

SOLUTIONS



RESEARCH PROGRAMS Summer 2015

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PROJECT HIGHLIGHTS

2015 New Research Projects

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

During the May [Research Review Committee \(RRC\)](#) meeting, seven new projects were approved to move forward to technical panels for further development. The technical panel for each project will determine the need for research based on the literature and other information. If the need for research is confirmed, the technical panel will develop a scope of work and will follow their project through the conduct of research and implementation.

2015's projects include the following:

Construction

[Ride Specification for Bridges](#)

MDT uses the International Roughness Index (IRI) to measure surface smoothness of Montana's asphalt paved roadways. A quality incentive/disincentive pay adjustment is applied to the pay estimate based on the IRI. Currently, MDT excludes bridge decks, approach slabs, and pavement within 50 feet of these structures from the IRI measurements. However, MDT proposes a research project that evaluates mean and localized IRI values collected on newly constructed bridges and their approaches for the purpose of instituting a ride specification for bridges.



[Effective Production Rate Estimation and Monitoring of Controlling Activities Using Daily Work Report Data](#)

The goal of this proposed project is to develop a production rate estimating system of controlling activities for highway projects and a visual dashboard tool that allows construction engineers to monitor the progress of controlling activities during construction.



Geotechnical

[Development of Best Practices for Micropile Foundation Design and Construction in Montana Transportation Infrastructure](#)

Micropiles are small diameter (generally less than 12 inches in diameter) piles that are constructed by drilling and grouting techniques. Potential applications of micropiles for MDT include new foundation systems, retrofitting of existing foundations and landslide mitigation. MDT is currently funding a [research project](#) consisting of a survey of neighboring western states on the use micropiles in transportation infrastructure. Information from this project will form the basis for a research proposal stemming from this topic statement. The current survey project is scheduled to be completed by October 2015.



[Guidelines for Chemically Stabilizing Problematic Soils](#)

MDT has very limited experience with chemical stabilization and, while there is a desire to potentially use chemical stabilization, a major concern with this approach is the presence of potential high sulfate concentrations. The main goal of this proposed research is to develop protocols for chemically stabilizing problematic soils with and without soluble sulfates.

Hydraulics

[Regional Regression Equations Based on Channel-Width Characteristics to Estimate Peak-Flow Frequencies at Ungaged Sites Using Data Through Water Year 2011](#)

The purpose of this proposed research is to develop regional regression equations for the eight

hydrologic regions of Montana using channel-width characteristics. Additionally, this research will develop and evaluate the use of aerial photography to estimate channel widths. Channel-width characteristics can be used on-site to quickly estimate frequencies and, when weighted with regression equations based on basin characteristics, can be used to reduce uncertainty in frequency estimates.

Materials

[Alkali-Silica Reactivity \(ASR\) in Montana](#)

This proposed research will be accomplished by first conducting a thorough literature review regarding ASR in Montana and the surrounding areas.



This will also include an investigation into the potential geological features that may contribute to reactive aggregates. A second task will involve testing the reactivity of numerous systematically selected fine and coarse aggregate sources from across the state. These test results will then be compared to geological survey maps to determine any correlations, and to evaluate the potential of using these maps to identify other reactive aggregate sources. Another task will be focused on identifying and documenting cases of ASR damage in the state.

Traffic

[A Systematic Safety Planning Tool for Local Roads in Montana](#)

The proposed study aims to develop a systemic safety planning tool that screens local road networks across the state for hot spots of focus crash types. It also aims to suggest countermeasures, ranked in the order of cost-effectiveness, for implementation to improve traveler safety along local roads in Montana.



In addition to the new projects resulting from MDT's 2015 research project solicitation, a new small project was initiated and MDT joined two pooled fund studies.

New Small Project

[Identifying Disparities in Definitions of Heavy Trucks](#)

The objective of this project is to identify the variations and ambiguity in the definitions of heavy trucks to help law enforcement, MDT personnel, and truckers understand heavy-truck regulations. That objective is achieved by conducting a literature review of state and federal regulations, mainly represented by three sources—the MCA, the ARM, and the CFR. Through exchange with MDT and a preliminary literature search, the research team has identified four emphasis areas as the most relevant to heavy truck operation and safety, consisting of Permitting/Registration; Size (including width, height, and length); Weight; and Safety (e.g., speed limit, safety standards, driver's license standards, hazardous materials, and safety inspection program). The project results will help MDT work with future legislators to clarify definitions and language regarding the heavy trucks.

Information on the above projects as they progress can be found on each project's web page or MDT's Research Programs What's New web page at <http://www.mdt.mt.gov/research/whatsnew.shtm>! View and subscribe to the What's New RSS feed at <http://feeds.feedburner.com/MDTresearch-whatsnew>. For more information, contact Kris Christensen (krchristensen@mt.gov or 406.444.6125) or Sue Sillick (ssillick@mt.gov or 406.444.7693).

New Pooled Fund Studies

[State Responses to Energy Sector Developments - TPF-5\(327\)](#)

New and expanding energy sector developments – oil, natural gas, coal, wind, biofuels, and solar – are occurring in numerous states throughout the country. Hydraulic fracturing (fracking) for crude oil and natural gas is expanding in many states. Extracting the sand used in the fracking process is underway in

other states. Increased shipments of crude oil by rail and barges are occurring in still other states. Supply chains serving energy installations in one state often originate in another state. While states, counties, and communities are realizing economic benefits from these activities, the impacts from energy development on transportation systems are immediate and extensive. Rural roads and bridges are especially vulnerable to the increased volumes of trucks, but additional demands are also being placed on the rail, port, and aviation networks. State departments of transportation and other agencies are responding in numerous ways to increased truck traffic, infrastructure deterioration, and safety concerns. The role of this project is to provide a mechanism for partner states to share information and experiences with each other and with experts in the field related to responding to energy sector development. The project will also identify areas for needed research that may be funded in future years of the TPF, through the NCHRP, or by other sources. For more information, visit the [project website](#).



[Traffic Control Device Consortium - TPF-5\(316\)](#)

The purpose of this project is to assemble a consortium composed of regional, state, local entities, appropriate organizations and the FHWA to: 1) establish a systematic procedure to select, test, and evaluate approaches to novel TCD concepts as well as incorporation of results into the MUTCD; 2) select novel TCD approaches to test and evaluate; 3) determine methods of evaluation for novel TCD approaches; 4) initiate and monitor projects intended to address evaluation of the novel TCDs; 5) disseminate results; and 6) assist MUTCD incorporation and implementation of results. For more information, visit the [project website](#).



Summer Speak - Research Projects

The summer quarter in MDT Research Programs is proving to be a busy one for research projects. Not only are we initiating the proposed projects from the 2015 annual solicitation, but also we have started two new projects and will be finalizing three. Project kick-off meetings were held for the following two projects:

- Statewide Rockfall Hazard Rating Process Update
- Development of a Strategic Enterprise Architecture Design for MDT

Kick-off meetings are held with the awarded consultant and the project's technical panel to ensure everyone involved in the research project is informed of the contractual obligations, scope of work, deliverables, project milestones, timetable, and appropriate office policies and procedures. Also it offers a chance to meet face to face.

Statewide Rockfall Hazard Rating Process Update

This project will evaluate MDT's existing system and update it as necessary to a more effective asset management system that can be used as a planning tool to guide MDT on rockfall mitigation projects. The project was awarded to Landslide Technology and should be completed in approximately three years. More information can be found on the project's web page at: <http://www.mdt.mt.gov/research/projects/geotech/rockfall.shtml>



Design of a Strategic Enterprise Architecture Design for MDT

In order for MDT to carry out its mission successfully, it is essential to appropriately incorporate and utilize

technology. Information management systems are vital to maintaining the State's transportation infrastructure and are critical components for activities such as asset management, forecasting, QC/QA efforts, and data collection and analysis. This research project will provide a technology and data roadmap to help MDT align its IT investments with its business processes to deliver the greatest business value, identify and resolve system and data inconsistencies that interfere with the sharing of data and information, and ultimately support MDT's evolving IT needs and strategies. It will also develop an actionable implementation plan that consists of a mix of both short-term and more intermediate to long-term implementation projects for MDT. The project was awarded to eVision and should be completed in approximately one year. More information can be found on the project's web page at: http://www.mdt.mt.gov/research/projects/isd_architecture.shtml.

Lastly, three multi-year projects will be ending, including:

- [Monitoring Wildlife Crossings on US 93 South](#)
- [Feasibility of Reclaimed Asphalt Pavement as Aggregate in Portland Cement Concrete Pavements](#)
- [Evaluating Wildlife-Vehicle Collisions \(WVC\) and Wildlife Connectivity in the Madison Valley and Hebgen Lake Areas](#)

Information on these projects as they progress, as well as project summary and project final reports, can be found on each project's web page or MDT's Research Programs What's New web page at <http://www.mdt.mt.gov/research/whatsnew.shtml>. View and subscribe to the What's New RSS feed at <http://feeds.feedburner.com/MDTresearch-whatsnew>.

For more information, contact Kris Christensen (krchristensen@mt.gov or 406.444.6125).



LIBRARY CORNER

What is Digitization?

Digitization is taking a physical work such as a photo, book, video and/or sound recording and converting it into a digital format. Photos, books, and similar items can be digitized by using a scanner; video and sound recordings, by using an analog to digital converter. Digitizing materials helps preserve them and keeps them accessible in a continuously changing technological world. Digitization also makes it possible for materials to reach a wider audience. Gary Cleveland (1998) states that the following criteria can be used to determine which materials are digitized:

- their potential for long-term use
- their intellectual or cultural value
- whether they provide greater access than possible with original materials (e.g., fragile, rare materials)
- and whether copyright restrictions or licensing will permit conversion

The [Transportation Digitization Wiki](#) offers links to resources about the digitization process, technology options, examples, and more.

These are some examples of digitization projects:

- [Montana Memory Project](#)
- [National Transportation Library FHWA Reports](#) (Internet Archive)
- [TRAIL](#)

While digitization can make resources more easily accessible, there are limitations to consider, particularly in relation to copyright. Many works are copyright protected and it is important to understand copyright restrictions to ensure that none of the laws are violated.



What is Copyright?

According to NCHRP Report [Management Guide to Intellectual Property for State Departments of Transportation](#) (2015), copyright is “a statutory privilege that grants a limited or mini-monopoly to a creator or author(s) of an original work of authorship fixed in a tangible or permanent means of expression” (p. 35). That means that copyright is given to original intellectual works and that creators of those works have the right to decide if anyone can use their work and how much of it can be used. Copyright is given automatically to works but creators can register their work at the U.S. Copyright Office. Individual copyright lasts 70 years after the creator has died and corporate copyright can last from 95 to 120 years, depending on when it was created or published. Copyrighted material may be used if permission from the creator is given, if the work is considered fair use, or if the copyright has expired.

Fair use allows people to use portions of copyrighted material without asking for permission. There are four factors which must be evaluated to determine whether or not materials can be used under the fair use doctrine: purpose and character, nature of work, amount, and market effect. Purdue University’s Copyright Office has a [checklist](#) that assists with determining fair use.



When copyrights expire, when materials have never had copyright protection, or when they are created by the U.S. government, they are part of public domain. Public domain means that the materials are free to use and are open to the public. Interested parties do not have to receive permission or figure out if the information can be used under the fair use doctrine. For U.S. government publications, if they are created by contractors, they may not be in the public domain.

Given the complex nature of copyright, unless the copyright permissions are very clearly conveyed, it's best to investigate and make sure of what is allowed before proceeding with digitization.

For more information, please contact the MDT Library (mdtlibrary@mt.gov or 406.444.6338). This article was written by MDT's Summer 2015 Research and Library intern, Akiema Buchanan.

SLA 2015: Data, Leadership, Technology, and More

In June 2015, the [Special Library Association](#) held its [annual conference](#) in Boston, Massachusetts, with a theme of "Be Revolutionary". It was an inspirational conference, providing information on hot topics such as research data management, new tools and technology, and how to provide better customer service through outreach and leadership.



The following are a few technology discoveries and insights gained from attending:

New Tools

DMPTool – The [Data Management Planning \(DMP\) Tool](#) was designed by the University of California to help researchers create data management plans that meet institutional and funder requirements. A data management plan is a formal plan describing how data will be handled during its collection and after research project completion. Data management has become a topic of importance for federally-funded research in light of the [2013 memo](#) issued by the White House's

Office of Science and Technology Policy. The U.S. Department of Transportation should release guidance later this year related to transportation research data.

Tiki-Toki Timelines – The [SLA Transportation Division's Innovation Award](#) went to Kenn Bicknell, Los Angeles County Metropolitan Transportation Authority's (LACMTA) digital resources librarian. Kenn won the award this year for his innovative work in creating [tiki-toki timelines](#), which are free interactive timelines that allow viewers to scroll through a chronological carousel of historical images and events. This tool could be highly useful for presenting historical information in a visually interesting way.

Insights

Language framing – Gail Fairhurst, author of "[The Power of Framing: Creating the Language of Leadership](#)", presented some of the key concepts from her book at one of the SLA sessions. Framing is the ability to shape meaning – to choose one meaning over another when we communicate. Fairhurst defines effective framing as "defining the situation in the here and now in a way that connects with others". In other words, by stepping back and seeing the bigger picture, we can choose language that opens communication with coworkers and peers. This is an important concept in terms of the library, as good communication is vital in allowing us to connect our customers with the relevant, timely information they need.



Revolutionizing training programs – MDT Library offers training for staff throughout the year on new resources and how to use the library; one session at SLA offered suggestions on how to improve trainings to make them more engaging and effective. To avoid “death by PowerPoint”, the presenters offered the following suggestions:

- Training should be accessible, short and to the point.
- You should show enthusiasm about the topic. If you’re not enthusiastic, your audience won’t be either.
- Follow-up (email, phone call) can be a good way to connect with your audience and answer any

questions that may have come up during the training but were not addressed.

The [presentation slides](#) are available freely online. This information will be helpful as we will be offering training to staff on some new products available this fall.

These were just a few of many takeaways from the SLA Annual Conference this year. We’re hoping to implement the ideas learned and the new technology found to improve the services we offer. If you have any questions, please contact Katy Callon (kcallon@mt.gov or 406.444.6338).

DID YOU KNOW?

Research Program and Project Management (RPPM) Website

The new [Research Program and Project Management website](#) enables the transportation research community to discover best practices, ask questions, collaborate on shared issues, and more. It is organized around the following key concepts:

- [Setting the research agenda](#)
- [Carrying out research](#)
- [Delivering results/communicating value](#)
- [Collaborating in research activities](#)

Users can register to add content and participate in discussions; the steps for registration can be found on the [homepage](#), under “Register to contribute content”. The site also offers a [calendar](#) that includes research funding deadlines, and links to conferences, meetings, webinars, and workshops. It also offers links to information



clearinghouses and other resources. This site is comprehensive in addressing the varied needs of research project and program management and allows researchers to work together to answer questions and resolve issues. For questions or comments, please contact Sue Sillick (ssillick@mt.gov) or Natassja Linzau (nlinzau@nas.edu).



CALENDAR OF EVENTS

September

ACRP Legal Studies Topics Due - 9/18/15
AASHTO Annual Meeting - 9/24-28/15
NCHRP Legal Studies Topics Due - 9/30/15
TCRP Legal Studies Topics Due - 9/30/15

October

ACRP Synthesis Topics Due - 10/1/15
MDT RRC Meeting - 10/2/15
NCHRP 20-68 Domestic Scan Proposals
Due - 10/15/15
NCHRP Problem Statements - Due 10/15/15
MDT RRC Meeting -10/30/15

November

Transit IDEA Proposals Due -
11/2/15

December

MDT RRC Meeting - 12/10/15

January

TRB Annual Meeting -
1/10-14/16
AASHTO RAC Meeting -
1/10/16



For additional information, please see: <http://rppm.transportation.org/Lists/Calendar/calendar.aspx>

NEW RESEARCH PROJECTS

[Alkali-Silica reactivity \(ASR\) in the State of Montana](#)

[Development of Best Practices for Micropile Foundation Design and Construction in Montana Transportation Infrastructure](#)

[Driving After Cannabis Use - Traffic Safety Culture Transportation Pooled Fund Program](#)

[Effective Production Rate Estimation and Monitoring of Controlling Activities Using Daily Work Report Data](#)

[Exploring Traffic Safety Citizenship - Traffic Safety Culture Transportation Pooled Fund Program](#)

[Guidelines for Chemically Stabilizing Problematic Soils](#)

[Identifying Disparities in Definitions of Heavy Trucks](#)

[Regional Regression Equations Based on Channel-Width Characteristics to Estimate Peak-Flow Frequencies at Ungaged Sites in Montana Using Data through Water Year 2011](#)

[Ride Specification for Bridges](#)

[A Systematic Safety Planning Tool for Local Roads in Montana](#)

[State Responses to Energy Sector Developments - TPF-5\(327\)](#)

[Summer Transportation Institute 2015](#)

[Traffic Control Device \(TCD\) Consortium - TPF-5\(316\)](#)

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

NEW EXPERIMENTAL PROJECTS

[Automated Bridge Deck Anti-Icing System – Helena Capital & Cedar Interchange](#)

[Fog Seal over Chip Seal \(FSCS\) Applications – Taft West](#)



[Wet Reflective Bead Technology Pavement Marking – Missoula-Reserve Street](#)

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

NEW EXPERIMENTAL REPORTS

[Plant Mix Seal \(PMS\) on Concrete Pavement Dowel Retrofit](#)

[Urethane Epoxy Pavement Markings](#)

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

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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