Kansas Department of Transportation

TECHNICAL SUMMARY

Evaluation and Long-Term Monitoring of the Time-Dependent Characteristics of Self-Consolidating Concrete in an Instrumented Kansas Prestressed Concrete Bridge

Report Number: K-TRAN: KSU-10-8 ▪ Publication Date: January 2014

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Old and New Amelia Earhart Bridges in Atchison, Kansas

Introduction

Construction of a new prestressed bridge with Self-Consolidating Concrete (SCC) provided the opportunity to further study the time-dependent properties of SCC mix and its long-term performance; considering the results and recommendations of previous studies on SCC conducted by the authors.

Project Description

This report discusses the instrumentation of three girders installed on the new Amelia Earhart Bridge (the Atchison River Bridge Project, 59-3 K-8238-02) to evaluate the long term performance of a SCC mix used in the pre-stressed concrete bridge girders. It describes the fabrication of the three girders and the measures taken for instrumentation at this stage, transportation of the girders to the erection site, instrumentation of the girders to be monitored on the site, the procedure for data collection, and long-term monitoring of the three instrumented girders

Vibrating wire strain gages were the main strain measurement instrument installed at pre-determined spots in the girders to determine long term losses. The girders were monitored for over three years. Creep and shrinkage prisms were also cast and measured to accurately determine creep and shrinkage variables for the concrete mix used. Strain measurements were used to evaluate the long-term losses.

Project Results

These values were then compared to ACI, PCI, and AASHTO code equations for girders under the same conditions. The measured losses were found to be less than the losses predicted by the aforesaid code equations. Comparison of the experimental values with the values calculated by the existing code procedures, shows that the actual values of losses are less than the values predicted by the procedures suggested by codes within the monitoring period in this study.

Project Information

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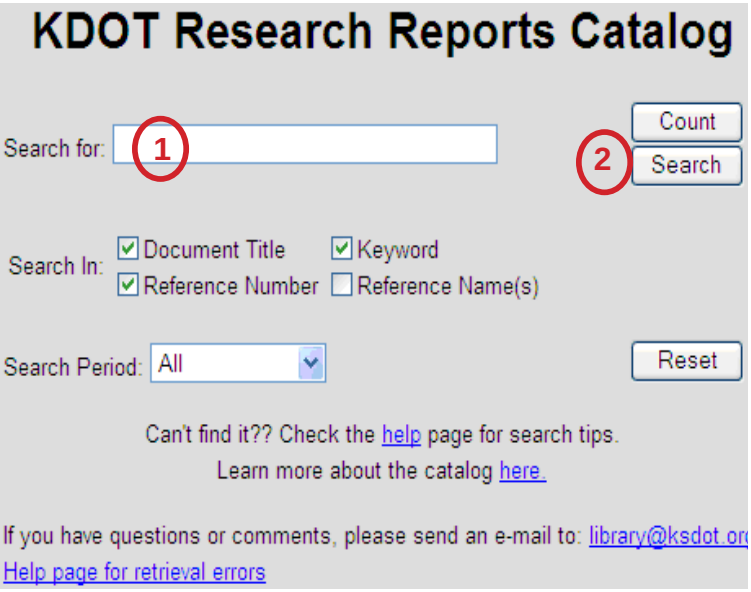

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