

# Soil Saver Wall Performance and Potential Modifications for Aquatic Organism Passage

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## Introduction

Reinforced concrete box (RCB) culverts are designed to provide hydraulic conveyance at peak stream discharge for low initial and long-term maintenance costs; however, these structures can pose challenges to aquatic organism passage (AOP) at some locations. A number of states are using a variety of methods for the construction of RCB culverts that facilitate the passage of aquatic organisms. Culverts constructed using stream simulation methods, roughened channels, and inclusion of baffles are some of the methods used to promote AOP.

One of the issues with RCB culverts is the potential for erosion to develop upstream of the culvert (headcutting). The Kansas Department of Transportation (KDOT) constructs soil saver walls on RCB culverts to prevent headcutting. The hydraulic efficiency of culverts with soil saver walls is usually acceptable. However, soil saver walls act as a drop inlet and can hinder AOP. Therefore, KDOT is considering modifications to the soil saver wall design to further promote AOP.



*Flume Testing Conducted in the Water Resources Lab at The University of Kansas*

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## Project Description

Thirty states were surveyed to evaluate current RCB culvert applications and headcutting prevention practice and how AOP was addressed.

Fifteen existing RCB culverts in Kansas with soil saver walls were surveyed; seven of these are discussed in this report. Most of these culverts were in excellent condition. There was very little to no headcutting observed and the culverts appeared to be functioning well. It did appear they could potentially act as a barrier to AOP.

Flume testing was conducted in the Water Resources Lab at The University of Kansas on models of a conventional box culvert with a standard soil saver wall configuration, a wall with a square notch, and a wall with a V-notch.

## Project Results

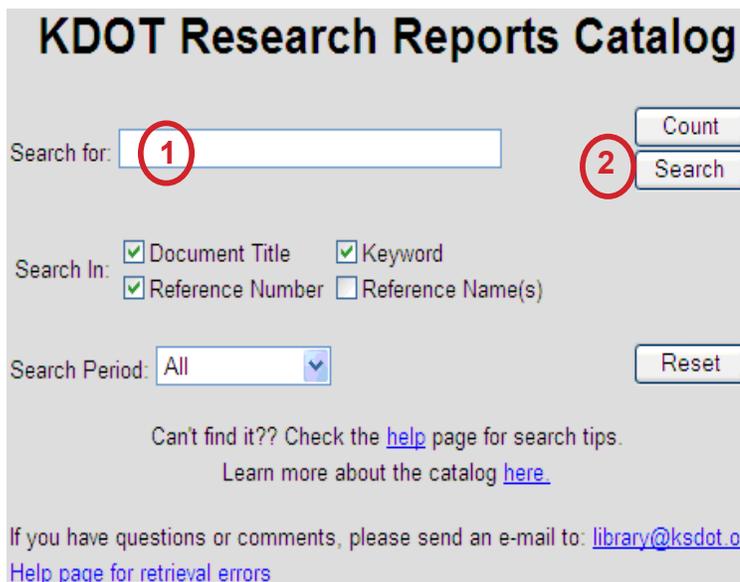
It was observed in the flume testing that excellent performance for the control of grade was provided by the soil saver wall for both the standard and notched walls. The V-notch wall appeared to have the potential to provide for better AOP for low flows, therefore this configuration is preferred.

Additional flume study to quantitatively evaluate the hydraulic efficiency of the V-notch soil saver wall is recommended.

## Project Information

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