Lateral Torsional Buckling Strength of Continuous Noncomposite Stringers in Existing Bridges

Dr. C. Shawn Sun
Assistant Professor
Department of Civil Engineering and Construction Engineering Technology
Louisiana Tech University, Ruston, LA

Abstract

Some bridges built in the 1960s used two-girder or truss systems, in which floor beams are carried by main members and continuous stringers are supported by the floor beams. The main members are either two edge girders or trusses. When the continuous noncomposite stringers are load-rated using AASHTOWare Bridge Rating analysis software, the moment gradient factor, Cb, is taken simply equal to 1.0, which may underestimate the lateral torsional buckling strength of the stringers. As a result, the rating may become low enough to require restrictive load posting or even closure. The current load rating would cause very expensive bridge rehabilitation or replacement with significant disruption for the traveling public. This presentation addresses the re-assessment of methodology behind load rating the continuous stringers, with the effort focusing on more realistic values for Cb. Review of the current load rating practice, finite element analysis, and full-scale lab testing will be discussed. The approach of determining the moment gradient factors suitable for continuous noncomposite stringers will be described.

Biography

C. Shawn Sun is an Assistant Professor at Louisiana Tech University. He received his Ph.D. from the University of Nebraska -Lincoln. He has more than 15 years of experience in research, teaching, and professional practice in structural engineering. His research interests include lateral torsional buckling of steel beams, innovative bridge systems, evaluation of existing structures, instrumentation and monitoring of structures, and full-scale testing. He has performed design and construction engineering of numerous types of structures and has been involved in many award-winning projects related to the use of high-performance concrete and steel.