

# Research Newsletter

**Responsive - Accessible - Relevant**

## A MESSAGE FROM THE RESEARCH DIRECTOR

*By: Cameron Kergaye, PhD, PMP, PE*

UDOT Research is pleased to host another research workshop (UTRAC) to identify solutions to our transportation challenges. This is an opportunity for engineers and academia to discuss the importance of research as it relates to UDOT's transportation goals, and for UDOT to prioritize project funding. Last year 44 unique problem statements were evaluated covering five subject areas. Fifteen of those problem statements were subsequently funded; and we are beginning to see benefits of the research.

A recent AASHTO request for high value research from UDOT allowed us to promote some of our completed (or nearly completed) projects. All were originally problem statements selected at a past workshop and are now providing measurable benefits. The following studies highlight a few of our submitted high value research projects. For a more complete list, please refer to the UDOT High Value Research article contained within this newsletter.

- Strong Motion Instrumentation Plan
- Culvert Roughness Elements for Native Fish Passage
- Determining Use of Wildlife Crossing Structures Under Different Scenarios

This year two new subject areas will be considered: environmental/hydraulics and preconstruction. Environmental and hydraulics (a combined subject area) has been featured in past workshops, as evidenced by the high value projects above. Preconstruction as a subject area will be specifically considered for the first time this year. Its focus will be project delivery and preconstruction activities such as design, GIS, CAD, project management and databases, risk management, right-of-way and utilities.

The workshop will take place on May 10<sup>th</sup>, with problem statements due by April 26<sup>th</sup>. Information and registration may be found on the Research Division website: [www.udot.utah.gov/go/research](http://www.udot.utah.gov/go/research)



2011 Research Workshop (UTRAC)

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**Completed and Active Research Available at:** [www.udot.utah.gov/go/research](http://www.udot.utah.gov/go/research)

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## JOHN NJORD ON RESEARCH

**The role of transportation researchers is to be continually “scouring the river looking for those valuable gems of truth that will enable us to be even better.” - John Njord**



John Njord, UDOT  
Executive Director

“Our business is dynamic and it’s changing all the time,” according to UDOT Executive Director John Njord. In the constantly shifting world of transportation, it’s important for leaders to understand the leading edge. To set the stage for progress, Njord prefers taking a step forward to the “bleeding edge.” In a recent interview Njord explained the bleeding edge, how UDOT has benefitted from research and what the future holds for transportation.

Leading safely will produce a good transportation system, but “the bleeding edge is where you’re cutting new territory,” explained Njord. He believes that leaders need to be willing to say “ok, nobody has done this, we don’t know if it will be successful, but we’re going to try it anyway.”

To reach the bleeding edge, executives need to create an environment where failure is not punished. Njord hopes researchers and others at UDOT feel comfortable enough to “step out on the edge” while weighing risks against benefits and doing as much as possible to ensure success.

### Recent success

Research has helped UDOT’s efforts to improve system mobility and reduce construction related delay. When many intersections along the Bangerter Highway in Salt Lake County were facing operational challenges, UDOT engineers “launched out to Juarez, Mexico” to investigate Continuous Flow Intersections (CFIs). UDOT has since built many CFIs. With design changes that make operation better suited to Utah locations “they are

tremendously efficient,” explains Njord.

Bridge moves allow road users to collectively realize savings in the millions of dollars by avoiding construction related delay. Nearly a decade ago, Njord and others from UDOT traveled to Florida to learn about accelerated bridge construction.

Today, UDOT has rolled more new bridges into place than all other states combined, he explains. “The time savings we’ve been able to generate for people who travel on the highways is worth finding new ways to work; we’re on *that* bleeding edge,” said Njord.



I-80 Bridge Move (Parley’s Canyon)

### Great expectations

Njord looks forward to seeing new research generate products that will make the transportation system safer and more reliable. SHRP 2, a Transportation Research Board effort, is focusing on developing ways to improve safety at intersections, rehabilitate highways and bridges without disrupting traffic, minimize unpredictable traffic congestion and expand highway capacity while also considering the natural and built environments.

For more information contact: Catherine Higgins at [CHiggins@utah.gov](mailto:CHiggins@utah.gov)

## STRONG MOTION INSTRUMENTATION PLAN

The highway transportation system in Utah is essential to Utah's economy and future growth potential. In order to help protect and maintain the highway system including highway structures, a strong motion instrumentation plan is needed to monitor bridge motion and possible damage that may occur in a seismic event.

Funding for seismic instrumentation is limited and should be used in the most effective way possible. Since all state bridges cannot possibly receive seismic instrumentation, the questions of "which bridges should be instrumented?" and "what factors should be considered?" need to be addressed. The goal of this project was to develop a methodology to help UDOT identify bridges for possible seismic instrumentation.

The submitted report by Utah State University includes a decision tree that is designed to help UDOT personnel compare a group of bridges in order to select those that are the most highly qualified candidates for seismic instrumentation based on the identified factors.

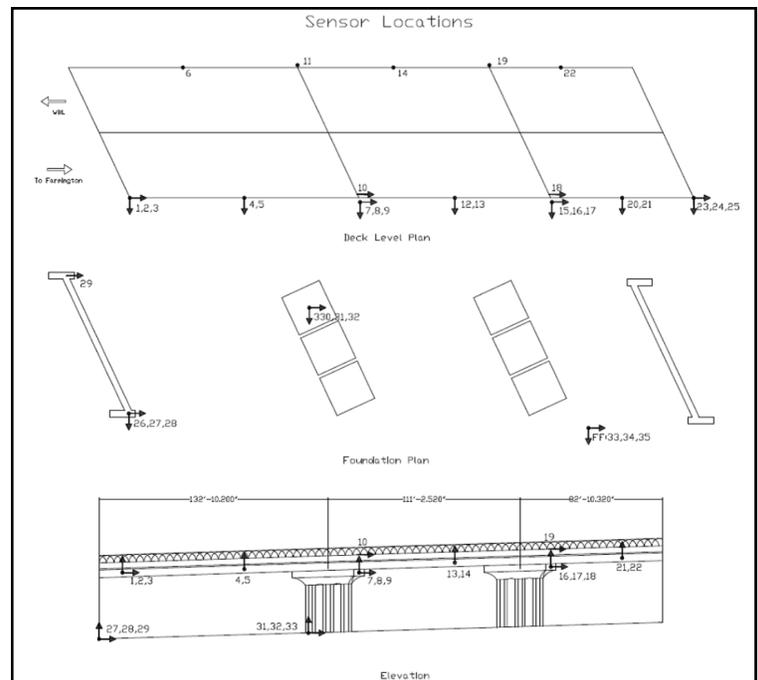
Identifier	Sub-Identifier	criteria	weight	Points
Proximity	to Identified Sources (miles)	Select One	5	3
		0<x<3		1
		3<x<10		0
	to another instrumented bridge (miles)	Select One	2	3
		x>10		1
		3<x<10		0
Importance	Average Daily Traffic	Select One	4	3
		ADT >3000		1
		ADT <3000		0

A Portion of The Decision Tree Template

This decision tree is based on factors such as; proximity to identified faults, structure importance, structural form, local soil conditions, and structure age. The calculations in the decision tree are purposely transparent to the user so that the "weighting factors" can be modified as desired.

The impact of this project is that when the question of seismic instrumentation is discussed, there is now an existing methodology to assist in selecting candidate bridges to receive instrumentation.

The next step for this project is the implementation of this methodology in the annual planning process so that in a very gradual way important structures can begin to be instrumented within the state. Seismic instrumentation can be thought of as the "data recorder," or "black box" in an airplane. The data is not used on a daily basis, but in case of a seismic event, it would be considered essential.



F-663 Bridge Instrumentation Plan

A copy of the full report can be found on the Research [website](#). For more information please contact Marvin W. Halling of Utah State University [marv.halling@usu.edu](mailto:marv.halling@usu.edu) or Kevin Nichol of the UDOT Research Division: [knichol@utah.gov](mailto:knichol@utah.gov)

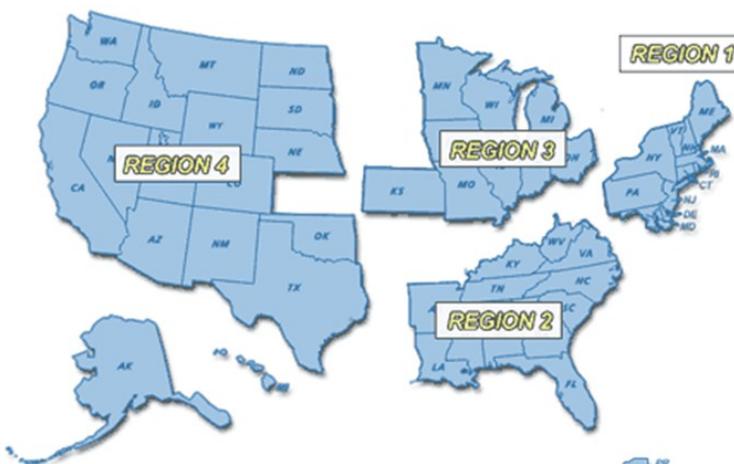
## UDOT HIGH VALUE RESEARCH



Each year, The American Association of State Highway and Transportation Officials (AASHTO) gathers, compiles, and publishes High Value Research (HVR) highlights from across the nation. AASHTO also presents a few of the HVR projects at the Research Advisory Council (RAC) annual meeting. The research highlights contain information on research projects that state DOTs feel have been of great value and provide recommendations to improve the transportation infrastructure.

There will always be an endless call for things to be researched and improved. The public wants to see bottom line results and to stretch their dollars to cover more. So occasionally, we have to remind ourselves of the value of research in the public sector.

UDOT has been actively involved in submitting nominations for the AASHTO High Value Research. All RAC Region Four submittals were due to the RAC 4 Chair and Vice-Chair on March 29th. Region Four will vote to select the top four submittals for forwarding to the Value of Research Task Force by April 20th. This year, UDOT submitted the following nominations from several



AASHTO RAC Regions

of our completed and ongoing research projects.

- *Liquefaction Mitigation in Silty Sands Using Stone Columns with Wick Drains*
- *Inspection, Assessment, and Database of MSE Walls*
- *Transportation Safety Data and Analysis*
- *Determining Use of Wildlife Crossing Structures Under Different Scenarios*
- *Evaluation of Utah Work Zone Practices*
- *Strong Motion Instrumentation Plan*
- *Culvert Roughness Elements for Native Fish Passage*
- *Development of a Sign Management Plan & System*
- *Retrofitting Culverts and Fish Passage-Phase II*

Nationally last year, there were **151** High Value Research highlights from **33** State Departments of Transportation, Federal Highway Administration (FHWA) and Transportation Research Board (TRB).

A collection of high value research highlights from across the nation are compiled each year for the RAC Annual Meeting and can be found at this [link](#).

For more information regarding HVR, please contact Abdul Wakil @ [awakil@utah.gov](mailto:awakil@utah.gov)

## TIGS: ENHANCING RESEARCH DATA MINING

Under the guidance of UDOT Deputy Director, Carlos Braceras, and UDOT Asset Management Director, Stan Burns, UDOT is currently putting the finishing touches on an internet program called Transparency in Government Spending (TIGS). Although not its primary purpose, this program has the potential to enhance data mining for research projects. TIGS will align each UDOT project with the Department Strategic Goals (Preserve Infrastructure, Optimize Mobility, Improve Safety, and Strengthen the Economy) and provide transparency by posting critical information about each project.

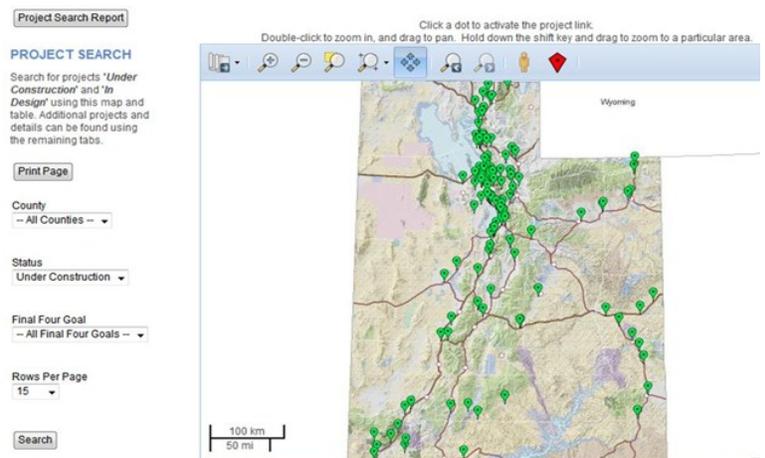


TIGS Home Page

By combining a large variety of data about UDOT projects, TIGS can provide quick answers to common research questions. For example, let's say a researcher was gathering data about Utah bridge repair and wanted to conduct an analysis, some of the useful information that can be discovered by using TIGS includes but is not limited to:

1. What UDOT has done before?
2. What UDOT is currently doing?
3. How much was spent?
4. Where each project was conducted?
5. The duration of each project?

In conjunction with providing answers to research questions, TIGS utilizes Google map features to show where each project is in satellite, map, and street views. There are also color coded pins on the map that label and provide an exact location of each project. Researchers can search projects by region, county and status.



TIGS Project Search Page

Currently, the TIGS internet program is still under construction but can be located on the UDOT web site. The site will be fully functional by July 1, 2012. If researchers would like an early sneak peak and a chance to try TIGS before July 1, 2012, a beta version of the program can be found by following the [link](#).

For more information please contact UDOT Webmaster, Becky Parker, at [rebeccaparker@utah.gov](mailto:rebeccaparker@utah.gov)

## **RESEARCH CONTRACT DOCUMENTS UPDATED**

As of March 1, the UDOT Research Division has been using a completely updated contract template. The two primary motivators for the update were to align this boilerplate more closely to the one used by UDOT Consultant Services and to streamline the contract standard and special provisions that had previously been brought together from multiple sources.



Signing of a contract

### **Certification of Consultant**

A new Attachment A – Certification of Consultant – has been added that matches the Consultant Services contract. Additional language has been added to Attachment A to address the unique needs of research projects.

### **Standard Terms and Conditions**

Attachment B – Standard Terms and Conditions – now combines two previous attachments. The wording in Attachment B matches the wording used by Consultant Services wherever applicable and will be updated when their template is updated.

### **Services Provided by the Consultant**

The new Research Division contract template includes a rough outline for an Attachment C – Services Provided by the Consultant – that may be downloaded separately in a Word format and prepared through consultation between the Principal Investigator, the UDOT Project Champion, and the UDOT Research Project Manager.

### **Method of Payment for Contract Services**

A new Attachment D – Fees – has been added, consistent with the Consultant Services template, that outlines the method of payment for contract services and three versions are included in the new template. In most cases, the lump sum version will be used for Research Division contracts, but there will likely be occasional cases when a cost plus a fixed fee contract or a unit price contract would be appropriate.



Discussing Attachments

The updated contract template is available for viewing on the Research Division [website](#). For more information please contact Kevin Nichol of the UDOT Research Division: [knichol@utah.gov](mailto:knichol@utah.gov)

## PIONEER: UTAH'S ONLINE LIBRARY

Many employees may not be aware of a great online information source available to all Utahns: Pioneer, Utah's Online Library, located at <http://pioneer.utah.gov>. Pioneer is a portal to selected electronic resources, including many that are usually only available by subscription. The Utah State Library develops and maintains the Pioneer site in collaboration with Utah's public libraries.



Pioneer Library Website

Pioneer contains databases on a variety of topics, including newspapers and magazines, jobs and careers, business and finance, health and medical, genealogy, and homework help for kids and teens.

In the newspaper database, you can access current editions of many of Utah's daily newspapers, including some of the university and college papers (BYU, U of U, Westminster), along with the archives of some newspapers, including the *Deseret News* back to 1988 and the *Salt Lake Tribune* back to 1990.

You can search by topic within a specific magazine or academic/professional journal or browse through an entire edition of a magazine. For example, to access the current edition of *Newsweek*, you would follow this path from the home page: Newspapers & Magazines > MasterFile Premier > EZ Access > Publications > enter

*Newsweek* into the search field, click browse > click on *Newsweek* > select an issue.

There are many magazines of general interest available, including *Popular Science*, *Slate*, *Parenting*, *Consumer Reports*, *Scientific American*, *Saturday Evening Post*, and *Foreign Affairs*.

More scholarly/work-related materials, such as *Civil Engineering*, can be accessed through the Academic Search Premier link.

In some cases, citation information may be given instead of a full text article. If you would like to see the entire article, print out or note the citation information and contact UDOT's Librarian, Joni DeMille, to arrange an Interlibrary Loan. Articles accessed through Pioneer are generally text only and do not include photographs or graphics. If a library card is requested for access, please use your Salt Lake County library card number.

Dictionaries, thesauri, encyclopedias, almanacs, and atlases can also be accessed through Pioneer, and you can find links for looking up acronyms, synonyms and antonyms, and for help with style, usage and grammar. There is even a ReferenceUSA link that includes access to telephone white pages and contact and management details for US businesses.

The Pioneer Online Library contains a wealth of information extending far beyond what's been highlighted here. Please take some time to explore the different databases and to discover what has been made readily and freely available to Utah residents.

If you have any questions or need more information, you may contact either the State Library at [cel-reference@utah.gov](mailto:cel-reference@utah.gov) or (801)715-6750, or UDOT's Librarian, Joni DeMille, at [jdemille@utah.gov](mailto:jdemille@utah.gov) or (801)965-4626.



## RESEARCH CALENDAR OF EVENTS

### 2012 UDOT RESEARCH WORKSHOP (UTRAC)

**APRIL 26, 2012** - UDOT Research Problem Statements **DUE**

**MAY 10, 2012** - UDOT Research Workshop (UTRAC), Sandy, Utah

For more information about the 2012 Research Workshop please click the image link:



### RESEARCH FUNDING OPPORTUNITIES

**MAY 1, 2012** - SHRP 2 Capacity Reliability Project Proposal **DUE**

**MAY 3, 2012** - Highways For LIFE Technology Partnerships Program Grant Proposals **DUE**

For a complete calendar listing of funding opportunities please click the image link:

Month	Topic	Due Date
January	BITA Announces \$17 Million in Transportation Research & Education Grants to UTCs Highways for LIFE FY 2012 Discretionary Grant Applications	N/A January 6, 2012
February	NCHRP Problem Statement Solicits NCHRP Synthesis of Practice Topics	February 17, 2012 February 17, 2012
March	NCHRP Highway Innovations Deserving Exploratory Analysis (IDEA) Proposals Airport Cooperative Research Program (ACRP) FY 2013 Problem Statements	March 2, 2012 March 2, 2012
April	Safety IDEA Proposals Transit Cooperative Research Program (TCRP) Synthesis of Practice Topics Small Business Innovation Research (SBIR) Applications Small Business Technology Transfer (STTR) Applications National Institute of Transportation and Communities (NITC) Proposal Abstracts Nevada DOT Research Proposals for Selected Problem Statements EPA Funding Opportunities UDOT Research Problem Statements NCHRP Project 20-7 Spring Submission Cycle Proposals Submitted by AASHTO Committee	April 1, 2012 April 2, 2012 April 4, 2012 April 4, 2012 April 13, 2012 April 20, 2012 April 26, 2012 April 26, 2012 April 27, 2012

### WEBINARS

**APRIL 10, 2012** - Managing Gravel Road Maintenance

**APRIL 19, 2012** - Use of Social Media During Weather Events

**APRIL 24, 2012** - FHWA Guidance on Using Corridor And Subarea Planning To Inform NEPA Training

For specific times and a complete webinar listing please click the image link:

Topic	Date	Time	Location
Erosion and Sediment Control for Native and Aggregate Surfaced Roads	April 4, 2012	10:00 AM-12:00 PM	Library Technology Transfer Conference Room
Benefit-Cost Analysis for Operations	April 4, 2012	11:00 AM-12:30 PM	Systems Planning and Programming Conference Room
Managing Gravel Road Maintenance	April 10, 2012	10:00 AM-12:00 PM	Library Technology Transfer Conference Room
Construction Contractor Series #2: Experiences with ABC Projects in Utah	April 12, 2012	11:00 AM-12:00 PM	Project Development Conference Room
Use of Social Media during Weather Events	April 19, 2012	11:30 AM-12:30 PM	Systems Planning and Programming Conference Room
Everyday Counts (EDC) Workshop	April 19, 2012	12:00 AM-2:00 PM	UDOT Region Four-Shirley Conference Room
FHWA Guidance on Using Corridor and Subarea Planning to Inform NEPA Training	April 24, 2012	11:30 AM-12:30 PM	Library Technology Transfer Conference Room
Practices and Examples to Manage Sign Retroreflectivity in Compliance with the MUTCD	May 2, 2012	12:00 AM-1:30 PM	Library Technology Transfer Conference Room
Research Workshop	May 10, 2012	8:30 AM-3:00 PM	SLOCC Larry Miller Campus