

A Technology Transfer Newsletter for Local Transportation Agencies

Carroll County Works to Make Their Roads Safer

*Jeff Hackbart, PE, T2 Safety Circuit Rider
Amy I. Terry, Marketing, Outreach and Publications Manager*

After years of declining vehicular related deaths, Kentucky has recently seen a 5.3% increase on its roadways. This led Carroll County to look for low-cost safety solutions.

Bobby Lee Westrick, County Judge/Executive for Carroll County, reached out to the Safety Circuit Rider Program which is part of the Technology Transfer Program at the Kentucky Transportation Center, for assistance. Jeff Hackbart, Safety Circuit Rider, pulled crash data for Carroll County prior to his visit and then met with Judge Westrick in Carroll County. Together they visited county roads with high crash rates in the county.

In one case, Judge Westrick mentioned that the county had discussed installing guardrails along a curve on Carlisle Road to prevent vehicles from leaving the roadway. However, as the Judge noted, "When a vehicle hits the guardrail, it's too late to prevent the accident." That was the Judge's goal: to prevent the crash before it occurs.

Hackbart met with Gene Clayton, Carroll County Road Foreman, and conducted a small scale road safety audit on Carlisle Road. Using a digital ball bank indicator, they identified three horizontal curves that warranted advisory speeds and curve signage. The county ordered and installed the signs soon after meeting with Hackbart. By installing signs instead of the guardrail, the county saved about \$10,000. In addition, the signs will help prevent a crash before it happens.



Before: Carlisle Road MP 3.1 WB



After: Carlisle Road MP 3.1 WB

Also Inside:

**Ask an Engineer:
Americans with
Disabilities Act**

**End of Queue
Warning System**

**Oldham County
Uses CatStrong**

**Traffic and Safety
Academy**

**Vegetation Control
for Safety**

Routing Box

Welcome New Advisory Board Members

The Kentucky Transportation Center (KTC) Advisory Board was established by the Kentucky General Assembly in 1984. The Board consists of nine members appointed by the Governor with the following representatives: the Secretary of the Transportation Cabinet, the State Highway Engineer, the Dean of the College of Engineering; one member from a list submitted by the Kentucky Association of Counties, the Kentucky County Judge/Executives Association, and the Kentucky League of Cities; and three members at large.

KTC would like to welcome Greg Thomas, Patty Dunaway and Larry Holloway to the KTC Advisory Board.

Greg Thomas will serve as Chairperson of the KTC Advisory Board. He was appointed by Governor Matt Bevin as Secretary of the Kentucky Transportation Cabinet in April 2016. He joins the Cabinet after spending nearly 33 years in the electric and natural gas industry.

Thomas has a bachelor's degree in mechanical engineering and is a graduate of Leadership Kentucky. He is also a volunteer for Project Warm, the WHAS Crusade for Children, and Metro United Way. He lives in Louisville with his wife LuAnn. He has two sons, Will and Gus.

On April 20, 2016, the Cabinet announced that Patty Dunaway would serve as State Highway Engineer for the Kentucky Transportation Cabinet. She brings a wealth of knowledge from her 26 year career at the Cabinet where she has worked in various areas including construction, planning, and most recently, serving as Chief District Engineer for District Four highway office in Elizabethtown.

Dunaway began her career with the Cabinet as a scholarship student in 1990, working summers out of the Lexington and Elizabethtown district offices. She holds a bachelor's degree in civil engineering from the University of Kentucky. Dunaway lives in Leitchfield with her husband Jerry.

Larry Holloway was named Interim Dean for the University of Kentucky College of Engineering in July 2016. Holloway is also chair of the UK Department of Electrical and Computer Engineering.

Holloway joined UK in 1991 as a joint faculty member in the Department of Electrical and Computer Engineering and the Center for Manufacturing, where he served as director from 2002 to 2007. He has had leadership roles in several projects from the U.S. Department of Energy focusing on energy education and workforce development.

KTC is fortunate to have these three individuals as part of the Advisory Board. We look forward to hearing their new ideas for the Center. ■



Greg Thomas



Patty Dunaway



Larry Holloway

For additional information about the Kentucky Transportation Center, visit www.ktc.uky.edu.

Traffic and Safety Academy an FHWA Accelerating Safety Activities Program (ASAP)

The Kentucky Transportation Center's Technology Transfer Program is pleased to offer the Traffic and Safety Academy for local governments. The Federal Highway Administration's Office of Safety and Office of Technical Services awarded funds to Kentucky's Local Technical Assistance Program (LTAP) to host this four-day academy for local governments.

The Academy is designed to offer local governments training to reduce roadway departures and pedestrian fatalities. The training will include 16 various topics in four training tracks. The training tracts include:

- Technology: Examining Crash Data, GIS Mapping, Asset Management
- Regulations and Guidelines: Risk Management / Guide to Depositions, Communications with the Press and Public, Highway Safety Manual Implementation
- Design (Addresses Pedestrian Safety & Intersection focus areas): Intersection Safety and Alternative Designs, Pedestrian and Bicycle Safety, Guardrail Installation, Systemic Safety
- Assessment (Addresses Roadway Departure focus area): Horizontal Curve Alignment, Road Safety Audits, Sign Retroreflectivity, Traffic Management and Inspection, Low-Cost Safety Improvements for Rural Roads

The Academy includes a variety of hands-on and group activities. Participants analyze a county road through a video to give them a feel of the Road Safety Audit process. Several pieces of equipment are available for participants to see and try out including a digital ball bank indicator and a retroreflectometer. Attendees are also given several opportunities to interact with each other to find out what others are doing within their agencies.

"I learned more about high friction surfaces and the importance of retroreflectivity.
I really enjoyed all four days; thank you!"
Donna Gabbard, Magistrate, Powell County Fiscal Court



Through the Accelerating Safety Activities Program (ASAP) grant provided by the Federal Highway Administration, this training is provided at **no charge** to local governments. Class size is limited so register early!

Dates

September 28 & 29 and October 5 & 6, 2016
Hyatt Regency Downtown
Registration will start each day at 8:00 am with classwork from 8:30 am to 4:00 pm.

For additional information about the training or to register, contact Becky Boston at 800-432-0719 or becky.boston@uky.edu. ■

Information is also available at www.kyt2.com.

Traffic Incident Management Training Extended to Military Personnel

Megan Perrin, T2 Conference Coordinator

The Traffic Incident Management (TIM) Program is designed to address the challenges of moving people and goods efficiently and safely on the nation's highways. TIM focuses on response efforts that protect motorists and responders while minimizing the impact on traffic flow. Since TIM's inception in 2012, Kentucky has trained over 4,300 first responders.

Recently, Kentucky ventured into new territory and partnered with military personnel in holding a TIM training. In April, Lt. Ron Reyna from the Department of Army Police at Fort Knox, attended a four-hour TIM training session in Elizabethtown. He was so impressed with the material being taught, he reached out to the Technology Transfer Program to bring the training to Fort Knox.

"TIM will allow all first responders to be on the same national standard at accident scenes, thus creating a much more efficient response and a safer environment for first responders to work in", Lt. Ron Reyna said.

A morning session and an afternoon session were held, where about 50 first responders were present. Attendees varied from military personnel to local agencies around the Fort Knox area.

"It was a great mix of local, state and military responders of all disciplines attending," noted TIM instructor John Crossfield.

Sgt. Paul Averill, Accident Investigator from the Department of Army Police explained, "Traffic Incident Management training is a great national outreach to all agencies big and small, regardless if you work an accident scene on a major highway



or on a small two lane road, the fundamentals are the same".

The feedback after the training was outstanding, however, the biggest compliment of all came from Detachment Sgt. Emily Cooper of the Military Police. She explained that the TIM training had shed light on how to better prepare her military police officers.

"Coming from a combat training mentality, it was interesting to hear about the different roles each responder plays in order to make the training work effectively", Sgt. Cooper said.

Sgt. Cooper enjoyed learning about the cone placement section and how helpful she believed it would be to her military police officers. She plans to have the TIM training back at Fort Knox in September.

For additional information about the TIM program, visit <http://www.kyt2.com/training/event/traffic-incident-management>. ■



APWA Kentucky Chapter State Conference

November 3, 2016

Four Points by Sheraton

1938 Stanton Way

Lexington, KY 40511

The American Public Works Association exists to develop and support the people, agencies, and organizations that plan, build, maintain, and improve our communities. The Kentucky Chapter assists its members in providing services through education and public awareness.

State Rodeo

The KY Chapter Rodeo competition includes backhoe and snow plow driving. This competition is open to anyone who wishes to participate. The registration fee is \$25 per person per category competing. The Rodeo is being held November 3. It will start at 9:00 am and conclude with trophies being awarded to the top finishers.

Conference

The conference will consist of an all-day general session, exhibitors, and an equipment display. There will also be cash door prizes!

Awards Luncheon

The Kentucky Chapter APWA Awards Luncheon will be held at 12:00 pm. Anyone not attending the State Conference is welcome to attend the awards lunch. The cost is \$30 per person. If you are a recipient of an award, you will receive three complimentary lunch registrations.

Award Lunch Nominations

All recently completed Public Works Projects or projects that will be substantially completed this year are eligible. Project categories are listed on kentucky.apwa.net. The deadline to submit an application is September 1.

Additional information is available at <http://kentucky.apwa.net/>.



Vegetation Control for Safety

As the weather warms up, thriving vegetation becomes a safety issue along our roadways. Grass, weeds, brush, and tree limbs can obscure or limit a driver's view of traffic control devices, approaching vehicles, and pedestrians. Controlling vegetation helps reduce crashes and injuries.

Roadway agencies should develop roadside vegetation management programs. An integrated roadside vegetation management program consists of eliminating or controlling vegetation through a variety of strategies including mowing, brush cutting, use of herbicides, and cultivating desirable vegetation.

SPECIFIC THINGS TO CHECK

Signs should be visible to drivers at all times. Tree branches or brush in front of a sign can hide it from view of motorists and should be cut.

Tall grass, weeds and brush in the shoulder and ditch areas of a roadside can create problems. Low fixed object hazards such as culvert headwalls, drainage inlets, guardrail ends, and any object markers in front of them can be hidden.

Weeds, turf and sod can interfere with roadside drainage. A high shoulder creates a secondary ditch and damages pavement. Water on the pavement due to high shoulders creates safety problems, including hydroplaning.

Safe and efficient vehicle movement through an intersection requires good visibility. As drivers approach an intersection, they need to check each quadrant of the intersection for the presence of entering vehicles. Similarly, drivers pulling out from a STOP sign need a clear view of oncoming traffic. Brush and trees should not be allowed to obscure the drivers view of oncoming

traffic. A clear vision triangle at each corner of an intersection helps drivers avoid problems.

FIELD EQUIPMENT

When going out to clear vegetation, personal protective equipment is necessary. These include gloves, safety goggles, hard hat, reflective vest and proper footwear.

Depending on the job, additional equipment may include a chain saw, tree-trimming saw, brush knife, and an axe.

Agencies should be sure that their employees are trained in using the equipment prior to sending them out into the field. The Technology Transfer Program offers a variety of training for roadside vegetation management, drainage, pesticide application, and chain saw safety. For additional information on these classes, or to register online, visit www.kyt2.com. ■

Source: Federal Highway Administration, Publication No. FHWA-SA-07-018



Members of the Team

Technology Transfer Instructor

David Allen

David has been teaching Grade & Drain Training since the Technology Transfer Program began the training in 2014. He was born in Hodgenville, Kentucky, and graduated from LaRue County High School.



David graduated from the University of Kentucky in 1969 with a degree in Civil Engineering. While in school, he was a part-time engineering technician for the Kentucky Transportation Cabinet’s Division of Research, which later became the Kentucky Transportation Center. Upon graduation, David began his professional career with the Division of Research as a research engineer. He eventually became head of the Pavements and Materials Research Program in the Kentucky Transportation Center at the University of Kentucky.

David retired from the Kentucky Transportation Center in April 2007, although he still works for T2 part-time. Some of the areas of research he worked included landslide analysis and remedial design, asphalt and concrete pavement designs, the effects of earthquakes on highway structures, and analysis of traffic data.

David’s favorite hobby is astronomy and he enjoys building his own telescopes. He has been married to Lynn Woliver for 49 years.

For a list of upcoming Grade and Drain classes, visit us at www.kyt2.com. ■

Technology Transfer Staff

Amy I. Terry

Amy has been with the Kentucky Transportation Center since 2005. She started as the Conference Coordinator for the Roads Scholar/Road Master Program and is currently the Marketing, Outreach and Publications Manager. Amy produces all printed marketing material including the *Link*, Directory and Training Calendar. She also maintains the website and social media pages for T2.



Amy grew up in Louisville, Kentucky, and graduated from Pleasure Ridge Park High School. She was active in sports from a young age and played softball, volleyball and field hockey. Amy has an Associate’s degree from Lexington Community College. She also graduated from the University of Kentucky with a Bachelor’s degree in Business Administration focused on Marketing.

Amy lives in Lexington with her husband, Robert, and their two children, Ryan and Gabriella. Her kids are active in a variety of sports and activities which keeps her busy in her “spare” time. ■

What is That on the Side of the Road?

Todd Morrison, PE, T2 Instructor

If you've driven I-65 lately between Munfordville and Elizabethtown, you may have noticed a traffic drum with a solar panel attached. It is part of a new Intelligent Transportation System (ITS) being utilized by Kentucky Department of Highways (KDOH) District Four for the I-65 widening project. The drums are part of a queue warning system. Along with strategically placed portable changeable message signs (PCMS), this system detects and alerts the public to slowed or stopped traffic.

These drums are outfitted with radar for speed detection, satellite and cellular for communications, thermometer for temperature readings, a GPS locator, and a sensor to send out an alert if it's been hit. The drums feed data into a central database. The data can be viewed in real time from the central database and it is archived. When a couple of the drums detect slowed or stopped traffic, they send out automated messages to the public via upstream PCMS. This alerts the driver well in advance of slowed or stopped traffic. Depending upon where the queue is located, the system can also encourage the use of alternate routes.

Typically the system would be utilized as you enter a work zone, however, the widening project on I-65 is somewhat unique in its length. Currently it goes for twenty-six miles from mile point sixty-five to mile point ninety-one. KDOH District Four has modified the system to help pinpoint slowed or stopped traffic within the work zone and provide the public with as much information as possible.

The primary purpose of the system is crash reduction. One study by Texas Department of Transportation (TxDOT) shows that when

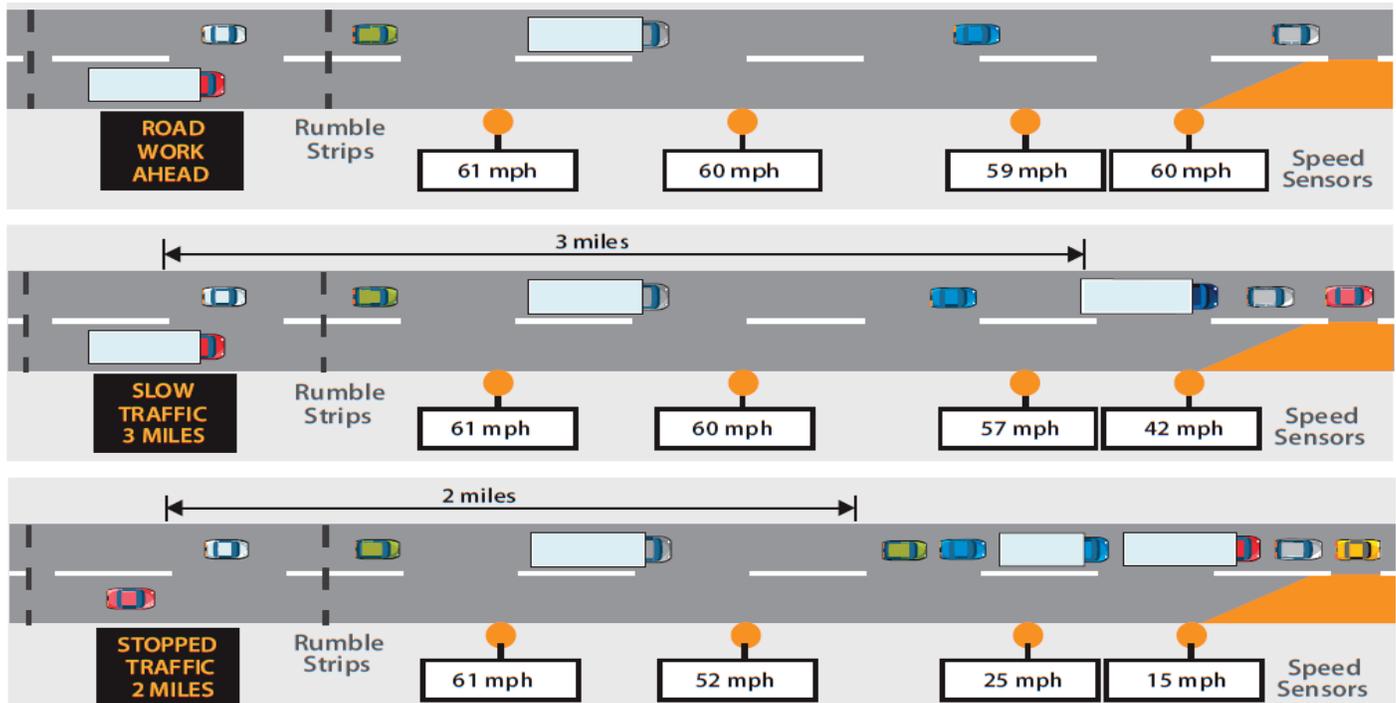


combined with temporary rumble stripes, this type of system can reduce work zone crashes by 18% to 45%. One plan in the TxDOT study was for detecting real time queues up to 3.5 miles in length. It contained four portable speed sensors from the merging taper to approximately 2.5 miles upstream, a single portable changeable message board 3.5 miles from the merging taper, and portable rumble strip arrays laid down beginning 3.75 miles from the merging taper. A second plan in the Texas study doubled the devices and length of queue detection to 7.5 miles. These plans were used on 200 nighttime lane closures and resulted in a savings of between \$1.4 and \$1.8 million in societal crash costs.

Speed management is another potential use for the system. Speed data can be sent to traffic control personnel or police and used to target enforcement for an area or a certain time of the day. The system can send an alert via email or text to project personnel when it detects a vehicle going faster than a pre-determined speed.

Continued, next page

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Source: TxDOT, “Innovative End-of-Queue Warning System Reduces Crashes Up to 45%”

This would provide advanced notice to project personnel when someone moving at a dangerous rate of speed is about to enter the work zone.

Archived data is another use for the system. The Indiana Department of Transportation has utilized archived work zone traffic volume data to estimate when lane closures could be installed, and decreased project time by doing so. Using the archived data to show the traffic condition and what your PCMS were saying at any point throughout the history of the project could also be useful to defend yourself from potential liability claims.

Paul Sanders, with KDOH District Four, mentioned a couple of other potential uses including investigation of high crash locations. The drums could be used to collect valuable traffic volume data and speeds. The other was during snow and ice to warn of slowed or stopped conditions at critical locations.

Congratulations to KDOH District Four for being innovative in their approach to work zone traffic control! ■

Source: National Work Zone Safety Information Clearinghouse www.workzonesafety.org

Check Out Your World

Included in this issue are selected print and electronic resources that relate to accessibility, intelligent transportation systems, pavement maintenance, and sign installation. Please contact the Library to borrow any of the library resources. Need help locating other transportation information or resources? Contact Laura at 800-432-0719

Materials to Consider:

Library Resources

- AV-V937 Accessible Sidewalks: Design Issues for Pedestrians with Disabilities, U.S. Access Board, 40 min.
- TE270.A87 2002 Asphalt Pavement Maintenance Field Guide, Minnesota Local Road Research Board, 2002.
- TE270.A87 2001 Asphalt Pavement Maintenance Field Handbook, Minnesota Local Road Research Board, 2001.
- TE220.H64 The Hole Story: Facts and Fallacies of Potholes, American Public Works Association, 1998.
- TE220.T46 2000 Roadway Maintenance Guide, American Public Works Association, 2000.

Internet Sites:

Accessibility and Transportation (DOT): <https://www.transportation.gov/accessibility>

ADA Standards for Transportation Facilities (U.S. Access Board): <https://www.access-board.gov/guidelines-and-standards/transportation/facilities/ada-standards-for-transportation-facilities>

Intelligent Transportation Systems (Kentucky Transportation Cabinet):
<http://transportation.ky.gov/Maintenance/Pages/Intelligent-Transportation-Systems.aspx>

ITS in Use Today (DOT): <http://www.its.dot.gov/resources/fastfacts.htm>

Maintenance of Signs and Sign Supports: A Guide for Local Highway and Street Maintenance Personnel (DOT FHWA): http://safety.fhwa.dot.gov/local_rural/training/fhwasa09025/

Sign Installation Guide, USDA Forest Service, 2010:
<http://www.fs.fed.us/eng/pubs/pdfpubs/pdf10712812/pdf10712812dpi300.pdf>

Unsignalized Intersection Improvement Guide (ITE): <http://www.ite.org/uiig/default.asp>

Don't forget to follow us on Facebook and Twitter!

Posts include changes to the schedule, new classes being offered and photos from class.

 facebook

ID: KTC Technology Transfer

 twitter

ID: KTCTechTransfer

Carroll County, continued from cover

Another location that was reviewed was Boone Road where it intersects KY 36. The stop sign had been installed back from the actual intersection which limited the sight distance for drivers turning onto KY 36. The county worked with the KDOH District Six on a solution, and with recommendations from Hackbart, they decided to add a stop bar. By adding the stop bar, the sight distance was greatly increased.

The Safety Circuit Rider Program uses crash data to locate high incident sites along roadways and assist communities in finding low cost roadway safety improvements. The Safety Circuit Rider works with local governments to remove fixed objects such as trees, brush, stumps, etc. and to install signage per guidelines set in the *Manual on Uniform Traffic Control Devices* (MUTCD). This **free** technical advice is helping cities and counties across the Commonwealth save lives every day.

For additional information about the Safety Circuit Rider Program, call 800-432-0719 or visit us online at www.kyt2.com. ■



Before: Boone Road at KY 36



After: Boone Road at KY 36



**42nd Annual KACO Conference
and Exposition
November 16-18, 2016
Galt House Hotel
Louisville**



The KACO Annual Conference & Exposition provides an opportunity for members to attend educational workshops, view an exhibit hall of more than one hundred booths, and meet and build relationships with county elected officials, state leaders and business people from across the state.

The Technology Transfer Program will have a booth in the exhibit area. Stop by and see us!

ASK AN ENGINEER!



Is there an engineering issue that is troubling you? Are you confused on how to address a specific road problem? Then the “Ask an Engineer” section is here to help! Submit your safety, engineering or other road questions to us and we will consult an engineer within the Kentucky Transportation Center to find an answer for you. Questions can be emailed to amy.terry@uky.edu or mailed to Ask an Engineer, Kentucky Transportation Center, 176 Raymond Building, Lexington, KY 40506.

Question: What is the Americans with Disabilities Act and how does it affect the transportation programs of state and local governments?

Answer: The Americans with Disabilities Act (42 U.S.C. 12101 et seq.) is a federal civil rights law that prohibits discrimination against individuals with disabilities. Title II of the Americans with Disabilities Act covers state and local governments. The United States Department of Justice (DOJ) is responsible for issuing regulations to implement Title II of the Americans with Disabilities Act, except for the public transportation parts. The DOJ has designated the United States Department of Transportation (USDOT) as the federal agency responsible for investigating complaints and conducting compliance reviews “relating to programs, services, and regulatory activities relating to transportation, including highways.” See 28 CFR 35.190 (b) (8).



The regulations issued by the USDOT include accessibility standards for the design, construction, and alteration of public transportation facilities provided by state and local governments.

Additional information is available at www.ada.gov.

Training is currently being developed by T2 and will be available in 2017.



IS YOUR CHILD IN THE RIGHT CAR SEAT?

Child Passenger Safety Week
September 18-24, 2016

Car crashes are a leading killer of children ages 1 to 13.

Don't know what type of car seat is right for your child? Visit NHTSA's Parents Central website for valuable information including car seat types, how to install a seat and find where you can get a free inspection of your car seat.

www.safercar.gov/therightseat.



TRAINING CALENDAR

September - December 2016

* Indicates Roads Scholar course # Indicates Road Master course **Indicates Central Standard Time Zone

September

7	Managing People I.....	Pennyrile Forest SRP, Dawson Springs***
7	Basic Plan Reading.....	Fairfield Inn & Suites, Lexington North#
8	Developing Leadership Skills.....	Pennyrile Forest SRP, Dawson Springs**#
8	Environmental Awareness.....	Fairfield Inn & Suites, Lexington North#
14	Construction of Concrete.....	Fairfield Inn & Suites, Lexington North*
15	Basic Work Zone Traffic Control & Flagger.....	James E. Bruce Convention Center, Hopkinsville***
20	Low-Cost Roadway Safety Improvements.....	Barren River Lake SRP, Lucas***
20	Managing People III.....	Rough River Dam SRP, Falls of Rough***
21	Environmental Awareness.....	Barren River Lake SRP, Lucas**#
21	Leading Challenging People.....	Fairfield Inn & Suites, Lexington North#
21	Traffic & Safety Academy (Day 1).....	Hyatt Regency Downtown, Lexington
22	Traffic & Safety Academy (Day 2).....	Hyatt Regency Downtown, Lexington
27	Developing Leadership Skills.....	Receptions Inc., South Erlanger#
28	Low-Cost Roadway Safety Improvements.....	Baymont Inn & Suites, Elizabethtown*

October

4	Environmental Awareness.....	Natural Bridge State Resort Park, Slade#
5	Traffic & Safety Academy (Day 3).....	Hyatt Regency Downtown, Lexington
6	Traffic & Safety Academy (Day 4).....	Hyatt Regency Downtown, Lexington
11	Traffic Management through Signals, Signs & Markings ...	The Corbin Center*
19	Work Zone Traffic Control Technician Qualification.....	Fairfield Inn & Suites, Lexington North
20	Work Zone Traffic Control Supervisor Qualification.....	Fairfield Inn & Suites, Lexington North

To check the availability of a workshop, please visit our website, www.kyt2.com.

To register for a class contact us at 800-432-0719.

Coming Soon!

2016 Roads Scholar & Road Master Graduation!

How many classes do you have left for graduation?
 We are coming to the end of the training year and graduation is just around the corner.
 If you think you are on track to graduate this year, contact Becky Boston at 800-432-0719 or becky.boston@uky.edu.



KTC Works with Oldham County to Make Their Bridge Safer

Issam Harik, Ph.D, KTC Program Manager, Structures
Abheetha Peiris, Ph.D, KTC Research Engineer

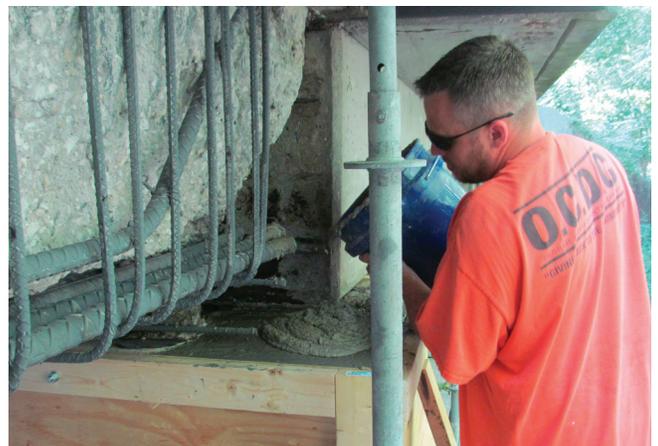
Several county maintained bridges were recently inspected in Oldham County. The bridge on Centerfield Drive over South Fork Currys Creek was given the lowest rating of any other bridge in the county. The bridge was built in 1951 and is a two span bridge with four reinforced concrete beams in each span. Considerable deterioration of the concrete was observed at the pier caps and reinforced concrete beams close to the pier caps. The deterioration was due to penetration of water and deicing agents through the deck joints. In addition, the bridge load rating was too low to allow vehicles such as fire trucks, school buses and dump trucks to traverse the bridge. This caused major concern because Centerfield Elementary School is located right next to the bridge which meant it was an active route to and from the school.

The county was in the process of reviewing bids to replace the bridge when Bill Berry, Bridge/ Civil Engineer for Oldham County, saw an article about CatStrong which was developed by a team of researchers at the University of Kentucky, led by Dr. Issam Harik. This innovative product consists of Carbon Fiber Polymer Rod Panels that are bonded to existing reinforced and pre-stressed concrete bridge structural members that have become deficient to increase their capacity. The goal of CatStrong is to decrease bridge repair costs by reducing labor hours typically required to fix concrete bridge structures.

Dr. Harik came to Oldham County and met with Bill Berry as well as Beth Stuber, County Engineer for Oldham County, and Steve Greenwell, Magistrate for Oldham County. He presented them with information about the material including the application process, timeline, cost



Deteriorated Concrete Has Been Removed from a Beam End



Application of Repair Mortar



Application of CatStrong UCF 120

“The estimate to replace the bridge was \$250,000, and CatStrong could be applied for half the cost.”

and results from previous applications. Seeing how effective the product was for half the cost of rebuilding the bridge, they decided to go with the CatStrong material.

The deteriorated concrete was removed from the beams and pier cap, and replaced with high strength rapid setting repair mortar. The beams were then strengthened using CatStrong unidirectional carbon fiber fabric in flexure (UCF 120) and CatStrong UCF -55 and the three directional TCF 012 carbon fiber in shear to increase the load carrying capacity of the beams. With the bridge beams stronger than they were originally built, the load rating of the Centerfield Drive bridge was increased to 35 tons with the use of CatStrong carbon fabric. In addition, the life expectancy was extended another 40-50 years.

The retrofit was completed within a span of three weeks. Traffic disruptions were minimized additionally by scheduling the construction during the summer school vacation.

“Dr. Harik was great to work with,” said Ms. Stuber. “It was a very positive experience.”

The retrofit was successfully completed with the assistance of the construction personnel provided by the Oldham County Department of Corrections through their inmate work program. Traffic control, logistical and construction support were provided by the Oldham County Road Department.

To learn more about the CatStrong product, visit the Kentucky Transportation Center’s website at www.ktc.uky.edu. ■



Retrofit beams and pier cap are complete and painted with protective coating.

Publication Statement

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*Kentucky
 LTAP Center*



The Link is printed on recycled paper.



THE LINK, Kentucky Transportation Center, Technology Transfer Program

What's Wrong With This Photo?

Do you see anything wrong with this crew's flagging set-up?

(Answers are below the photo.)

Classes covering proper flagging procedures, and work zone set-up are available through the Technology Transfer Program. Learn more at www.kyt2.com.



Answers: 1. No channelizing devices or warning signs. 2. Flagger is next to the truck. 3. Other workers are with the flagger. 4. The flagger has his back turned to traffic. 5. The paddle is partially hidden from the view of oncoming traffic. 6. Paddle appears to be in the back of the truck. 7. Flagger has poor or no escape route.

In This Issue:

Carroll County and SCR	Front Cover
New Advisory Board Members	2
Traffic and Safety Academy.....	3
Traffic Incident Management Takes Fort Knox	4
APWA Kentucky State Conference.....	5
Vegetation Control for Safety.....	6
Members of the Team	7

End of Queue Warning System.....	8
Check Out Your World - Library	10
Ask an Engineer/Child Passenger Safety Week	12
Training Calendar	13
Oldham County Bridge	14
What's Wrong with this Photo?	Back Cover