

KENTUCKY TRANSPORTATION CENTER

Annual Report 2014



KENTUCKY TRANSPORTATION CENTER VISION FOR 2015

The following paragraphs describe the vision of what we would like to achieve by 2015. This vision, developed in 2010, has served as a target to guide the development of our goals, objectives, and strategic plans.

Customer Satisfaction and Customer Relationships

The Kentucky Transportation Center (KTC) has developed and implemented tools for measuring our customers' perceptions regarding the quality and value of the products and services we provide. These tools are consistently utilized for all projects, regardless of who the client is. Feedback provided by these tools is scrutinized on a regular basis to identify improvements that can be made in policies and/or procedures.

Research Excellence / National Prominence

KTC enjoys a strong national reputation in selected, high-priority areas of research and technology transfer. KTC researchers are widely known for their subject matter expertise, group facilitation skills, effective communications, and project management skills. KTC's technology transfer professionals are nationally recognized for excellence in information delivery and workforce development. This reputation is reflected in strong name recognition at all applicable national and regional meetings and conferences.

Size of Program and Diversity of Funding Sources

The size of KTC's research and technology transfer program has grown substantially over the past five years, primarily due to the identification and cultivation of new funding sources (federal, state, local, and private-sector) and the growth of non-SPR (State Planning and Research) funding. The Center has strategically targeted areas of research and technology transfer that are important to the Kentucky Transportation Cabinet (KYTC) and to the nation. KYTC receives substantial benefits from having direct access to KTC's research results and technology transfer resources. The SPR program remains strong and vital.

Work Environment / Employee Satisfaction

KTC is a rewarding and enjoyable place to work. Employee retention is high, as is employee morale. KTC provides opportunities and support for all employees to continue learning and to grow professionally throughout their careers. Exceptional employee performance is recognized and rewarded. Employees are highly motivated and highly productive. Co-workers treat each other with courtesy and respect. The workforce includes a strong and increasing presence of minorities and women.

Implementation and Value of Research

Tools and processes have been put in place to promote, facilitate, and track the implementation of research results. Implementation is a priority for KTC and is accomplished through a team effort, involving practitioners, researchers, and technology transfer professionals. Implementation is considered from the earliest stages of each research project. The benefits resulting from the implementation of research findings are well-documented and well-disseminated. This information is used to promote the value of transportation research and technology transfer programs both within Kentucky and nationally.

DIRECTOR'S MESSAGE



I am pleased to present to you the Kentucky Transportation Center's Annual Report for the 2014 calendar year. It has been a busy, exciting, and fruitful year. We have continued to carry out our mission of providing services to the transportation community through research, technology transfer, and education, and we have continued to pursue our vision of exemplary customer service, research excellence and national prominence, program growth and diversified funding sources, a delightful work environment, and research products that result in high-value implementation.

In fiscal year 2014, we brought in \$6.9 million in sponsored project awards, which ranked us number one in the College of Engineering, number three out of all non-medical departments on the University of Kentucky Campus, and number eight out of all UK departments. Our total program expenditures for the fiscal year were \$10.4 million, marking the third consecutive year that our program has exceeded \$10 million. The past three years also happen to be the largest (in terms of total program size) in our 34-year history. So, in terms of sponsored projects revenue and overall program size, the Center has enjoyed three years of unprecedented success.

We greatly value our unique relationship with the Kentucky Transportation Cabinet and our role as their "research arm." An exciting development in 2014 was the creation of a full-time Innovation Engineer position within the Office of the State Highway Engineer. We are working closely with the Innovation Engineer to improve management of the research program, streamline administrative processes, heighten the visibility and appreciation for the research program throughout the Cabinet, and develop and implement performance measures for the program.

Throughout 2014, we were actively and intimately involved in the research activities of the Southeast Transportation Center, a regional University Transportation Center (UTC) funded by the U.S. Department of Transportation and led by the University of Tennessee. We also continued our participation in the NURail consortium, a rail-focused UTC led by the University of Illinois, and we carried out the final year of work under the Multi-modal Transportation and Infrastructure Consortium (MTIC), a Tier-One UTC led by Marshall University.

Among our many notable achievements in 2014, the Kentucky Automated Truck Screening project was selected by the Intelligent Transportation Society of the Midwest as their 2014 Project of the Year, our Traffic and Safety Academy was featured in the Federal Highway Administrations "Safety Compass" publication, and our Technology Transfer Program had a record year for training, with the number of participants up 19% from 2013.

These are just a few of the exciting activities going on at KTC. You will find many other examples throughout this report. We thank our many sponsors, stakeholders, and partners for their support, encouragement, and guidance as we all strive to optimize the safety and efficiency of our transportation system.

A handwritten signature in black ink.

Joe Crabtree, Ph.D., P.E.

BRIDGE PRESERVATION

Ted Hopwood, Program Manager

SHRP2 RAPID RENEWAL PROJECT IN KNOX COUNTY

The Kentucky Transportation Center assisted KYTC in developing an experimental bridge construction project for the FHWA “Rapid Renewal” SHRP2 program. The project involved replacement of two small bridges on KY 6 in Knox County. The project assessed the cost effectiveness and benefits of using an accelerated construction technique, which delivered a nearly complete manufactured product to the field site. The purpose of this strategy is to minimize the amount of fieldwork necessary to install a bridge.

In addition to the “Rapid Renewal” aspect, the project used design materials intended to minimize KYTC maintenance requirements so the bridges would attain an extended service life of at least 75 years. If the project proves successful on this relatively small scale, the technology and processes could be employed to greatly reduce the adverse impacts new construction imposes on the public as well as the infrastructure maintenance burden to KYTC.

The project involves the use of innovative shop-applied duplex coating technology (thin film organic coatings applied over Hot Dipped Galvanized structural steel), which offers potentially long service life. The KYTC Division of Structure Design designed the experimental structures, while KTC provided the supplementary Special Notes, assisted in quality control inspections of all experimental features, monitored the process, and provided technical aid in problem resolution. In addition, KTC personnel assisted KYTC by applying deck sealants to the two bridges. The field installation for both bridges took 35 days from traffic closure to reopening.



Workers lowering a precast deck/superstructure segment into place on the KY 6 bridge over Stewarts Creek.



KY 6 bridge over Stewarts Creek after completion.

CURRENT PROJECTS

1. Spot Painting to Extend Highway Bridge Coating Life
2. Laboratory Evaluation of Concrete Coatings
3. Chloride Contamination Remediation on Steel Bridges
4. Nondestructive Technology For Bridge Evaluation
5. Improved Joint Materials and Details
6. A Programmatic Approach to Long Range Bridge Preventive Maintenance
7. Assessment of Structural Concrete to Provide Durable Repairs
8. Experimental Rapid Renewal Project
9. In-depth Inspection of Stay Cables on the U.S. 231 Natcher Bridge near Owensboro, Kentucky
10. Taping and Minute Preparation of KYTC Pre-Bid and Pre-Construction Meetings

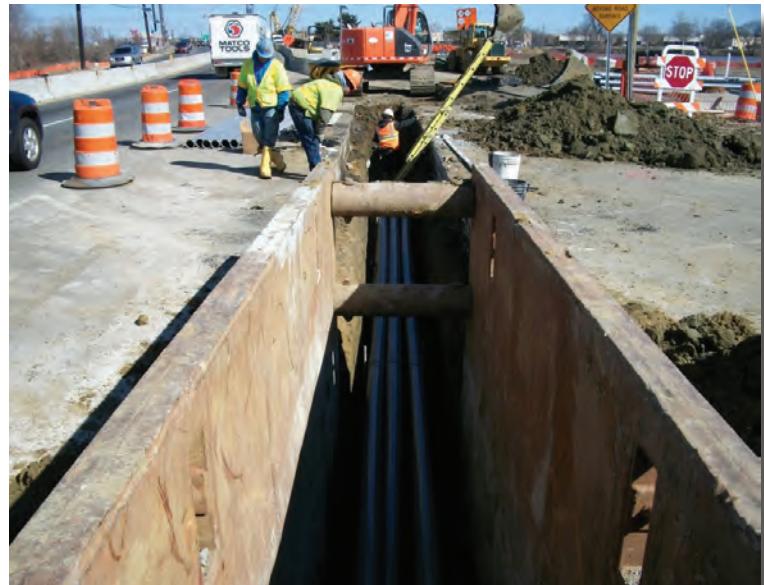
CONSTRUCTION MANAGEMENT

Timothy Taylor, Program Manager

METHODS TO EXPEDITE AND STREAMLINE UTILITY RELOCATIONS FOR ROAD PROJECTS

Utilities located within and near road right-of-ways present challenges to state transportation agencies (STAs) in terms of coordinating the reconfiguration of those facilities to accommodate highway system improvements. Similarly, KYTC faces many obstacles when it performs utility work associated with highway projects. In most cases, KYTC cannot directly manage utility relocations because the utility owner and/or operator directly supervises the process. Utility owners and operators maintain direct oversight because a wide range of complexities can emerge during the relocation; dealing with these complexities can pose challenges for even the most experienced utility planner. While utility relocations are controlled by permit, contractual, and legislative regulations, there are tools and procedures available that, when strategically employed, can assist the relocation process.

The guidance provided within this project provides KYTC utility staff with the knowledge of best practices, while also informing them on the circumstances under which each should be implemented. Along with the summary of best practices, KTC researchers developed a method of risk assessment to determine the level of difficulty a project may expect when utility relocations are necessary. This model, which uses multiple linear regression, has robust predictive utility ($R^2 = 0.84$), and will offer KYTC staff insights into what best practices are most compatible with the level of risk associated with a specific project. This study presents several valuable tools along with organized best practices and guidance for STA utility coordinators. When used pragmatically, these methods will assist STAs and utility companies in identifying problematic projects early in their life to resolve any issues.



CURRENT PROJECTS

1. Differential Bridge End Settlement
2. Safety Concepts for Workers from an OSHA Perspective
3. Design-Build and Alternative Technical Concepts Process
4. Project Scoping to Improve Project Cost and Schedule Performance
5. Use of Mobile IT Devices in the Field for Design, Construction and Asset Management
6. Renovation of the Construction Guidance Manual and Resources

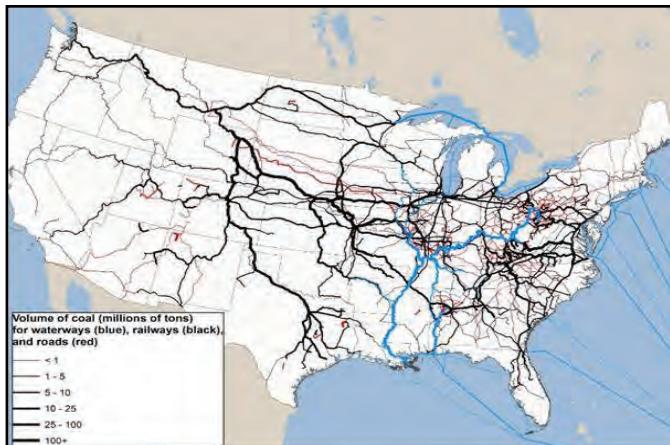
DECISION SUPPORT SYSTEMS

Ted Grossardt, Program Manager

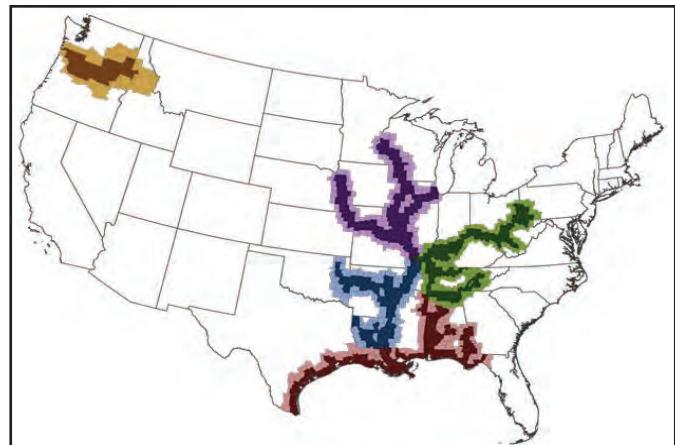
OVERVIEW OF DECISION SUPPORT SYSTEMS PROGRAM

The Decision Support Systems Division (DSS) spent 2014 developing economic and transportation models of freight movements in the United States. This year saw the completion of the National Waterways Foundation-funded study that developed the current system value and investment potential for the inland navigation system in the U.S. At the same time, a national model of coal movement was developed using a GIS-based three-mode transportation model (the Integrated Freight Network Model) developed by DSS, and data files from the Energy Information Administration.

Dr. Ted Grossardt, along with economists from the University of Tennessee and Regional Economic Models, Inc. presented the NWF results at the 2015 Transportation Research Board meetings in Washington. Dr. Ben Blandford presented the results of his coal modeling work at the same meetings. Dr. Blandford's research on coal modeling has been accepted for publication in an upcoming edition of the *Transportation Research Record*.



2010 Coal Movement Modeled Using Integrated Freight Network Model



Economic Benefits of Inland Navigation in the United States

CURRENT PROJECTS

1. GIS-Based Threatened and Endangered Species Habitat Modeling
2. Using GIS and LIDAR for Environmental Feature Shape Recognition
3. Structured Public Involvement (SPI) Support for the Louisville Metropolitan Sewer District
4. SPI Support for Public Health Research in Eastern Kentucky

ECONOMICS, FINANCE & MULTIMODAL

Bryan Gibson, Program Manager

TRANSPORTATION FUNDING SOURCES AND ALTERNATIVES IN THE SOUTHEASTERN STATES NOW AND IN THE FUTURE

Most states collect the majority of own-source transportation revenues from sources such as fuel taxes and vehicle registration fees. In recent years, concerns have arisen over funding due to various factors such as increasing fuel efficiency. Additionally, the Federal Highway Trust Fund has run a deficit in recent years; legislators have used general funds to replenish it, leaving future federal funding levels uncertain. This project, initiated by the Southeastern Transportation Consortium, focused on current revenue sources, forecasted future revenue shares under current regimes, synthesized alternative revenue options and current legislative actions, and examined the feasibility of changing state transportation revenue sources. The findings indicated that most states saw little or no growth in total revenues over the past decade. Revenue alternatives prominently featured in the literature included vehicle miles travelled fees, tolls, and public-private partnerships. The project summarized the results of public surveys that were administered to gauge the public's acceptance of alternative revenue sources. Public opinion was often driven by a perception of benefits received, and many options that include tolling received majority support. Current legislative initiatives included changes to fuel taxes, fees for electric and hybrid vehicles, tolls, and increasing the emphasis on local governments' involvement in transportation.



CURRENT PROJECTS

1. Synthesis of Public-Private Partnerships: Potential Issues and Best Practices of Project Implementation and Administration
2. FHWA Form 536: County Road and City Street Finance
3. Boom and Bust Cycles: Making Smart Infrastructure Investments
4. Big Data for Safety, Monitoring, Assessment, and Improvement
5. Inland Waterways Funding Mechanisms Assessment
6. Marketing and Economic Development Analysis for the Maysville-Mason County Port Authority
7. Jurisdictional Roadside Ditches
8. Green Infrastructure Implementation Study
9. Audit Template for Inland Port Sustainability
10. Fedtrak

ITS & TRAFFIC MANAGEMENT

Jennifer Walton, Program Manager

KENTUCKY AUTOMATED TRUCK SCREENING

In 2013, nearly 3.5 million trucks passed through Kentucky's 14 weigh stations, but just over one percent of those trucks were inspected. Limited resources at these locations make it essential for enforcement to choose the most problematic carriers for inspection. Researchers at the KTC worked in conjunction with the Kentucky Transportation Cabinet and the Kentucky State Police to develop a truck screening system that will automatically identify the company and vehicle as it enters a weight station. By the end of 2014, the Kentucky Automated Truck Screening (KATS) system had been implemented at seven of Kentucky's weigh stations.

KATS uses a license plate reader (LPR), USDOT/KYU number reader, and scene camera technology to collect and process a vehicle's identifying information. This identifying information is checked against state and federal databases to determine if a safety, registration, or credentials problem may exist. Those vehicles with potential problems are automatically stopped using the weigh station tracking and signage system. Research has shown that the inspections prompted by KATS (rather than randomly) tend to have more violations and are also more likely to result in increased revenue (due to unpaid taxes or fees) for Kentucky.



CURRENT PROJECTS

1. Civil Penalties for Commercial Vehicle Offenses
2. Online Driver License Renewal System – Synthesis
3. Collecting Taxes and Fees Using the Observation System
4. Coordinating the Use and Location of Weigh-in-Motion Technology for Kentucky
5. Implementation and Evaluation of KATS Systems on Weigh Station Ramps
6. KATS Mainline Screening System
7. KATS Virtual Weigh Station
8. CVISN Program Administration
9. CVISN-Related Training for Commercial Vehicle Enforcement
10. Maintenance of KATS Systems

PAVEMENTS, MATERIALS & GEOTECH

Brad Rister, Program Manager

3-D IMAGING TECHNOLOGY

The Kentucky Transportation Center and UK's Center of Visualization have teamed together to use 3-D imaging technology to resolve unsafe pavement conditions along several highway segments in Kentucky. Using both a mobile and stationary LiDAR scanning system, sub-centimeter 3-D point clouds have been collected in areas where wet-weather accidents have been increasing. In a completely autonomous environment, KTC has collected the required field data while driving within the normal traffic stream. Field data are then post-processed to create a geospatially corrected 3-D point cloud of the study area. Next, an algorithm developed in-house is used to create a water flow path analysis of the pavement surface in a 3-D virtual environment. These computer generated flow paths depict where water is going to channel along the roadway surface during a rain event. Often, the accumulated rain water in these channelized paths can contribute to hydroplaning, which creates an unsafe driving condition.

During the 2014 calendar year, KTC inspected seven different roadway segments using this process. KYTC has proactively used KTC's flow path analysis data to regrade pavement surfaces throughout the study area, resulting in fewer wet-weather accidents.



CURRENT PROJECTS

1. Pavement Crack Sealing Cost Effectiveness
2. Mobile LiDAR Integration with Other Data Sources
3. Geosynthetically Confined Soil and IEB
4. Cost/Benefit SMA Surface
5. Coring and Evaluation Bridge Decks
6. Construction Joint Failure Synthesis of Past Work
7. MEPDG Implementation
8. Pavement Load Rating
9. Insoluble Residue Testing of Cement
10. Bridge Deck Rapid Inspection Using Multi-GPR

STRUCTURES

Issam Harik, Program Manager

ADJACENT PPC I-BEAM BRIDGE WITH HIGH PERFORMANCE MATERIALS

The increasing number of vehicles on Kentucky's roads, combined with the public's expectation that congestion be minimized during construction projects, has motivated KYTC to widely adopt the use of Accelerated Bridge Construction (ABC). To date, KYTC has used both precast superstructures and substructures. The use of ABC has decreased impact to the traveling public, while increasing bridge quality and safety.

KYTC has proposed the use of adjacent Precast Prestressed Concrete (PPC) I-beams pretensioned with carbon fiber reinforced polymer (CFRP) tendons and reinforced with stainless steel rebars in place of the more traditional bridge girder. The use of precast beams could lessen congestion associated with construction and increase the safety of ABC. The use of CFRP tendons and stainless steel rebar, in place of the traditional corrosion prone steel tendons and rebar, will increase the expected service life of the bridge.

The new CFRP PPC I-beam bridge will replace a functionally obsolete bridge (NBI: 109B00007N) on KY70 over Stoner Creek in Taylor County, KY. The current two-span Reinforced Concrete Deck Girder bridge and center pier will be removed, and a single span PPC I-beam bridge will be built. This will be the first time that CFRP pretensioned beams are used by the KYTC. Following the implementation of the bridge, its performance will be evaluated to determine if future bridge projects in Kentucky should apply this method.



CURRENT PROJECTS

1. Load Rating Bridge Size Culverts
2. Bridge Load Testing vs. Bridge Load Rating
3. Rapid Bridge Repair Using High Performance Materials
4. Bridge Deck Rapid Repair
5. FRP for Bridge Substructure Retrofit
6. Retrofit of AASHTO Girders Using High Strength Steel Wire Fabric
7. Stainless Steel Reinforcement for a Concrete Bridge Deck
8. Temperature Movement in Bridges

TECHNOLOGY TRANSFER

Martha Horseman, Program Manager

Kentucky's Technology Transfer Program (T2) promotes efficiency in Kentucky's transportation system by providing workshops and training events, newsletters, how-to manuals, new and existing technology updates, legislative and regulatory news, on-site technical assistance, and access to the only transportation library in the Commonwealth. The Program is also designated the Local Technical Assistance Program (LTAP) in Kentucky.

During 2014, T2 presented 330 workshops attended by over 8,000 participants. There were 170 Roads Scholars and 140 Road Masters who graduated this year. They join the 2,582 Roads Scholars and 1,933 Road Masters who had previously graduated from these programs.

T2 also conducted the Asphalt Qualification Program, leading to the qualification of 66 new technologists and the requalification of 59 technologists. The Asphalt Field Technician Qualification resulted in 131 individuals earning their qualification. The Kentucky Erosion Prevention and Sediment Control Program (KEPSC) for Roadway Inspectors trained almost 450 participants, and the Pesticide Continuing Education courses trained over 800 participants. The Work Zone Traffic Control Employee Qualification Program had a great year, qualifying and requalifying 346 flaggers, 383 technicians, and 304 supervisors.

Under the ASAP grant, T2 conducted the Traffic and Safety Academy, a free course available to all local governments. Participants also attended specialized training for Sign Retroreflectivity, Local Public Agencies, Road Safety Audit, and Traffic Incident Management Responder Training.

T2 produces material that promotes their training programs, conferences and events, and services. It also publishes a quarterly newsletter, *The Link*, which offers valuable best management practices and insights into new and innovative approaches. Visit T2's website (www.kyt2.com) for digital copies of most of their resources. Stay informed about the latest news and information by following T2 on Facebook and Twitter.

The Safety Circuit Rider Program, managed by T2, is a free service to local governments. The 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 MUTCD guidelines. This program is helping communities across the state of Kentucky save lives every day.



2014 Roads Scholar/Road Master Graduates
from Franklin County, with Secretary Mike Hancock,
Kentucky Transportation Center.

TRAFFIC INCIDENT MANAGEMENT RESPONDER TRAINING

Traffic incidents, including crashes, disabled vehicles and road debris, create unsafe driving conditions for motorists and responders, and account for approximately 25 percent of all traffic delays. The key to building stronger incident response teams is to train responders across all agencies together.

The Kentucky Transportation Cabinet and the Federal Highway Administration-Kentucky Division, in partnership with the University of Kentucky's Technology Transfer Program, are pleased to offer the Traffic Incident Management Program (TIM). This program is designed to teach participants the requirements for safe, quick clearance at traffic incident scenes; prompt, reliable and open communications; and motorist and responder safeguards. More than 1,700 participants were trained in 2014.

When Major Jason Rice, with the Shelby County Sheriff's Office, heard about the training, he knew it would benefit his agency to attend. He worked with KYTC to host a free training for over 30 responders in Shelby County.

"We deal with emergency situations on an everyday basis and sometimes we become complacent on what we do and forget about the necessary safety precautions we need to take to keep us and the general public safe," said Major Rice.

Using a multidisciplinary approach, this four hour course covers many topics, including recommended incident management procedures and techniques, and teaches first responders across different states, regions, and localities how to operate more efficiently and safely.

Training classes include representatives from many disciplines, including, but not limited to, law enforcement, fire and rescue personnel, emergency medical services, towing and recovering professionals, dispatchers, hazardous materials responders, coroners, medical examiners, and public works professionals. T2 will continue to offer the TIM training across Kentucky.



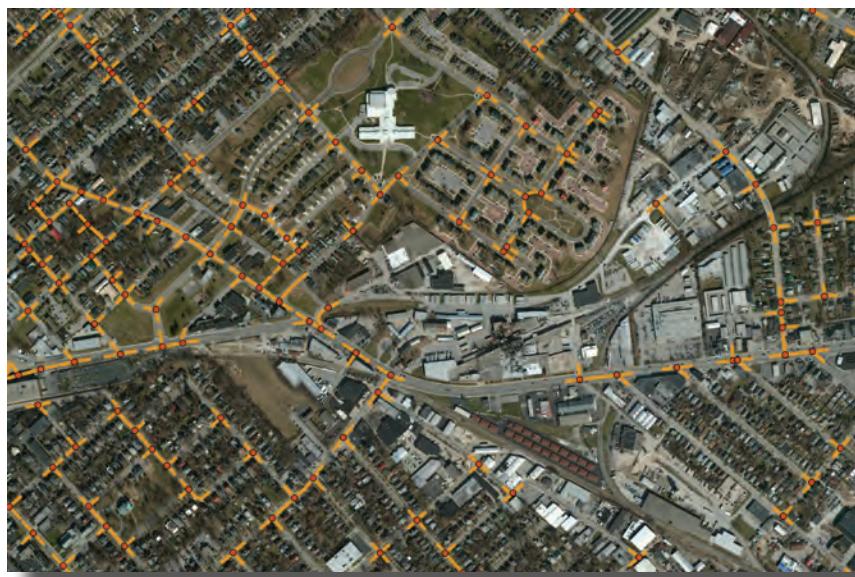
TRAFFIC & SAFETY

Jerry Pigman, Program Manager

SPATIAL DATABASE FOR INTERSECTIONS

Several years ago, KTC conducted a research study analyzing crashes at intersections. That effort resulted in the creation of a database of intersection features associated with increased crash risk that has since been used by KYTC to perform safety analysis and prioritize projects. The database contained a snapshot of intersection information with a focus on safety, but unfortunately, it has not been maintained and is now out-of-date.

The objective of this research is to create a maintainable intersection database that KYTC can integrate into their Enterprise System. The database will be spatially linked to other features, which will allow attributes to be updated with major roadway changes. With the ever increasing dependence on geographic data, many areas and functions will benefit from a spatially-enabled intersection database. The development of this database will continue to require input from planning, traffic, safety, maintenance, and information technology to ensure that the database will be sustainable.



Intersections in downtown Lexington (red dots),
showing areas-of-influence (orange lines.)

CURRENT PROJECTS

1. Evaluation of Commercial Truck Parking and Related Issues
2. Steel Sign Posts Specifications and Design
3. Methods for Determining Curve Advisory Speeds
4. Permitted Left Turn Guidance
5. Roadside Analysis Rating
6. Geometric Design Training
7. Wet-Nighttime Delineation Evaluation
8. Signal System Performance

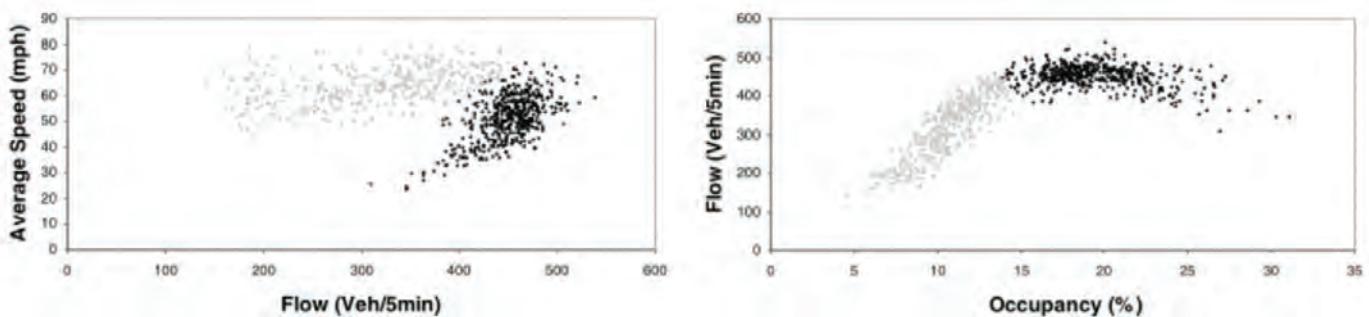
PLANNING AND EDUCATION

Reg Souleyrette, Program Manager

OVERVIEW OF PLANNING AND EDUCATION PROGRAM

Good planning is fundamental to the successful completion and good performance of all transportation projects. Planning is also among the most interdisciplinary of transportation functions. Planners are, or work with, engineers, urban developers, economists, policy analysts, geographers, environmental specialists, designers, architects, and people from a host of other disciplines. The role of the KTC Planning program is to coordinate research involving the transportation planning function across the various program areas of KTC and indeed, where possible, across UK. The Planning program conducts research on data and data processing for decision making, travel models, advanced technologies, and multimodal transportation, almost always in conjunction with other KTC programs.

An example project from 2014 was Methodology Update for Estimating Volume to Service Flow Ratio. Volume to service flow (VSF) ratio is an item used by the Federal Highway Administration (FHWA) as an indicator of peak hour congestion. It has been used as an essential input to KYTC's key planning applications such as highway adequacy rating. After FHWA's reassessment of the Highway Performance Monitoring System (HPMS), the standalone HPMS software (based on Highway Capacity Manual, HCM 2000) is no longer supported and states can no longer access the capacity and VSF calculations. The calculation of VSF requires traffic, hourly and directional factors, and peak capacity as input. Peak capacity is calculated based on a number of items such as cross section, lane configuration, access and traffic control, as well as volume and vehicular composition. The procedure has certain limitations. For example, it does not address the impact of climbing lane on capacity, which often significantly underestimates capacity on rural two-lane roads in mountainous areas. In addition, the availability and accuracy of several required data items (such as peak percentage green time and number of signalized intersections) on all roads, not just the HPMS samples, are of concern. KTC is updating this methodology to reflect the changes made to the capacity estimation procedure in HCM 2010. The project also explores how to use available data items currently available in the Kentucky Highway Information System to improve the capacity estimation and to identify additional data items that should be collected for this purpose.



FINANCIAL SNAPSHOT

FY2014 Expenditures*

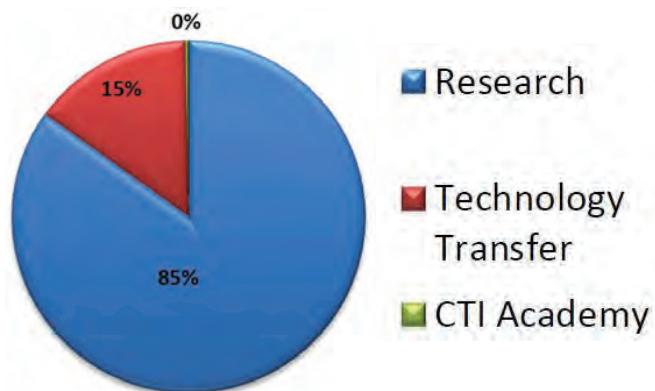
Category of Expenses	Research **	Technology Transfer***	Other (CTI Academy)	Total Program
Personnel	\$5,627,262	\$731,628	\$24,681	\$6,383,571
Operating	\$1,558,085	\$804,494	\$0	\$2,362,579
Equipment	\$75,591	\$2,220	\$0	\$77,811
Indirect Costs and Admin Support	\$1,586,605	\$0	\$10,376	\$1,596,981
Total Program	\$8,847,543	\$1,538,342	\$35,057	\$10,420,942

*Expenditure detail by subcategory of expense is available on request (1-800-432-0719)

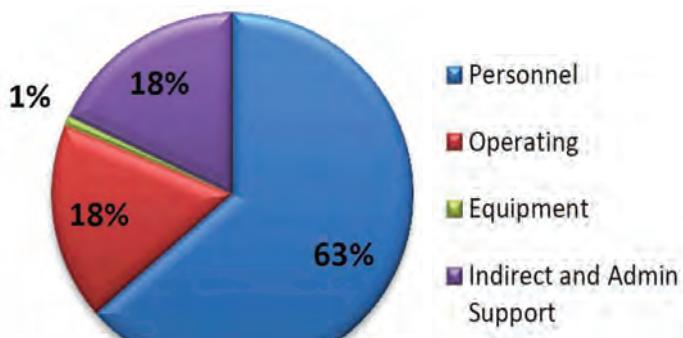
**The research program for FY 14 consisted of over 100 projects conducted for numerous agencies and organizations. Primary research sponsors included the Kentucky Transportation Cabinet, the Federal Highway Administration, the Federal Motor Carrier Safety Administration, and the US Department of Homeland Security. KTC partnered with the University of Louisville, the University of Tennessee, the Asphalt Institute, and several other research organizations. Also, KTC continued a unique partnership with the US Army Corps of Engineers focused on inland waterways and continued as a partner with Marshall University in a University Transportation Center consortium funded by USDOT's Research and Innovative Technology Administration.

***Technology Transfer includes workforce training and technical assistance.

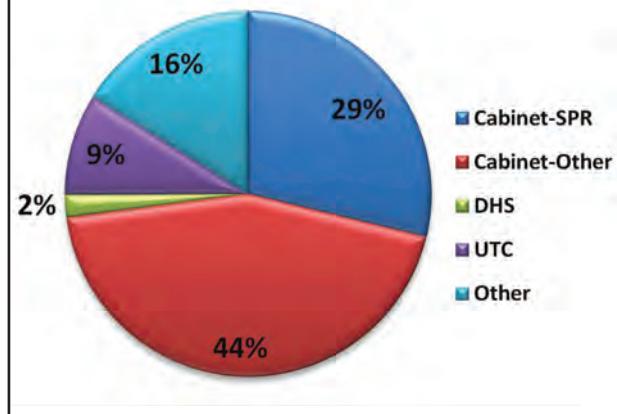
Expenditures by Program Area (FY 2014)



Expenditures by Expense Category (FY 2014)



Funding Sources



PROJECTS COMPLETED

Report Number	Title
KTC-14-01/TA33-12-1F	"Intercounty Commuter Public Transit Services and Opportunities in the Central Bluegrass," Ted Grossardt, Ben Blandford, and Mei Chen
KTC-14-02/SPR486-12-1F	"Contractor Evaluations in the Contractor Selection Process," Timothy Taylor, Roy E. Sturgill, Maegan McDowell, Alexa Deep, and Paul M. Goodrum
KTC-14-05/SPR456-13-1F	"Coordinating the Use and Location of Weigh-In-Motion Technology for Kentucky," Andrew Martin, Valerie Keathley, Jerry Kissick, and Jennifer Walton
KTC-14-06/KSP1-12-1F	"2014 Safety Belt Usage Survey in Kentucky," Kenneth R. Agent, Eric R. Green, and Michael A. Fields
KTC-14-07/KSP2-13-1F	"Analysis of Traffic Crash Data in Kentucky (2009-2013)," Eric R. Green, Kenneth R. Agent, Jerry G. Pigman, and Michael A. Fields
KTC-14-08/OHS-14-1F	"Roadway Contributing Factors in Traffic Crashes," Kenneth R. Agent
KTC-14-10/SPR447-12-1F	"Green Infrastructure," Sarah M. McCormack, Roy Sturgill, Brian Howell, Chris VanDyke, and Doug Kreis
KTC-14-11/MTIC1-14-1F	"Audit Template for Inland Port Sustainability," Doug Kreis, Sarah McCormack, Christopher VanDyke, and Bryan Gibson
KTC-14-12/MTIC2-14-1F	"2013 Barge and Rail Symposium: Moving Freight Between Multimodal Systems," Doug Kreis, and Candice Wallace
KTC-14-13/MTIC3-14-1F	"Inland Waterway Operational Model & Simulation Along the Ohio River," Doug Kreis, Roy E. Sturgill, Brian K. Howell, Chris VanDyke, and D. Steve Voss
KTC-14-14/MTIC4-14-1F	"Inland Waterways Funding Mechanisms Synthesis," Doug Kreis, Bryan Gibson, Christopher VanDyke, Candice Wallace, and Sarah McCormack
KTC-14-15/SPR460-13-1F	"Methods to Expedite and Streamline Utility Relocations for Road Projects," Roy E. Sturgill Jr., Timothy Taylor, Seyedmahdi Ghorashinezhad, and Jiwen Zhang
KTC-14-16/SPR452-13-1F	"Effect of Enhanced Trackbed Support on Railway/Highway At-Grade Crossing Performance," Jerry G. Rose, and Brett R. Malloy
KTC-14-17/SPR452-13-2F	"Railway/Highway At-Grade Crossing Surface Management: An Overview," Jerry G. Rose, and Brett R. Malloy
KTC-14-18/SPR452-13-3F	"Recommendations for KYTC's Railway/Highway At-Grade Crossing Surface Management Practices," Brett Malloy, Jerry Rose, and Macy Purcell
KTC-14-19/SPR452-13-4F	"Railway/Highway At-Grade Crossing Surface Rehabilitation Manual: Recommendations and Guides," Brett Malloy, Jerry Rose and Macy Purcell

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Transportation Research Program

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