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Kansas Department of Transportation

News

Research & Technology

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Partnership Builds on Road Lighting Research North of Chanute

by Joshua Vail, *Chanute Tribune* reporter

The Kansas Department of Transportation is partnering with Pittsburg State University on a research project at two U.S. 169 intersections north of Chanute.

The experiment involves independent solar-powered lights in the road surface—yellow lights along yellow road lines and white lights for white lines.

Kansas Department of Transportation Engineering Associate Chris Pross said KDOT is installing lights on the offramps at the Plummer interchange and on Old 169 Highway and at the Humboldt-Chanute Road interchange on Old 169 Highway. While both yellow and white lines are being lit at Plummer, only the yellow lines are being lit at Humboldt-Chanute.

A total of 600 lights will be installed at the two intersections, with 110 lights installed at the Humboldt-Chanute interchange and 490 installed at Plummer. The lights themselves cost about \$100, not including installation. Pross estimated the total cost of installing the 600 lights at about \$100,000.

Pross said the lights are intended to illuminate the lines so that drivers can see their way, and provide enough brightness to illuminate the intersection, replacing both





reflectors and overhead streetlights.

Pross said the main goal is increasing safety by making road lines more visible at night, but savings are expected if the project is successful. Currently, the cost of power and maintenance for the overhead lights at the Humboldt-Chanute interchange is about \$20,000 per year. Though the initial cost of installing lights is about the same as the cost of installing overhead lights, the power cost of the new lights is zero.

Pross said KDOT chose to work with PSU because of its strong construction background, and the main goal is increasing safety at the interchanges. He noted this project is still mainly an experiment.

Pross said KDOT and PSU will try different options in the project, including 10-, 12- and 15-foot spacing between lights. They also need to test how well the lights stand up to being driven on or coming into contact with snow plows as fall moves into winter.

Pittsburg State University School of Construction Assistant Professor Seth O'Brien said they are also testing which adhesive is the most effective for the price. The lights are placed in holes drilled into the road surface, and are secured with either grout (\$2 per hole), epoxy (\$25 per hole) or epoxy on the bottom of the hole with silicon on top (\$15-18 per hole).

O'Brien said there will be advantages for residences near the interchanges as well.

"These lights won't be flooding the area," he said. "The lights only shine one way."

O'Brien said those in southbound lanes will only see the southbound lights marking their side of the yellow lines, while those going north will only see the northbound lights.

The installation of the lights at both interchanges is expected to be finished in two weeks.

Editor's note: This article originally appeared in the Chanute Tribune and is reprinted here with permission.

Joshua Vail/Chanute Tribune



KDOT Workers Install a Solar Powered Light on Old 169 Highway Near the Humboldt-Chanute Road Interchange. KDOT Will Install 110 Lights at That Interchange and 490 at the Plummer Interchange.

The New Bureau of Research

by Rick Kreider, Bureau Chief

In March of 2013, Division Director Catherine Patrick announced the re-alignment of the Division of Operations. It officially took place on July 1st, which coincided with the new fiscal year. As we enjoy the upcoming holidays, I am very thankful for all of the assistance received from the Bureau and agency staff during this transition period.

There was a coordinated effort to handle unforeseen obstacles. Those obstacles were and continue to be resolved with help from our great staff. Recently, many have helped in the restructuring of several office spaces in the Materials and Research Center (MRC). This helped provide more space not only to Research staff, but also to the staff of other bureaus located in the MRC. I thank them for their efforts in making the changes minimally invasive.

I look forward to continuing as Chief for the Bureau of Research and seeing what we can accomplish together in the new year. Happy Holidays!

Research Peer Exchange

by Susan Barker, Technology Transfer Engineer
and
Rodney Montney, Research Engineer

The Kansas Department of Transportation held a Research Peer Exchange in September 2013. The participating states were: Illinois, Louisiana, Minnesota, Missouri, and Utah. The focus on this peer exchange was tracking the benefits of research whether it was in house or contracted out. Many of the attending states have other duties assigned to their Research sections, or Research is part of another section. Some are part of a Materials section while others are associated with Planning. Some of the states conduct routine testing within the Research section, such as FWD, skid data collection, and laboratory testing.

Noteworthy findings from the Peer Exchange include:

- All of the attending states had implementation plans, but most of the states begin working on the implementation plans from the beginning of the project.
- Some of the attending states separate out projects that they know will not have implementation plans and label them as such from the beginning. These are projects where the product will be knowledge, or information to be gained, policy research, or research where the product will be training. These projects are not included in benefit/cost ratio calculations. At least three of the states do not do this type of soft side or policy research. These three states require quantifiable benefits before the research is approved.
- Most of the states have committees that oversee the Research projects instead of a single project monitor. They require quarterly or semi-annual meetings and reviews. Missouri's research administrator decides which projects to fund and forwards the program to the chief engineer. The other states have committees or groups that determine which projects to fund.



- Some of the states have the principal investigator assist in the B/C calculation. More than one of the states will not accept proposals unless the PI has a champion in the DOT for that proposal. Two states hire consultants to calculate their benefits or act as implementation engineer for their project.
- Some of the states keep money in their budgets to allow for cost overruns and extensions. Most of the states allow time extensions also. Three of the states pay tuition as part of their contract research with the universities, either directly or indirectly. The other three states do not pay tuition.

Recent Publications

Here's a look at research reports sponsored by the Kansas Transportation Research and New-Development (K-TRAN) Program and other Kansas research reports published between September 2013 to December 2013.

The Texting and Driving Epidemic: Changing Norms to Change Behavior

This campaign was created to reduce texting and driving and to increase awareness of the serious risks involved with texting and driving. The target audience of the campaign is The University of Kansas students. It proposes an "Anti-Texting and Driving Week" that implements guerilla marketing strategies with support from traditional and social media outlets prior to, throughout and after the main event. The campaign is designed to be exportable to other campuses in Kansas and nationwide.

The objective of the campaign is to:

1. Increase awareness about the dangers of texting and driving.
2. For those who are not driving, to speak up to the driver.
3. Change the perception of the students to build a negative connotation of texting and driving.

The campaign will utilize the captive audience of the campus environment to deliver messages to students in an unique way in order to create a stigma around texting and driving. The pervasiveness of cell phones and texting and driving provide a formidable challenge, as well as the opportunity to resonate with a larger audience. Strategies included in the campaign are:

1. Place advertisement with the *University Daily Kansan* focusing on the dangers of texting and driving.
2. Series of two advertisements in *Jayplay* (campus newspaper).
3. Create video public service announcements (PSAs) and distribute them through social media.
4. Advertise on campus buses where students will frequently be exposed to it.



5. Run a public service announcement on the radio.
6. Create a “Txt L8r. Drive Safer.” Facebook Page.
7. Create a “Txt L8r. Drive Safer.” Twitter account to send campaign update tweets using the hashtag #thumbsonthewheel.
8. Use Facebook ads to direct student attention toward our campaign’s Facebook page.
9. Contact the University of Kansas athletic “celebrities” as well as local Lawrence businesses to promote our cause via Twitter and Facebook.
10. Create an Anti-Texting and Driving Week event on campus.
11. Create a scavenger hunt for students to participate in as part of the event week to raise awareness and increase interaction with the campaign, posting clues online and in the *University Daily Kansan*.
12. Partner with the University of Kansas Student Union Activities (SUA) to put on a benefit concert at the end of the event week.



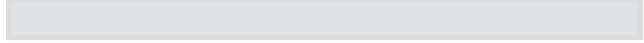

This report was published as K-TRAN: KU-12-2, [The Texting and Driving Epidemic: Changing Norms to Change Behavior](#), by Paul Atchley, Ph.D.; Mugur Geana, M.D., Ph.D. October 2013.



Effects of Curing Methods and Supplementary Cementitious Material Use on Freeze Thaw Durability of Concrete Containing D-Cracking Aggregates

For concrete pavements in Kansas, the most effective method of increasing their sustainability is to increase the service life. One of the principal mechanisms of concrete pavement deterioration in Kansas is freezing and thawing damage. Some Kansas limestone aggregates are known to be very susceptible to D-cracking and have resulted in millions of dollars in maintenance costs. The Kansas Department of Transportation (KDOT) has developed rigorous testing procedures for limestone aggregate use in concrete.

In this study, the role of concrete curing, mixture proportioning, and aggregate type on the freeze thaw durability of concrete beams tested using ASTM C 666 method B were investigated. This study found that long periods of soaking in lime water produced more damage during freezing and thawing than standard KDOT curing methods. Curing for shorter period of time in a lime wa-



ter bath at 100°F however gave comparable freeze thaw results to that seen with the longer standard KDOT curing regime. Increasing the concretes' resistance to water penetration can greatly increase the freeze thaw durability of concrete containing D-cracking susceptible aggregates. It was seen that the concrete volume of permeable voids and water absorption rate correlated well with the freeze thaw durability of concrete made with a poor quality aggregates. It is recommended that KDOT continue to enforce concrete permeability and volume of permeable voids specifications to improve the service life of Kansas concrete pavements.

This report was published as K-TRAN: KSU-11-2, [Effects of Curing Methods and Supplementary Cementitious Material Use on Freeze Thaw Durability of Concrete Containing D-Cracking Aggregates](#), by Kyle A. Riding, Ph.D., P.E.; Brett Blackwell; Amir Farid Momeni; Heather McLeod, Ph.D., P.E. December 2013.

Other Reports Published Since September 2013

K-TRAN: KSU-09-2, [Investigation of Aged Hot-Mix Asphalt Pavements](#), by Jeremiah Thomas; Farhana Rahman; Mustaque Hossain, Ph.D., P.E. September 2013.

K-TRAN: KU-09-5R, [Evaluation of Innovative Traffic Safety Devices at Short-Term Work Zones](#), by Ming-Heng Wang, Ph.D.; Steven D. Schrock, Ph.D., P.E.; Yong Bai, Ph.D., P.E.; Robert A. Rescot, M.S., E.I.T. September 2013.

K-TRAN: KSU-12-5, [Establishment of a Building Audit Procedure and Analysis for the Kansas Department of Transportation Phase 2A: Buildings](#), by Kyle A. Riding, Ph.D., P.E.; Robert W. Stokes, Ph.D.; David Carter; Julia Keen, Ph.D., P.E.; Rebecca Gentry; Kimberly Pierson. November 2013.

K-TRAN: KU-10-2, [Capacity of Scour-Damaged Bridges, Part 2: Integrated Analysis Program \(IAP\)—A Program for the Analysis of Lateral Performance of Pile-Supported Structures under Scour Conditions](#), by Cheng Lin; Caroline Bennett, Ph.D., P.E.; Jie Han, Ph.D., P.E.; Robert Parsons, Ph.D., P.E.; A. David Parr, Ph.D. November 2013.

K-TRAN: KU-11-6, [Establishing a Design Procedure for Buried Steel-Reinforced High Density Polyethylene \(SRHDPE\) Pipes](#), by Deep Kumar Khatri, M.S.; Jie Han, Ph.D., P.E.; Ryan Corey, M.S.; Robert L. Parsons, Ph.D., P.E. November 2013.

K-TRAN: KU-11-8, [Use of Innovative Concrete Mixes for Improved Constructability and Sustainability of Bridge Decks](#), by Pankaj Narayan Shrestha; Amber Harley; Benjamin Pendergrass, Ph.D., P.E.; David Darwin, Ph.D., P.E.; JoAnn Browning, Ph.D., P.E. November 2013.

K-TRAN: KU-10-1, [Evaluation of Interactive Highway Safety Design Model Crash Prediction Tools for Two-Lane Rural Roads on Kansas Department of Transportation Projects](#), by Steven Schrock, Ph.D., P.E.; Ming-Heng Wang, Ph.D. December 2013.

KS-13-4, [Report of Concrete Pavement Evaluation: Project 105 C-4181-01 Donahoo Road, Wyandotte County](#), by Jennifer Distlehorst, P.E. December 2013.

K-TRAN: KSU-10-6, [Improving Safety of Teenage and Young Adult Drivers in Kansas](#), by Sunanda Dissanayake, Ph.D., P.E.; Niranga Asmarasingha, B.S., M.S. December 2013.

The Library Corner

Google Scholar: Quality Information, No Purchase Required



By Marie Manthe, KDOT Librarian

The Library Corner article in [the previous issue](#) discussed ways to use Google more efficiently, and focused on [Google's Advanced Search](#) functions, and using Custom Search tools like the [State DOT Search Engine](#). Now, I want to tell you about [Google Scholar](#), which is probably my favorite overall search tool.

Often, a basic search in Google (or most any search engine) will bring back links to pages that want to sell you something. If you search the same topic in Google Scholar, you **won't** find suggestions to buy various products that, according to the ads, will quickly and easily solve your research problem. Google Scholar searches the texts of articles (many of them from peer-reviewed journals), books, abstracts, court opinions, patents, and theses and dissertations. Many of these publications and documents are from universities, academic publishers, and professional organizations. An academic publisher's website will generally include a complete citation and abstract, but will charge for the PDF of the full article. That's when you contact your library to obtain access to the article.

When you have a report or paper that exactly meets your needs, you probably skim its bibliography to identify additional pertinent resources. With Google Scholar, you can also search **forward** in time, to see recent publications which cite the item you already have. In the example below, note that the article is dated 2009, and has already been cited 74 times in less than five years.

[Properties of sustainable concrete containing fly ash, slag and recycled concrete aggregate](#)
ML Berndt - Construction and Building Materials, 2009 - Elsevier
... Waste and supplementary cementing materials such as fly ash, blast furnace slag, silica ...
microstructural characteristics of the interfacial transition zone between RCA and cement paste
is ... and increase the microhardness of the interfacial transition zone for concrete with natural ...
Cited by 74 Related articles All 2 versions Cite Save

More citations doesn't always mean broad agreement and support: articles citing an earlier publication might be presenting arguments **against** its methods or conclusions. In any case, if a lot of people in your field are discussing a publication, you'll want to take a look at it.

Articles published in the past several years usually haven't been widely cited, simply because they're so new. Results in Scholar always have a link for "Related articles," so you might still locate helpful resources on that same topic, even if the article you start from has been cited only a few times or not at all.

Only a few weeks ago, Scholar added the option to "Save" resources from your list of search results. This feature, called "Scholar Library," allows users to create and maintain a collection of articles and references of interest to them. More information about this new tool is available [here](#).

The next time you have a research question, try searching Google Scholar and see what you find. If you have a great resource in hand that's five or ten years old, use Scholar to locate more recent publications where it's been cited. Search tips are available [here](#), but if you'd like some additional help, you can contact me at library@ksdot.org.

The KDOT Electronic Library (available only to KDOT personnel) which contains more than 66,000 documents (many full text) can be accessed at: <http://kdotweb/KDOTOrg/BurMatrlRes/kdotlib2.asp>.

The Research Reports Catalog (available to the public) which contains over 700 KDOT full text research reports can be accessed at: <http://www.ksdot.org/burmatrres/kdotlib2.asp>.

For assistance locating library materials, contact Marie Manthe, KDOT Librarian.

The KDOT Library is located in the Eisenhower State Office Building, 4th Floor, 700 SW Harrison Street, Topeka, Kansas 66603 and can be contacted at library@ksdot.org or by calling 785-291-3854.

Upcoming NHI and Technical Courses

February 25: NHI Freight & Land Use Workshop (Topeka, Kansas)

March 4: :ATSSA Traffic Control Technician (Lenexa and Salina, Kansas)

March 5–6: ATSSA Traffic Control Supervisor (Lenexa and Salina, Kansas)

March 24–27: NHI LRFD for Highway Bridge Substructures (Topeka, Kansas)

March 25–27: NHI Bridge Inspection Refresher Training (Topeka, Kansas)

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