling through expert judgment elicitation. The paper presents an example to demonstrate application of Dempster–Shafer theory of evidence to estimate the transition probabilities.

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