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Load Distribution of Adjacent Prestressed Concrete Box Beam Bridges

Luis F. Urrego
School of Civil Engineering, Universidad de los Andes - Colombia
Ryan T. Whelchel, Robert J. Frosch, Christopher Williams
School of Civil Engineering, Purdue University

ABSTRACT

One of the most common bridge types is the adjacent prestressed concrete box beam bridge because the system is economical and simple to build; over 43,000 are currently in service within the US. However, they are highly susceptible to strand corrosion and concrete deterioration which can result in early loss of load capacity. Therefore, an experimental program sponsored by the Indiana Department of Transportation (INDOT) was initiated to determine the behavior of deteriorated beams and develop recommendations for load rating and design of this bridge type. Displacement sensors were installed on a bridge in service to measure its deformation under load. Modifications of the bridge condition were made in phases. These phases included the initial condition, removal of the asphalt layer, cutting of the shear keys (beam joint), and construction of a concrete deck. The bridge used in this project was constructed of seven adjacent box beams, with a length of forty feet. Finally, after comparing the results, the change in load distribution was evaluated to determine how much the shear keys contribute to this, and if the addition of a concrete deck was an appropriate rehabilitation solution for the structure.

KEYWORDS

Load distribution, bridges, box beam, prestressed beams, shear keys.