

SOLUTIONS

PROJECT HIGHLIGHTS

Survey of Micropile Use in Neighboring Western States <http://www.mdt.mt.gov/research/projects/mat/micropile.shtml>

Micropiles are small diameter piles that are constructed by drilling and grouting techniques. Micropiles are a foundation alternative that are cost-effective in a variety of conditions encountered in Montana Department of Transportation (MDT) projects; however, a limited experience base has led to underutilization of a potentially beneficial foundation alternative. Given this, MDT conducted a synthesis project on the use of engineered micropiles, with a survey of nine neighboring western state transportation agencies.



Response to this survey indicated use of micropiles in situations for which they were intended. The use of micropiles was tied to the availability of qualified contractors. With the Pacific Northwest containing such contractors, use in this area has become common practice and satisfaction is high. In states where population density is lower and local micropile contractors are not available, micropiles have been used less frequently. Responses emphasized the importance of a well-qualified contractor and a well-qualified QA/QC program. The importance of comprehensive geotechnical data describing the subsurface conditions in which micropiles will be installed was also indicated. The greatest use of micropiles was for new bridge foundations, followed by projects involving retrofitting existing bridge foundations. Micropiles appear to be versatile as evidenced by their use on a variety of projects involving structures other than bridge foundations. In addition, micropiles have been used exclusively on projects for which other conventional deep foundation approaches would not work. The reasons for this were approximately split between site surface conditions and subsurface conditions. These responses supported the notion that micropiles are particularly suited for difficult ground conditions (i.e. presence of cobbles and boulders, intermediate geomaterials) and sites with restricted work areas



RESEARCH PROGRAMS *Winter/Spring 2016*

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having limited space and/or remote access and/or urban, noise and vibration sensitive sites.

Load testing of micropiles is common and appears to be incorporated in all projects. None of the agencies responding indicated a “failure” or lack of capacity with project micropiles that have been load tested, which speaks to the success and high degree of satisfaction of the users. Contracting methods for micropile subcontractors appear to be typical and well established. All agencies have developed specifications and/or special provisions for this technology.

Limitations associated with micropiles involve limited lateral capacity in areas of high seismic demand and the higher cost of installation as compared to conventional deep foundations. The latter limitation is not necessarily applicable in common situations where a conventional deep foundation cannot be used.

MDT’s next step is to test micropiles in a project as an experimental feature. For more information, including various state specifications, visit the [project website](#) or contact Sue Sillick (ssillick@mt.gov or 406.444.7693).

Effects of Backcountry Aviation on Deer (*Odocoileus spp.*) Stress Physiology



Backcountry aviation is a popular form of recreation throughout the US and Canada and is predominantly composed of single engine aircraft. It is unclear whether the activity of recreational aircraft has adverse effects on wildlife. Numerous studies have sought to understand the effects of human-related activities and disturbances on wildlife. However, the research related to aircraft noise and aviation has focused on behavioral responses associated with military aircraft, high frequency takeoffs and landings at commercial airports, or sightseeing aircraft around national parks and wildlife preserves. This study focused on determining if there are significant increases in stress levels among wildlife due to recreational aviation activity (e.g., takeoffs, landings, prop noise, camping, human presence) at backcountry airstrips compared to similar, but non-aviation recreational activity (e.g., camping, motorized access to campground or trailhead, human presence) at campground and recreation access sites.

The project included the evaluation of the relationship between disturbance intensity, specifically by

backcountry recreational aviation, and stress response by white-tailed deer (*Odocoileus virginianus*) and mule deer (*O. hemionus*). White-tailed deer and mule deer were used because of their abundant distribution and relatively high densities, which allowed for repeated measures and comparative sampling between airstrip sites and control sites. This study used glucocorticoid concentrations in the feces to quantitatively investigate stress physiology and chemical analyses. Fecal deposits were collected from deer and analyzed for fecal glucocorticoid metabolite (FGM) concentrations as an indicator of stress levels.

Stress physiology metrics in wildlife have been shown to correlate with the relative severity of stress responses across different levels of human disturbance. Using stress physiology techniques provides a mechanistic understanding of the effects of disturbance. The basic concept applied in this study is that stress hormones secreted by vertebrates when presented with an environmental “stressor” to heighten awareness or provide some form of short-term survival advantage are released by the stressed animal and then metabolized and excreted in the form of fecal glucocorticoid metabolites (FGM).

There was no significant difference in airstrip and control sites in 2014, with the exception of what was believed to be weather related stress levels expressed by deer at one test site. In 2015, data analysis suggested that stress levels among deer were higher at the non-aviation control sites than at the airstrip sites,



in spite of the fact that two of the airstrip sites had the highest visitor-use among both airstrips and controls. The lowest FGM concentrations among all sites was found at Fish Lake airstrip, which also had the lowest human presence between both airstrip and control sites. Based on the results, it was concluded that there is no significant increase in stress levels among deer

due to recreational aviation activity at backcountry airstrips compared to that expressed by deer because of similar, but non-aviation recreational activity at campground and recreation access sites.

For more information, visit the [project website](#) or contact Kris Christensen (krchristensen@mt.gov or 406.444.6125).

LIBRARY CORNER

National Library Week 2016: Libraries Transform



This year, the American Library Association's theme for National Library Week, held April 10-16, was "Libraries Transform". Transportation libraries such as MDT's Library provide access to resources and services, with library staff helping to transform the work lives of customers in the following ways:

- **Time and Energy Savings** – Often, people wonder why libraries are necessary when “everything is online”. With so much information available electronically, the need for libraries and librarians actually increases. Finding needed information can be frustrating and time-consuming. Dead ends, broken links, too many results, unrelated results, and having to pay for access are just a few of the barriers often encountered as staff spend valuable time searching. According to [statistics from the International Data Corporation](#), the average worker finds needed information only 56% of the time. Librarians can offer a solution by using their skills in efficiently and effectively finding needed resources.
- **High Quality Information** – The quality of information refers to characteristics such as relevance, accuracy, timeliness, and generally “fitness for use”. Poor quality information can lead to errors in decisions; the information may be out-of-date or incomplete, for example. A librarian can help employees find high quality resources, many of which may not turn up in a Google search. Quality is an important characteristic that librarians seek in information provided.

- **Updates on New Developments** – New tools, methods, publications, and more are produced on a regular basis, and staying up-to-date with the latest developments can be challenging. Staff may also be concerned, with so many new products announced, that they might miss something important. MDT Library staff not only send out announcements about new resources related specifically to employees' areas of interest, but also catalog resources so that they can be easily found when staff need them. These services are intended to help staff manage the deluge of information they may encounter in trying to stay up-to-date with developments in their field.
- **Cost Savings** – Publications can be costly, and by sharing resources, agencies can save money. Rather than purchasing multiple copies to sit on individuals' bookshelves, having a copy available in the library that everyone can use when needed is a better strategy. Many publications are now being offered in electronic formats rather than print, but the library is still needed in helping manage and provide access across an agency. The world of digital subscriptions can be challenging and confusing, but librarians can help coordinate with vendors to ensure not only easy access but also copyright compliance.

These are just a few ways employees' work lives can be transformed through libraries. Of course, this doesn't happen in a vacuum. Through participation in communities of librarians such as the [Special](#)



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Winter/Spring 2016

MONTANA DEPARTMENT OF TRANSPORTATION RESEARCH PROGRAMS

[Library Association's \(SLA\) Transportation Division](#), the [Western Transportation Knowledge Network](#), and the [Montana Shared Catalog](#), MDT's library staff are transformed and inspired to find new, innovative ways to meet the needs of employees.

"Libraries transform" is not only an ongoing process but also a challenge to look towards the future to identify opportunities for improvement and enhancement in service for patrons. For more information, please contact Katy Callon (kcallon@mt.gov or 406.444.0871).

DID YOU KNOW?

US DOT's Public Access Plan



In November 2015, the US Department of Transportation (US DOT) released its [public access plan](#) for ensuring federally-funded research publications and data are available for the public to access, both now and in the future.

This plan was developed in response to the [White House Office of Science and Technology Policy's 2013 memorandum](#), which requires Executive Departments with greater than \$100 million in yearly research and development expenditures to create a plan to make the research data and results publicly available and accessible.

US DOT's plan takes advantage of existing resources, such as the National Transportation Library (NTL), and incorporates related policy and legislative mandates to present a comprehensive plan addressing the research lifecycle. The NTL, which is mandated to be the central repository for federally-funded transportation research and technical reports, as well as a portal to federally-funded transportation data, is also taking the lead in implementation of these new requirements and outreach to stakeholders. The NTL now offers a [Public Access website](#), to provide implementation guidance and other information about the US DOT's plan. Sections include: an overview of the research process and public access; both the executive summary and the complete US DOT access plan; guidance for researchers; information about repositories; training resources, and answers to frequently asked questions. Recently, [a series of recorded webinars](#) entitled "USDOT Public Access Plan: Overview and Data Management Primer" has been made available through the Transportation

Research Board; this series provides a helpful overview and promotes a better understanding of the topic.

Data management, preservation, and accessibility are greatly important in research, as these practices enable other researchers to reuse the data and allow others to verify and build upon the results. Good data management maximizes the value of the funds invested, as that data can then be used in the future. The following are additional resources for those looking to learn more about data management:

- [Transportation Data Management Wiki](#) -This wiki is intended to help transportation agencies, researchers, information professionals, and librarians understand data management rules and issues presented by the 2013 memo from the Office of Science and Technology Policy.
- [Special Library Association Data Tool Kit](#) – This site offers past presentations, guides, recorded webinars, links to other federal agencies' data plans, data management planning tools, and data search tools.
- [Data Management LibGuide from Northwestern University's Library](#) – This resource guide is designed to assist researchers in data management and includes information about data management plans, federal funding agency requirements, links to data management training, as well as a YouTube video illustrating the importance of data management.

For more information, please contact Katy Callon (kcallon@mt.gov or 406.444.0871).



CALENDAR OF EVENTS

May

Transit IDEA Proposals Due - 5/1/16
NCHRP Panel Nominations Due - 5/6/16
AASHTO Spring Meeting - 5/24-26/16
MDT RRC Meeting - 5/24/16

June

TCRP Problem Statement Submittals
Due - 6/15/16
MDT RRC Meeting - 6/29/16

July

MDT RRC Meeting - 7/22/16
AASHTO Research Advisory Committee (RAC)/TRB
State Reps Meeting - 7/25-28/16

August

MDT RRC Meeting - 8/12/16

September

NCHRP-IDEA Proposals Due -
9/1/16
Rail Safety IDEA Proposals
Due - 9/15/16
ACRP Synthesis Topic
Statements Due
- 9/22/16
MDT RRC Meeting - 9/30/16



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

NEW RESEARCH PROJECTS

[Mobility Mindset of Millennials in Small Urban and Rural Areas](#)

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

NEW RESEARCH REPORTS

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NEW EXPERIMENTAL PROJECTS

[TAPCO Sequential Dynamic Curve Warning System - MacDonald Pass](#)

[Urban Traffic Counter Evaluation](#)

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

[Crash Attenuator - Smart Cushions Innovations \(SCI\) 100GM Crash Attenuator - Construction Report and Annual Evaluation 2016](#)

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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