

## RESEARCH FOCUS

# FLOOD DAMAGE

## Battling Storm Damage to Roads: Prevention and Repair

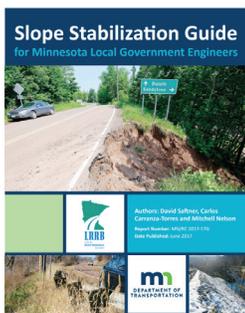


MnDOT knows the damage flooding can do to our transportation system. A June 2012 flash flood closed a two-mile section of Highway 210 in Jay Cooke State Park. To reopen a route that would be safe for the public, reconstruction needed to repair current damage and prevent future damage from flooding and erosion. Crews stabilized slopes using innovative solutions like geo-web walls and anchor-reinforced vegetation and installed sensors to monitor ground movement. The highway officially reopened Oct. 4. A video is available at [mndot.com/d1/projects/Hwy210future](http://mndot.com/d1/projects/Hwy210future).

## New Field Guide Helps Local Engineers Stabilize Damaged Slopes

Damaged slopes along highways and bridges can lead to damaged roads and embankments. The Local Road Research Board funded a project to help local

engineers identify types of slope failure and select an appropriate repair method.



They examined 14 destabilized sites, analyzing soil samples from each; identified 12

potential stabilization techniques from a literature search; and used computer modeling to examine the viability of various techniques at sites where soil was sandy, fine-grained or rocky.



The resulting guide includes a simple, three-step flowchart for selecting the most appropriate repair technique for each situation. It also includes photographs and detailed repair procedures.

**Technical Summary 2017-17**

## Designing Embankments to Resist Erosion



To help prevent floodwaters from causing erosion and road damage, researchers monitored flood-prone locations near the Red River periodically from 2013 through 2016 and conducted laboratory experiments using a simulated section of roadway. They tested three erosion protection techniques that are alternatives to riprap and other hardscapes. For example, roadsides can be covered with a flexible concrete geogrid mat that allows vegetation to grow through it.

“This project developed a fairly complete matrix of useful erosion protection measures that our own staff can implement - techniques that are less elaborate and more cost-effective than hiring contractors,” J.T. Anderson, Assistant District Engineer, MnDOT District 2, said.

Further study of these techniques will be required before definitive recommendations for changes in practice can be made.

### Technical Summary 2017-21

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## Active Projects Addressing Slope Stabilization

Information about these and other current MnDOT research projects is available at [bit.ly/SlopeStabilization](https://bit.ly/SlopeStabilization).

### MnDOT Slope Vulnerability Assessment

A current implementation project will help Minnesota’s transportation agencies identify and prioritize stabilization work and areas that need additional study. The project will identify, map and rank slopes vulnerable to landslides that can affect our highways. This effort should inform future investments as well as asset management and emergency planning efforts.

### Slope Failure Risk Analysis

Researchers are developing a geographic information system–based slope failure risk model to identify areas with high susceptibility to slope failure. This model has been applied to Carlton and Sibley counties, with map books already available.



**Online Video:** Watch flume testing of different embankment overtopping control methods on a simulated road shoulder at [youtube.com/mndotresearch](https://youtube.com/mndotresearch).