

# Bridge Deck Drainage: Evaluation of KDOT's Current Design Guidance

Report Number: K-TRAN: KU-20-1 • Publication Date: March 2022

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*Single Inflow from the High Side of a Scale Bridge Deck Model*

## Introduction

Proper drainage of bridge decks is essential for vehicle safety and bridge sustainability. The evaluation of Kansas Department of Transportation (KDOT) design guidelines could reduce the likelihood of future deck drainage problems. Therefore, this research investigated current bridge deck drainage design guidelines and related literature and surveyed 22 Departments of Transportation (DOTs) to identify deck drainage issues, solutions, designs, and guidance.

## Project Description

This study utilized a scaled physical model and varying downspout shapes and sizes to investigate the hydraulic performance of current KDOT deck drainage design and evaluate grate efficiency and lateral spread. Experimental variables included deck cross slope, longitudinal slope, and approach discharge. This study also compared a curved vane grate to the current KDOT bar grate to determine differences in drainage efficiency. An erosion rate test was performed between the two grate types to determine if changing from a rectangular vane to a curved vane could increase cleanout potential, thereby alleviating problems related to inlet clogging.

## Project Results

Experimental results indicated increasing the downspout size from 8 inches to 10 inches or changing the downspout shape from circular to square could increase drainage efficiency with no negative impacts to performance. The curved vane grate showed similar hydraulic performance (i.e., efficiency) to the KDOT rectangular vane grate, and erosion results indicated that the curved vane grate performed similarly to the rectangular grate for cleanout of accumulated debris within the grate. Although experimental results indicated similar performance of rectangular and curved vane grates, DOT survey results showed superior in-field performance of curved-vane grates.

## Project Information

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