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Cost-Effective Data Collection in Louisiana

As the population of the world keeps increasing, so do the number of cars on the road and Baton Rouge is no exception. Ways to ensure the quickest and safest routes for travelers are necessary, and that takes planning.

Metropolitan areas with populations over 50,000, are required to conduct transportation planning on a continuing basis to maintain a transportation plan that qualifies for Federal funding, but that type of data is expensive and can become easily outdated.

Researchers at the Louisiana Transportation Research Center (LTRC), headed by Dr. Chester Wilmot, looked at methods to acquire the necessary transportation planning data as cost-effectively as possible. The research was directed at identifying how to make the maximum use of existing data, collect new data most efficiently, and combine existing and newly-collected data as effectively as possible.

Vast amounts of existing data are easily accessible to metropolitan transportation planners at little or no

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Kirt Clement, LTRC Associate Director of Technology Transfer and chairman of the Management Development Task Force and LTRC's Gordon Smith, Project Manager, have traveled the state introducing and explaining the benefits of this innovative training program.

Management Development Program Implemented

The Department of Transportation and Development (DOTD) recognizes that employee training and development should form an integral part of the its future. A Management Development Task Force was appointed by LTRC and charged with instituting a comprehensive training program designed to further Secretary Movassaghi's strategic goals to improve management performance within the agency.

DOTD has long offered its staff a basic management development program. This program has now been expanded, however to address all levels of management from basic management training for entry level positions to leadership training for top administrators.

Because DOTD was a major participant in the Louisiana Managerial and Supervisory Survey conducted by Louisiana State

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Cost-Effective Data Collection in Louisiana (cont. from page 1)

cost. This information can come from official sources such as the decennial census, National Personal Transportation Survey, Bureau of Economic Analysis, and the Bureau of Labor Statistics or commercial data providers such as Dunn and Bradstreet and Data Resources Inc. Commercial sources provide data for a price, but present the opportunity to obtain data quickly, with little effort. Research indicates that these secondary sources of information can provide data that closely, but not completely, resemble Louisiana transportation information.

More than 50 metropolitan areas in the U.S. have conducted transportation surveys in the last decade. Although not all of the information is useful, it could provide a valuable source of information on the travel characteristics that can be expected in Louisiana metropolitan areas.

Researchers investigated three means of improving the efficiency of data collection:
1. Stratifying the population by household size and vehicle ownership which can capture approximately one-third of the variation in household trip rates. This method provides an accurate estimate of travel behavior.
2. Implementing a new form of activity diary that was tested on 108 households. The participants recorded their activities in a day-planner format and the results were useful.
3. Observing vehicular travel using a GPS instrument in the vehicle. Researchers realized that an accurate record of travel could be obtained in this manner.

One of the problems associated with periodically collected data sets for use in metropolitan transportation planning is that the data soon becomes outdated. If local data is to be as useful as possible, then it should preferably be constantly up-to-date. Researchers assembled a panel of respondents that could be surveyed on an annual or biannual basis. Results suggest that a panel of 500 households would allow effective updating possibilities to transferred data at an annual cost of $25,000, which is less than the cost of a full-scale cross sectional survey of 2,000 households.

Also researchers realized that combining transferred and local data using the Bayesian updating procedure is very effective. Data such as trip rates, mode shares, time-of-day travel, and trip length distributions can be updated with Bayesian updating methods. In tests using transferred data from the National Personal Transportation Survey of 1995 and the North Central Texas Council of Governments Survey of 1996, transferred values updated with local data were found to be generally similar to the values obtained from a full-scale data collection exercise in Louisiana in 1997.

Researchers concluded that there are a wide variety of methods to gather transportation information. They believe that if the methods investigated in this study are used in an actual metropolitan area, data will be rapidly and efficiently updated and made available to the city.

For more information on this research, contact Art Rogers, LTRC, at (225) 767-9166.

Louisiana Traffic Sign Management:
An Inventory System

For more information on the project, contact Dr. Brian Wolshon (LSU), principal investigator, at (225) 578-5247

Think of all the stop signs in a neighborhood, in a city, in the state. Add that to all the yield, warning, speed, and other street signs and one will realize that keeping a record of these signs is a difficult task. Currently DOTD has no comprehensive system for inventorying

and maintaining records of traffic signs, but researchers at LTRC are helping to change that. Their goal is to complete a pilot traffic sign inventory program for the department.

Around the country several state highway departments have, or are starting to develop, computer-based sign inventory systems. These systems count, locate, and monitor the maintenance and condition of sign inventories. These systems can include a variety of information on signs, guardrails, traffic signals, pavements, bridges, survey markers, etc. They can also be used to train personnel to help monitor field maintenance and replacement programs.

LTRC researchers proposed a field inventory program to assist DOTD in developing such a comprehensive system. The program would provide the initial field data to start a statewide sign inventory system. Most importantly, the proposed project will provide training to DOTD, permitting them to determine the best procedures and methods to follow when completing the full statewide inventory task.

The field inventory program uses state-of-the-art mapping and geographical information systems (GIS). Key data items from traffic signs adjacent to state roadways within DOTD District 61 are being collected. This includes information such as sign type, condition, support device, and location (based on GIS coordinates, route numbers, and log miles with respect to the roadway). All data will be recorded and stored in a computerized GIS database.

The project consists of six steps:

Task 1: Equipment acquisition and set-up;
Task 2: Data collection;
Task 3: Validation of database;
Task 4: Updates to inventory;
Task 5: Conduct training for DOTD personnel;
Task 6: Transfer sign inventory database to DOTD.

This pilot inventory project will probably serve as the model for a future statewide inventory management system that will permit DOTD to track and monitor the number, location, and condition of every traffic sign within their inventory. The study should be completed by June 30, 2002.

Informative Meetings Implementing ALF Project Deemed a Success

LTRC and LSU researchers, Masood Rasoulian and Dr. John Metcalf visited DOTD district offices and met with the engineering staff during April and May 2001. The purpose of the visits was to describe LTRC's accelerated pavement research program and focus on the findings of the first project conducted on evaluation of alternative soil cement base courses.

The LTRC Pavement Research Facility has been operating for six years and is currently testing the third experiment on evaluation of base courses built with rubberized asphalt pavements (RAP). The second experiment on the evaluation of RAP which contained rubber from shredded tires and mixed with liquid AC according to the Wet-Rouse procedures, has been completed and researchers are in the process of developing implementation strategies.

The Accelerated Loading Facility (ALF) device used in these projects is located at the LTRC Pavement Research Facility, a six-acre site located in Port Allen. The ALF device is capable of compressing many years of road wear into just a few months of testing, using accelerated traffic loading.

The facility is managed by an engineer manager and assisted by a mechanical and an electrical operator under a research contract with LSU. The facility is 100% state funded, although federal funds were used to obtain the needed equipment. There are only two other ALF devices in this country which are located at the FHWA Turner-Fairbank Research Center in McLean, Virginia.

In the first ALF experiment, the performance of different pavement base course design schemes including conventional soil cement and crushed stone base courses and other alternative designs were tested. Nine different design lanes were constructed at the site using full size construction equipment and constructed through standard DOTD practices of construction letting.

Pavements constructed at the site were all covered with standard HMAC as a wearing surface and were all tested to failure using the ALF device. The variables included in this experiment were:

- various layers of crushed rock,
- geogrid placement,
- 4% and 10% cement stabilized soil,
- polypropylene fibers in soil cement,
- thicker and weaker cement treated layers,
- an inverted pavement design.

General and specific findings of the first project were presented at each district office meeting. The two concepts which were

Close-up of the ALF device located at the LTRC Pavement Research Facility.

shown to be the most effective were thicker/weaker cement treated base courses, and inverted pavements in which a crushed stone layer is placed over a cement-stabilized soil layer, covered by a flexible pavement.

At the end of each session, the participants were asked to identify potential projects suitable for incorporating the concepts proven effective through the first ALF project. The responses from most districts were positive. Most of the participants had already tried concepts developed through the first ALF project, and were interested in selecting additional projects within their allocated funding. Other issues relating to pavements and base courses such as overloading, greater use of RAP, and life cycle cost were also discussed.

Meeting one-on-one with LTRC customers proved to be an excellent medium of information exchange and an effective way of shaping LTRC's future research program.

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Management Development Program (cont. from page 1)

University, the task force relied on need assessments and their individual years of professional experience at DOTD to determine learning objectives. The competencies identified by the task group underpin the framework for the formal program designed to develop leadership, administrative, and managerial skills to meet the goals and vision of DOTD. Affected positions have been identified and levels of participation for those positions determined. Learning objectives are established and mandatory courses have been designated. A Policy and Procedure Memorandum (PPM 59) to govern the DOTD Management Development Program is in place.

The management training program requires the participation of employees in professional job series, starting at the entry level. Additional levels include staff (journeyman, advanced journeyman, or team leader); managerial (first or second line supervisor); administrative (appointing authority and/or budget authority); and executive (members of DOTD Executive Committee).

Existing employees are "grandfathered" into existing positions, but are encouraged to participate in training for their level. New employees must take all required entry level courses to obtain permanent status. Also, permanent employees transferring into DOTD at staff level and employees moving into entry or staff levels from jobs not covered by this program, must take all required training for entry and staff levels within two years.

All training included in the program will be available through LTRC in cooperation with the Division of Administration's Comprehensive Public Training Program (CPTP), DOTD sections, and outside vendors.

Because many of the courses required by the DOTD Management Development Program are also required by the CPTP certificate program, many employees may want to take additional CPTP courses and required exercises to earn the national Certified Public Manager (CPM) certificate or other certificates sponsored by the CPTP program.

Other state agencies are looking at the potential of this program to be used as a model when addressing their management training needs.

Members of the task force include: Kirt Clement (Chair), John Basilica, Curtis Patterson, Bob Boagni, Jimmy Little, Bob Roth, Gill Gautreau, Tom Richardson, Rick Holm, Farilyn Dupuy, Gordon Smith, and Claire Major (Consultant/Facilitator).

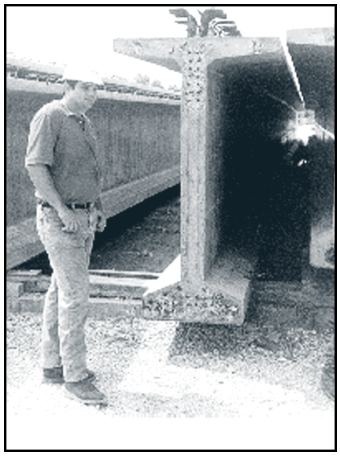
Entry level courses include: Ethics, Sexual Harassment Training, Excellence in Customer Service, Parts 1 and 2, Diversity: What Employees Should Know, Team Work, and Developing Effective Teams, Part 1.

Staff level courses include: Effective Problem Solving, Resolving Conflict, Conducting Meetings, Project Management, Managing Work Time Effectively, Technical Writing, Effective Presentation Skills, and Managing and Improving Work Processes.

Managerial level courses include: Developing an Effective Planning Process, Civil Service Rules and Regulations, Developing Effective Teams, Part 3, Conducting an Effective Job Interview, Productive Employee Performance Reviews, Key Element of Civil Service Disciplinary Actions, Performance Planning and Review, Effective Conflict Resolution Strategies, Managing Customer Service Systems, Advanced Project Management, and Employment Law.

Administrative level courses include: Financial Administration, Individual Differences & Diversity in the Workplace, and Long-Range Planning.

Fatigue and Shear Behavior of HPC Bulb-Tee Girders



The estimated completion date for this project is December 31, 2001. For more information on the current research, contact John Eggers (LTRC), at (225) 767-9116.

The construction of a bridge is a major commitment of time and resources. DOTD and LTRC have strived to use the best available technology for the state's bridge construction while keeping costs at a minimum. One of the latest technologies currently under study by LTRC researchers is the use of 72-inch deep bulb-tee girders. These girders will allow for a reduction in the number of beams used when building bridges. But to ensure that the girders will perform satisfactorily, it is necessary to verify design provisions for repeated flexural loading and sheer.

LTRC researchers developed a detailed test plan by describing the girder design, test specimen design, anticipated fabrication procedures for the girder and deck, instrumentation plan, material testing program, fatigue testing program, and shear testing program.

After the plan was complete, the researchers designed three test specimen girders. The first girder was designed according to the American Association of the State and Highway Transportation Officials (AASHTO) standard specifications, while the other two girders were based upon AASHTO Load Resistance Factor Design (LFRD) specifications. All three girders, having the same number of bonded strands, were produced in the same pre-casting bed at the same time. The testing instrumentation included vibrating wire strain gages at the mid-span of each girder, strain gages on the shear reinforcement, non-pre-stressed longitudinal reinforcement at the ends of each girder, and load cells on selected pre-stressing strands in the pre-casting bed.

Researchers then tested the compressive strength, modulus of elasticity, modulus of rupture, and coefficient of thermal expansion by obtaining data on approximately 50 specimens for tests on concrete used in the girders and 25 specimens for concrete used in the deck. The girders were then tested using a closed-loop, load-controlled, servo-hydraulic system. After those test were completed, the two ends of each girder were tested to evaluate static shear strength performance. Two of the three girders have been tested by the Construction Technology Laboratory (CTL).

The new data that these tests provided will be submitted to the DOTD Bridge Design Section. It should result in structures that are more economical because the designs will utilize fewer beams that will result in lower costs in materials, labor, transportation, and construction, while increasing span lengths that require fewer piers. The use of HPC bulb-tee girders will also produce structural benefits, including increased rigidity because of the increased elastic modulus and increased concrete strengths. Overall this data may even have long-term economical benefits due to increased durability and reduced maintenance.

LTRC Awarded NCHRP Project in National Competition

For more information on this research project, contact Art Rogers, LTRC, at (225) 767-9166.

An LTRC research team, headed by Dr. Peter Stopher (LSU), was recently awarded a $300,000, two-year contract by the National Cooperative Highway Research Project (NCHRP) to develop standardized procedures for personal travel surveys.

Over the past 40 years, researchers at transportation centers throughout the United States have spent millions of dollars collecting data, but have had no specific guidelines for information gathering procedures. With no specific gathering methods, much of the information is unreliable, of bad quality, and incapable of being compared to other data.

LTRC researchers wanted to develop objective standards that would lead to an overall increase in the quality and reliability of transportation surveys performed, while improving the comparability between surveys. The research team plan to produce standardized guidelines including guidance on how to select cost effective survey methods, how to implement the survey, how to analyze the results, and how to report measures that allow assessment of the quality of the data. The study includes the tasks of identifying procedures and assessment measures and testing selection procedures.

The researchers hope to produce a number of personal travel survey procedures and assessment measures that can be standardized within the planning industry. The final report from the researchers, which will be published by LTRC, will describe these procedures and assessment measures in detail. The researchers also plan to create a web site that will post the results and provide programming modules that would assist implementation of appropriate procedures and assessment measures.

It's that time again . . .

For more information on the upcoming Transportation Engineering Conference call (225) 767-9139 or email kclement @dotd.state.la. us.

Plans are underway for the DOTD 2002 Transportation Engineering Conference. The conference will be held February 17-20, in Baton Rouge at the Radisson Hotel and Conference Center.

The conference provides a forum for members of the transportation industry to relate innovative technologies and to discuss transportation policy, practice, and problems. Conference organizers anticipate more than 1,100 transportation professionals will attend the biennial event. LTRC is coordinating the conference.

LTRC is currently soliciting input from the transportation community on speakers and the agenda for the conference. Recommendations should be directed to Harold "Skip" Paul, LTRC associate director, research, who serves as chairman of the conference program committee, or Kirt Clement, LTRC associate director, technology transfer, who chairs the planning committee charged with overall responsibility for the conference.