

Research Newsletter

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A MESSAGE FROM THE RESEARCH DIRECTOR

By: Cameron Kergaye, PhD, PMP, PE

The Research Division will host our annual workshop (UTRAC) on April 30th. All transportation and research professionals are encouraged to support our efforts to identify challenges and potential improvements to our roadway infrastructure and operations through new research projects.

Problem statements must be submitted by April 16th and should focus on one of the listed subject areas for the workshop. Last year 59 problem statements were submitted from UDOT, university and consultant professionals. Twenty-eight problem statements were subsequently funded for research by the Research Division and other divisions.

This is also the time of year that AASHTO's Research Advisory Committee requests nominations for its 'High Value Research' award. Last year we were recognized for completed research on Identifying Characteristics of High-Risk Intersections for Pedestrians and Cyclists. This year we plan to submit the following two research projects: Dynamic Passive Pressure on Abutments and Pile Caps, and Maintenance Program Decision-Making Utilizing Crash Data. The former was a five-state pooled fund study and helped refine design methods for evaluating the available dynamic passive resistance at non-skewed bridge abutments. The latter developed methods for UDOT maintenance and traffic safety personnel to improve highway safety through con-

sideration of crash data in these maintenance programs: snow and ice crash cluster reduction, wild animal fence evaluation, low skid number correction, and semi-annual inspection crash data.



Abutment passive force deflection testing

Lastly, we will participate in a Program Review with the Utah Division of the Federal Highway Administration on April 22-23. Using the Louisiana Transportation Research Center as a model, the expectation is that our research practices and products will better meet our customer needs. Our Research Manual of Instruction will also be updated, as a result of the review, and available online.

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

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2014 Annual Research Workshop (UTRAC) Coming in April

As the month of April begins, we would like to announce the annual UTRAC Workshop is on track and has been scheduled for Wednesday, April 30 at the SLCC Larry Miller Campus in Sandy, Utah.

This one-day event will provide people in our research community (universities, consultants, contractors and vendors) with the opportunity to meet with UDOT subject experts and to exchange research ideas and needs. As in the past, our Director of Research, Cameron Kergaye, will open the session followed by our keynote speaker. Instruction will then be given on our breakout sessions. The Trailblazer Award will also be presented to recognize the recipient's outstanding contributions to research.



USU's Marvin Halling, winner of 2013 Trailblazer Award, and Cameron Kergaye of UDOT's Research Division

We are starting to receive several great problem statements and we anticipate many more. These statements will be divided into subject areas for breakout sessions at the April 30 workshop, which will include Materials & Pavements, Maintenance, Traffic Management & Safety, Structures & Geotechnical, Preconstruction, and Planning. Since we cannot fund all problem statements, they will be prioritized and the top ones selected by each group will be considered for funding in the coming year.

Last year we received 59 problem statements for prioritization. Of these, the Research Division together with other divisions was able to fund 28.



Breakout session from 2013 UTRAC Workshop

Information about this year's workshop can be found on our UTRAC webpage (<http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:234>). It provides helpful links for Registration, Problem Statement Form, Workshop Agenda, Breakout Session Contacts, and Problem Statements from the previous year. Please register online to participate in this free event.

Problem Statements must be submitted prior to the UTRAC Workshop, with a firm deadline of **April 16, 2014**. Completed Problem Statement Forms should be emailed to rgscovil@utah.gov by the deadline.

We encourage preparers of problem statements to first check TRB's [TRID](#), the TRIS and ITRD Database, for completed or active research that may help solve the problem described in the proposed statement.

We look forward to sharing innovative ideas and solutions with you at the UTRAC Workshop. For more details, contact Russ Scovil of the UDOT Research Division (rgscovil@utah.gov).

UDOT's Traffic Signal Performance Metrics: Benefits of the TRB Annual Meeting

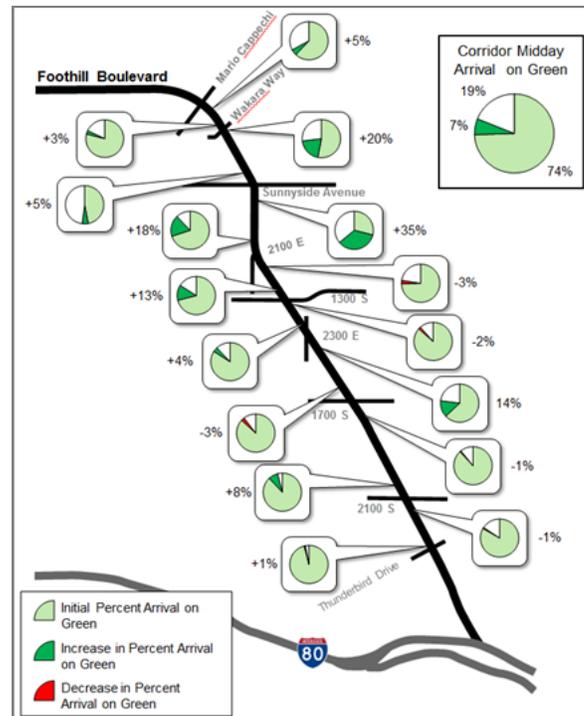
In January of each year a group of UDOT leaders and staff attend the Transportation Research Board (TRB) Annual Meeting in Washington, D.C. to learn about key transportation research and best practices and to share our own. Each UDOT attendee to the Annual Meeting brings back innovative, cost-saving ideas to implement at UDOT. One example is Traffic Signal Performance Metrics, which Rob Clayton of the Traffic Management Division brought back in 2012 and helped UDOT to successfully implement.

Managing traffic is an effective way to reduce congestion, save fuel costs and improve safety. One of the most visible components of the traffic management landscape is traffic signals. Day-to-day traffic challenges keep the staff at the UDOT Traffic Operations Center (TOC) very busy – especially during winter weather, special events and during the morning and evening commutes. The operators at the TOC have the ability to remotely operate over 80% of Utah's traffic signals, which can be a very helpful way to alleviate traffic congestion.

UDOT partnered with Purdue University and Indiana DOT to implement Traffic Signal Performance Metrics. UDOT's version of this program enables UDOT to actively manage, in real-time, its traffic signal systems which will help traffic flow as efficiently as possible along any given roadway corridor. The [Signal Performance Metrics website](#) has a significant amount of information and may take several seconds to load when graphs and data are queried. The performance of traffic signals is critical in reducing congestion, improving travel times and reducing fuel consumption.

Since implementation in 2012, UDOT has used the Traffic Signal Performance Metrics as a cost effective solution that measures vehicle delay, speeds and travel times. The metrics have also identified operational deficiencies, areas where mobility can be optimized and have helped with evaluating traffic signal timing and maintenance.

Using Traffic Signal Performance Metrics, UDOT was able to realize a 7% increase in vehicles arriving at a



Arrivals on green along Foothill Boulevard

green signal on Foothill Boulevard in Salt Lake City (see graphic above). This improves corridor performance, reduces fuel consumption and improves air quality.

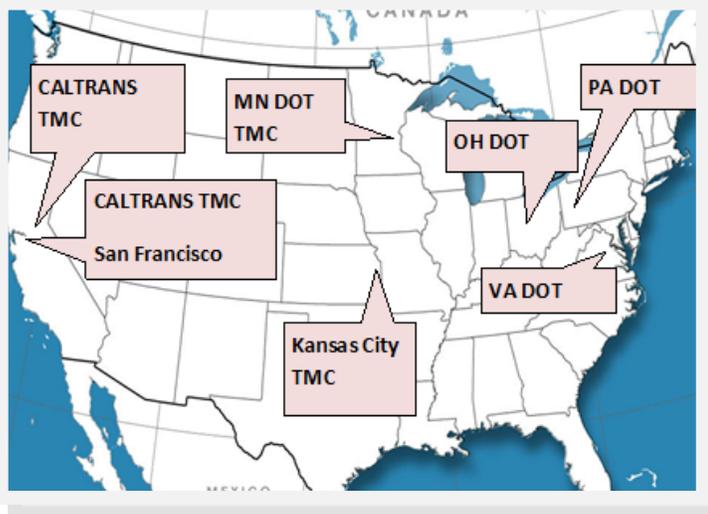
Every year the AASHTO Technology Implementation Group (TIG) identifies innovative technologies successfully adopted by some state DOTs and funds teams to assist other DOTs with implementation. One of the [2013 AASHTO Focus Technologies](#) was Automated Traffic Signal Performance Measures, which UDOT nominated to TIG based on successes in Utah and Indiana. UDOT is part of the Lead States Team sharing this technology with other states. UDOT is also participating in a related Transportation Pooled Fund study led by Indiana DOT.

For more information, contact Mark Taylor (marktaylor@utah.gov) or Lisa Miller (lisamiller@utah.gov), both of UDOT's Traffic Management Division.

Scanning Traffic Management Centers for Potential Improvements

Traffic Management Centers require dedicated management and staff with specialized skills and training, advanced technologies, and operating and capital funding. Investments in new technologies and services allow agencies to proactively manage and control traffic to optimize performance of a surface transportation system. In 2012 UDOT commissioned a study to identify potential technological and service improvements for its TMC, the Traffic Operations Center. The goal of the study was to synthesize the current state of practice on applying innovative and advanced procedures, applications, and tools in TMC operations.

The study included a broad web-based survey of transportation agencies and field visits to TMC agencies whose practices were recognized as most interesting for UDOT. The survey contained 22 questions which were developed for UDOT's need to investigate improvement areas in its own operations. After reviewing responses from 54 agencies, a technical advisory team selected TMC candidates to interview during field visits. Two tours by groups of UDOT engineers and researchers were organized and included Minnesota, Pennsylvania, Ohio, Virginia, California, and Missouri (see map below). Tour participants gathered several best practices from these field visits.



The UDOT advisory team for this study identified a number of improvements for adoption based on the national TMC survey and field visits. These represent areas for improving UDOT's technology and services, though they may be applicable to other TMCs. Some of these improvements were adopted even before completion of the study:

- ◆ Employment of a systems engineer to ensure compatibility between ITS components and overall systems architecture.
- ◆ Minimization of controller compatibility issues.
- ◆ Preference for web/apps over 511 telephone systems.
- ◆ Development of a ramp metering policy for optimal balance between traffic flow and impacts.
- ◆ Enhancement of the control room with natural light to improve operator morale.
- ◆ Certification of traffic signal technicians, using training to help maintain technician competency and workforce succession.
- ◆ Use of retroreflective borders on backplates around signal heads.

A more detailed summary of the study is included in a [publicly available paper](#) prepared for the 2014 TRB Annual Meeting. For more information, contact Cameron Kergaye (ckergaye@utah.gov) of the UDOT Research Division.

Opportunities: SHRP2 Implementation Assistance

Round Four of SHRP 2 Implementation Assistance Opens for Applications in June 2014

This June, additional projects will be available from the second Strategic Highway Research Program (SHRP 2). In the fourth round, FHWA and AASHTO will provide various funding levels to selected state DOTs to implement the following [twelve products or “solutions”](#):

- * Managing Risk in Rapid Renewal Projects (R09)
- * Innovative Strategies for Managing Complex Projects (R10)
- * T-PICS/Economic Analysis Tools (C03/C11)
- * Integrated Travel Demand Modeling (C10/C04/C05/C16)
- * Reliability Data and Analysis Tools (L02/L05/L07/L08)
- * Designing and Preserving Bridges to Achieve a 100-Year Service Life (R19A)
- * Composite Pavement Systems (R21)
- * Rapid Technologies to Enhance Quality Control on Asphalt Pavements (R06C)
- * Nondestructive Testing Technologies for Concrete Bridge Decks (R06A)
- * Mapping Defects In or Behind Tunnel Linings (R06G)
- * Tools to Evaluate and Improve Pavement Smoothness on PCC in Real-Time During Construction (R06E)
- * Concept to Countermeasure—Research to Deployment Using the SHRP2 Safety Database

Applications for implementation assistance for these products will be accepted on the [FHWA SHRP 2 website](#) beginning June 2014. Information on the SHRP 2 products and implementation activities is also available on the FHWA SHRP 2 website. UDOT staff should check with their Region Director or Group Leader before submitting applications. Contact Jason Richins in Research, if you would like help preparing the applications.

In the third round of the SHRP2 Implementation Assistance Program, UDOT applied for four of the five solutions:

- * Precast Concrete Pavement (R05)
- * Identifying and Managing Utility Conflicts (R15B)
- * Pavement Renewal Solutions (R23)
- * GeoTechTools (R02)

We recently learned that UDOT was awarded user incentives for Pavement Renewal Solutions (R23) and GeoTech Tools (R02). We look forward to working with our Pavement and Geotech areas! We appreciate the hard work of those that helped with the applications.



UDOT has already benefited from the research studied in these projects and has been using parts of the research in these SHRP2 solutions:

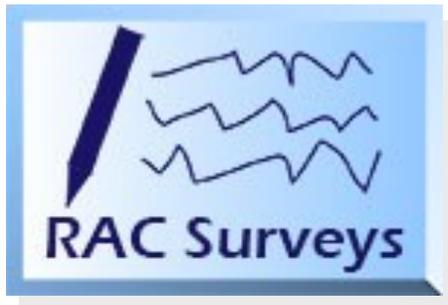
- * Precast Concrete Pavement (R05), Outside of this research project, Regions 1 & 2 have done a lot of concrete panel repairs/replacements with Precast Concrete Panels. They have successfully removed and replaced cracked concrete pavement with a durable long lasting repair using overnight closures.
- * In our Utilities group, they have been using a modified version of the (R15B) spreadsheet to manage utility conflicts. One region is using it on almost all their projects.
- * The GeoTech Tools (R02) project has developed a website that gives a lot of valuable information. www.GeoTechTools.org The website is aimed at Geotechnical, Structural & Pavement Engineers, but anyone can create a login and password and be able to access the information on 46 geotechnical solutions for embankments on soft soils, embankment widening, and pavement foundations. The information available is extensive. Fact Sheets, Photos, Case Histories, Design guidance, QC/QA Procedures, Cost Estimating, Specifications, and Bibliographies are available on the website.

We look forward to working with TRB, FHWA and AASHTO on implementing these technologies. For more details, contact Jason Richins of the UDOT Research Division (jtrichins@utah.gov).

What Do RAC Surveys and Peer Exchanges Have In Common?

The answer is: the resourceful [website](#) of the AASHTO Standing Committee on Research (SCOR) and its Research Advisory Committee (RAC). Two tools on this website are very useful to state DOT engineers, leaders, and research managers: the [RAC survey](#) results and the research [Peer Exchange](#) reports.

Periodically, members of the AASHTO RAC in various state DOTs will circulate RAC surveys on topics of interest provided by their agencies' leaders and staff. The UDOT Research Division will then coordinate UDOT's response to the survey with other division leaders and their expert staff. We appreciate everyone's help in responding to past RAC surveys.



UDOT can also initiate RAC surveys. Responses typically take a few weeks to come back. If UDOT leaders and staff cannot find needed information on other state DOTs in published or online sources, feel free to contact Cameron Kergaye (ckergaye@utah.gov) or David Stevens (davidstevens@utah.gov) in the Research Division to discuss a RAC survey. Results of completed RAC surveys are available on the SCOR/RAC website and act as useful syntheses on various topics. Examples of recent survey topics include:

- Construction Permitting Portals
- Employee Mentoring Programs
- Salt Storage Practices



Research peer exchanges are required by FHWA and provide an opportunity for state and national transportation agency participants to share management innovations and best practices to promote excellence in their research units. Both staff and management from the host state and a group of invited state and federal research managers exchange information that is relevant to the host state's research program over two to four days. Most states will host a research peer exchange once every three to five years. Peer Exchange reports are also available on the SCOR/RAC website. Examples of recent peer exchange themes include:

- Transportation Research Implementation and Performance Analysis
- Most Promising Research and Asset Management
- Product Evaluation

For more information contact David Stevens of the UDOT Research Division (davidstevens@utah.gov).

RESEARCH CALENDAR OF EVENTS

RESEARCH FUNDING OPPORTUNITIES (click to see the full document)

April 16, 2014 - UDOT Research Problem Statements DUE

May 1, 2014 - Transit IDEA Proposals DUE

June 2014 - Applications Accepted for Round 4 of SHRP2 Solutions Implementation Assistance

2014-2015 - Applications Accepted for FHWA Accelerated Innovation Deployment (AID) Demonstration Grant Program



WEBINARS (Click to see webinar details)

Title	Day/Date	Time	Location
Conducting Forensic Investigations of Highway Pavements (TRB)	Thursday, April 10	12:00 PM – 1:30 PM	Personal computer or conference room
Programs and Policies to Advance Livability (NHI)	Thursday, April 17	11:00 AM – 12:30 PM	
Rockfall – Mitigation and Management (TRB)	Wednesday, April 30	11:00 AM – 1:00 PM	
SHRP2 Tuesdays Webinar: Bridges Beyond 100 Years: Innovative Systems (TRB)	Tuesday, May 6	12:00 PM – 1:30 PM	
Basic Right of Way 101 Requirements for Federal Participation in Right of Way Projects	Tuesday, May 20	12:00 AM – 2:00 PM	
Leading Yourself and Others to Higher Levels of Performance: A Four-Fold Approach	On demand	On demand	
Why Teams Fail: Dealing with Friction and Dissension	On demand	On demand	
Brain Health Webinar	On demand	On demand	
Approaching Wellness with Mind & Body	On demand	On demand	