

# Comparison of NU I-Girders and K-Girders for Use in Kansas Pretensioned Concrete Bridges

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**Robert J. Peterman, Ph.D., P.E.**  
**Yu-Szu Chen**

*Kansas State University Transportation Center*

## Introduction

Over the past five decades, prestressed concrete bridge girders have evolved from traditional bulky shapes to efficient girder cross-sections with long spans and wide, thin top and bottom flanges. The objective of this research study is to provide the Kansas Department of Transportation (KDOT) with the information needed to make an informed decision about possible adoption of NU girders, including the data to determine whether or not wide-scale adoption is warranted.

## Project Description

The investigation compared NU girders and Kansas K-girders in a parametric study of bridge superstructure designs using CONSPAN software, including evaluation of anticipated costs that include material, labor, and transportation. The bridge design procedure was based on the American Association of State Highway and Transportation Officials (AASHTO, 2012) *Load and Resistance Factor Design (LRFD) Bridge Design Specifications* (6th edition). Additional design guidelines were referenced from the Precast/Prestressed Concrete Institute's (PCI, 2014) *Precast Prestressed Concrete Bridge Design Manual* (3rd edition), and the KDOT (2015) *Design Manual, Volume III – Bridge Section*.

*Preparation of  
NU-2000 Girder  
Form at Coreslab  
Structures, Inc., in  
Kansas City, KS*



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## Project Results

The overall finding of this study is that K-girders should continue to be used instead of NU girders whenever normal spans and girder spacing allow, as this will likely result in the most economical superstructure. At longer spans (beyond 130–140 ft) NU girders are an excellent option and should become a standard design implementation to extend the applicable range of pretensioned girders to 200 ft and beyond. Additionally, the NU girder system can be used for the purpose of extending the span range (beyond K-girder capabilities) in specific situations where the maximum girder height is fixed. However, as shown previously through analyses, if K-girders can achieve the desired span at a normal spacing, then these will likely provide the most economical option.

## Project Information

For information on this report, please contact Robert J. Peterman, Ph.D., P.E.; Kansas State University, 2118 Fiedler Hall, Manhattan, KS 66506; (785) 532-7612 phone; [bob@k-state.edu](mailto:bob@k-state.edu).

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