KANSAS DEPARTMENT OF TRANSPORTATION

# A TECHNICAL REPORT ON STRUCTURAL EVALUATION OF THE MEADE COUNTY REINFORCED CONCRETE BRIDGE

Report Number: KS-08-6

By: Asad Esmaeily, Ph.D., P.E.
Kansas State University

RESEARCH

## Introduction

Meade County Bridge is a two-lane highway reinforced concrete bridge with two girders each with 20 continuous spans. The bridge was built in 1965. It has been reported that in early years of the bridge service period, a considerable amount of cracks were detected on the bridge girder, with a concentration at the end spans which raised concern on the safety and capacity of the bridge. To address this concern and prevent crack propagation and possible corrosion, the bridge was repaired by epoxy injection and strengthened by rebar insertion in 1986.

## Project Objective

The objective of this technical work was to specify simple analytical methods and use them for prediction of the load capacity of the bridge which in turn can be used to assess the safe load levels for the Meade County reinforced concrete bridge. The current information is limited to the original design and the visual inspection and field crack test data.

## Project Description

Bridge evaluation is performed to determine the integrity of the bridge, its deterioration level in terms of the main elements and connections, and load-carrying capacity of all critical elements of the bridge, and the bridge condition as a whole. The ability of the bridge to support all present and anticipated loads according to current code requirements or standards should be considered. Where these code requirements are not met with the bridge in its current condition, appropriate upgrade or strengthening methods and techniques should be determined.

Using the information obtained from the field survey, dimension and geometry evaluation, and material evaluations, the load-carrying capacity of the bridge or portions of the bridge undergoing evaluation should be determined. The choice of the evaluation method is dependent on such factors as the nature of the bridge and the amount of information known about its existing condition. The typical choices are 1) evaluation by analysis, 2) evaluation by load rating, 3) evaluation by non-destructive tests, 4) evaluation by analysis and structural modeling.

## Project Results

Based on the existing information and the field tests conducted in 2004 and especially in 2006, it is recommended to closely and continuously monitor the bridge and keep the maximum level of the loading limited to the values as in the table above.

A more comprehensive study of the bridge, including field test and evaluation methods and procedures is recommended for a more accurate and realistic analysis of the bridge condition, assessment of the bridge safety and capacity, and proposing the optimal process to address the deficiencies. The recommended study, while for this bridge, will provide a valuable resource to evaluate other bridges with identical or similar conditions.

## Report Information

For technical information on this report, please contact: David Meggers, Kansas Department of Transportation, 2300 SW Van Buren, Topeka, Kansas 66611; Phone: 785-291-3845; fax: 785-296-2526; e-mail: Dave.Meggers@ksdot.org.

For a copy of the full report, please contact: KDOT Library; 700 SW Harrison Street, Topeka, Kansas 66603-3754; Phone: 785-291-3854; Fax: 785-291-3717; e-mail: library@ksdot.org.