

Structural Identification of Bridges to Assess Safety and Lifecycle Performance

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Abstract

Structural identification (St-Id) refers to the construction of field-calibrated simulation models of a structural system by correlating simulated and measured responses. For over a decade, the Drexel Intelligent Infrastructure Institute (DI3) has served numerous infrastructure owners through wide ranging applications of St-Id to assess bridge safety and lifecycle performance. Applications by DI3 have range from long-span (suspension, arch and truss) landmark bridges to undocumented short-span reinforced concrete slab, t-beam and arch bridges. This paper will provide an overview of these experiences with a specific focus on the vast differences between long- and short-span bridge applications, including: (a) relevant metrics and responses for assessing safety and performance, (b) owner motivation and resources, (c) impact of both structural scale and population scale, and (d) reliability of results and owner expectations, among others. The presentation will conclude with a summary of lessons learned and recommendations for formulating and carrying out St-Id to support objectives specific to safety and life-cycle performance assessment of bridges.