Wyoming Technology Transfer Center
WY T² LTAP
Local Technical Assistance Program

T² Roads on the Range

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From the Desk of the Director

by Khaled Ksaibati

Early this month, I attended the 2009 Strategic Highway Safety Plan (SHSP) Peer Exchange in Chicago, Illinois. Matt Carlson, Wyoming State Highway Safety Engineer and Martin Kidner, Wyoming State Planning Engineer also attended this event. At the meeting, there were representatives from most other states and four other LTAP centers. States shared their experiences in developing and updating highway safety plans. In addition, there was lots of emphasis on the cooperation among state and local governments to improve safety nationwide.

In Wyoming, the LTAP Center is trying to play a significant role in promoting safety at the local level. Our recently completed project, Wyoming Rural Road Safety Program (WRRSP), has resulted in working out an important partnership between WYDOT and local governments in the safety area. The LTAP Center has helped four counties in the past couple of months in selecting high-risk safety locations and then identifying low cost safety improvements. The Center has done the benefit costs analysis on all the proposed improvements so that the most cost effective improvements would be selected for funding from the WRRSP. This program pays around 91% of the improvement cost; the counties need to provide only 9% of the funding. The deadline for submitting proposals for funding has passed for this go around but there will be another round of funding in the fall. If you are interested in implementing a safety program in your county, give us a phone call and we will walk you through the process. It would be a good idea to get your projects lined up early since the process may take some time. Improving safety on our local roads should not be an expensive proposition. Installing an advanced warning sign could be the reason behind saving a life or multiple lives at a sharp curve. Let us consider safety every time we maintain or improve our roads. For more information about the WRRSP, please visit our web site: wwweng.uwyo.edu/wyt2 .

14th Annual Transportation and Safety Congress

The Center hosted the 14th Annual Transportation and Safety Congress on April 1st and 2nd at the Parkway Plaza in Casper. The Congress was attended by Wyoming transportation workers, speakers, and vendors.

The opening session consisted of welcoming and introductory remarks by the Center's Director, Dr. Khaled Ksaibati. Del McOmie, WYDOT's Chief Engineer, followed with a description of planned safety improvements on the I-80 corridor, including upgrades such as climbing lanes, median guardrails, and snow fences. The FHWA's Wyoming Division Administrator, Phil Miller, described the American Recovery and Reinvestment Act of 2009 (ARRA). Dan Blakeman, President of the Wyoming Association of County Engineers and Road Supervisors (WACERS) gave a quick update on some of the issues they are facing. The opening session concluded with the induction of this year's Master Roads Scholars and Roads Scholars.

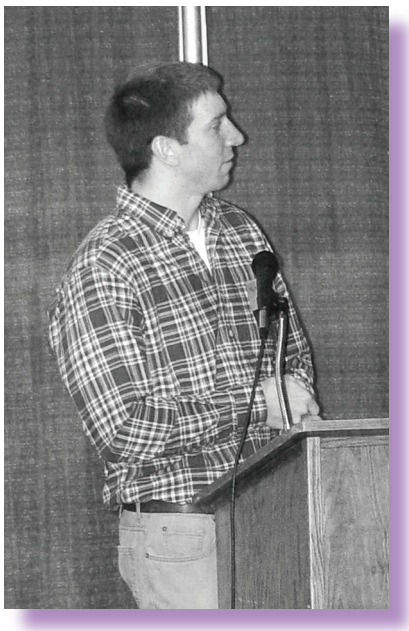
Pictured (l to r): Craig Nottage, Steve Nelson, Jared Winzenried, Stephen Monk and Rob Fisher.

The Road Scholars program is the Center's way of recognizing those individuals who have demonstrated their dedication to the profession by attending twelve Wyoming T2/LTAP workshops including Work Zone Traffic Control and the Transportation and Safety Congress. Once a Roads Scholar has been to a total of twenty workshops, they are recognized as a Master Roads Scholar. The program was begun in 2000. Since then the Center has recognized a total of 51 Master Roads Scholars and 126 Roads Scholars. This year the following six professionals were recognized as Master Roads Scholars: Ray Cordova, City of Green River; Ken Haefele, Albany County; Mark Hurley, City of Cheyenne; Gerry Mascarenas, City of Laramie; Larry Nielsen, Park County; and Ron Richard, City of Casper. In addition, six new Roads Scholars were recognized: John Bringolf, Fremont County; Rob Fisher, Albany County; Stephen Monk, City of Green River; Steve Nelson, City of Laramie; Craig

Nottage, City of Laramie; and Jared Winzenried, City of Casper. The Center commends these new inductees and all the past inductees for their dedication to improving their skills as road and bridge professionals.

Two panel discussions addressed issues being faced by local government agencies. First, a discussion titled 'How to Implement a Safety Program in Your County' was held with panelists Matt Carlson, Martin Kidner, and Rich Douglass of WYDOT and Khaled Ksaibati and Bart Evans of the T²/LTAP Center. A second discussion titled 'Subdivisions: Impacts & Issues' was led by Dave Kieper, Park County; April Getchius, City of Casper; Warren Webb, Town of Star Valley Ranch; Ross Turner, Lincoln County; and Don Beard, Laramie County.

Other technical sessions included 'Road Dust Control: State of the Practice' by Roger Surdahl, FHWA-FLH; 'Chain Saw Safety and Maintenance' by Jerry Locker of Oregon Cutting Systems; and 'Full Depth Reclamation of Asphalt with Cement' by Jamie Johnson of the Rocky Mountain Cement Council.



Updates on activities taking place at the T²/LTAP Center included George Huntington discussing developments in asset management, Bart Evans describing the Center's traffic counter loan program, Scott Koch presenting preliminary results from a study examining the use of reclaimed asphalt pavement as a gravel roads surfacing material, and Khaled Ksaibati describing the county road safety program. Melanie O'Hara of Centennial provided us with an interesting presentation on log architecture in Wyoming.

Meeting with exhibitors during breaks and plenty of door prizes rounded out the event.

WACERS met immediately after the Congress, as did a group of city and town streets supervisors and public works directors.

Pictured at left:
Scott Koch

IMPORTANCE OF EROSION CONTROL

Roadside erosion and runoff is a problem during and after construction. Erosion and the sediment it causes can result in an unhealthy growing environment for vegetation and can affect waterways. Erosion also can result in additional maintenance and costly repairs.

Effective erosion control requires an integrated approach, which considers government statutes and regulations, a broad knowledge of temporary and permanent erosion control methods; design, construction and maintenance considerations; and new technologies.

Silt fence used for perimeter control, keeping sediment out of an existing waterway.

Erosion Control During Construction

Construction produces the most erosion and sediment problems. Best practices for reducing or controlling erosion during construction include:

- **Minimize the area exposed at one time, and the exposure duration.** Develop a staging plan that specifies temporary seeding as areas of construction are completed.

- **Minimize the disturbed area.** Clear only within the construction limits or as required for safety or clear zones.

Leaving exising drainage intact can reduce erosion control efforts during construction.

- **Use erosion control practices throughout construction,** such as keeping the soil covered, roughening the slope on the contour or tracking the area with a cleated dozer.

- **Place gravel base immediately after the subcut is completed.**

- **Strip existing topsoil and store for use later. Seed stockpile**

- **Temporary mulching and seeding** are very effective at controlling erosion. Repeat several times as needed throughout the project.

- **Erosion control is generally more cost effective than sediment control and requires less maintenance and repair.**

- **Stabilize small critical areas adjacent to wetlands and culvert outlets.**

Culvert outlet stabilized with geotextile and riprap.

Erosion Control Blankets and Stabilization Mats

Description

Blankets and stabilization mats may be used to stabilize and protect the soil from rainfall impact, to increase infiltration, decrease soil compaction and crusting and conserve soil moisture. They are effective at critical areas and/or on steep slopes. Blankets are especially effective in controlling sheet erosion and in aiding seed germination. An appropriate seed moisture is important for use in conjunction with the blankets.

Design

Use erosion control blankets on steep slopes and streambanks, where vegetation is slow to establish, and in channels where flow velocities are likely to wash out new vegetation.

Blankets may be used:

- On slopes steeper than 1:3 that are longer than 25 feet (as measured along the slope).
- Where runoff from adjacent areas flows over or across the slope, or on slopes 1:3 or flatter depending on the critical nature of the area, the soil conditions and the quantity of runoff flowing over the slope.
- To ensure that runoff flows over the erosion control blanket and not under it, the upper end of the blanket should be buried in a six-inch-deep trench and all strip ends overlapped a minimum of 10 inches. In addition, overlap the edges of adjacent strips a minimum of three inches.
- Further protection at the upper end of the blanket may be required. In those cases, use a sodded runoff spreader at the upper end and overlap the top of the erosion control blanket.
- Place erosion stabilization mats within 24 hours after seeding is completed.

Installation

For erosion control blanket

- Seed area first. Then place blankets within 24 hours of seeding.
- Anchor blanket at the top of the slope in a six-inch vertical slot, backfill and compact.
- Unroll in the direction of the water flow. Overlap ends every seven inches, edges every four inches. Staple every three feet.
- Use longer anchors for loose soils.
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch the blankets.

Erosion control blankets reduce erosion until vegetation is reestablished. They also retain moisture so vegetation grows back sooner.

For erosion stabilization mats

- After broadcasting half of the seed and fertilizer, spread fine topsoil to fill the mats using

lightweight equipment and avoiding sharp turns. Then, broadcast the remaining seed and fertilizer over the topsoil.
- Cover the seeded topsoil with a category 2 or 3 blanket.
- Don't drive tracked or heavy equipment over the mats.
- Avoid any traffic over the mats if the solid is wet or loose.

Seeds should be planted in spring or late fall so they have a chance to germinate and grow before the seedlings are killed by hot, dry summers or frost.

Soil Berms

Description

Water flowing over disturbed earth will erode the soil and deposit the eroded soil as sediment in lower areas or pollute waters with its sediment-laden runoff. One practical method is using slope protection dikes constructed at the top of the slope.

Design

Provide soil berm dikes where land adjacent to a planned cut section drains toward the highway, and where the area involved will yield sufficient runoff to cause rill or gully erosion before permanent turf can be established.

- Construct berms using erosion resistant embankment material, not by cut and fill or by plowing of a furrow.
- If slight rises in the natural ground occur over relatively short distances, shallow cuts may be made, but must be sodded to prevent erosion.
- Where swales will cause flooding beyond the right of way, provide flumes to carry the water down the slope.

Installation

- Berms should be approximately 1.5 feet high, 2 feet wide on top, with 1:2 or flatter side slopes.
- Compact by the ordinary compaction method.
- Eliminate berms where the soil is protected from erosion by natural cover such as grasses, waterways or dense woods.
- Where protected outlets do not exist or where auxiliary outlets are needed to prevent large concentrations of water, construct protected outlets utilizing sod, level spreaders, metal pipe flumes or plastic pipes.
- Install surge basins at the bottom of the slope.

Earth Diversions and Swales

Description

Earth diversions may be used to divert runoff away from a work area and/or to protect slopes. The diversions can be used on drainage areas up to five acres and where the grade of the diversion will be less than 5 percent.

Earth diversions may erode and become erosion problems. They only should be used when necessary. In areas with grades greater than 5 percent, slope rounding and other temporary measures are preferred. Erosion on the slope may occur until vegetation is established.

Broad shallow channels containing a dense stand of vegetation can be designed to promote infiltration and trap pollutants. The combination of low velocities and vegetative cover allows pollutants to settle out or be treated by infiltration. They also can reduce the runoff and peak discharges from rain.

Design

- Cross sections may be parabolic, v-shaped or trapezoidal. Design the side to be less than the stable slope of the soil being used. In areas that will be mowed, specify slopes less than 3:1.
- Swales should be designed to flow at a maximum velocity of two feet per second.
- The grade of the channel should be as flat as possible, and less than 2 percent.

Installation

- Locate the top of a slope.
- Use a slope to break up its length or to redirect water flow.
- Locate diversion ditches and berms where they will empty into stable disposal areas to collect sediments.
- Use a combination of a ditch and a berm or mound of earth or stone in areas where runoff is hard to control or when constructed on a slope.
- Design and line diversion ditches the same as other ditches.

Berms can be used to divert water to flat areas with established vegetation.

Sediment from urban construction can plug up existing drainage structures such as storm drains and culverts.

Maintenance

- Regularly inspect vegetation, especially during establishment, and repair as needed.
- Remove excessive amounts of deposited sediment which reduces capacity or damages vegetation.
- Mow grass occasionally, but not too short, which reduces the filtering effect of the swale.

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Upcoming Events

Gravel Roads Maintenance & Rehabilitation

Rawlins
July 13 & 14

Buffalo
July 20 & 21

Wyoming T²/LTAP Staff:

Khaled Ksaibati, Ph.D., P.E.
Director

George Huntington, P.E.
Senior Engineer

Bart Evans, Safety Analyst

Mary Harman
Executive Assistant

Alex Literati, Marcus Chapman
Student Assistants

The national Local Technical Assistance Program mission is to foster a safe, efficient, and environmentally sound surface transportation system by improving skills and increasing knowledge of the transportation workforce and decision makers.

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Mickey Simmons

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Don Beard
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Philip Miller
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