FALL 2015

Research Newsletter

Responsive - Accessible - Relevant

A MESSAGE FROM THE RESEARCH DIRECTOR

By: Cameron Kergaye, PhD, PMP, PE

The Research Division is proud to again sponsor a poster session during the annual UDOT conference. This will be our fifth year promoting innovative and transportation-related research in a one-on-one interactive format. Researchers will discuss their innovative and applied research in the main exhibit hall for two hours prior to lunch on Wednesday, October 28. Please spend some time at this session learning about UDOT's new and recently completed research, as well as other transportation research highlighted by researchers and students.

In July, some in the Research Division participated in the 2015 AASHTO RAC and TRB State Representatives Meeting in Portland, Oregon. This event was hosted by the Oregon DOT and planned with help from AASHTO RAC Region 4, including UDOT. We benefited from the networking and learning opportunities at this meeting with our counterparts from other state DOTs, FHWA, and TRB. Presentations and committee meetings focused on how to improve our research programs. It was also a chance to learn about new opportunities from NCHRP and SHRP2.

We are currently working with UDOT leaders in the Central Office and Regions to compile an FY 2015 Efficiencies Report. This report will highlight some of the accomplishments and cost-saving initiatives that were implemented within UDOT over the completed fiscal year. Once prepared, it will be shared with the state legislature specifically, and made available online. We appreciate everyone's help in putting this informative document together.

Variable Speed Limit, FY 2014 Efficiencies Report

A few months ago UDOT applied for FHWA implementation assistance for two products in Round 6 of SHRP2: Identifying and Managing Utility Conflicts, and PlanWorks. UDOT was recently selected for implementation and technical assistance for both. I would like to acknowledge the hard work of those involved in the application process, and the continuing work from those involved in product implementation. The final round of SHRP2 product implementation assistance will be advertised early next year.

Finally, the 2016 UDOT Research (UTRAC) Workshop is being scheduled for Monday, March 28, 2016. Save the date, and we hope to see you there as we prioritize UDOT's research needs.

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Completed and Active Research Available at: www.udot.utah.gov/go/research

Editorial Staff: Joni DeMille jdemille@utah.gov **and David Stevens** davidstevens@utah.gov

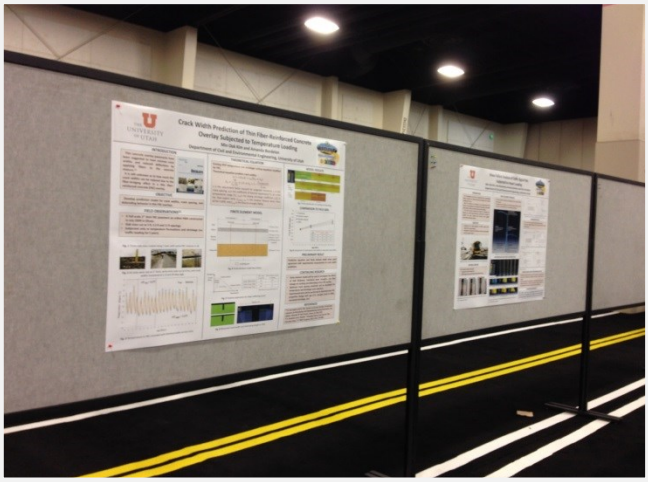
By: Jason Richins, SE
UDOT Research Division

Call for 2015 UDOT Annual Conference Poster Submissions

What have YOU been working on?

Have you developed a new procedure, discovered a new application, or overseen another innovative practice within your work responsibilities that you would like to share? Have something to present that didn't quite lend itself to a lecture format? The Research Poster Session at the UDOT Annual Conference is the ideal time and place to get the word out.

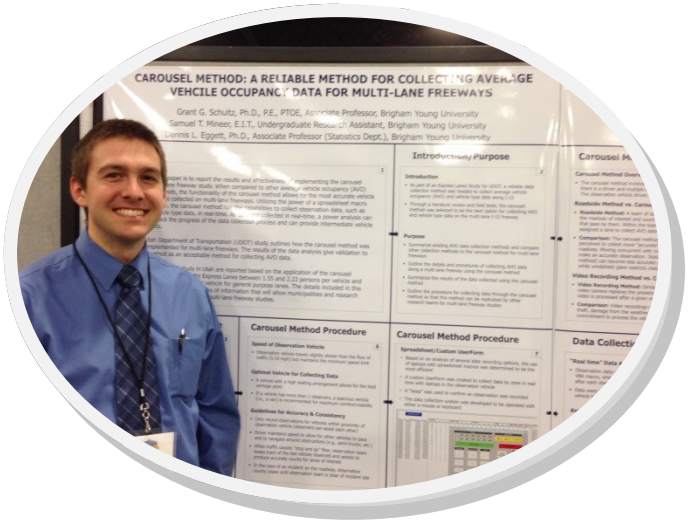
The poster session will be held before lunch on October 28th in the exhibition area, presenting a perfect opportunity to display your research to conference attendees.



Annual Conference Poster Session

Posters may be presented on any topic related to Utah transportation, including highways, motor vehicles, transit, nonmotorized modes, financing, planning, economic impacts, etc. Please email the session coordinator, Jason Richins, right away at jtrichins@utah.gov to express interest and get the form to submit a poster title and abstract.

The posters will be displayed on 4-ft by 8-ft boards. The ideal poster will have more graphics than text and can be readable from 5 feet away.



Sam Mineer of BYU at the 2014 Poster Session

Conference attendees perusing posters

For further information, contact Jason Richins of UDOT's Research Division (jtrichins@utah.gov).

By: David Stevens, PE
UDOT Research Division

NCHRP Guidance on Knowledge Management

The resources available to transportation agencies on the subject of knowledge management continue to grow. Recently, TRB's National Cooperative Highway Research Program (NCHRP) published NCHRP Report 813, "A Guide to Agency-Wide Knowledge Management for State Departments of Transportation". The new guide and a related presentation are available here: http://www.trb.org/main/blurbs/173082.aspx.

This publication presents guidance for state transportation agencies on adopting an explicit knowledge management (KM) strategy and the ways that organizations have implemented such strategies. According to the guide, "KM is an umbrella term for a variety of techniques for building, leveraging and sustaining the know-how and experience of an organization's employees." The guide builds on the results of Scan 12-04, "Advances in Transportation Agency Knowledge Management," in the U.S. Domestic Scan Program.

There are many KM techniques that can be useful to state DOTs. The guide suggests that KM techniques can be aligned with a DOT's strategic initiatives. Focusing on priority areas such as safety or asset management could quickly show success.

Below are some of the techniques that the guide suggests DOT executives can consider to preserve and employ knowledge within the organization:

- **Workforce planning** to identify and close gaps between needed skills and existing capabilities;
- **Communities of practice** that enable less experienced employees to learn from their peers;
- **Expertise directories** that employees can use to identify who to contact if they have a question;
- **Capture of specialized knowledge** from employees before they leave the organization;
- **Project management methodologies** that ensure project teams learn from prior experience and document lessons learned for future efforts; and
- **Use of information management methods** to ensure that employees can quickly find the information they need to be effective.

Implementing KM within a state DOT is a continuing four-step process, as shown in the figure below from the guide. Step one includes a "KM Litmus Test for DOTs" that can help quickly assess the need for an agency-wide approach to KM or fine-tuning of an existing KM program.

Steps in Implementing KM

A few transportation agencies with KM initiatives and experience are highlighted in the guide, complete with contact information. These include Alaska DOT & Public Facilities, Alberta Transportation, Caltrans, Georgia DOT, Kansas DOT, Missouri DOT, Virginia DOT, Washington State DOT, Wisconsin DOT, and the U.S. DOT Federal Aviation, Federal Highway, and Federal Transit Administrations. The guide also includes sample implementation tools and templates.

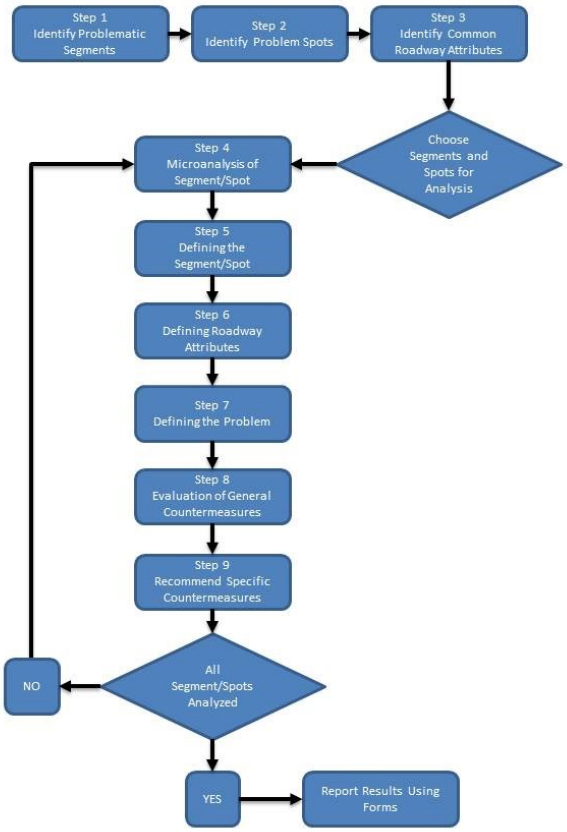
We look forward to hearing and sharing success stories about KM techniques being implemented within UDOT. The new guide will certainly become a valuable resource for us all in this process. For more information, see the guide at the link above, or contact David Stevens in the UDOT Research Division at davidstevens@utah.gov.

By: Grant G. Schultz, PhD, PE, PTOE
Brigham Young University
Travis L. Jensen, PE
WCEC Engineers
W. Scott Jones, PE
UDOT Traffic & Safety Division

Use of Roadway Attributes in Hot-Spot Identification and Analysis

The Utah Department of Transportation (UDOT) Traffic and Safety Division continues to advance the safety of roadway sections throughout the state. In an effort to aid UDOT in meeting their safety goals, the Department of Civil and Environmental Engineering at Brigham Young University (BYU) has worked with the Statistics Department in developing analysis tools for safety. The most recent of these tools has been the development of a hierarchical Bayesian Poisson Mixture Model (PMM) of traffic crashes known as the Utah Crash Prediction Model (UCPM), a hierarchical Bayesian Binomial statistical model known as the Utah Crash Severity Model (UCSM), and a Bayesian Horseshoe selection method that can be utilized within the UCPM. The UCPM and UCSM models helped with the analysis of safety on UDOT roadways statewide and the integration of the results of these models was applied to a Geographic Information System (GIS) framework.

This research focuses on the addition of roadway attributes in the selection and analysis of "hot spots." This is in conjunction with the framework for highway safety mitigation in Utah with its six primary steps: network screening, diagnosis, countermeasure selection, economic appraisal, project prioritization, and effectiveness evaluation. The addition of roadway attributes data (including the Light Detection and Ranging (LiDAR) roadway inventory data) was included as part of the network screening, diagnosis, and countermeasure selection, which are included in the methodology titled "Hot Spot Identification and Analysis" found in UDOT Report No. UT-13.15. Procedures and a systemization process were created to convert raw data into new roadway attributes, such as grade and vertical sag/crest curve location. Methods were also developed to combine and associate the attributes to crashes on problem segments and possible problem spots within the segments to help in the identification of safety hot spots so that they can be analyzed and countermeasures selected. The inclusion of roadway asset data allows the user to utilize the model to more closely examine the data and to identify key roadway characteristics that contribute to crashes and then search on these characteristics to identify and prioritize safety projects



statewide. Specific examples from Utah's state roadway network are used to show how the methods function.

For more information, contact Grant Schultz of Brigham Young University (gschultz@byu.edu) or Scott Jones of UDOT's Traffic & Safety Division (wsjones@utah.gov).

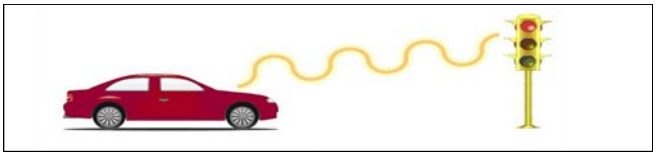
By: Blaine Leonard, PE, D.GE, F.ASCE
UDOT Traffic Management Division

Connected Vehicle Pooled Fund Study

UDOT's interest in connected vehicle technology began over 12 years ago, when John Njord initiated an AASHTO Leadership Team on the subject. Recognizing the potential that this technology will have to mitigate crashes and improve mobility, John wanted the states to be engaged in the work that FHWA had been pursuing for some time. At the time the technology was known as "vehicle infrastructure integration (VII)" and had two components: 1) vehicles communicating to other vehicles (V2V) and 2) vehicles communicating with the infrastructure (V2I). A third component, vehicle to others (pedestrians, bicyclist, transit rider) (V2X) has since been envisioned. While V2V applications are primarily being developed by the automakers, V2I communication will rely on roadside infrastructure that will need to be installed by departments of transportation or other entities.

Pooled fund study TPF-5(206) was proposed by several states in 2008 to "facilitate the development, field demonstration, and deployment of connected vehicle infrastructure applications", based on the recognition that infrastructure owners needed to play a lead role in the infrastructure component of connected vehicles. UDOT participated in the pooled fund as an observer for several years, and joined as a full participant in 2013. The study is led by the Virginia DOT and includes 13 states, one county, and the FHWA.

Unlike some pooled fund studies, which are established to tackle a single, specific problem, the connected vehicle study was intended to undertake a range of projects in this emerging field. The effort has completed seven projects, has three more underway, and is about to initiate two more. Projects have evaluated the impact connected vehicle data will have on Traffic Management Center operations, considered the adoption rate of this technology through after-market devices, and defined methods for standardization of relevant communication hardware. Several of the pooled fund projects have resulted in the development of a Multi-modal Intelligent Traffic Signal System (MMITSS), a software application which uses communication between vehicles and the traffic signal to prioritize movements through intersections by busses, trucks, and emergency vehicles. This technology is currently in trial deployment in Arizona and California. UDOT is in the early stages of deploying MMITSS, in conjunction with UTA, to help keep buses on schedule so riders can depend on consistent performance. Another pooled fund project has developed technology to gather real-time road weather data from moving vehicles. UDOT is exploring the implementation of this system to provide enhanced data on busy rural corridors to our weather group.



Vehicles will communicate using 5.9 GHz, short range radio (known as DSRC), a technology which will be mandated equipment on all new light vehicles beginning in about 2020. A similar radio in signal cabinets can broadcast signal phase and timing information or other infrastructure information, such as warnings about sharp curves, low bridges, icy roads, or work zones, so that drivers can respond. Some applications could also use cellular communication. Test beds in Michigan, Virginia, New York, Florida, Minnesota, California and Arizona have demonstrated the capabilities of this technology. Over 70 applications are in some stage of development, including MMITSS and the road-weather application.

Many of us have heard predictions of autonomous (driverless) vehicles, but are unaware of connected vehicle technology. These two innovations, autonomous and connected vehicles, will be reality in the next few years, and are poised to radically transform our transportation system. UDOT is engaged in these efforts and anticipates leveraging the benefits of these technologies to reduce fatalities and improve your commute.

For more information on the connected vehicle pooled fund study and UDOT's progress in this area, visit http://www.cts.virginia.edu/cvpfs/ or contact Blaine Leonard, bleonard@utah.gov, at the UDOT Traffic Operations Center.

By: Travis L. Jensen, PE
WCEC Engineers

Kevin P. Nichol, PE
UDOT Research Division

Safety-Related ITS Scan Tour

UDOT has long been on the forefront of nationwide efforts to improve roadway safety. This safety focus encompasses infrastructure improvements as well as non-infrastructure elements such as education and enforcement. UDOT's Traffic and Safety Division is tasked with managing the Zero Fatalities initiative in cooperation with other divisions and the region offices. These varying groups within UDOT work together to continue recent long-term trends of fewer fatalities and serious injury crashes on Utah's roadways.

The use of intelligent transportation systems (ITS) technology is one method that UDOT uses to improve safety. ITS devices include variable message signs (VMS), vehicle detection, and other electronic systems that convey information to drivers or sense traffic conditions. UDOT is working to deploy ITS technology on the state roadway system where it can be an effective means of reducing crashes and crash severity.

The objectives of this study were to:

- Research safety-related ITS devices and practices in use around the country
- Determine a subset of these devices with the greatest potential for adaptation to Utah's roadway environment
- Gather information from other state departments of transportation (DOTs) about their use of those devices
- Organize a scan tour for a group of UDOT employees to visit a few locations where the selected devices are being used
- Record activities and discussion points of the scan tour group
- Formulate a final report to document the study process and summarize the information gained from it

The research team developed an initial list of survey questions about safety-related ITS applications of interest and presented it to the Technical Advisory Committee (TAC) for their review. The questions were then finalized based on TAC input and uploaded to the *SurveyMonkey* website. TAC members provided names and email addresses of their nationwide peers as well as access to listserves where other relevant contributors could be reached. The online survey link was emailed to 95 people directly, plus a state DOT research director listserve. A total of 33 responses to the initial survey were received, representing input from 25 states and the Canadian province of British Columbia.

Responses to the initial survey were used to refine the list of potential scan tour destinations to seven states that could be emailed a more detailed follow-up survey. Following evaluation of the follow-up surveys, the decision was made to visit Iowa and Minnesota based on their willingness to participate, experience with many of the ITS devices of interest to UDOT, and their geographic proximity to one another. The scan tour group visited Iowa on May 4-5, 2015 and spent the following day (May 6) in Minnesota.

The following safety-related ITS infrastructure treatments were visited and/or discussed with DOT personnel in Iowa and Minnesota:

* Automated Flashing Chevron Signs
* Dynamic Speed Warning Signs
* Variable Speed Limit Signs
* Speed-Activated Variable Message Signs in Work Zones
* Rural Intersection Conflict Warning Systems
* Freeway Interchange Signal "Flush" Cycles
* Freeway Smart Lanes
* Truck Rollover Warning Systems
* 360-Degree Radar Detection

Some non-infrastructure elements related to safety and ITS were also discussed. They include such items as:

- "Message Mondays" safety messages displayed on variable message signs in Iowa
- Seatbelt usage and documentation of the impact of seatbelt usage by officers investigating crashes
- Maintenance of ITS equipment and use of innovative contracting methods to promote product quality
- Enhanced speed compliance for work zones

The last chapter of the report contains specific recommendations for translating the knowledge gained during the scan tour into action items for follow up by specific groups represented on the TAC.

For more information, contact Travis Jensen of WCEC Engineers (tjensen@wcecengineers.com) or Kevin Nichol of UDOT's Research Division (knichol@utah.gov).

By: Grant G. Schultz, PhD, PE, PTOE
Brigham Young University
Travis L. Jensen, PE
WCEC Engineers
W. Scott Jones, PE
UDOT Traffic & Safety Division

Crash Prediction Modeling for Curved Segments of Rural Two-Lane Two-Way Highways in Utah

Highway safety is a top priority for everyone. Understanding and being able to identify crash causes and potential mitigations is paramount. Fatalities from crashes on U.S. highways are far too common. In 2012, there were 33,561 crash-related fatalities in the U.S., 217 of which were in Utah. That is one death nearly every 15 minutes in the U.S. because of a crash. In Utah, crashes on rural roads are 3.3 times more likely to result in a death than crashes on urban roads.

The "Crash Prediction Modeling for Curved Segments of Rural Two-Lane Two-Way Highways in Utah" report contains the results of the development of crash prediction models for curved segments of rural two-lane two-way highways. The modeling effort included calibration of the predictive model found in the Highway Safety Manual (HSM) as well as development of Utah-specific models developed using negative binomial regression. Data for these models came from 1,495 randomly sampled curved segments in Utah, with crash data from years 2008-2012.

The HSM predictive model for rural two-lane two-way highways consists of a safety performance function (SPF), crash modification factors (CMFs), and a jurisdiction-specific calibration factor. For this research, two sample periods were used: a three-year period from 2010 to 2012 and a five-year period from 2008 to 2012. The HSM predictive model calibration factor was determined to be 1.50 for the three-year period and 1.60 for the five-year period. These factors should be used in conjunction with the HSM SPF and all applicable CMFs.

A negative binomial model was used to develop Utah-specific crash prediction models based on both the three-year and five-year sample periods. A backward stepwise regression technique was used to isolate the variables that would significantly affect highway safety. The independent variables used for negative binomial regression included the same set of variables used in the HSM predictive model along with other variables such as speed limit and truck traffic that were considered to have a significant effect on potential crash occurrence. The significant variables at the 95 percent confidence level were found to be average annual daily traffic (AADT), segment length (L), total truck percentage (TT), and curve radius (R) as illustrated in Equation 1 and Equation 2. The main benefit of the Utah-specific crash prediction models is that they provide a reasonable level of accuracy for crash prediction yet only require four variables, thus requiring much less data collection effort than the HSM predictive model.

(1) $$N_{3\text{-}year} = 483.8542 * AADT^{0.8833} * R^{-0.2236} * \exp[-11.5570 + (2.4465)(L) - (0.0127)(TT)]$$

(2) $$N_{5\text{-}year} = 640.6824 * AADT^{0.8606} * R^{-0.2082} * \exp[-11.2040 + (2.5757)(L) - (0.0148)(TT)]$$

For more information, contact Grant Schultz of BYU (gschultz@byu.edu) or Scott Jones of UDOT"s Traffic & Safety Division (wsjones@utah.gov).

Quote Unquote

It is not the answer that enlightens, but the question.
–Eugene Ionesco

I think, at a child's birth, if a mother could ask a fairy godmother to endow it with the most useful gift, that gift would be curiosity.
–Eleanor Roosevelt

By: Kyle Rollins, PhD
Brigham Young University

Jason Richins, SE
UDOT Research Division

Lateral Resistance of Bridge Abutment Piles Near MSE Wall Faces

Pile foundations for bridge abutments must resist lateral loads produced by earthquakes and thermal expansion or contraction. Increasingly, space constraints are also leading to vertical Mechanically Stabilized Earth (MSE) walls at abutment faces as shown in Fig. 1. At present, there is relatively little guidance for engineers in assessing the lateral resistance of piles located close to these MSE walls. As a result, some designers locate abutment piles six to eight pile diameters behind a wall face to minimize the interaction while others neglect any soil resistance.

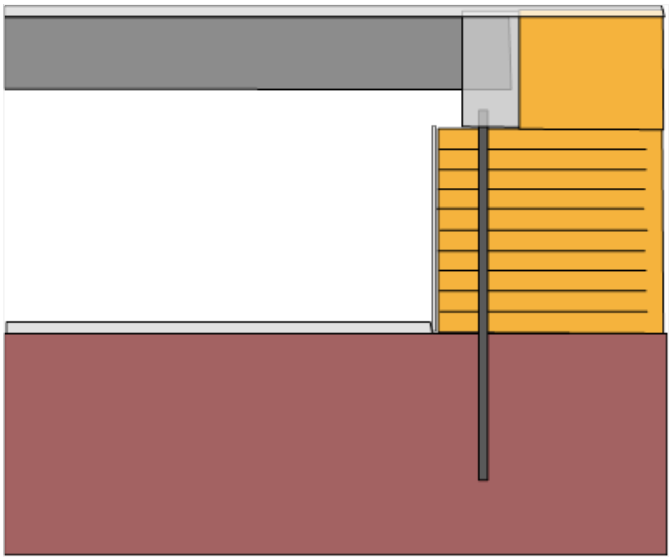


Fig. 1 Typical pile supported bridge abutment with MSE abutment wall

The objectives of this research were (1) to develop reduction factors to account for reduced lateral soil resistance near a wall face and (2) to develop equations to predict the force induced in the reinforcement as the piles are loaded laterally.

Testing for this study included lateral load tests on nine piles at three sites where bridges were under construction. In addition, 24 lateral pile load tests were performed near a 20-ft tall, 180-ft long MSE wall face constructed specifically for this study. A photograph of the test wall is provided in Fig. 2. The test piles were circular, square and H piles between 12 and 14 inches in diameter or width and were located between 1.25 and 8 pile diameters behind the wall face.

Fig. 2. Photograph of MSE test wall used for lateral load testing of 24 circular, square and H piles located 2 to 5 pile diameters behind the wall

Applied pile head load is plotted vs. pile head displacement for a set of lateral pile load tests on piles at three different spacings in Fig. 3. For a given displacement, the lateral resistance clearly decreases as the distance from the wall decreases. Relative to the pile at a distance of 6.3D (pile diameters) from the wall, the piles at 2.7D and 1.25D from the wall provided only about 70% and 40% of the lateral resistance, respectively.

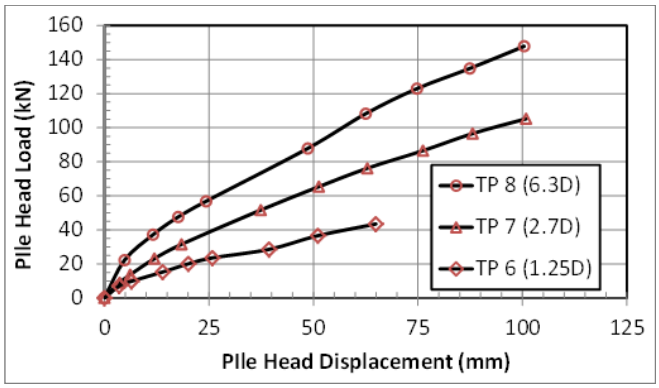


Fig. 3 Applied pile head load vs. displacement curves for a set of lateral pile load tests at three distance behind the MSE wall face

Lateral pile load analysis was first performed on the piles located furthest from the wall (6.3D in this case) assuming that there was no effect from the proximity of the wall. Thereafter, the soil properties were held constant for the analyses of the

By: Kyle Rollins, PhD
Brigham Young University

Jason Richins, SE
UDOT Research Division

Lateral Resistance of Bridge Abutment Piles Near MSE Wall Faces (cont.)

other piles. The reduction in lateral soil resistance was accounted for by using separate constant p-multipliers for each pile. The back-calculated p-multipliers are listed in Fig. 4 and the computed curves are in good agreement with measured points.

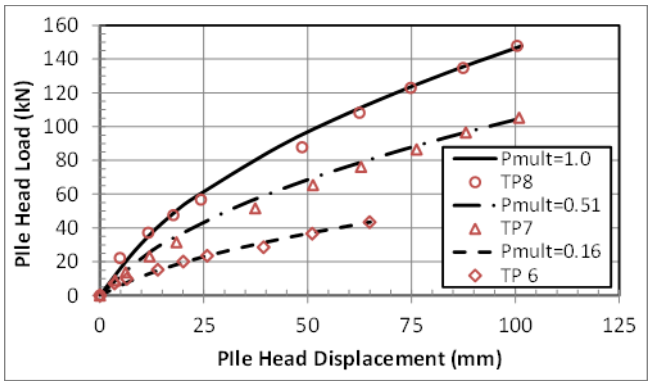


Fig. 4 Comparison of computed pile head load vs deflection curves and measured points using p-multipliers to account for presence of the wall.

The back-calculated p-multipliers from this study are plotted versus the normalized pile spacing behind the wall in Fig. 5. The normalized pile spacing is the distance from the back of the MSE wall to the center of the test pile divided by the outside diameter of the pile.

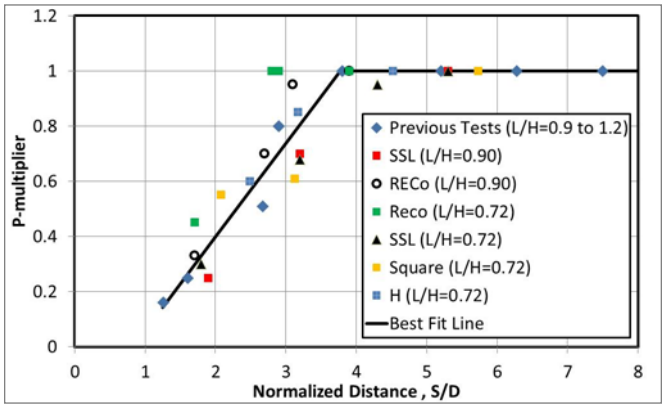


Fig. 5 Back-calculated p-multipliers as a function of normalized distance from the center of the pile to the back of the MSE wall.

Considering the variation in test pile types, backfill materials and relative compaction for the different tests, the relative consistency between the various tests is quite good. A p-multiplier of 1.0 indicates that there is no reduction in lateral pile resistance. The p-multipliers are all equal to 1.0 when the normalized pile spacing exceeds about 3.8D. At closer normalized spacings, the p-multiplier decreases linearly indicating that interaction with the wall is reducing the lateral pile resistance. A best-fit line for the p-multiplier when D is less than 3.8 is given by the equation:

$$P_{mult} = 0.34(S/D) - 0.283 \quad \text{for } S/D < 3.8 \qquad (1)$$

where S is the spacing from the back of the wall to the center of the pile and D is the outside pile diameter or width. The p-multipliers were not strongly affected by the pile type (pipe, square, H) or the reinforcement length to height ratio.

Reinforcements in the MSE walls consisted of both ribbed strips and welded wire mat styles. Selected reinforcements were instrumented with strain gauges so that the induced force in the reinforcement could be determined during the lateral pile load tests. The test results indicate that maximum tensile force was typically at the location of the test pile. Tensile force increased with increased pile load. However, it decreased with normalized distance transverse and normal to the load point. Maximum reinforcement force generally occurred in the second or third level of reinforcement from the top. Equations to predict the measured tensile force are currently under development.

Funding for this study was provided by an FHWA pooled fund study TPF-5(272) supported by Depts. of Transportation from the states of Florida, Iowa, Kansas, Massachusetts, Minnesota, Montana, New York, Oregon, Texas, Utah and Wisconsin. Some support has also been provided by wall suppliers. UDOT serves as the lead agency, with Jason Richins as the project manager and Jon Bischoff as the UDOT champion. This support is gratefully acknowledged; however, the opinions, conclusions and recommendations in this article do not necessarily represent those of the sponsoring organizations.

For more information, contact Prof. Kyle Rollins of BYU at rollinsk@byu.edu; or Jason Richins in the Research Division at jtrichins@utah.gov.

By: Thomas Hales, SE
UDOT Research Division

Leadership Discussion Book: Review of *The Speed of Trust* (Part 3)

Many UDOT employees accepted the challenge to read the book *THE SPEED OF TRUST* by Stephen M. R. Covey. Due to the number of pages, it was recommended to break the reading up into three parts: **Part 1** – read up to page 124 by March 25; **Part 2** – read up to page 232 by May 5; and **Part 3** – read through the end of the book (page 322) by September 15. After each section of reading we had the opportunity to discuss and review it with Shane Marshall, UDOT's Deputy Director.

"Organizations are no longer built on force, but on trust."
-- Peter Drucker, business consultant

"Good leaders should trust those around them."
-- Richard Branson, The Virgin Group

"The surest way to make a man untrustworthy is to distrust him and show your distrust."
-- Henry Stimson, former US Secretary of State

The preceding quotes are just a few made by prominent figures that were shared in Part 3 of the reading which covered topics of:

- ***ORGANIZATIONAL TRUST***
- ***MARKET TRUST***
- ***SOCIETAL TRUST***

These three elements of trust are critical to the success of any business organization. Interestingly, however, these three elements of trust are equally as important in other organizations in our lives as well, such as our families. It was inspiring to see how the principles discussed in the book can be applied equally as well to creating successful family organizations as it can to successful business organizations.

"Whatever your organization – be it a business, a not-for-profit, a department or team within a larger organization, or a family – it's vital to realize that designing or aligning it in a way that establishes trust may well be your greatest influence. In doing so, you positively affect everything else within the organization."
-- Stephen M. R. Covey, CEO CoveyLink Worldwide

An organization with high trust can enjoy many benefits that an organization with low trust can't. The following table shows some of the differences.

Low-Trust vs. High-Trust

Low-Trust Organization	*High-Trust Organization*
Redundancy	Increased Value
Bureaucracy	Accelerated Growth
Politics	Enhanced Innovation
Disengagement	Improved Collaboration
Turnover	Stronger Partnering
Churn	Better Execution
Fraud	Heightened Loyalty

This was truly a great read that not only gives inspiring ideas for use in our careers but also in our personal lives.

If you want to get in on the next book for the Leadership Discussion, we will be reading ***LEADERSHIP AND SELF-DECEPTION: GETTING OUT OF THE BOX*** by The Arbinger Institute. We will be meeting with Shane Marshall to discuss this book on Thursday, December 3 from 11:00 a.m. to 12:00 p.m. in the John Njord Conference Room at the Calvin Rampton Complex. Videoconferencing to the regions is available by request.

Copies of both books can be checked out from Joni DeMille (jdemille@utah.gov) in the UDOT Library. Audio copies of *Leadership and Self-Deception* are also available.

By: David Stevens, PE
UDOT Research Division

Joni DeMille
UDOT Research Division

Research Calendar of Events

2016 UTRAC—SAVE THE DATE

The 2016 UDOT Research (UTRAC) Workshop is scheduled for Monday, March 28, 2016 from 7:30 a.m. to 3:00 p.m. at the Salt Lake Community College Miller Campus, 9750 S 300 W, Sandy, UT. It is anticipated that the following subject areas will be covered: Materials & Pavements, Maintenance, Traffic Management & Safety, Preconstruction, and Planning. For those interested, please mark the date on your calendar. We look forward to seeing many of you there to make this a worthwhile and successful event. We will send out more information on the problem statement submittal process in a few months. You may contact Tom Hales for more information (tahales@utah.gov).

RESEARCH FUNDING OPPORTUNITIES (click to see the full document)

NCHRP FY 2017 Problem Statements, DUE on October 15, 2015

2016 US Domestic Scan Program Topic Proposals, DUE on October 15, 2015

Transit IDEA Proposals, DUE on November 2, 2015

WEBINARS (click to see details)

Title	Day/Date	Time
Strain-based Structural Health Monitoring for an Informed Extension of Bridge Lifetime (TRB)	Wednesday, Oct 7	12:00 PM -1:30 PM
The Vital Role of Operations & Maintenance in Supporting & Enhancing Sustainability (TRB)	Thursday, Oct 15	11:00 AM – 1:00 PM
Effect of Wide-Base Tires on Pavement Damage—A National Study, Part II (TRB)	Monday, Oct 19	11:00 AM – 12:30 PM
Sign & Pavement Marking Retroreflectivity – Measurement Basics, Safety Benefits, Advancements: A State DOT Perspective (TRB)	Tuesday, Oct 20	12:00 PM – 1:30 PM
Legal Aspects of Airport Programs (TRB)	Wednesday, Oct 21	12:00 PM – 1:30 PM
Reducing Costs by Streamlining the Selection & Bidding of Alternative Highway Drainage Pipe Systems (TRB)	Thursday, Oct 22	12:00 PM – 1:30 PM
Sustainability as an Organizing Principle for Transportation Agencies (TRB)	Tuesday, Oct 27	11:00 AM – 12:30 PM
Signal Timing Manual, Second Edition (TRB)	Wednesday, Nov 4	12:00 PM – 1:30 PM
NON-ENGINEERING WEBINARS		
Ten Things I Wish I Knew When I Became a Manager	Wednesday, Oct 28	11:00 AM – 12:00 PM
Acting with Power	On Demand	On Demand
How Science Is Reshaping Everything We Thought We Knew about Leadership	On Demand	On Demand