

WINTER 2004



## Quality Centered Research

### A View from the Top

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As the country's largest university-based transportation research organization, the Texas Transportation Institute is fortunate to be able to take on research projects that not everyone can successfully accomplish. The Texas Department of Transportation (TXDOT) is our major sponsor; but we also perform research for the Federal Highway Administration, the National Cooperative Highway Research Program, other state DOTs, and assorted federal, state and local agencies. As part of The Texas A&M University System in College Station, we have access to many exceptional facilities, one of which is the Texas A&M Riverside Campus. This facility is an old Air Force Base with five runways that offers vast expanses of flat open spaces to accommodate many different elements of the TTI research program.

### Practical Solutions; Real World Challenges

TTI was established over 50 years ago to conduct transportation-related research in several different areas. TTI may be best known for its pioneering research in crash testing, but today's researchers at the

Institute address many critical issues such as operations, safety, planning, pavements, structures, and others. The TTI website, <http://tti.tamu.edu>, provides a good overview of the Institute's overall research program.

The Operations and Design Division is one of several divisions and centers at TTI, and has an active program of research in the traditional areas of transportation engineering. We strive for results that practitioners can apply immediately to solve real-world challenges and improve their transportation systems. Most of our projects and results are on the web at <http://tti.tamu.edu>.

The division's primary areas of research are signs, markings, signals, work zones, and roadway design. Researchers evaluate different performance measures in these areas, including operational considerations, safety impacts, driver behavior, visibility, and others. The following information provides some insight into a few recent initiatives in TTI's Operations and Design Division. Advancing highway quality is at the core of each project, since the Institute shares with the National Partnership for Highway Quality a drive to improve the quality and safety of the nation's roadways.

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## Brighter Roads Ahead

A series of research projects has supported the FHWA's development of the landmark proposed rule on minimum retroreflectivity levels for traffic signs. Our division's task has been to revise the basis for the minimum retroreflectivity levels and the resulting values to be used in the proposed rule. Among other considerations, the revised minimum retroreflectivity values for nighttime visibility of signs had to address the following nighttime visibility-related factors: increasing vehicles sizes, changing headlamp technologies and light distribution, progressively more complex sign sheeting technology, and aging drivers. It's been enlightening work (no pun intended!), especially because there is not one simple and effective metric for nighttime traffic sign visibility.

Many in the highway community will recall that the minimum retroreflectivity effort started with research in the 1980s. In 1993, Congress directed the U.S. DOT to revise the Manual on Uniform Traffic Control Devices (MUTCD) to include a standard for a minimum level of retroreflectivity that must be maintained and applied to all roads open to public travel. FHWA completed its research and reports, and was ready to start rulemaking. AASHTO created its Retroreflectivity Task Force, which provided input, and TTI's been doing much of the updated research over the last few years.

Along the way, we've had the benefit of national workshops on nighttime sign visibility that have enabled the sharing of information among state and local agencies and industry. These workshops solicited ideas from participants on future language for the MUTCD and consolidated practitioners' thoughts on acceptable nighttime sign evaluation methods. TTI recommended flexibility for jurisdictions, and the new rule will give agencies alternative methods for evaluating, maintain-

ing and managing retroreflectivity levels, given their resources and the number of signs they manage.

## Overnight Delivery: the Customer's Choice

Quality management practices often result in the highway user's choice of night time work zones, so we're putting considerable focus on safety in that increasingly common environment. Most of our projects in that arena are for TXDOT, but they have important ramifications for DOTs across the nation. About \$4 million in this kind of research is underway as we identify the kinds of night work that predominate, review the problems, assess risks, and find countermeasures to solve the problems. One area of scrutiny, for instance, is better lighting in night work zones.

In conjunction with the American Road and Transportation Builders Association, TTI operates the Work Zone Safety Information Clearinghouse at <http://wzsafety.tamu.edu>. This is an up-to-the-minute national resource where practitioners can go for information about work zone issues.

## Rural Innovation

Moving to the realm of highway signal operations, TTI has been studying economical vehicle detection control systems to minimize delay and crash frequency at rural intersections. The system extends the green to approaching vehicles and, thereby, prevents rear-end and right-angle crashes. It also predicts the type of vehicle that's approaching an intersection and extends the green according to stopping ability. For instance, a truck is likely to receive more green extension since it can't stop as fast as a car. Details about TTI's Intelligent Detection-Control System for

Rural Signalized Intersections are available on the Institute's web site.

## Red Light Running Revisited

Recent TTI research looks at how to reduce red-light-running through engineering countermeasures – methods other than giving out tickets. Alternatives can include increasing the length of the yellow indication, installing signal back plates to make signals more visible, or using larger signal heads. These engineering countermeasures apply to situations where drivers are incapable of stopping (due to high speed or misjudged grade) or inattentive. TTI's studies to reduce the number of red light violations are also on the web site, and include Guidelines to Reduce Red-Light-Running, Engineering Countermeasures to Reduce Red-Light-Running, and Review and Evaluation of Factors that Affect the Frequency of Red-

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## The NPHQ Newsletter

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## A View from the Road

# Common Qualities: Foundations of State Quality Partnerships



By Jeff Amoriello, Assistant District Engineer, Maryland State Highway Administration District 2 and Member of the NPHQ Task Force for State Quality Partnerships

**W**hy do state departments of transportation establish formal State Quality Partnerships (SQP) with charters, vision statements, committees, policies and regularly scheduled meetings? Because project delivery hinges on a team; no single agency, consultant, or contractor has the expertise to give the driving public the high-value roads we all want to deliver. State Quality Partnership foundational elements may differ, but each articulates the same purpose: to work together toward common goals.

A primary goal of the National Partnership for Highway Quality's Long Range Plan is the creation of an SQP in every state. NPHQ recently formed a task force to study existing partnerships and share their foundational elements for modeling by other states.

### Pennsylvania Partnership for Highway Quality (PPHQ)

Amar Bhajandas is my colleague on the NPHQ State Quality Partnerships Task Force, a member of the NPHQ Steering Committee from the AASHTO Subcommittee on Construction, and Director of the Bureau of Construction and Materials at the Pennsylvania Department of Transportation. He notes that early on, the Pennsylvania Partnership for Highway Quality attracted strong interest within the consultant community and says, "The PPHQ has done

a lot of good, notably in the design and construction communities. The partnership brings synergy to issues, problems, and solutions in the construction of highways and bridges. It keeps our common goals front and center."

The Pennsylvania Partnership for Highway Quality has one of the most comprehensive quality partnership charters of any state in the nation. It's worth a visit to the PennDOT web site to check it out at <http://www.dot.state.pa.us/PennDOT/Bureaus/ChiefEng.nsf/frm-PPHQ>. The charter outlines management operations, Board duties and responsibilities, frequency of meetings, membership criteria, and the PPHQ's national affiliation with the National Partnership for Highway Quality. It also establishes objectives for new technologies, communications, workforce development, specifications, awards, and strategic planning.

### Maryland Quality Initiative

The Maryland Quality Initiative (MDQI) launched in 1994 when Maryland's State Highway Administration (SHA) recognized the need to address quality at all levels and areas of the highway community. SHA had attended the NPHQ (then called the National Quality Initiative) Conference and came away with a renewed commitment to incorporating quality strategies as a way of doing business in Maryland.

A Steering Committee was formed to foster ongoing dialogue within the highway community and sponsor MDQI quality conferences. The organization includes several subcommittees, and I serve on the Partnering Subcommittee, which tries to keep partnering an integral part of highway planning, design and construction.

The Maryland SHA Deputy Administrator chairs the Steering Committee. The current chairman is Doug Rose, who is also the Steering Committee Co-Chairman of the National Partnership for Highway Quality. SHA's four-year, business plan drives our efforts, and the deployment of the business plan is strategically linked to our quality initiatives. More about the MDQI is at <http://mdqi.org/>.

### New Jersey Quality Initiative (NJQI)

Susan Gresavage, Supervising Engineer for the New Jersey Department of Transportation's Quality Management Services, notes that NJDOT operates in a very intense transportation sector.

"Typically we have a number of subcommittees that work continuously on common challenges facing all the transportation affiliates in the area," she explains.

"In addition," she says, "the New Jersey Quality Initiative sponsors summits to present updates and opportunities, share successful strategies, and debrief on methods that may not have worked

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Susan Gresavage  
New Jersey Department of Transportation

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successfully.” This winter’s 2004 NJQI Transportation Summit’s 30 sessions range from utility coordination to alternate contracting methods. For details, the schedule is posted at <http://www.state.nj.us/njq>.

The NJQI is celebrating its 10th anniversary, and still has its original charter. The mission statement reads, “The purpose of the New Jersey Quality Initiative is to promote implementation of quality principles and practices throughout New Jersey’s transportation industry through proactive leadership, communication, partnering, quality programs and initiatives.”

## Kentucky Transportation Cabinet (KYTC) Office of Quality

The Office of Quality is relatively new to the Kentucky Transportation Cabinet – just three years old. But in that short span the office has deployed a sophisticated, progressive quality system. As Executive Director Marc S. Clark explains, “Quality is a deployed concept applied as appropriate within each division and sometimes differently among divisions.”

He continues, “In short, our quality system is made up of applicable 150 requirements and applicable Baldrige

criteria items, and we are beginning to use Six Sigma concepts to measure our performance. We’re working with divisions throughout the organization to establish a performance reporting system using a scorecard type system that rolls up to leading outcomes of success.”

Clark notes, “A major initiative underway is our partnership with the Federal Highway Administration. We’re in the second year of building a joint organization between our two agencies. So far, we’ve merged our strategic plans and performance measures. We’re also on the verge of creating the nation’s first Joint Quality Office within a state DOT. Having a Federal Highway Administration engineer on hand two or three weeks a month will help with compliance, interpretations, and improvements. We expect to devise joint systems for monitoring and data collection that will let us spot trends and find better ways to do things.”

The next hurdle, Clark concludes, is to break down some walls that prevent joint execution of key process steps. “We envision a workforce dedicated to delivering transportation products and services, regardless of the agency they work for.”

## Different Forms, Common Qualities

State quality organizations take different shapes and names, and can include various stakeholders. For instance, the University of Texas at Austin Center for Transportation Research is a stakeholder in the Texas Quality Initiative. Purdue University is a stakeholder in the Indiana Partnership for Highway Quality (IPHQ) and the IPHQ annual awards are presented at the Purdue Road School.

Some states augment charters with formal transportation policies. In 2001,

Indiana adopted a formal “Indiana Policy on the Quality of Transportation Systems” to underscore that the quality of the state’s transportation network “is critical to Indiana’s economic growth and its ability to compete in the world marketplace.” The Arizona Transportation Quality Initiative is reinforced by the Arizona State Policy on the Quality of Transportation Systems, which accentuates the value of partnering among federal, state and local agencies, design professionals, industry, regulatory agencies and academia; cooperative development of quality management systems and specifications; and incentives that reward achievement.

Despite the variety of SQP organizational structures, all train stakeholders’ attention on shared goals. What prompts a state to form one? The Mission Statement for the Georgia Quality Initiative may best answer that question. It reads, in part, “...to improve the satisfaction of our end customer, the highway user, a statewide initiative of quality improvement is hereby adopted. This initiative is committed to satisfying the transportation user by providing a durable, smooth, safe aesthetically pleasing, environmentally sensitive, efficient and economical transportation system, in balance with other modes of transportation.” ●

*Editor’s note: The author invites readers to contact him and NPHQ Executive Director Bob Templeton with comments or questions. E-mails are [JAioriello@sha.state.md.us](mailto:JAioriello@sha.state.md.us) and [btemplephq@aol.com](mailto:btemplephq@aol.com).*

Deploying Quality:

# The American Society for Quality Distills the Basics

The American Society for Quality shares insights about quality cultures, strategies, and plans with the following perspective on the deployment of quality.

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## Quality Culture

For an organization to make long-lasting changes, a culture change must also take place. A quality culture exhibits four characteristics:

**Leadership:** Executives and managers must demonstrate a personal commitment to quality. Lukewarm support from top management can be the kiss of death for a quality program.

**Quality management:** Practices must reduce barriers to change, such as traditional thinking, reliance on fire fighting, and policies that impede communication and learning and rob people of pride in their work. Quality management must promote decision making and problem solving that is driven by customer, date, and proven cause-and-effect relationships.

**Organizational learning:** Quality principles must be translated into corporate policies and practices that spread new quality ideas across organizational boundaries.

**Code of ethics:** A firm code of ethics specifies generally accepted standards of professional conduct useful to the organization and its customers.

## Quality Strategy

To implement TQM, an organization must have a clear strategy. A good quality

strategy is one that is integrated with an organization's overall business strategy. It should include a vision statement (describing where an organization wants to go), mission statement (describing where the organization is), goals (endpoints or conditions the organization works toward to close the gap between vision and mission), and objectives (expectations stated in quantitative terms to help achieve goals).

## Quality Plan

An organization's quality plan outlines how it will meet its goals and objectives. Reduced to the simplest terms, the quality plan should answer three questions: What specific quality work needs to be done? How is it to be done? What are the outputs?

The planning process often begins with a quality assessment – the process of identifying business practices, attitudes, and activities that are enhancing or inhibiting quality improvement in the organization. Tools and techniques that can be used include self-evaluation, organizational assessment, customer surveys, and benchmarking.

The quality function – defined as the entire collection of activities through which an organization achieves fitness for use – is supported by systems thinking, the belief that an organization is an interrelated system that cannot be divided into independent parts. ●

*The quality function – defined as the entire collection of activities through which an organization achieves fitness for use – is supported by systems thinking, the belief that an organization is an interrelated system that cannot be divided into independent parts.*

## NPHQ “Making a Difference” Awards

*Nomination Season Underway Until May 3*

The National Partnership for Highway Quality hopes 2004 proves to be a record-breaking year for nominations for its “Making a Difference” Awards. The nomination season is now underway, and lasts until May 3, 2004 at 5 PM.

Gold, Silver, and Bronze Team Awards are bestowed in four categories: Partnering, Breaking the Mold, Risk Taking, and State Quality Program. Nomination forms, tips for preparing strong packages, and information about the awards, eligibility, and evaluation criteria are available at [http://www.nphq.org/awards\\_success.cfm](http://www.nphq.org/awards_success.cfm) or by contacting NPHQ Executive Director Bob Templeton, P.E., at [btemplenphq@aol.com](mailto:btemplenphq@aol.com) or (512) 301-9899. The web site also offers tips and suggestions for preparing especially strong nomination packages.

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Light-Running.

The safety impacts of red-light-running are a major issue in Texas and other parts of the country. Statistics are hard to come by, but anecdotally, the impression is that the amount of red-light-running is increasing due to increased aggressiveness of drivers.

## Quality – and Safety – Are Job One

These are just a few initiatives at the Institute to boost the safety and quality of roadways. There are many others: studies on rumble strips and their use not only on shoulders, but also on center lines and within lanes; the safety of rural and urban intersections – ranging from pavement marking treatments to the location of signal poles; the impacts of the Americans with Disabilities Act on roadway design operations, including work zones; and safety in the highway design

process, which addresses the geometries that concern highway engineers in efforts to optimize safety in design.

In the spirit of Ford's motto "Quality Is Job One," we're aligned with the National Partnership for Highway Quality's goals because in highway research, safety is job one. We have a safe system, but search continually for ways to make it even safer. In practice, roadway agencies will always be caught in that delicate balance of how best to spend public money while making as many safety improvements as are fiscally feasible. Like NPHQ, we try to help

agencies achieve that equilibrium. No agency can afford every possible safety improvement at every possible location on the highway. If the ultimate road had every safety treatment possible, then we wouldn't have as many miles of roadway as we do now.

So the community continually searches for ways to reconcile available resources with the need to best serve the expectations of road users. The Texas Transportation Institute's traffic engineering research program stands squarely in NPHQ's corner in support of that quest. ●

## AASHTO SCoQ Team Excellence Awards

Applications for the AASHTO Standing Committee on Quality (scoQ) 2004 Team Excellence Awards will be accepted until March 15, and selection criteria have been simplified to address just three categories: customer focus, process management, and results. For more information visit <http://quality.transportation.org/community/quality/portal.nsf/Home> or contact Marc. Clark@mail.state.ky.us.

## Calendar of Conferences and Conventions

The following is a partial list of major conventions and conferences sponsored by NPHQ partners. More information about these and hundreds of other noteworthy industry, state, federal and international workshops, meetings and conferences can be found at partners' web sites.

March 8-10, 2004	NRMCA Annual Convention, Orlando, FL
March 10-13, 2004	AGC Annual Convention, Orlando, FL
April 13-16, 2004	AASHTO Standing Committee on Quality Meeting, Santa Fe, NM
April 13-17, 2004	AASHTO Spring Meeting, St. George, UT
April 25-28, 2004	APWA North American Snow Conference, Lexington, KY
May 9-13, 2004	ACEC Annual Convention, Colorado Springs, CO
September 8-12, 2004	ARTBA Annual Convention, Boston, MA
September 12-15, 2004	APWA International Congress & Expo, Atlanta, GA
September 16-25, 2004	AASHTO Annual Meeting, Philadelphia, PA
November 30 - December 3, 2004	ACPA Annual Convention, Marco Island, FL