

# Focus on Research

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"Focus on Research updates engineers and technicians on their interest upon projects in active TxDOT research projects."

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Planning \_\_\_\_\_ ROW \_\_\_\_\_  
Other \_\_\_\_\_

## Optimum Design Criteria Studied

Highways requiring capacity expansion often are located in suburban areas where their right-of-way with adjoining commercial and residential development is usually limited. Depending on the extent of adjoining development, available right-of-way for a rural multilane facility may also be severely limited. To reduce the right-of-way requirements and associated costs, designers often propose a curbed section with inlets and storm drains. This kind of system eliminates the need for parallel drainage ditches and, as such, reduces the right-of-way requirements.

The objective of Project 0-1347, *Design Criteria for Suburban High Speed Curb and Gutter Sections*, is to study various facilities of this type throughout the state and to determine optimum design criteria, including clear zone, design speed, and shoulder requirements. The project will also develop specific guidelines for high-speed urban curb and gutter facilities in suburban areas.

The results of this project will increase capacity, cost-effectiveness, and safety for suburban highways. The project will also provide uniform design procedures throughout the state.

The project runs from September 1992 through August of 1994.

**Area 3 — Technical Panel Chairman: Bill Crumley, P.E.,  
Brownwood District**

**Researchers: Drs. D. Fambro, P.E., and H. Ross, P.E., TTI**

## Tests to Ensure Quality of Pavements Built from RAP

In response to new environmental legislation, TxDOT has expanded its use of reclaimed asphalt pavement (RAP). With such asphalt recycling likely to become a key component of the paving process, how will TxDOT ensure that the desired pavement quality is achieved? A critical factor is the adaptation of appropriate technology. A significant part of this technology involves proper characterization of the RAP.

Research Study 0-1369, *Testing Methods for Reclaimed Asphalt Pavements*, attempts to clarify the steps necessary to produce quality recycled hot mix through the following objectives:

- Evaluate the effects of major parameters influencing the wave propagation and conventional measurements of asphalt cement (AC) aging and recycled hot mix (RHM) stripping potential.
- Develop a systematic testing approach that can be used to rapidly

and reliably assess the aging of RAP and stripping of RHM.

- Calibrate the above testing approach for correlating RAP properties measured under laboratory tests with the in-place and laboratory properties of RAP.

**Area 2 — Technical Panel  
Chairman: Dale Rand, P.E.,  
Materials and Tests Division  
Researcher: Dr. Soheil Nazarian,  
UTEP**

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## **Hydraulic Modeling Facility Considered for Scour Assessment**

The Texas Department of Transportation has about 25,000 bridges constructed over waterways that may be susceptible to scour. The scouring of piers and foundations is a primary cause of structural failure. Because such damage drives up maintenance costs and endangers both individuals and property, TxDOT is in need of a method for evaluating scour damage. Unfortunately, current methods of evaluating scour potential are based on assumptions and models that do not necessarily

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***The modeling facility could yield more applicable evaluation techniques for TxDOT bridges...***

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reflect conditions prevalent in Texas.

Project 0-1408, *Feasibility Study for Hydraulic Modeling Facility for Scour Problems*, is assessing TxDOT's specific needs regarding scour evaluation and prediction. In addition, the project team will determine the feasibility of constructing a hydraulic modeling facility to accommodate TxDOT requirements. The modeling facility could yield more applicable evaluation techniques for TxDOT bridges, thereby improving current design techniques and scour prediction.

If the modeling facility is indeed determined to be viable, then the next stage would be to actually construct the facility (under a separate research contract). The project runs from September 1993 through August 1995.

**Area 4 — Technical Panel**  
**Chairman: W. J. Vose, P.E.,**  
**Design Division**  
**Researchers: Drs. Briaud and**  
**Ting, TTI**

## **Economic Impact of Highway Widening Projects**

The Texas Department of Transportation is continually upgrading its highways. These reconstruction projects add capacity, straighten horizontal and vertical alignments, and provide continuous two-way left-turn lanes (some with protected left-turn lanes) to urban roadways. Such reconstruction activity, however, often adversely affects adjacent businesses and property owners. The general objective of Project 0-1260 is to determine the economic impacts of highway widening improvements along selected strip-commercial areas in Texas. More specifically, the study will determine the impacts on motorists, abutting businesses, and on local urban areas or cities.

The results of Study 0-1260 will help TxDOT

maintain effective public relations with those directly and indirectly affected by highway widening improvements. The dissemination of the results to the press and to the general public (through public hearings) will save TxDOT time and money in getting proposed projects approved for construction.

Additionally, the results of this study can be used by TxDOT planning and design engineers to prepare environmental statements and to document the expected economic impact of a proposed highway widening project. The study runs from September 1990 to August 1996.

**Area 1 — Technical Panel**  
**Chairman: Robert Wilson,**  
**P.E., Design Division**  
**Researcher: Jesse L.**  
**Buffington, TTI**

## **Project Investigates Erosion Control Materials and How They Are Evaluated**

The objective of Study 7-1914, *Roadside Development and Management Field Laboratory Erosion Control Material Testing*, is to develop for TxDOT a program for evaluating the field performance of such erosion control materials as soil retention blankets and cellulose fiber mulches. Overall, the project was created to provide the manufacturers of erosion control and revegetation materials a timely and fair program through which their individual products could be evaluated for use within TxDOT's construction and maintenance activities. This project will ultimately provide for TxDOT a list of approved erosion control materials and methods, including

channel lining and vegetation establishment for maintenance, construction, and repair.

The tests will be conducted under controlled conditions. Artificial rain-making equipment will be used to test the effectiveness of the materials on slopes using rainfall intensities of up to 5 inches per hour. Channel materials will be tested at full cross-sectional flow and stress computations will be extrapolated for a range of cross-section areas.

**Area 2 — Technical Panel**  
**Chairman: Paul Northcutt,**  
**Construction and Maintenance**  
**Division**  
**Researcher: Sally Godfrey, TTI**

## Study Will Enhance TxDOT Communication

Efforts to build effective communication within the Texas Department of Transportation have been hampered by the agency's particular statewide organizational structure. Specifically, the centralization of TxDOT's policy-making and administration contrasts with the high level of decentralization in its district operations. Given that an effective internal and external communication program is absolutely crucial to the maintenance and improvement of morale, efficiency, and productivity within complex organizational environments, the sharp contrasts in TxDOT's organization poses a significant communication challenge — especially with respect to ethnic groups and other special audiences.

Project 0-1324, *Enhanced Public Education Campaign for Ethnic Groups and Special Audiences*, proposes a comprehensive assessment of current TxDOT internal and external communication practices and procedures. This proposal's components address significant issues raised by TxDOT in previous attempts to educate both its employees and its external audiences regarding the agency's commitment to equal opportunity in employment and contracting.

This project will allow TxDOT to define and convey its goals and objectives as they relate to racial/ethnic groups and other special audiences. It will also strengthen Texas' relations with racial/ethnic groups and other special audi-

ences, especially during a highly transitional period. Overall, the project will promote support for the TxDOT mission.

With their field research nearly complete, the project team at the Lyndon B. Johnson School of Public Affairs is currently developing an action plan. In terms of implementation, the researchers will brief selected TxDOT officials and staff (at agency headquarters and within the Austin District) on project findings.

The study runs from September 1992 through August of 1994.

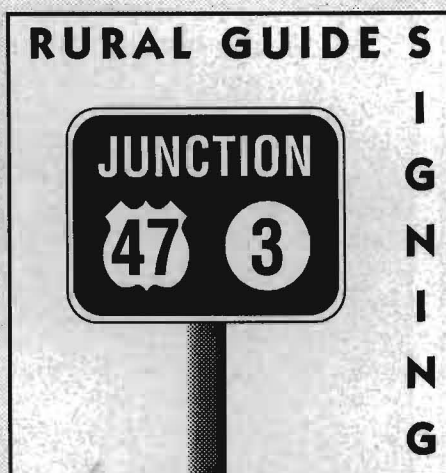
**Area 1 — Technical Panel  
Chairman: Michele Bibby  
Researchers: Dr. Patricia  
Witherspoon, CTR, and J. Jorge  
Anchondo, TSU**

## TTI Study Seeks to Reduce Rural Sign Confusion

The Texas Manual on Uniform Traffic Control Devices (MUTCD) prescribes how guide signing and directions are to be set up on rural highways. The problem is, these guide signing standards do not take into account the important findings of a recent comprehensive study of rural guide signing. By evaluating the effectiveness of current MUTCD standards, Project 0-1373, *Evaluation of Rural Guide Signing*, will provide a more effective system of communicating directions and guidance to rural drivers.

In their approach to this problem, the study team first conducted a motorist survey to determine what

elements of the standard sign sequences confuse drivers. Using the information obtained from the survey, the researchers next



selected sites where existing sign sequences could be revised. Follow-up surveys will be con-

ducted to determine if the alternate sign sequences used at these selected sites do in fact reduce driver confusion.

Ultimately, the study's evaluation of current rural guide signing standards will identify how rural guide signs can be improved. Equally important, the study evaluation will improve standards for rural guide signing — standards that may eventually become a part of the Texas MUTCD.

This study got underway in September of 1992 and will run through August of 1995.

**Area 3 — Technical Panel  
Chairman: Lewis Rhodes,  
P.E., Traffic Operations**

**Division  
Researcher: Gene Hawkins, Jr.,  
P.E., TTI**

# New Bridge Rail End Treatment Examined

Study 0-1263, which ended in August of 1993, designed and tested a new bridge rail end treatment for use in those cases where intersecting streets or driveways would not allow the installation of the standard TxDOT guardrail approach (usually 100 feet or longer). With one exception, the 60 mph short-radius end treatment developed under Study 0-1263 passed each of the four crash tests selected as critical design impact conditions. The one failure involved a 4,500-lb vehicle impacting at the center of the curved rail segment at 60 mph and at a 25-degree impact angle. In this case, the vehicle passed under the guardrail, though not before the new system had dissipated 90 percent of the vehicle's kinetic energy.

Study 0-1442, *Treatment at Intersecting Streets and Drives: Bridge Railing End Treatments*, will continue the efforts of Study 0-1263

by developing and crash testing a thrie-beam system similar to the nested W-beam configuration developed in the earlier study. In

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addition to being significantly safer than existing designs, the thrie-beam short-radius system will be much easier to install and maintain than the interim nested W-

beam design developed under Study 0-1263. This new design will be crash tested at the Texas Transportation Institute.

The project's benefits include improved safety performance and relatively easy installation and maintenance. The new design will attempt to incorporate standard TxDOT hardware to minimize inventory and to reduce costs. Upon verification of the structural adequacy and crash-worthiness of the new design, TxDOT can develop new standards and can begin immediate implementation of the system where site conditions warrant.

The project runs from September 1993 through August 1994.

**Area 4 — Technical Panel**  
**Chairman: Robert Cochrane, P.E., Construction and Maintenance Division**  
**Researcher: Dr. Hayes Ross, P.E., TTI**

## Focus on Research

The purpose of **Focus on Research** is to update engineers and technicians on items of interest in active upcoming projects. The contents of the various articles do not necessarily reflect the official views of the FHWA or TxDOT.

Contact Kathleen M. Jones (512) 465-7947, Office of Research and Technology Transfer, P.O. Box 5051, Austin, TX 78763-5051, if you need more detailed information on any one of these projects.



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