

SOLUTIONS

PROJECT HIGHLIGHTS

GRS-IBS Showcase at Dupuyer, Montana

http://www.mdt.mt.gov/research/projects/grs_ibs.shtml

In September, the Federal Highway Administration (FHWA), Montana Department of Transportation (MDT), and the Local Technical Assistance Program (LTAP) teamed up to present a Geosynthetic Reinforced Soil - Integrated Bridge System (GRS-IBS) technology showcase in Dupuyer. The showcase focused on the bridge technology being used to construct a new structure just south of Dupuyer on US Highway 89.

GRS-IBS is a form of accelerated bridge construction (ABC) that lowers cost, slashes construction time, improves durability, and increases safety. GRS-IBS technology uses alternating layers of compacted granular fill material and fabric sheets of geotextile reinforcement to provide support for the bridge. GRS-IBS also provides a smooth transition from the bridge onto the roadway, and alleviates the “bump at the end of the bridge” caused by uneven settlement between the bridge and connecting roadway. The technology offers unique advantages in the construction of small bridges, including reduced construction time and cost, use of common equipment and materials for simplified construction and maintenance, and a flexible design that’s easily modified in the field for unforeseen site conditions, including unfavorable weather conditions.

The Dupuyer showcase included a morning classroom session and working lunch that focused on technical overviews and national perspectives presented by FHWA. MDT staff presented on the



GRS-IBS Construction Site in Dupuyer



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design and construction criteria and lessons learned on the current bridge project. In the afternoon, the participants participated in a fieldtrip to the bridge construction site.

The showcase was attended by individuals representing a variety of organizations both within Montana and the surrounding states, including: MDT staff, private consultants, the US Forest Service, and interested counties.

Additional information is available on [FHWA's GRS-IBS website](#) and [MDT's website](#). If you have questions, please contact Craig Abernathy (406.444.6269 or cabernathy@mt.gov).



Morning Classroom Session



Afternoon Site Visit

Synthesis on Educational and Informational Campaigns for Roundabouts

Roundabouts are a form of at-grade traffic control that have seen increased application across the United States in recent decades, and are one of the Federal Highway Administration's (FHWA) nine proven countermeasures for improving highway safety. In Montana, however, there has been strong public opposition to some of the roundabout projects proposed by the Montana Department of Transportation (MDT). While MDT staff has presented facts and figures to the public on the effectiveness of roundabouts to generate support for these projects, the public has remained skeptical about their benefits. As a result, MDT determined it was necessary to

identify other effective and efficient strategies to use in public meetings and other venues. This synthesis project was conducted to assist MDT in developing strategies to promote and educate the public about roundabouts.

The research employed a multi-faceted approach to determine the methods used by other states for roundabout education and outreach. Included were a literature review of existing education and information campaigns; survey and interviews of states regarding their experiences with educating stakeholders and the public on roundabouts; review of public comment



records from past MDT projects that recommended or incorporated roundabouts; limited survey of Montana residents on their opinions of roundabouts and education; and a review of other education and/or information campaigns that have been successful, though not necessarily transportation-specific.

The results of the literature review found that the use of meetings/forums to include the public in the process was advisable. Based on state agency survey responses and telephone interviews, it was clear that a majority of agencies have encountered similar issues of public opposition early in their development and deployment of roundabouts. A key finding of the agency survey and follow-up interviews was that although many states use roundabouts to some extent on their roadway systems, no agency appears to engage in promotion of roundabouts through media campaigns and not all have developed dedicated websites that present information on roundabouts.



In reviewing public comments provided on past projects incorporating or recommending a roundabout, several interesting observations were made. For all projects, more comments were registered against the use of roundabouts as compared to favoring them. Whether this is the result of a propensity of those against the use of roundabouts to attend public meetings and formally submit comments is not clear. Most of those surveyed (56 percent) had seen MDT-produced or other information on roundabouts, with some finding the materials useful and others finding it too technical or uninformative. Recommended improvements to outreach materials made by

respondents included considering the use of videos, simulations, and three-dimensional renderings, as well as increased education to help drivers learn how to navigate roundabouts.



Overall, the synthesis found that agencies have provided a number of different types of outreach materials relative to their focus and delivery mechanism. The information disseminated has generally centered on how to use roundabouts and highlighting the safety and other benefits they provide. In terms of the types of media available to provide roundabout education and outreach, some were more traditional, such as television and radio commercials in the form of PSAs, while some are more recent such as websites and social media. The messages conveyed via the different media are largely the same, being educational or informative in nature. Project specific outreach efforts universally are centered on public meetings.

Based on the information reviewed during the course of this research, a number of recommendations were made and that which MDT will implement, including that in many cases, the needs of an individual roundabout project will vary, and the outreach and education efforts should be tailored to meet those needs.

Additional information is available on the [research project website](#). If you have questions, please contact Kris Christensen (406.444.6125 or krchristensen@mt.gov).



2013 Summer Transportation Institute

The Western Transportation Institute (WTI) at Montana State University (MSU) in cooperation with MDT hosted the 2013 Summer Transportation Institute (STI). STI is intended to spark interest in transportation careers; aid in the development of the next generation of engineers, scientists, planners, and designers; and address the nation's need for a diverse pool of transportation professionals.

The STI recruited rising tenth, eleventh, and twelfth grade students from a mix of backgrounds and hometowns. The program was free to all selected participants with program expenses paid by a grant from the Federal Highway Administration (FHWA) and in kind contributions from MDT, WTI, and



MDT Director Mike Tooley Speaks with STI Students

MSU. Students lived on campus while learning about career opportunities in transportation. The two-week program provided a multidisciplinary academic curriculum, which included guest speaker presentations, hands-on laboratories, and field trips.

Eighteen students participated in the program at MSU from June 17 to June 28, 2013. Students learned about all modes of transportation and gained leadership skills while working on team design-build projects. Topics and activities included road ecology, urban planning, traffic engineering, geotechnical engineering, concrete mix designs with the actual mixing of concrete batches and testing for strength, bridge design and a team design and build competition, aviation, and traffic safety/human factors. Highlights included field trips to the MDT headquarters in Helena and Gallatin Field Airport. In addition, the participants learned about college preparation and career planning. During the evenings and weekend, STI students participated in educational, sports, and team-building activities.

Additional information is available on [MDT's](#) and [WTI's](#) websites. If you have questions, please contact Kris Christensen (406.444.6125 or krchristensen@mt.gov).

Re-evaluation of Montana's Air Quality Programs

This research project was recently completed to evaluate Montana's air quality programs, which includes the Congestion Mitigation and Air Quality (CMAQ) and Montana Air and Congestion (MACI) programs. The project resulted in recommendations for practical refinement to MDT's current methods for determining CMAQ and MACI projects with an orientation to high value investments for Montana communities.

The project began with determining Montana's current air pollution situation by examining three key pieces of information:

1. 2009-2011 ambient air quality monitoring data for Montana sites.
2. The U.S. Environmental Protection Agency's (EPA's) designations of Montana areas with respect to the National Ambient Air Quality Standards (NAAQS).
3. Source apportionment studies from the Montana areas with potential fine particulate nonattainment



problems to identify the sources that have contributed to wintertime 24-hour average fine particulate concentrations. This provided important information about which areas in Montana have unhealthy air quality levels and whether transportation sources are important contributors in any air pollution problem areas.

The major tasks in this research project included:

- Review CMAQ Program past practices in Montana.
 - Review CMAQ Program Federal funding practices and the possible changes that may be implemented via the MAP-21 program.
 - Perform a risk assessment to identify which Montana communities have the greatest risk of health effects associated with current criteria air pollutant (CAP) exposure and to identify Montana areas prone to future transportation-related issues.
 - Identify emission reductions that are potentially achievable by different types of CMAQ measures.
- Then, these estimates, along with the estimated contributions of transportation sources in each Montana area of interest, were used to compute

county-specific emissions reduction potentials of CMAQ measures in Montana.

These analyses were used to identify priority CMAQ measures most worthwhile for MDT to use. Based on the prioritization, a set of emission quantification spreadsheet tools were developed to estimate the emission reductions associated with priority CMAQ projects. The tool categories developed include:

- Traffic flow improvements projects
- Street sweeping and flush truck purchases
- Road paving programs
- Vehicle miles traveled and trip reduction projects

In addition, a separate spreadsheet tool was developed to estimate the cost effectiveness of these project types using the tool-estimated emission reductions.

Additional information is available on the [research project website](#). If you have questions, please contact Kris Christensen (406.444.6125 or krchristensen@mt.gov).

Radar-Activated Wireless LED Chevron System

MDT installed a radar-activated wireless chevron LED system to provide additional signage and delineation to dynamically warn motorists of and guide them through a sharp curve.

The curve (located on highway 41, Beaverhead State Park, Beaverhead County) was selected due to the crash analysis which documented 17 crashes during the time frame of January 2001 through June 2012, four of those events involving fatalities. A reconstruction project is scheduled for 2018 to change the structure of the curve. In the interim, this sign system will be in service for a sufficient duration to establish a trend and determine overall performance. The chosen product is the TAPCO BlinkerBeam & BlinkSync dynamic LED Sequential Dynamic Curve Warning System. Once activated it directs the chevrons to flash sequentially, delivering the “Pull-Through” effect when a vehicle approaches.

The chevrons were placed on the northbound lane (south side shoulder) encompassing 11 directional sign panels. Every odd number sign contains the TAPCO



Image of the BlinkerChevron unit under activation. There are 10 high-intensity LED's per each panel.



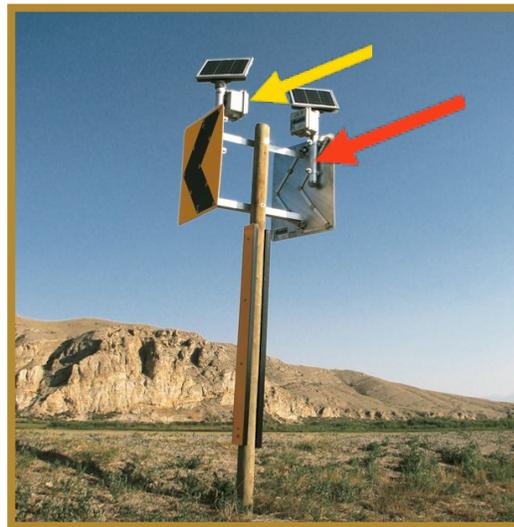
device, incorporating two solar powered blinker chevrons angled to capture both southbound and northbound traffic. Approaching vehicles activate each sign to flash in sequence, via a radar trigger, helping the driver to navigate through the curve. The even numbered signs are conventional chevron signs. Additional warning signage and delineation enhancements will be installed on both lanes approaching the chevron system to

caution drivers of the approaching curves. The TAPCO system is purported to be just as effective during daytime hours as it is at nighttime.

Additional information is available on the [project website](#). If you have questions, please contact Craig Abernathy (406.444.6269 or cabernathy@mt.gov)



Five conventional chevron signage alternating with each of the six radar-activated units.



One of the six dual Blinker Chevron's installed on site. The chevron components are fixed on a four inch post with added reflector panels. Each individual LED chevron has its own solar panel and slave radio control unit (yellow arrow). As in the advance signal master unit, the NiMH battery is in the tube bracket (red arrow).

LIBRARY CORNER

Digging for Information in the Treasure State

In honor of Montana's Library Week, held September 29 – October 5, 2013, Montana-specific resources are presented here, along with sites providing information related to Montana and transportation.

The following are some Montana-specific websites available through the Montana State Library and other state agencies:

Mt.gov/connect crawls all Montana state agency websites, capturing information to preserve. Per the page's description, a "vast majority of state publications are archived in the MT.GOV Connect web collection. There are nine million pages and 175,000 PDFs in the web collection as of 2012. The web collection is fully text searchable at the top of the homepage. The web collection may also be searched by URL. The web collection is made



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possible through the web crawling services of the Archive-It Team of the Internet Archive.”

[Montana Memory Project](#) offers access to digitized collections related to Montana’s cultural heritage, including newspapers, photographs, and more. This is a good place to look for historical information and artifacts pertaining to Montana and its history.

[Census and Economic Information Center](#) “provides current, easily accessible and thorough economic and demographic analysis, maps, data, and expert assistance to meet the needs and requests of Montanans” (per the Center’s homepage). It has information on Montana’s population, economic and business activities, energy prices and production, and more.

[Montana Geographic Information](#) provides access to maps, geographic facts, data, aerial photographs, and more.

[Montana Natural Heritage Program](#) presents information on Montana’s wildlife and habitats, emphasizing those that are at risk. The site has field guides for animals and plants, maps, reports on species of concern, and more.

For information specifically related to Montana and transportation, the following sites can be useful resources:

[Montana’s Department of Transportation \(MDT\) Research site](#) has current project information for our Research and Experimental projects, as well as links to full-text reports for all of our completed projects. We also now have an interactive map that allows viewers to see locations of active, pending, and completed Research and Experimental projects.

[MDT’s home page](#) offers access to construction news, plans and studies, announcements, links to services, contact information, and other resources. We also have social networking sites to help people stay current with projects and news from MDT; links are available from the home page.

[Montana State University’s Western Transportation Institute \(WTI\)](#) focuses on rural transportation research. Their site contains links to newsletters and research reports, some related specifically to Montana.

MDT Research and Experimental projects are entered in the Transportation Research Board’s (TRB’s) database [Research in Progress](#); all final Research reports are also available in [TRB’s TRID database](#), the [National Transportation Library \(NTL\)](#), the [National Technical Information Service \(NTIS\)](#), and the [MDT Library](#). These are some additional sources to access research related to Montana and transportation.

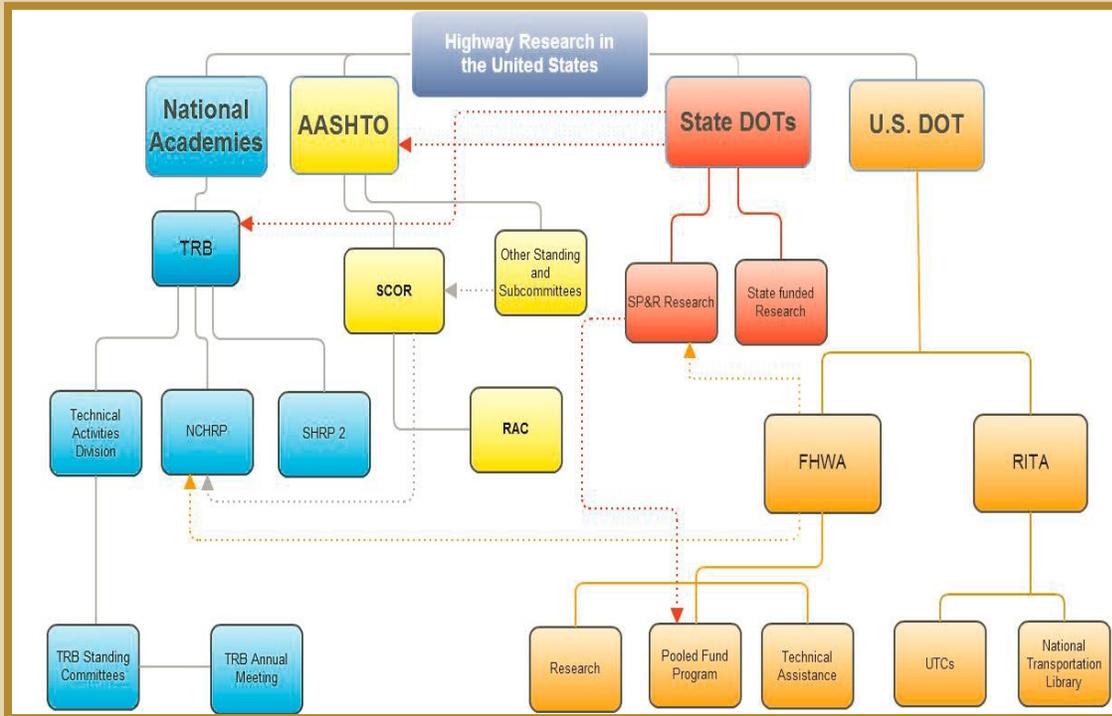
Montana is a state rich in resources, and the tools mentioned above will hopefully enable easier, more efficient searching for information specific to “The Treasure State”. Please contact Katy Callon (406.444.0871 or kcallon@mt.gov) for more information.





DID YOU KNOW?

Highway Research in the United States¹



This chart documents the relationships between four of the major sponsors of highway research in the United States: the National Academies, AASHTO (American Association of State Highway and Transportation Officials), the state Departments of Transportation, and the U.S. Department of Transportation. Solid lines generally represent a reporting structure, while dotted lines indicate a transfer of funds or advice.

The [Transportation Research Board \(TRB\)](#) is a not-for-profit organization and is a division of the [National Academies](#). It is the home

for two major highway research programs: the [National Cooperative Highway Research Program \(NCHRP\)](#) and the [2nd Strategic Highway Research Program \(SHRP 2\)](#). NCHRP is a cooperative research program funded by the state Departments of Transportation. SHRP 2 is a federally-funded program requested by Congress. Both NCHRP and SHRP 2 establish advisory panels that enable the major stakeholders to guide the research work. Projects are conducted by contractors, generally academic institutions or private sector consultants. There are other cooperative research programs at TRB which are not included in the chart for simplicity.

¹ Chart and text for this article reproduced from: <http://research.transportation.org/Documents/RAC%20Docs/Research%20map%20and%20notes%20final9-25-12.pdf> with permission of author, Christopher Hedges.



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Among other responsibilities, the [Standing Committees of TRB's Technical Activities Division](#) organize the sessions at the [TRB annual meeting](#). Many of these committees also generate ideas for new research. While these committees cannot submit problem statements directly to the NCHRP, the ideas may be picked up and sponsored by state DOTs, AASHTO Committees, or FHWA and submitted to the program. These are the three authorized submitters of NCHRP problem statements.

[AASHTO](#) is a not-for-profit organization that represents the state Departments of Transportation. The [AASHTO Standing Committee on Research \(SCOR\)](#) is the oversight group for the NCHRP. SCOR receives advice from its [Research Advisory Committee \(RAC\)](#) which comprises the research heads in each of the 50 state DOTs and the District of Columbia.

The other [AASHTO Standing Committees](#) submit research problem statements to the NCHRP and play a role in reviewing problem statements in their areas of expertise. Research by the state Departments of Transportation can be divided roughly into two categories: research funded through federal State Planning and Research (SP&R) funds, and those which are state-only funded. Each state provides a portion of its SP&R budget to AASHTO to fund the NCHRP. States

also fund their own research projects, and collaborate with other states through the [FHWA Transportation Pooled Fund program](#). Some states conduct research in-house; most contract the work out to universities or private consultants. Most DOTs collaborate with their state university partners, some of which receive Federal grants as part of the [University Transportation Centers \(UTC\) program](#).

Within the [U.S. Department of Transportation](#), the [Federal Highway Administration \(FHWA\)](#) is a partner along with TRB and AASHTO in the NCHRP. FHWA conducts its own research projects, and provides assistance to the state DOTs. It also manages the FHWA Transportation Pooled Fund Research program, which enables states to pool research funds to address common issues.

The [Research and Innovative Technology Administration \(RITA\)](#) has a coordination role within the DOT and also manages its own research programs. Additionally, RITA oversees the University Transportation Centers program. The UTCs typically conduct research in partnership with one or more state DOTs.

RITA also administers the [National Transportation Library](#), which maintains and facilitates access to DOT and other research results as well as statistical and other information for multiple customers.

NEW RESEARCH REPORTS

[2013 Summer Transportation Institute](#)

[Evaluations of Montana's Air Quality Programs](#)

[Informational/Educational Campaign for Roundabouts](#)

A listing of all past and current projects can be found at www.mdt.mt.gov/research/projects/sub_listing.shtml.



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October

AASHTO Annual Meeting - 10/17/13-10/21/13
MDT RRC Meeting 10/30/13
TCRP (FY 2014) Projects Chosen

November

AASHTO SCOPT and MTAP Winter Meeting -
11/18/13 - 11/21/13
Domestic Scan Topics Due

December

AASHTO SCOR Meeting 12/3 - 4/13
MDT RRC Meeting 12/18/13
ACRP (FY 2014) Projects Selected
Domestic Scan Topics Chosen

January

AASHTO SCOR/RAC Meeting - 1/12/14
TRB Annual Meeting - 1/12/14 - 1/16/14

MDT RRC Meeting 1/30/14

February

NCHRP (FY 2014) Synthesis
Topics Due 2/8/14
MDT RRC Meeting 2/26/14
NCHRP (FY 2015) Problem
Statement Ratings Due

March

IDEA Research Topics Due
3/1/14
MDT RRC Meeting 3/26/14
TCRP Synthesis Topics Due
3/31/14
NCHRP (FY 2015) Projects
Chosen



REMINDER

Information on research services and products, such as research and experimental project processes and reports and technology transfer services, can be found on the Research web site at www.mdt.mt.gov/research.

MDT's library collection can be searched through the [library catalog](#). The catalog and other information resources are available through the [MDT Library web site](#).

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