



Kansas LTAP Fact Sheet

A Service of The University of Kansas Transportation Center for Road & Bridge Agencies

Erosion Control Tips for Road and Bridge Work

By Pat Weaver

At right, this image from an erosion guide from Kentucky (see sidebar on page 2 for reference) shows good installation of silt fence at the toe of the slope. If space is available, move the fence back from the toe of the slope to allow room for sediment accumulation and maintenance. Leaving a strip of vegetation between bare soil and the fence also improves performance. The Kentucky guide has many photographs of good (and not so good) erosion control practices.



Tetra Tech / US EPA

Certain road and bridge construction and maintenance projects require plans for erosion and storm water control to be prepared by an engineer or erosion control specialist, according to federal and state regulations. However, there are some basic principles to keep in mind, even for those projects that don't require a specific plan or permit. This article will highlight erosion control methods typically recommended for use on low-volume roads, culverts and bridges and work on shallow slopes (less than 10 ft). We'll also provide resources for more detailed information.

The basics of erosion control

The purpose of erosion control is to prevent the loss of surface soil through proactive measures. This is a more effective approach than sediment control that attempts to capture the soil once it has washed away. The three most common types of erosion are

surface, rill, and gully. Surface erosion occurs when soil on the surface is dislodged during rainfall and the water and soil flow down a slope. Rill erosion occurs when small, narrow channels that form on slopes not protected from erosion, and gully erosion is simply rill erosion that combines and erodes into a gully (Fay, Atkin and Shi, 2012).

Without surface slope protection, slope failure occurs due to erosion, creating the potential for both maintenance and safety issues. Factors such as removing vegetation, topsoil or other organic matter without re-covering it; reshaping the land, allowing gullies to continue to grow are all contributors to erosion. The goal of surface slope protection is to minimize erosion caused by disturbed sites and to limit sediment washed away from these sites. In general,

the flatter the slope the less erosion will occur; sites with steep slopes near waterways need more controls than flat sites farther away.

General approach to erosion control

In general, preserving existing vegetation and minimizing the amount of land disturbed at one time will go a long way toward reducing the impact of any roadway project. Your objective should be to keep the soil at its original location if at all possible and, if not, to keep the soil close to its original location and on site. For disturbed soil, mulch or seed bare soil immediately for the best and cheapest erosion protection. (*KDOT Temporary Erosion-Control Manual, 2007; and Kentucky Erosion Prevention and Sediment Control Field Guide.*)



Tips for reducing or eliminating erosion

Skorseth and Selim (2000) in their Gravel Roads Manual, provide some good basic tips for reducing or eliminating erosion. Here are a few of those common-sense recommendations:

- Some regions have certain times in the year when frequent and heavy rainfall can be expected. Try to avoid major reshape work during those periods of time.
- Keep disturbed areas small. The more earth you disturb, the greater the risk of soil erosion.
- Set work boundaries and don't let work crews get outside of them.
- Consider stabilization of disturbed areas. Silt fences, mulching, erosion control blankets and other means should be considered.
- Removing vegetative cover and topsoil generally increases the amount and speed of runoff. Keep water velocity low by keeping slopes as shallow or gentle as possible. Divert upland runoff around exposed soil. Shorten drainage runs and work to get vegetative cover reestablished as soon as possible after work is finished.
- Keep sediment within work boundaries. Sediment can be retained by filtering water as it flows (as through a silt fence), and ditch checks will retain dirty runoff water for a period of time until the soil particles settle out.
- Protect slopes and channels from gullying. Inspect recent work. This is vital to make sure channels haven't formed in ditch bottoms or on slopes, or around and under controls that were used. Be particularly vigilant after heavy rains.

Conclusion

The purpose of erosion control is not to delay construction projects, but to conduct them in such a way as to minimize the impact on waterways. Federal laws and regulations require land disturbance activities (construction) to control erosion and sediment. Federal and state regulations require a construction storm water permit for

Resources on Erosion Control at Road Work Sites

A **Sample Project Water Pollution Prevention Plan** is available at the Document Center of the Kansas County Highway Association website: <http://www.kansascountyhighway.org/documentcenter>. The Water Quality Protection Plan is a template for small projects with less than one acre of land disturbance. Larger projects require a Stormwater Construction Permit which will have a more detailed plan and requirements. Section IV of this template provides a list of water quality protection measures planned, based on typical activities such as road shaping, removal and replacement of existing culvert or bridge, stream bank stabilization, heavy equipment use, construction waste, and seeding and mulching.

Construction Stormwater Program. Kansas Department of Health and Environment. <http://www.kdheks.gov/stormwater/#construct>

Fay, Laura, Michelle Akin and Xianming Shi, 2012. **Cost-Effective and Sustainable Road Slope Stabilization and Erosion Control.** NCHRP Synthesis 430. Washington, D.C.: Transportation Research Board. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_430.pdf

Johnson, Ann and Andrea Moffatt. **Erosion Control Handbook for Local Roads.** Minneapolis, MN: Minnesota Local Road Research Board. <http://www.lrrb.org/media/reports/200308.pdf>

KDOT Temporary Erosion-Control Manual. A Guide for the Design, Installation, Inspection, and Maintenance of Temporary Erosion-Control Measures in Kansas, 2007. <http://www.ksdot.org/Assets/wwwksdotorg/bureaus/burConsMain/Connections/ecm.pdf>

Kentucky Erosion Prevention and Sediment Control Field Guide. Undated. http://water.epa.gov/polwaste/npdes/stormwater/upload/esc_guide.pdf

Skorseth, Ken and Ali A. Selim, 2000. **Gravel Roads Maintenance and Design Manual.** South Dakota Local Transportation Assistance Program. http://water.epa.gov/polwaste/nps/upload/2003_07_24_NPS_gravelroads_gravelroads.pdf

land disturbance activities when the disturbed area is one acre or greater, and for maintenance five acres or greater. Construction projects near waters of the US of less than one acre of disturbed area require a Project Water Pollution Prevention Plan. There are a number of resources available to you to learn more about erosion control techniques and associated regulations. Regardless of the regulatory requirements for your specific project, the tips laid out in this article

will help minimize the impact of your projects.

Above is a short list of some additional resources on erosion control that you may find helpful. ■

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