

Research Results

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Development of Kentucky's Highway Incident Management Strategic Plan

[KTC-05-08/SPR-288-05-1F]

Principal Investigator:

Joe Crabtree

Study Advisory Chair:

Chuck Knowles

Purpose: Over the years Kentucky has taken many steps to improve the statewide incident management efforts. This has been done because highway incidents (crashes, debris, abandoned vehicles, adverse weather, etc) represent a serious hazard to motorists and significantly delay highway users. In addition, the longer an incident remains

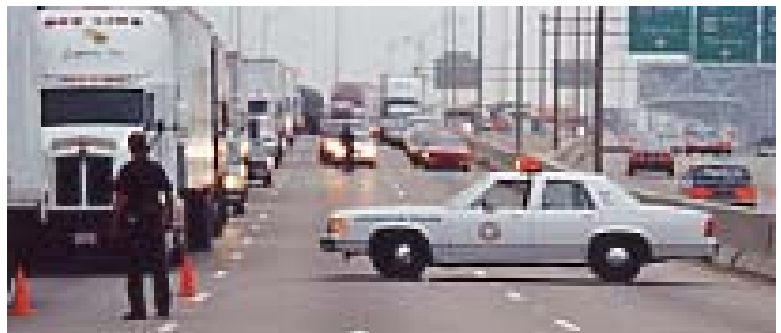
in place to constrain traffic, the more likely are secondary crashes. The purpose of this study is to develop a coordination plan and framework for a systematic, multi-agency, statewide effort to improve the management of highways accidents.

Objectives:

1. Develop a vision and strategic plan for highway incident management in Kentucky.
2. Offer an overall framework for a systematic effort to the management of highway incidents.

Conclusions/Recommendations:

- Numerous actions were identified throughout the report to improve the Incident Management Program. Priorities for implementation were noted for each identified activity and a timeframe for completion established.
- High priority suggestions included:
 - ◊ Public information campaign
 - ◊ Alternate route planning
 - ◊ Incident reporting hotline
 - ◊ Quick clearance and vehicle removal
 - ◊ Interagency training
 - ◊ Post incident debriefing
- Medium priorities include:
 - ◊ Emergency vehicle lighting
 - ◊ End of queue warnings
 - ◊ Towing incentive program
- Low priorities included:
 - ◊ Secondary crash investigation
 - ◊ Open roads policy
 - ◊ Automatic cargo identification
 - ◊ Mock disaster exercise



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Review of Traffic Provisions of KRS/KAR and Kentucky Drivers Manual

[KTC-05-02/SPR-285-05-1F]

Principal Investigator:

Jerry Pigman

Study Advisory Chair:

Steve Coffey

Purpose: There is a continuing need to provide the most current and applicable statutory and regulatory guidance related to traffic safety to the general public and enforcement officials. The Kentucky Drivers Manual provides rules and regulations appropriate for proper operation of a vehicle. This manual is updated periodically to reflect new legislation and other changes. The

Kentucky Revised Statutes (KRS) and Kentucky Administrative Regulations (KAR) were also reviewed for consistency.

Objectives:

1. Review the Kentucky Drivers Manual and ensure its consistency with any changes in law or practice. This included updated information from the federal MUTCD.
2. Relevant portions of the KRS/KAR were reviewed and recommendations made for updating consistent with state/national information.

Conclusions/recommendations:

- The Drivers Manual was updated to reflect changes in the MUTCD (2003) with emphasis on traffic control devices.
- KRS Chapter 189 and each chapter of KAR Titles 601 and 603 were reviewed and detailed changes were recommended.



Safety and Capacity Evaluations for Interstates in Kentucky

[KTC-05-06/1F-56-04-1F]

Principal Investigator:

Jerry Pigman

Study Advisory Chair:

Daryl Greer

Purpose: The interstate highway system was designed and built in the 1960's and commercial vehicles were considered to be a relatively minor fraction of the total traffic. However, due to economic factors and operating characteristics of interstates there have been substantial increases in the volumes of truck traffic. Between the time period of 1996 to 2002, all traffic increased by 18.2% whereas truck traffic increased by 27.3%. Improvements are continually

being made to the interstate system but they are not keeping up with the demands, especially for commercial vehicles. The purpose of this study is to assess the safety and capacity issues on the Interstates and the manner in which commercial vehicles impact these facilities.

Objectives:

1. Assess the safety and capacity issues on the interstates in Kentucky.
2. Assess the particular impacts of commercial vehicle traffic on these issues.
3. Analyze past trend and projects future traffic trends and impacts.

Conclusions/recommendations:

- Future traffic projections
 - ◊ A clear upward trend in truck traffic has been observed
 - ◊ Since the 1970's the annual growth in interstate traffic has been 3.46%
- Recurring congestion
 - ◊ Under 2003 conditions 30 miles of Interstate were found to operate at level of service "F" (It is expected to grow to 390 miles by 2030.)
 - ◊ Recurring traffic delay is expected to increase from 26 million vehicle hours (2003) to 321 million vehicle hours by 2030
- Non-recurring congestion
 - ◊ Rural interstates accounted for almost 40% of the non-recurring delays compared to 1% for recurring delays in 2003 (These number will increase to 50% and 35% respectively by 2030.)
- Crash rates
 - ◊ The fatal crash rate on interstates in KY is less than the national rate
 - ◊ The fatal crash rate for commercial vehicles on interstates is higher than the national fatal rate
 - ◊ The most significant contributors to expanding crash rates on the interstates were ADT and interchange density
- Alternative analysis
 - ◊ Expanding existing interstates (4-6 lanes and 6-8 lanes) is expected to reduce recurring and non-recurring congestion significantly
 - ◊ For the expansion alternative (noted above) 102 out of 161 sections evaluated had a B/C ratio greater than 1.0, and 64 of these sections had a B/C greater than 2.5
 - ◊ Of the 10 sections with the highest B/C ratio, 7 are 4-lanes segments in rural areas

Outsourcing of KYTC Project Delivery Functions

[KTC-05-12/SPR-282-04-1F]

Principal Investigator:

Dr. Donn Hancher

Study Advisory Chair:

Ken Sperry

Purpose: DOT's have conducted most of their engineering and inspection functions with in-house staff. There has always been some outsourcing (predominantly in the design and construction management phases) to address periodic projects activities that are in excess of normal staffing capacity. With current budget constraint, workforce hiring restriction and other factors there is need to address how DOT's will accomplish the essential work of needed transportation projects. One of

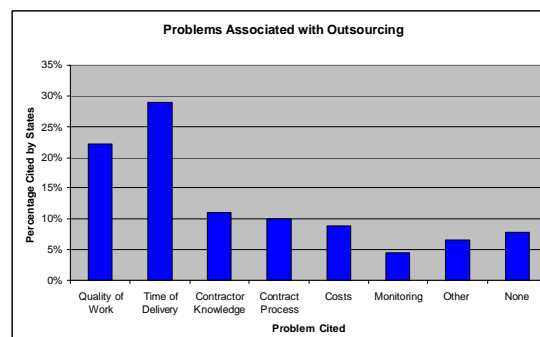
those options is to contract out more activity to external parties. The purpose of this study is to evaluate the potential effectiveness, benefits, concerns and implementation of outsourcing.

Objectives:

1. Review the current practices by DOT's for outsourcing primary project development functions
2. Evaluate the effectiveness and concerns of the outsourcing of primary project development functions
3. Evaluate the potential benefits of outsourcing
4. Develop guidelines for outsourcing

Conclusions/recommendations:

- DOT's have successfully outsourced various functions in the past and the trends indicate that outsourcing will expand in the future.
- Outsourcing can be accomplished for many activities undertaken by a DOT.
- A core competency should be maintained for all essential functions of the Cabinet to enable them to conduct and monitor outsourced activities.
- Outsourcing should be considered differently in districts vs. central offices. One policy or practice would not necessarily be appropriate for implementing on a statewide basis.
- Procedures should be developed to validate the costs and benefits associated with outsourcing.
- Some of the factors to evaluate for outsourcing are: workload requirements; time frame requirements; resources available; budgets; and availability of qualified vendors to do the work.



Kentucky Geotechnical Database

[KTC-05-03/SPR-227-01-1F]

Principal Investigator:

Tommy Hopkins

Study Advisory Chair:

Bill Pfalzer

Purpose: Gathering geotechnical information represents a major investment in the development of a transportation project. In order to make effective use of existing information it was determined that a data base should be developed that would enable the storage and subsequent retrieval of relevant geotech information in an easy to use format, by a wide variety of users. Retrieval of historic information will greatly assist in the plan-

ning stages of work and enable designers to avoid, minimize impacts and/or appropriately address critical geologic features.

Objectives:

1. Development of a comprehensive database of geotech information for the state
2. Provide for easy entry of new data from a variety of sources
3. Build in flexibility for future uses and expansions as warranted

Conclusions/recommendations:

- The database was developed and placed into operation.
- Details of the database development have been documented and furnished to the Cabinet.
- Some elements of geotech information have been added to the database by KTC research staff.
- Significant training will be required in order for this tool to become a routine part of the Cabinet's operation.



Evaluation of Auto Incident Recording Systems (AIRS)

[KTC-05-09/SPR-277-03-1F]

Principal Investigator:

Jerry Pigman

Study Advisory Chair:

Nancy Albright

Purpose: AIRS is a sound actuated, video recording systems that automatically records an accident when triggered by sounds (horns, collisions, etc.). Data in Kentucky indicates that approximately 35 per cent of all traffic crashes occur at intersections. The Cabinet's Strategic Plan has a goal of reducing these crashes by 10% by the year 2007. The Auto Incident Recording System (AIRS) was installed at an intersection in Louisville

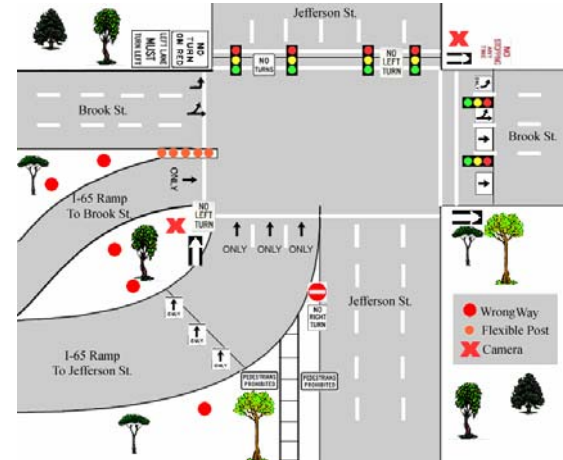
as a tool to detect patterns of crashes and to use this video data in conjunction with crash reports for designing improvements.

Objectives:

1. The primary objective of this study was to evaluate the effectiveness of AIRS as a data collection and analysis tool.
2. It also included an assessment of the costs and benefits of the system.
3. Recommendations were to be concerning future use of these systems and if appropriate a deployment strategy.

Conclusions/recommendations:

- AIRS is capable of documenting crashes at intersections.
- AIRS data is a reliable surrogate for crash data.
- An excessive number of false indications were recorded.
- 47 crashes occurred that were not recorded by AIRS.
- AIRS provides a time efficient method of analyzing intersection collisions compared to a conflict analysis or continuous videotaping. However, the efficiency is limited by the false incidents detected by AIRS.
- The crash savings in one year would pay for the cost of an AIRS installation.
- Overall AIRS is a cost effective tool and future installations should be considered, however, improvements need to be made in the system to eliminate the false (or missed) reports. It is suggested that installations be made at a variety of intersections to verify the versatility of AIRS to record data. The most cost-effective applications of AIRS would be at locations where traditional on-site observations could not be easily made.
- In addition to the use of AIRS and conflict studies, another alternative is the use of the "Intersection Safety Audit" procedure.



Examination of Economical Methods for Repairing Highway Landslides

[KTC-05-04/SPR-180-98-1F]

Principal Investigator:

Tommy Hopkins

Study Advisory Chair:

Ron Rister

Purpose: Each year the Transportation Cabinet spends millions of dollars repairing highway landslides-this includes patching roads that have settled or removing rock that has fallen on to the roadway. Often the only remedy that is affordable is to clean up the immediate problem or to provide a short-term solution. Without question these

slides are a potential safety hazard for highway users and a tremendous expense for the state to correct. Because of the frequency of landslides and the associated expense it was determined that some new and economical methods for repair were needed.

Objectives:

1. Examine promising techniques of repairing small highway landslides.
2. Develop a Windows program to assist in applying some of the new approaches.

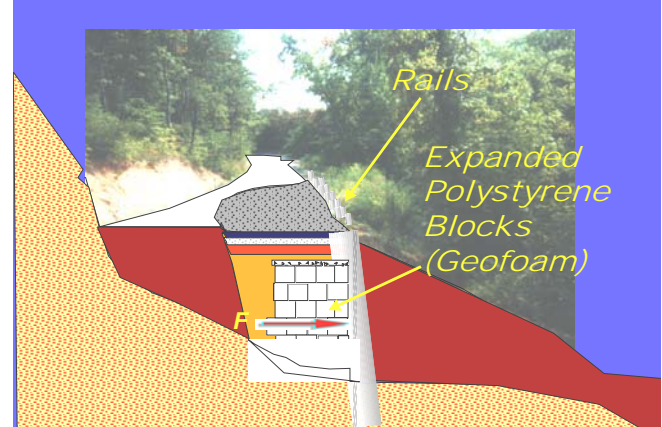
Conclusions/recommendations:

- The unit weight of the material plays a significant role for the retaining system.
- The use of geofam as a means of reducing the weight contributing to the landslide should be an effective and reasonably priced solution to some small landslides.
- A computer program was developed to assist in the design of the landslide repair.

*Economical Ways of Repairing Small Landslides
(And using Byproducts)*



...Ultra lightweight backfill...



New Kentucky Highway Research Projects for 2005/2006

- Speed Estimation and Data Base Program (06-305)
- High Level Benefit Cost Analysis (06-306)
- Extended Use Investigation of Ground Penetrating Radar (06-307)
- ESAL Forecasting Estimation Update for Superpave (06-308)
- Evaluation of Extended Truck Weight Impacts (06-309)
- Diamond Grinding Effects on Pavement Performance (06-310)
- Best Practices Tracking for On-Site Erosion Control (06-311)
- Environmental Content for Construction Inspection Training (06-312)
- Stockpiling Potential for Hydrated Lime-Soil Mixture (06-313)
- Economic Costs of Low Seatbelt Usage In Kentucky (06-315)
- Low-Cost Safety Measures at Signalized Intersections (06-316)
- Traffic Control for Emergency Responders (06-317)
- Development of Traffic Sign Inventory System (06-318)
- Evaluation of Pavement Rumble Strips Effectiveness (06-319)
- Update of Kentucky's Statewide ITS Architecture (06-320)
- Incident Management Strategic Plan Recommendations (06-321)
- Remote Monitoring of Bridge Piers for Barge impacts (06-322)
- Improved Safety of Construction/Maintenance Workers (06-323)

If you have a transportation issue that needs studied or a research project idea, please let us know. You can call any staff person or simply go to our web site's home page and click on the [research idea button](#). You will be asked to provide a brief statement about the issue or idea and some contact information. Give it a try!

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