Road Map for the Future

Transportation Officials Steer Texas Into New Era of Super Highways

Construction of the I-35 and I-635 interchange in Dallas. The major cities in Texas built loops, such as I-635, around the central core of the city as a practical way of navigation and congestion relief. (courtesy of TxDOT)

While looking ahead at the transportation challenges of tomorrow, the Texas Transportation Institute, along with other statewide organizations, is honoring the work of the thousands of dedicated engineers, planners and builders who worked to create a successful highway system in Texas by celebrating the Interstate's first 50 years.

By Eileen Schwartz

Bold strategies for moving Texas into a new era of highway design, construction, mobility and safety were discussed by transportation experts from the federal, state and private sectors at the first-ever Texas Transportation Forum, held June 8 and 9 at the Hilton Hotel in Austin. The Forum kicked off the state's celebration of the 50th anniversary of the Federal-Aid Highway Act, signed into law June 29, 1956, by President Eisenhower.

The Forum, cosponsored by the Texas Department of Transportation, the Associated General Contractors of Texas, the Texas Good Roads Transportation Association and the Texas Transportation Institute, provided networking opportunities as well as a comprehensive look at the methods that will drive the transportation industry into the next half century.

Norman Y. Mineta, secretary of the United States Department of Transportation, was the headline speaker at the Road Hand Awards Luncheon on June 8 while Texas Governor Rick Perry delivered the keynote address at a dinner that night. Other featured speakers included Michael W. Behrens, executive director of TxDOT, Steve Massie, senior vice president of the AGC of America, Harold Linnenkohl, president of the American Association of State Highway and Transportation Officials and economist Ray Perryman of Waco-based The Perryman Group.

Topics thrashed out included the challenges of the next 50 years, the road to economic opportunity, leveraging existing infrastructure, the national tolling issue and the future of transportation financing.

A related event on June 8, with Mineta in attendance, was the announcement that the $3.6 billion Central Texas Turnpike Project near Austin was opening in fall 2006, nearly a year early and about $400 million below budget. In making the announcement, Ric Williamson, chairman of the Texas Transportation Commission, said the CTTP "in many ways is as forward-thinking as Eisenhower's legislation."

Mineta said Texas has shown tremendous leadership. "This project is ahead of schedule and below budget," Mineta said. "Those words are music to the ears of anyone in charge of money."

TTI Steps Forward

The two-day transportation forum in Texas as well as nationwide celebrations of the Interstate Highway System's 50th birthday have focused attention on the accomplishments of

the private sector and state agencies such as TxDOT, which have helped make the Texas highway system one of the nation's finest. Such accomplishments are acknowledged by the transportation industry. Perhaps not so well known are the innovative and valuable contributions made to this success story by the state's unique research organization, the Texas Transportation Institute.

Located on the Texas A&M University campus, TTI is the largest university-affiliated transportation research agency in the United States. Since its inception 56 years ago, the state agency has been a leader in efforts to solve present and future transportation problems not only in Texas, but throughout the nation.

TTI has had a positive impact on virtually every mile of roadway in Texas in the highway area alone-planning, design, construction, maintenance, safety and operations.

"We were formally established in 1950," said Dr. Herbert Richardson, director of TTI. "Prior to that, in 1949, the Texas Legislature authorized the Texas Highway Department (now the Texas Department of Transportation) to contract with Texas A&M because they wanted the College Station university to be the research arm of the highway department."

At that time, Richardson said, the Interstate Highway System was just being developed and there were myriad questions and research issues to be addressed. "TTI did a lot of research on how to make the highways safer," he said. The crash barriers found on most major highways nationwide are most likely the direct result of this early research. TTI has since broadened its focus to address all modes of transportation–highway, air, water, rail and pipeline. Its research and guidance has resulted in more durable pavements, readily available aggregates for construction, improved soil selection, intersection illumination and sign supports that yield when struck by vehicles, just to mention a few improvements.

Currently TTI is helping TxDOT to establish criteria for selecting safety projects scheduled to receive some $600 million in state funds, Richardson said. The agency also helps develop urban traffic management systems such as Houston's. "This works like a Johnson Space Center for urban transportation," Richardson said. "With county, police, emergency management and TxDOT teams all working together."

TTI researchers, all objective transportation experts, contribute to the growth of the transportation profession by participating in, and leading, more than 250 local, state and national transportation organizations.

TTI operates on a budget of some $43 million annually, earning more than 90 percent of its funds each year

Construction of the upper deck of I-35 in Austin in 1972. The unique double deck construction of this stretch of roadway allowed lanes to be built in this tight stretch of Austin. (courtesy of TxDOT)

I-35 west weaving through Fort Worth. State Highway 183 crosses the interstate at the bottom of the photo. (courtesy of TxDOT)

through competitively awarded research contracts, Richardson said. The remainder, he added, comes from contracts and grants–about 60 percent from TxDOT and 20 percent from the federal government, while a small percentage comes from private work.

TxDOT estimates that the benefit-cost ratio of TTI's research programs is in excess of five to one.

Currently, TTI employs some 600 people–52 percent professionals, 10 percent support staff and 38 percent graduate and undergraduate students. More than 40 members of the TTI professional staff hold joint academic appointments.

Headquartered on the TAMU campus, TTI also maintains a full-service crash-testing facility in Bryan, and has offices in Arlington, Dallas, Austin, San Antonio and Houston. All of which puts the agency in a "real-world" environment and facilitates its research and data collection.

Since its inception, a major goal of the TTI has been the training and education of students who will become the next generation of transportation professionals. More than 4,000 individuals who have worked for TTI and/or have a degree from Texas A&M University are practicing transportation professionals today. They work in 47 states, the District of Columbia and 18 foreign countries.

A roadcrew lays an asphaltic base on I-35 south of San Antonio. (courtesy of TxDOT)

"Because of support from the TTI research program, Texas A&M University now has one of the largest and best transportation engineering programs in the U.S.," Richardson said. The agency has attracted national media attention over the years due in large part to its annual Urban Mobility Report, which provides data on traffic congestion in every major U.S. city. The first report was published in 1982.

"This generates a lot of interest," Richardson said. "Because every major city is facing increased congestion issues.

"Our goal is to raise awareness of the problem and to do so in terms that general audiences can understand while being technically accurate," said Tim Lomax, research engineer for TTI's System Planning, Policy and Environment Research Group, Mobility Analysis.

"The number one issue we look at is what congestion means to the average traveler in a certain area," Lomax said. "How much extra time do they spend on the road? How has that gotten better or worse?"

Data from the annual mobility

TTI used towers and motion picture cameras to assist in the design, construction, operation and improvement of urban interstates. Shown here is I-45 (the Gulf Freeway) in Houston. (courtesy of TTI Communications)

report is available to the public. Lomax said the studies provide a basis for examining trends–both positive and negative. One trend he has noticed is the tendency of state and metropolitan planners to address congestion problems in travel time and travel delays.

There is less reliance on terms such as "volume to capacity," he said, and more emphasis on language the general public can understand such as the travel-time index, which helps in calculating time spent on trips in peak and off-peak hours. "For instance, people understand spending 51 hours in the car."

The data works in any geographical area because they can be broken down by section of road or group of roads or an entire region, he added.

"This gives you a sense of prioritizing regions or roads, showing the effect of adding a bus and carpool lane to a freeway, for instance," Lomax said.

TTI's Material and Pavements Division is recognized for its ability to work simultaneously on multiple projects. Currently it has 25 researchers on top of 100 different projects, said Joe Button, senior research fellow in the division.

"We conduct research on asphalt, concrete, aggregates, stabilizers and even cement itself," he said. "We study the pavement from the subgrade natural ground to the surface of the pavement, whatever type of pavement that might be."

Such research leads to better performance and longer lasting pavements, thus saving money.

"People [from the private sector] hire us for such projects, but we do most of our work for TxDOT and some for the federal government and the National Cooperative Highway Research Program," Button said. One result of the research is the development of best practices or improved specifications, he added.

Workers build a frame during construction of I-45 in Houston in 1961. (courtesy of TxDOT)

"These types of projects will effect contractors when we start messing with specs, but the goal is to try to keep their business easy," Button said.

Currently, he is working on a proposal with TxDOT to further examine the hot topic of warm-mix asphalt. At temperatures of 200 to 250 – around boiling point of water – the asphalt is heated to a lower temp, which also lowers the amount of fumes that may be coming off. Those fumes may contribute to existing problems in non-attainment areas.

Additionally, at a lower temperature, the hauling distance can be lengthened because they're not worried about the mix losing its heat.

"The industry is pretty excited about it," Button said. "It hasn't been used much in this country, but it has been used in Europe. It is only in its infancy even where it was first introduced, but the concept has been around for a long time. New chemicals are making it more realistic to bring it to the marketplace."

Central Expressway, Dallas at the peak of traffic in 1958. The estimated hourly traffic load per inside lane was better than 2,000 vehicles per lane, per hour. (courtesy of TxDOT)