MAY–JUNE 2002
NUMBER 220

TRANSPORTATION RESEARCH BOARD
NATIONAL RESEARCH COUNCIL

TR NEWS

Going Public

Involving Communities in Transportation Decisions

- How-To Primer
- High-Tech Tools
- Organizational Changes
- Reaching Minorities
- Measuring Effectiveness

THE NATIONAL ACADEMIES

National Academy of Sciences
National Academy of Engineering
Institute of Medicine
National Research Council

The Transportation Research Board is a division of the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering. The Board's mission is to promote innovation and progress in transportation by stimulating and conducting research, facilitating the dissemination of information, and encouraging the implementation of research results. The Board's varied activities annually draw on approximately 4,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities.

www.TRB.org

TR NEWS

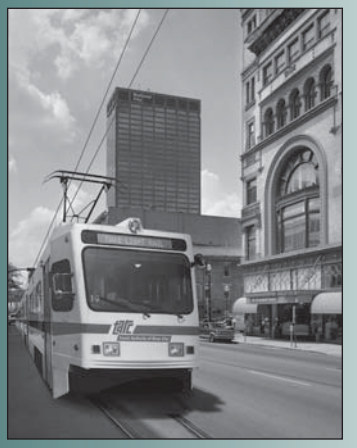
NUMBER 220 MAY–JUNE 2002

Public Involvement in Transportation: Best Practices, New Approaches

9

18

25



Cover: Computer image of light rail transit vehicle on Market Street in Louisville, Kentucky, used to stimulate public response and gain project support (*image by Joe Humphrey, courtesy of Transportation Tomorrow—Transit Authority of River City*).

TR NEWS

features articles on innovative and timely research and development activities in all modes of transportation. Brief news items of interest to the transportation community are also included, along with profiles of transportation professionals, meeting announcements, summaries of new publications, and news of Transportation Research Board activities.

***TR News* is produced by the Transportation Research Board Reports and Editorial Services Office**
Nancy A. Ackerman, Director
Javy Awan, Managing Editor
Kristin C. Motley, Associate Editor
Juanita Green, Production Manager

TR News (ISSN 0738-6826) is issued bimonthly by the Transportation Research Board, National Research Council, 2101 Constitution Avenue, NW, Washington, DC 20418. Internet address: www.TRB.org.

Editorial Correspondence: By mail to the Reports and Editorial Services Office, Transportation Research Board, 2101 Constitution Avenue, NW, Washington, DC 20418, by telephone 202-334-2972, by fax 202-334-3495, or by e-mail kmotley@nas.edu.

Subscriptions: North America: 1 year $55.00; single issue $9.50. Overseas: 1 year $70.00; single issue $13.00. Inquiries or communications concerning new subscriptions, subscription problems, or single-copy sales should be addressed to the Business Office at the address below, or telephone 202-334-3216, fax 202-334-2519. Second-class postage paid at Washington, DC.

Postmaster: Send changes of address to *TR News*, Transportation Research Board, 2101 Constitution Avenue, NW, Washington, DC 20418.

ALSO IN THIS ISSUE

COMING NEXT ISSUE

A special issue on inland waterways transportation draws a variety of feature articles to dock, delivering information and insights on safety and security, fuel efficiency, service levels, and research needs—plus how almost everything about transportation can be learned on the Erie Canal.

Junction of the Erie Canal and the Hudson River, Albany, New York (*photo by Catherine Lawson*).

INTRODUCTION

Public Involvement *in* Transportation

Collaborating with the Customers

The Transportation Research Board's Committee on Public Involvement in Transportation has assembled this issue of *TR News* to promote a better understanding of the role of proactive processes for public involvement in the planning and delivery of high-quality transportation products and services. One of the authors notes, the processes are "part of improving service to the customer."

Involving the public in the planning and decision making for transportation projects is an idea that has been around for many years. However, the Intermodal Surface Transportation Efficiency Act of 1991 spurred a quantum leap in the frequency and the sophistication with which transportation professionals have involved community stakeholders in the planning, design, construction, and operation of transportation facilities.

A transition from the "decide, announce, defend" approach to collaborative and consensus-based approaches is under way. Innovative uses of technology are helping to move involvement beyond the limitations of the public meeting.

Although some of the enhancements may be the result of legislative and regulatory influences, citizens today expect to be involved meaningfully in decisions that affect their daily lives. To meet this expectation, transportation agencies must move beyond one-way communication—such as the traditional public information and public relations campaigns—to new two-way models of engagement. These two-way processes allow simultaneous learning by the public and by transportation professionals. Often the result is an innovative decision that enjoys broad-based support from elected leaders, agency professionals, and citizens.

But integrating sound public involvement principles into the technical work of transportation agencies remains a struggle. Many agencies still view public involvement as another task tacked on to a long list of services, not as a new paradigm for developing high-quality transportation products with high levels of public support and a strong likelihood for implementation. Transportation professionals must continue to develop new and creative ways to engage the public at all points within the transportation decision-making process.

The articles in this issue provide a sampling of the ideas and techniques in use by practitioners in all phases of transportation projects. The articles reinforce the critical importance of building informed public consent—not designing and implementing projects in a vacuum—to deliver a transportation system worthy of the 21st century.

For additional information on the topic, visit the website of the Committee on Public Involvement in Transportation, www.ch2m.com/TRB_PI./default.asp.

Margaret Campbell Jackson
Principal, Director of Planning
Howard Stein-Hudson Associates, Boston, Massachusetts
Chair, TRB Committee on Public Involvement in Transportation

EDITOR'S NOTE: Appreciation is expressed to Kimberly Fisher, Transportation Planner and Environmental Specialist, TRB, for her efforts in coordinating this issue of *TR News*.

Effective Public Involvement in Transportation

A Primer for Practitioners

TED M. MATLEY

The author is Executive Director, Wilmington Area Planning Council, Newark, Delaware.

One of the most dramatic changes in transportation project planning has been the increased focus on effective public involvement. Requirements for public information and involvement have been around for many years but often were addressed superficially, doing more to discourage citizens from involvement and to increase frustrations with public representatives. Even with improved efforts, public involvement sometimes is confused with public information—describing what we are going to do, and when we are going to do it—under the mistaken notion that knowledge equals consent.

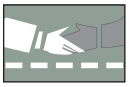
More and more, agencies and transportation professionals are facing the challenge of public involvement—meaningfully engaging the public in the decision-making process for transportation issues. Many are devoting significant amounts of project and plan budgets to involve the public and are considering public input before making important decisions.

Answering the challenge of effective public involvement has created a new pool of knowledge for practitioners. What do we know for sure?

- Public involvement is difficult to do well—but good public involvement usually pays off, and bad public involvement invariably backfires.
- Public involvement is not more difficult than it used to be—but the goals have been raised.

Traditionally, efforts have focused on providing information and then gaining consent to a decision. Now transportation professionals want to engage a variety of individuals to participate actively in making decisions on transportation issues and the future of their communities. The following practical tips indicate some of the reasons why raising the bar has proved complicated, difficult, and expensive.

Insider Tips

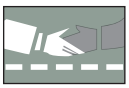


An effective public involvement effort will take time, money, and patience.

In some cases, an effective public involvement effort will require more time, money, and patience than you think you have. Involving the public introduces unknowns into the decision-making process. You may be sure about your technical data, but you can never be sure of the perspective and information that members of the public will bring to the table.

Plan for enough time and resources and be prepared to be flexible. You may find out that basic assumptions are incorrect or need to be adjusted. New questions may be asked and additional data required, and you may have to educate participants so they can contribute more effectively.

Tying a public involvement process to a timeline may backfire by making the participants feel rushed. This increases the difficulty of budgeting and project management, but the inability to respond effectively once you have engaged the public may doom your effort, and possibly the plan or project.



Find good people.

Public involvement is not for the unskilled or the untrained—it is crucial that public involvement not be an afterthought when assigning staff. Even if you have allocated a fair amount of resources, make sure the right people are involved.

Talking to people may appear to be a task for junior staff or for that person you don't know what else to do with, but communication is what is important, not conversation. Well-intentioned individuals without the skills or training to conduct effective public involvement will doom the effort and increase public frustration.

In addition, individuals with public involvement expertise must participate actively in planning the entire effort—whether a construction project or a 20-year plan. Lost opportunities to spot potentially controversial issues, to develop a strategic public involvement approach, and to seek public involvement before making a decision cannot be regained—there is no such thing as good retroactive public involvement. Similarly, experiences from a badly designed public involvement effort will haunt later efforts and damage relationships and reputation with the community.

Successful public involvement usually raises controversy.

You are not doing a good job at public involvement if you expect the effort to be a quiet, bureaucratic exercise. Good public involvement identifies and explores possibly controversial issues, brings conflicting views to the table, seeks solutions to concerns, and builds a consensus to maximize benefits and minimize negative aspects.

Avoid knock-down, drag-out fights, but be prepared to explore conflicts among the positions of individuals involved. Dealing with people means dealing with personalities. Each person's method of public interaction may add or detract from the process—therefore make sure that the process focuses on the problem and not on the people.

Getting the right people to the table can be tough, but getting them to stay can be tougher.

Identifying those who should be involved in the process requires a balanced focus. Invite local leaders and residents, but also consider a wider audience of transportation users and community members.

Getting the word out may require a wide set of communication approaches. A notice in the back of the newspaper or a sign on the agency bulletin board will limit success. Often the individuals inclined to participate are already active in other areas of the community, which can make scheduling a meeting difficult. Less advantaged citizens may have significant obstacles to participation, such as lack of transportation. With long commutes, two-job families, and 100 cable TV channels, getting the public to meetings—even for a short period—is difficult.

Since the decision-making process builds over time, a lack of continuity for participants is a significant threat to consensus building. Although efforts should be made to encourage attendance, there may be a significant turnover in participants from meeting to meeting. Be prepared to lose participants who may have been key players.

Communicating technical information to nonprofessionals without exhausting them may strain your creativity.

You will have to think of ways to communicate with interested and intelligent citizens who probably do not share your professional training and experience. It is not enough to explain how you made your decision—make sure that they can consider information and weigh alternatives to indicate their own preferences.

Education is part of effective public outreach, but do not exhaust participants with training so that they do not stay to the end to participate in a decision. Separating out what participants need to know to make good decisions may be difficult for professionals who have a comprehensive education, but it is a key task.

Gaining agreement on facts is not always straightforward.

Gathering data and presenting data as truth may not be simple. Be prepared to address issues raised by participants whose view of the world may not match yours. Avoid bias in data collection and do not create the impression that data were skewed to support a certain solution.

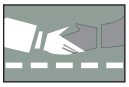
Few things can disrupt and delay the process more than extended debates about the accuracy or appropriateness of data. Data that are counterintuitive or that directly contradict a certain position will be looked at with skepticism. Never assume that data are value-free, and be careful and clear in data collection and presentation.

Balance immediate impacts with the big picture.

Consider the larger benefits of any particular solution, as well as the larger costs of any particular problem. Often the larger perspective is lost when a few participants feel threatened by significant negative impacts and seek to dominate the discussion.

Sometimes from the perspectives of a few residents or businesses, doing nothing is preferable, even if there is a legitimate larger issue. Understand and limit negative externalities that focus on any one person or group.

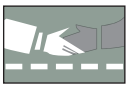
However, you may find that the larger good lacks a strong advocate. Seek balance between the needs of the larger community and the individual, and present information so that the group can evaluate and make fair decisions on trade-offs to achieve balance.



Advocacy groups can add or detract from the effort.

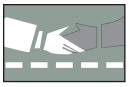
Members of interest or advocacy groups can be valuable participants in a public process on transportation issues, often providing information on innovative practices and new ways of looking at problems. However, they also usually come as advocates of certain ideas and priorities, regardless of the circumstances. Advocacy taken too far can get in the way of consensus building.

Excluding certain interest groups from the process is never a good idea and will undermine any decision. Make sure that the rules of the debate are clear, that no one is allowed to dominate through superior skills or knowledge, and that it is understood that all ideas are on the table until removed by consensus.



Build and maintain a consensus.

The public decision-making process should build on a series of agreements that lead to a larger, comprehensive agreement. Breaking up the process into a series of consensus agreements will make it easier for participants to understand the information and evaluate each decision. Ensuring agreement on each step, on the data, on the nature of the problem, on the goals of the process, and on the options on the table may be time consuming but brings everyone along to a final group decision about which option is best.



Know when to make a final decision.

Maximizing consensus is important, but you may have to make some tough calls about the diminishing returns of continued discussion. Prolonging the discussion is an effective strategy for someone who holds a minority opinion. Generally, the views of the majority should be the guide. If the consensus is strong and minority opinions have had a fair hearing and consideration, it probably is time to call for a final decision.

Outline the group decision-making rules at the beginning. Achieving consensus is the goal, but a preexisting understanding of the critical mass needed

Public Involvement in Long-Range Transportation Planning

Benchmarking Study Identifies Best Practices

LORI BYRD AND SABRINA DAVID

The Federal Highway Administration (FHWA), in cooperation with the Florida Department of Transportation (DOT), has sponsored a benchmarking study, Public Involvement in the Development of the Long-Range Transportation Plan, to provide Florida metropolitan planning organizations (MPOs) with new tools and innovative techniques to enhance public participation and outreach.

The study arose from concerns among Florida MPOs about the federal requirement to develop a long-range transportation plan with at least a 20-year horizon. The plan must include long- and short-range strategies and actions to develop an integrated intermodal transportation system for the efficient movement of people and goods.

Many Florida MPOs had experienced difficulty getting the public to participate in the long-range planning process. For the most part, public involvement activities were not well attended—the meetings competed with other issues for attention, as well as with other demands such as employment and childcare, or faced problems with location and time. As a result, the FHWA Florida Division, in cooperation with Florida DOT, decided to conduct a special study of organizations that apply exemplary public involvement techniques and to provide MPOs with a forum for best practices.

The authors are with the FHWA Florida Division, Tallahassee: Byrd is Benchmarking Project Manager and David is Subject Matter Expert.

The study used the research technique of benchmarking. In the words of the American Productivity and Quality Center (APQC), "Benchmarking is the practice of being humble enough to admit that someone else is better at something and being wise enough to try to learn how to match and even surpass them at it."

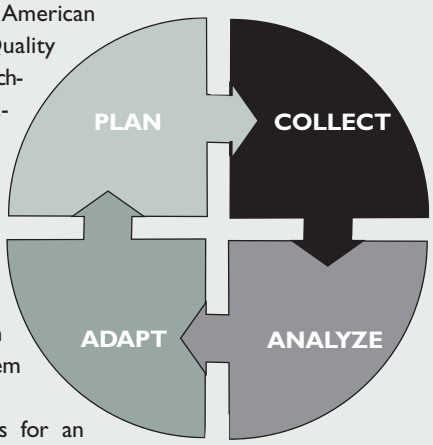


FIGURE 1 The American Productivity and Quality Center's four-phase benchmarking approach to discover, highlight, and implement best practices.

The first step is for an organization to examine its processes, products, and services to discover successes and areas for improvement. The study adopted APQC's four-phase approach: planning, collecting, analyzing, and adapting information from the team and partner organizations to discover and highlight best practices (see Figure 1).

to move forward on a decision is important if roadblocks arise.

Success may be fleeting. Even an extremely well-done public involvement process may not be a 100 percent success. Despite the quality of the process and the effort, some may be dissatisfied with the final decision. Others may sue even after participating fully in the process and receiving a fair hearing. A public involvement effort may not remove every potential human obstacle to solving the transportation issue or problem but, if done well, will build a strong public consensus on a preferred solution and will provide a strong defense against challenges.

Because you got it right once, don't think you've got it down. Effective public involvement is more an art than a science, and each public involvement effort must be tailored to the particular circumstances, context, and players. You can learn from experience and from the experiences of others about effective methods to engage the public in decision making. However, there is no one approach that is always effective, and a success in one context may be a flop in another. Much of the training of transportation professionals emphasizes replication of the same basic process, but replication rarely is a good operating procedure for public involvement.

Effort and Challenge

Public involvement may be the most challenging task for a transportation professional to undertake. Planning and implementing a public involvement effort will be difficult, exhilarating, frustrating, and rewarding—and possibly will lead in unanticipated directions.

In many cases, you may not involve everyone you could have, or avoid that tough late-night meeting, or make everyone happy. Don't expect success just because you have invited the public to talk—good intentions and a friendly attitude will go only so far when discussing issues important to a community. But as with many other things, the rewards are in direct relation to the effort and to the size of the challenge.

During the planning stage, a scope proposal was developed with feedback from participating MPOs and Florida DOT—the benchmarking partner organizations. Training sessions on benchmarking were conducted in Tallahassee, Orlando, and Ft. Lauderdale and focused on key principles, the code of conduct, and the process itself.

Secondary research validated the topic and identified several public and private best-practice organizations. Applying specified criteria, the benchmarking partners chose six best-practice organizations as benchmarks.

The second phase involved site visits to discover success strategies and lessons learned. All study participants provided information about and discussed

- Developing a long-range plan,
- Obtaining public involvement,
- Choosing communication strategies, and
- Planning and implementing effective public meetings.

During the third stage, analysis, all information from the site visits was compiled, with a narrative report on trends and innovative techniques. Feedback from benchmarking team members and best-practice organizations revealed several overarching principles for success in public involvement in long-term planning. The compendium report focused on four areas:

1. Key themes:
   – Educate the public continuously.
   – Involve key stakeholders early and throughout the process.
   – Develop partnerships with the media.
   – Collaborate to maximize resources for public involvement.
   – Personalize public involvement activities.
   – Provide incentives to increase participation.
   – Provide alternatives to traditional meeting places.
   – Use innovative techniques to define communities and traditionally underserved populations.
   – Evaluate public involvement activities continuously.
2. Methods for communicating with the public: newsletters, citizen and public advisory committees, newspaper articles and advertisements, workshops, informational materials, and surveys.
3. Innovative public involvement techniques: games, traveling information centers, tours, computer simulation, and school curriculum.
4. Technology's role: geographic information systems, databases for mailing lists, websites, and e-mail.

The fourth phase of the study involved adapting. The best-practice organizations and the benchmarking partners gathered for a knowledge transfer session to discuss the study's key findings, review public involvement processes, and determine how to adopt and adapt best practices.

The study itself has become a benchmark as the first time that federal, state, and local governments have partnered for benchmarking. The study has received support from FHWA's Office of Metropolitan Planning, through the Metropolitan Capacity-Building Program, which provides educational and technical assistance to MPOs. The final report is available at www.mcb.fhwa.dot.gov/noteworthy.html.

For more information about the study, contact Lori Byrd, Benchmarking Project Manager, or Sabrina David, Subject Matter Expert, FHWA Florida Division, 227 N. Bronough Street, Suite 2015, Tallahassee, FL 32301; telephone 850-942-9650.

Citizen-Generated Design Plans

DONAL R. SIMPSON

Citizen groups often have a view of the purpose and needs of road projects that differs from that of transportation agencies. Citizens have to live with the agency's road for better or for worse on a daily basis—the road is their neighbor, as well as their transportation route.

With the growing emphasis on context-sensitive design and public involvement, agencies must consider the viewpoints of citizen groups. However, the public and the agency often speak different languages in trying to describe the best solution for a roadway.

Traditionally, the design agency starts the dialogue by articulating a design concept, based primarily on highway engineering principles. Then the community reacts—not always in a positive way. This trial-and-error approach of the agency proposing and the community reacting can lead quickly to conflict and stalemate as positions harden and each side becomes defensive.

Community groups usually have little or no familiarity with the technical requirements and parameters of highway design. That makes it difficult for them to articulate their vision of a road compatible with their community. It also makes it difficult for highway engineers to interpret the community's desires into a workable design.

The citizen-generated design plan is a practice that successfully has bridged the communications gap between citizens and highway agencies. With this approach, design concepts are generated primarily by community groups with technical assistance from a team of knowledgeable professionals. The technical help usually is multidisciplinary, involving community planners and urban designers, as well as highway engineers.

Citizen-generated design plan for 6.4-mile scenic Ministerial Road, a visitors attraction in Rhode Island, reduced speed limits and added three new stops at intersections to improve road but retain scenic qualities.

Independent technical assistance can help the community articulate its desires and positions and can force citizen groups to deal with issues that the agency must confront: safety, cost, maintenance, constructability, and legal responsibility. The plan should define the community values that the road design must respect and protect. It also should deal with the functional requirements of the roadway and propose technical changes or design exceptions required for the road to fit into the community.

In addition to the standards of the Green Book (the American Association of State Highway and Transportation Officials' Policy on Geometric Design of Highways and Streets), the community should research other localities that have dealt with similar situations and identify proven alternative design standards. The community planning group then should propose a design strategy, with detailed illustrations of key locations along the road to show the fit between a buildable roadway and the community.

The value of the citizen-generated design plan emerges when both the community and the design agency treat the plan as a partnering document. The community should understand that the plan is a strategy, not an ultimatum. The design agency should treat the plan as a technically competent guide to the desires and aspirations of the community. The result is a win-win design and a shorter, easier process for both the community and the agency.

Turquoise Trail (Highway 14), Santa Fe County, New Mexico, benefited from citizen-generated design plan that would preserve scenic byway and adjacent land but would allow pavement and safety improvements. New Mexico State Highway and Transportation Department worked closely with community-selected design consultant.

The author is Associate Vice President, HNTB, Charlotte, N.C.

Cutting-Edge Visualization Tools

Graphic Simulations That Stimulate Project Understanding and Decision Making

MARIE S. KEISTER AND DAN MORENO

The authors are with CH2M HILL: Keister is Transportation Public Involvement Technology Lead, Columbus, Ohio, and Moreno is GIS Technology Development Manager, Denver, Colorado.

The right graphics at the right time can increase public understanding of a transportation project and the opportunities for reaching consensus. Effective visuals improve comprehension by up to 400 percent[1] and help maintain listener interest and retention.

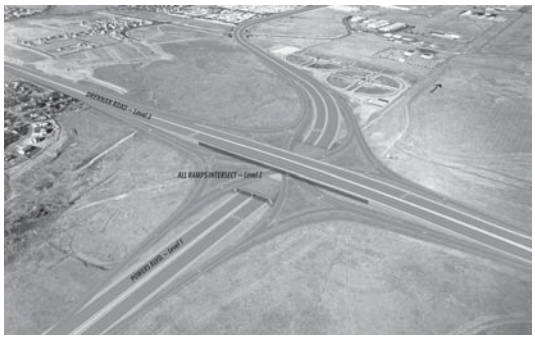
Yet many transportation project teams face a daunting task in gaining input from the public on complex, technical issues. Audiences raised on a multimedia diet of television, computer games, and interactive websites expect to see and understand project proposals before spending millions of public dollars.

Taking the time to create visuals that assist public understanding of project impacts early on can avoid costly confusion and disputes later. It is much less expensive to change plans at the conceptual phase than to spend millions of dollars to make changes at the final design or construction phase. Additionally, the investment made in building consensus throughout a project can save funds by preventing the lawsuits that often result from misunderstandings.

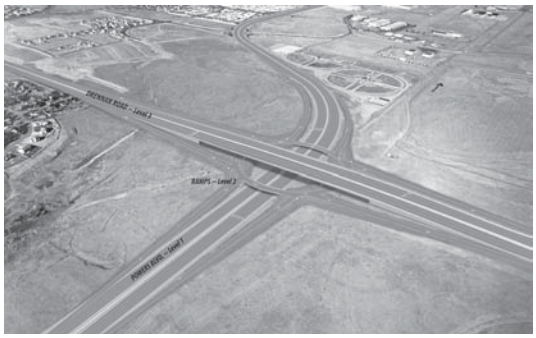
Some visualization techniques employed by transportation professionals today may appear to be old news, expensive, or technically infeasible for most practitioners. Some may bristle at paying $30,000 for a three-dimensional (3-D) animation, for example, or at hiring a graphic artist. However, many agencies are finding that incorporating 3-D animation and other graphics early—during data collection and project development—has proved cost-effective in the long run. They are also finding new, more cost-effective ways to use some tried-and-true visualization techniques.

[1] Knowledge Industry Publications, Conference on Technology and Techniques for Effective Communication, Chicago, Ill., Feb. 1–3, 1999.

(*a*)

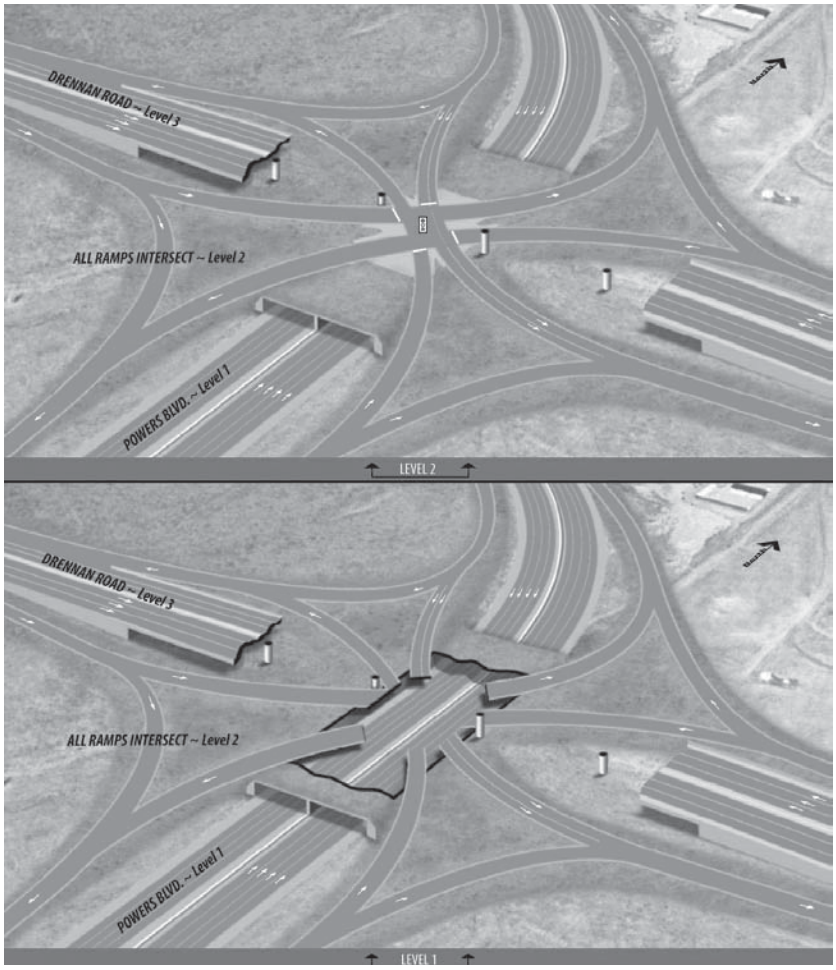


(*b*)



(*c*)

Visualizations depict conversion of a Colorado highway intersection into interchange: (*a*) photograph of intersection; (*b*) illustration of triple-layer, single-point interchange concept; (*c*) illustration of interchange option with traffic circles (illustrations by Jeannine Moore, CH2M HILL, Boise, Idaho).



Cutaway illustrations showing traffic movement on each layer of triple-layer, single-point interchange option in Colorado (illustrations by Jeannine Moore, CH2M HILL, Boise, Idaho).

There are as many visualization approaches as there are computer software programs and audiences. Following are some of the basic tools that can enhance project understanding and decision making, with several examples of effective use.

Design Visualization

Design visualizations are graphic techniques to help audiences imagine what different project alternatives may look like and to show how they may fit into the surrounding landscape and community. From least to most expensive, the approaches include illustration, photo simulation, animation, 3-D images, and multimedia.[2] These techniques also may be merged with geographic information systems (GIS) to provide accurate, visually compelling renderings.

Illustrations

Illustrations are drawings produced by a trained graphic artist, typically with software programs like Adobe Photoshop and Adobe Illustrator. The artist can base the illustrations on hand sketches, technical drawings, or site photographs.

Illustrations are particularly useful if design data are not yet available, but stakeholders or interagency partners have been asked to provide input on preliminary concepts. The drawings can take a few days or several weeks to complete, depending on the project's complexity and on the detail and realism desired. The disadvantage is that an illustration cannot be manipulated to show different perspectives or to show changes as a project evolves.

In Colorado Springs, Colorado, the city's traffic engineer was considering several concepts to convert a highway intersection into an interchange, including a triple-layer, single-point interchange and traffic circles. When the design team found that 2-D computer-aided design (CAD) drawings were too complicated to convey the concepts clearly, they asked an illustrator to sketch the ideas.

The illustrations allowed the design team to see whether the ideas were viable (see images at left) and provided a starting point for discussions with other stakeholders. Although not yet used in public, the concept illustrations have been effective in conveying the engineer's ideas to the city council and other public agencies.

Photo Simulation

To create a photo simulation, a series of photographs are taken of the project site. The photos are then integrated into a 3-D design file to allow users to see a proposed transportation improvement from different points of view.

The city of Shoreline, Washington, used photo simulations to assist in the development of a new roadway design for a three-mile portion of State Route 99, also known as Aurora Avenue North (see

Photo simulation enabled stakeholders in the Shoreline, Washington, area to select this design alternative (photo simulation by Michael Stephan, CH2M HILL, Seattle, Washington).

[2] Hamilton, T. Visualization Module, Context-Sensitive Design Course. CH2M HILL, Denver, Colo.

image, page 10). Problems included traffic congestion, aging strip development, and a lack of pedestrian facilities.

Citizens and agencies worked with planners and engineers to define a solution that best fit community and agency goals and values. The design process considered the needs of all roadway users—pedestrians, transit, freight trucks, and bicyclists—and created a multimodal facility. Photo simulations helped stakeholders to visualize the impacts of the proposed solutions on their community. In addition to winning support from citizens and businesses along the corridor, the plan gained unanimous acceptance from the city council.

"Without the simulations, we wouldn't have been able to arrive at a consensus as easily," said Kirk McKinley, Shoreline's planning manager. "Citizens and city council members commented on how effective [the visualizations] were in communicating how things would or wouldn't look."

Photorealistic Computer Animation and 3-D

The Nevada Department of Transportation (DOT) has used photo simulations and another technique, photorealistic computer animation, to address environmental and community concerns for an 8.5-mile extension of I-580, linking Reno and Carson City. Steady growth and increased traffic underscored the need for the project to reduce congestion and improve safety.

Although portions of the freeway had been constructed in stages since initial approval of the environmental impact statement in 1983, concerns about environmental, aesthetic, and community impacts had stalled the project. An effective public involvement and outreach effort by Nevada DOT was essential to keep the project moving.[3]

Nevada DOT produced photo simulations of the proposed project alternatives. A still photograph of the site was integrated by computer into the digital terrain models of the highway and of the slope and wall surfaces. A model of the bridge was prepared in a different software program (see image, this page) and integrated into the simulation. Finally, graphic artists simulated the revegetation of the slopes and wall treatments.

The project team then used photorealistic computer animation to show stakeholders an overview of the 8.5-mile highway segment. With animation, many still images are played in rapid succession to produce the illusion of motion. By defining a path through or around any 3-D architectural model of a proposed project, a "drive through," "fly by," or "fly through" can be created to show different points of view. The fly-by of the I-580 project was prepared for use at public meetings and on the project's website (www.freewayextension.com).

Photo simulation of proposed bridge in natural environment for I-580 extension in Nevada was incorporated into photorealistic, animated fly-by of the 8.5-mile highway segment for presentations at public meetings and on the project website (photo simulation by The Louis Berger Group; computer modeling by J. Muller International; animation by Mike Ostrom, CH2M HILL, Redding, California).

"It's difficult for engineers and stakeholders to communicate via engineering figures and sketches," said Todd Montgomery, Nevada DOT's project manager for I-580. "Photo simulations and animated images proved to be much more effective."

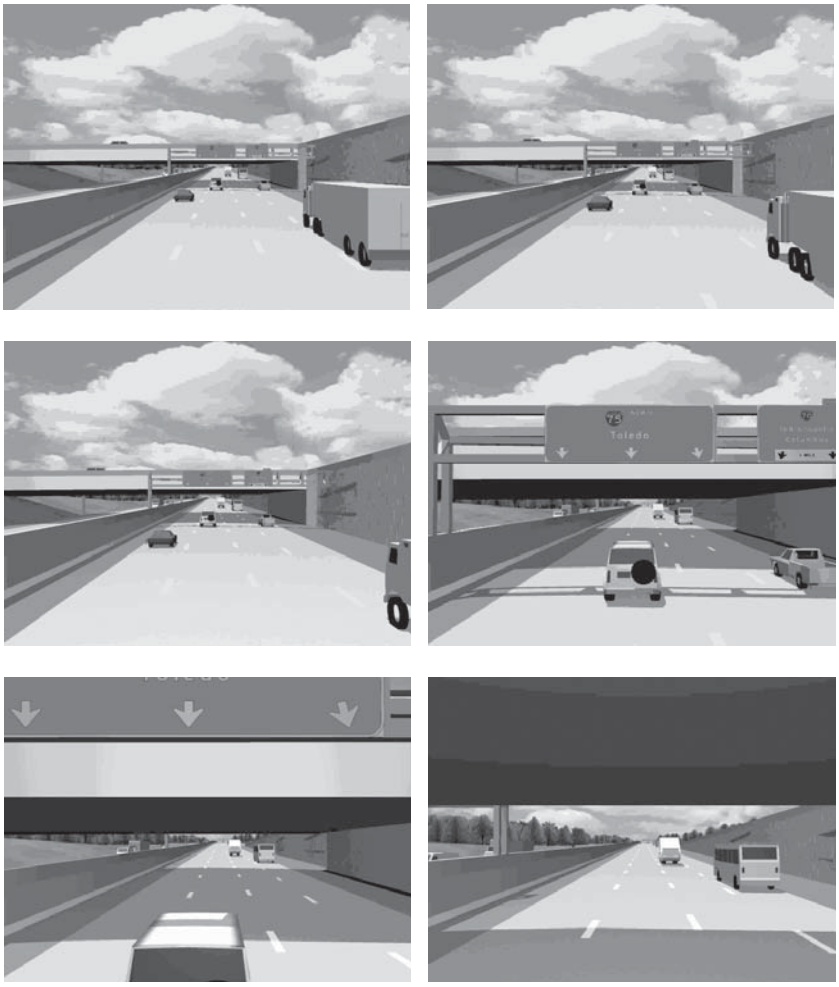
The most cost-effective approach for animated images is to create a 3-D model of the project design in programs like Bentley Systems' MicroStation or InRoads, and then transfer the model into animation software such as World Construction Set by 3D Nature, LLC; Discreet's 3DS Max; or LightWave by NewTek. Project-specific design data are used to create sequenced images that look like a movie.

With the addition of GIS software—like ESRI's ArcGIS, Caliper Corporation's TransCAD, or Autodesk Map—viewers can click on project components to learn more details. With this technology, stakeholders and other project partners can gain accurate information about a project without new renderings for every scene.

The photorealistic approach features a high degree of geometric and aesthetic detail, texture mapping, sophisticated lighting, and simulated environments. The images look realistic and consequently require additional time for rendering.

The I-70/75 interchange near Dayton, Ohio, is of major importance to the business community and the motoring public and is one of Ohio DOT's key

[3] Potter, C. I-580 Fact Sheet. CH2M HILL, Reno, Nev.



Sequence of frames (*left to right*) from animation that places viewer in driver's seat on the new I-70/75 interchange in Dayton, Ohio (animation by Michael Stephan, CH2M HILL, Seattle, Washington).

strategies to relieve bottlenecks in the highway network. Moving from the engineering design phase to the six-year construction phase of the project, Ohio DOT wanted to reassure the public about efforts to maintain traffic flow during construction.

With engineering data and 3-D modeling, the project team created an animated fly-through to show how motorists would use the new interchange (see images, this page). The team also displayed the construction phases and the effects on traffic. The animation was presented using Microsoft (MS) PowerPoint at a series of public meetings and media briefings and has been posted on the Ohio DOT website (www.dot.state.oh.us/dist7). Copies of the animation also were provided to the media for use in coverage during the next several years of construction.

"Audiences have been very receptive to the I-70/75 interchange reconstruction project," said Rhonda Higgins, Ohio DOT public information officer. "We have held numerous public awareness meetings to get the word out and address individual concerns. The fly-through has been the highlight of these meetings."

Multimedia

Beyond the images and animations, the information also can be organized and packaged to tell the story to the public through interactive compact discs (CDs), MS PowerPoint presentations, websites, or videotape:[4]

- Interactive CDs can be created with applications like Macromedia Flash and Macromedia Director, adding a user interface to navigate throughout the CD and incorporating illustrations, photographs, and animations.
- The images can be embedded or linked in an MS PowerPoint presentation for workshops or public involvement meetings.
- Macromedia Flash can be used to create an electronic file similar to the interactive CD for posting on a public involvement or project team website, making the information readily available 24 hours a day, 7 days a week.
- Similarly, all of these images can be incorporated into videotapes.

Macromedia Flash was used in a presentation on the proposed Hoover Dam bypass corridor to focus on the issues associated with 48 specific project areas and features. The 48 locations were highlighted on a photo of the area (see image, page 13), and Macromedia Flash was used to create pop-up boxes with information about each. The animated fly-throughs also were linked to MS PowerPoint and could run as the presenter explained the proposed options.

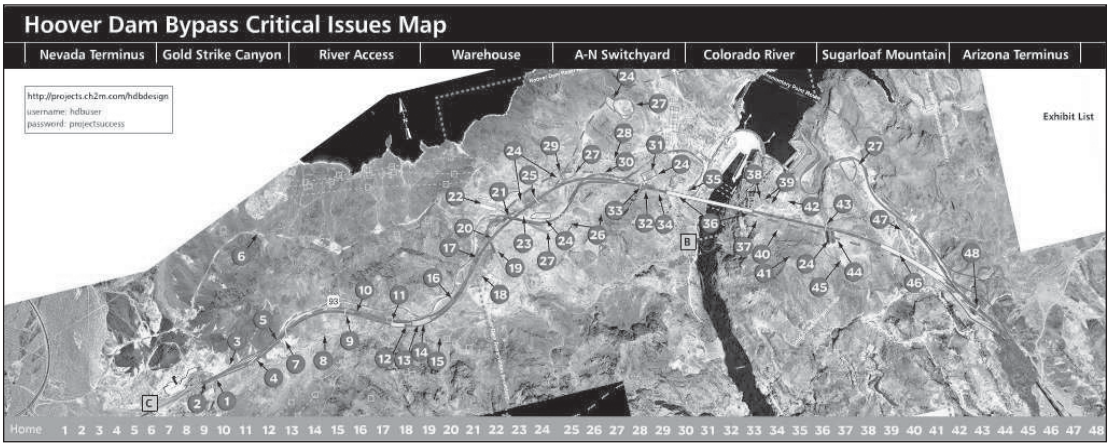
GIS

Although not historically considered a visualization technique, GIS provides the computer-based capability to store, manage, analyze, and display geospatial information. GIS data are being integrated with photo simulation and animation applications to bring a high degree of accuracy to graphics. GIS can offer geographic information on data and objects, show locations in relationship to one another, show the distribution of objects over a particular location, and illustrate the impact or benefit of decisions.[5]

Merging GIS technology with visualization tools can create accurate and photorealistic scenes, down to adding the correct tree species into the graphics. GIS also can save time and money for developing the geospatial data for the visualization.

[4] Banks, M. Multimedia Fact Sheet. CH2M HILL, Denver, Colo.

[5] Lay, M., B. J. Wahlstrom, C. D. Rude, C. L. Selfe, and J. Selzer. *Technical Communication*. Irwin-McGraw-Hill, 1999.



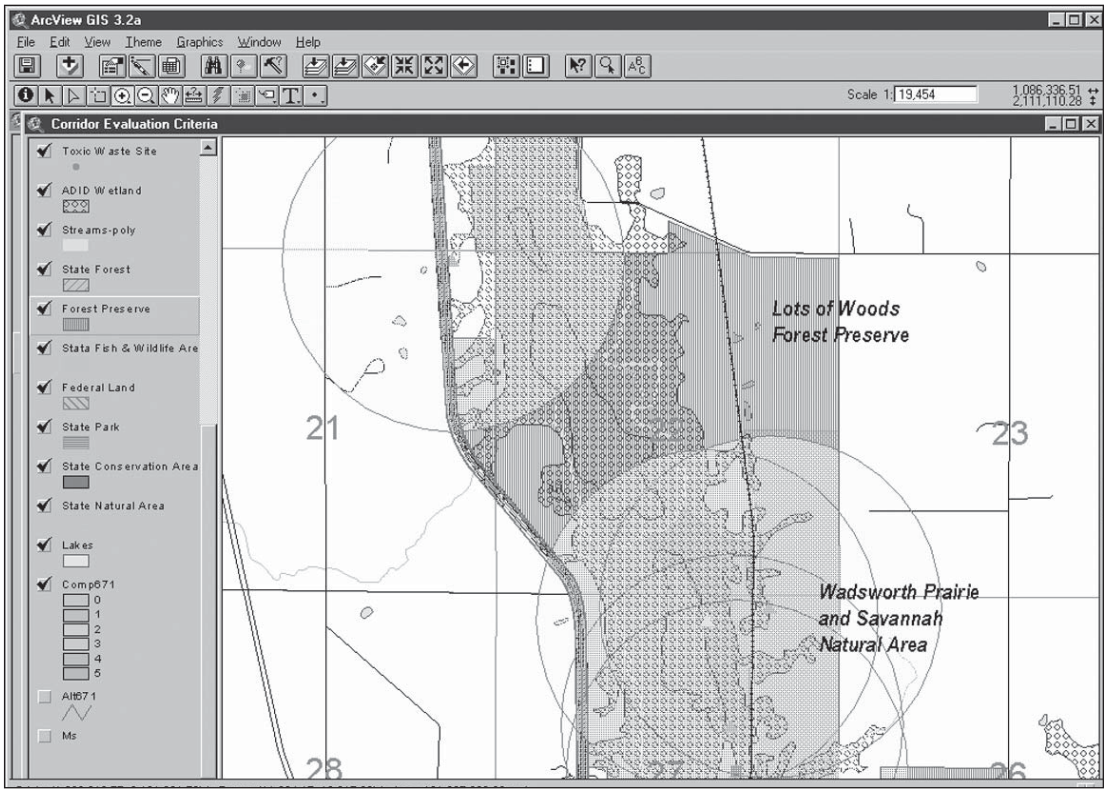
Each number on map of Hoover Dam corridor indicates a point of interest and is linked to a pop-up box providing site-specific information.

Methods and Sources

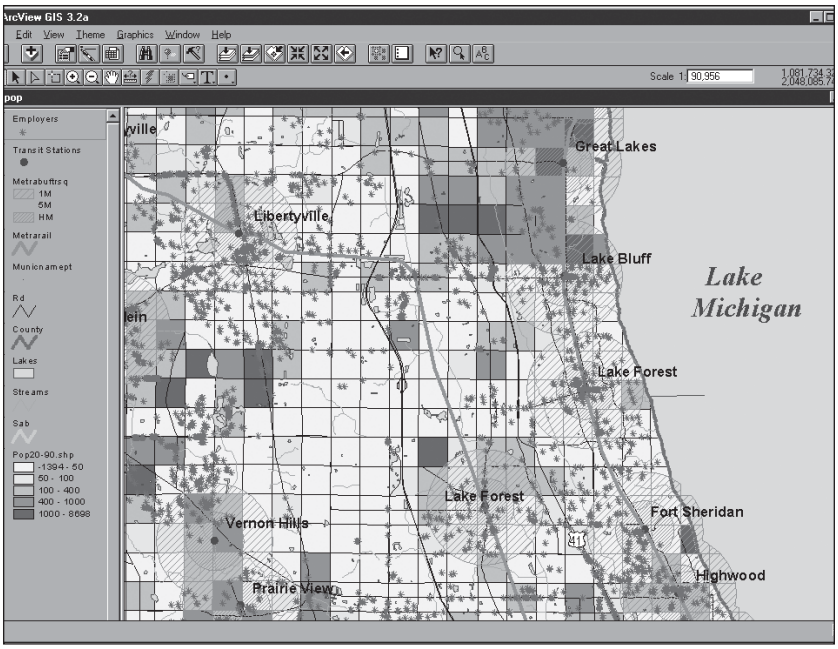
Less than a decade ago, building a GIS database for a large regional project could be time-consuming and costly. Today, with software like ESRI's ArcGIS, MapInfo, and Intergraph's GeoMedia, GIS databases can be assembled at a desktop workstation from a variety of methods and sources, including

- GIS files exchanged with CAD and computer-aided engineering files;
- Spreadsheet and database files imported directly into GIS;
- GIS data downloaded from public websites;
- Data exchanged between transportation modeling software and GIS;
- High-resolution satellite imagery;
- Global Positioning System data; and
- Field data imported from palmtop computers.

Consequently, GIS can be deployed much faster on transportation projects, with large GIS databases leveraged across many project team members, for many different uses and for greater cost-efficiency. Sophisticated GIS maps can display proposed



GIS overlay map shows environmental impacts associated with highway alternatives.



Lake County, Illinois, planners used GIS to evaluate transit system in relation to population and employment densities and to develop proposals for improvements.

highway alignments, airport runways, light rail lines, and other transportation projects easily and accurately in the context of such decision-making information as environmental resources, demographics, and land use.

The Lake County, Illinois, Transportation Improvement Project team used GIS data from local sources to identify cost-effective and environmentally sensitive highway alternatives. Mapped features displayed opportunities and constraints to highway development so that stakeholders could identify the advantages and disadvantages of each alternative.

GIS maps and reports provide ways to assess the sensitivity of various natural and human resources, including wetlands, historical sites, and wildlife habitats. For example, GIS can generate reports that quantify the number of acres that are affected by a project alternative. The Lake County project used a GIS overlay map to illustrate and assess environmental impacts associated with proposed highway alternatives (see image, page 13).

Web GIS

Web-enabled GIS solutions provide the ability to deliver mapped information to project teams and other public agencies through web browsers. This allows end-users of geospatial information to visualize projects remotely, on demand, and without the need for GIS software or training.

Washington State DOT's Trans-Lake Washington Project involved identifying and implementing solu-

Public Involvement Initiative Gains Transit-IDEA Funding

A proposal to develop and test innovative methods for enhancing community involvement in the planning and design of light rail transit stations and adjacent areas has received funding through TRB's Transit Innovations Deserving Exploratory Analysis (IDEA) Program. The University of Kentucky received a Transit-IDEA contract for $75,000 for "Community Visualization in the Design of Light Rail Transit–Oriented Developments" (see box by Bailey et al., page 16). The Transit Authority of River City, Louisville, Kentucky (see box, page 34), is participating in the project and will assist in testing the high-tech visualization system, evaluating the impact on the quality and effectiveness of the established community involvement process.

The Transit-IDEA Program is seeking additional proposals for the development of innovative concepts and methods for advancing transit practice. Current high-priority topics are transit security and bus rapid transit. Other major areas of IDEA programs are highways, railroad and motor carrier safety, and high-speed rail.

Transit-IDEA is funded by the Federal Transit Administration as part of the Transit Cooperative Research Program and is managed by TRB. For additional information—including how to submit proposals—see the IDEA website, www.TRB.org/trb/idea. For questions, contact Harvey Berlin, Senior Program Officer, TRB, at 202-334-2441.

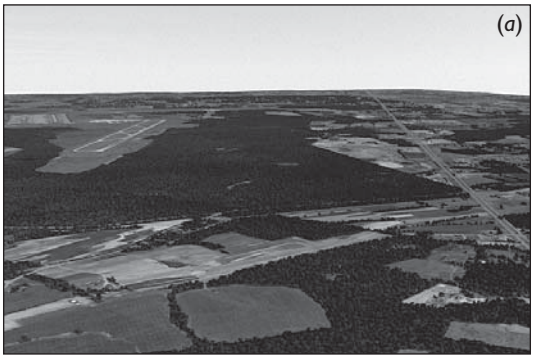
Visualization system that produced image on cover is undergoing tests through Transit–IDEA.

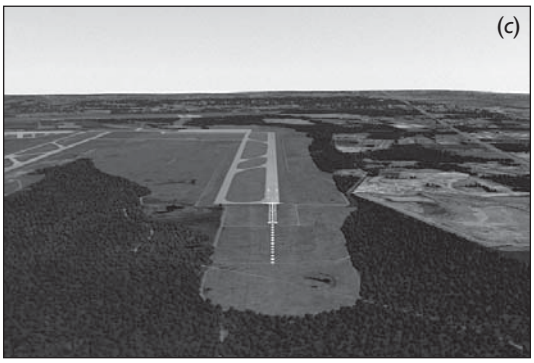
tions to improve mobility across and around the Seattle-area lake. The proposed solutions included a variety of options, such as increased highway and transit capacity, travel demand management, new or enhanced bicycle and pedestrian facilities, and environmental mitigation. A GIS website allowed the public and project staff from multiple contractors to view and query information about project alternatives and environmental features.

In Lake County, Illinois, GIS was integrated with the travel demand forecasting model and spatial analysis of transit facilities. By viewing population and employment densities and distances from rail stations, decision makers were able to evaluate the transit system operations and propose improvements (see image, page 14).

A GIS database contains and stores the locations and attributes of mapped features, providing accurate depictions of project impacts. The analytical capabilities of GIS allow users to look at a project from a variety of perspectives—for example, land owner, utility company, transportation provider, or elected official. By understanding who will be affected during each stage of project development, transportation planners and engineers can devise appropriate project schedules and communication strategies.

A graphic artist was able to use the plentiful GIS data for Northern Virginia's Dulles International Airport and surrounding area to animate several key project issues for a proposed fourth runway (see images at right).





GIS data were incorporated into animated images depicting addition of runway to Dulles International Airport, Northern Virginia: (*a*) proposed location; (*b*) area cleared of trees; and (*c*) proposed runway alignment (animation by Mike Ostrom, CH2M HILL, Redding, California).

Choosing the Right Technique

Each visualization technique requires expenditures for staff time, software, training, and professional expertise. The following information can help organizations determine which visualization technique is most applicable:[6]

1. Type and duration of the project;
2. Audience;
3. Potential for controversy;
4. Time available;
5. Budget;
6. Data availability;
7. Project requirements; and
8. Resource availability.

Visualization planners, GIS technicians, and graphic artists should be brought into project development early—whether to create the visualizations or to secure the resources—to save valuable time and to use resources efficiently. Those who understand the visualization techniques can identify the one appropriate to the project goals, available data, and budget. This can help direct the effort, avoid duplication, and save project funds.

Transportation professionals sometimes struggle over how to educate the public and coordinating agencies to give meaningful input on how projects should be developed, designed, and implemented. Visualization tools can distill complex technical information into understandable concepts. These, in turn, can lead to the "Aha!" moment, when stakeholders grasp the ideas and feel confident about approving a project.

Websites

I-580 extension, Nevada, www.freewayextension.com
I-70/75 Interchange, Dayton, Ohio (Ohio DOT), www.dot.state.oh.us/dist7

[6] Hamilton, T. Visualization Solutions for Transportation Planning, Design and Construction. CH2M HILL.

Enhancing Public Involvement Through High Technology

KEIRON BAILEY, T. GROSSARDT, AND JOEL BRUMM

To improve stakeholder satisfaction with both the process and the outcomes of public involvement in transportation decisions, the Policy and Systems Analysis (PSA) team at the Kentucky Transportation Center is developing the Structured Public Involvement (SPI) framework. The goal is to develop a shared language and understanding among stakeholders and then to communicate the opinions directly to professionals (*1*).

The PSA team integrates three diverse methods into the SPI protocols: visualization technologies, facilitation techniques, and decision theory. Visualization helps the public understand design options. Facilitation techniques—also termed "group dialogic methods"—help participants reach a shared understanding of the options. Decision theory applies formal analytic methods to public preferences, providing more insight than the simple observation that people prefer one option to another. Decision theory gives designers and other professionals a good idea of which elements people are responding to and how important these are.

Sample 3-D visualization showing potential four-lane road with grass median, grass shoulder, and traditional rock fence (image by GIS Programmer Joel Brumm).

But integrating visualization into SPI is more complicated than showing computer-generated design scenarios, asking people how much they like them, and then telling planners that people prefer Scenario A to Scenario B. SPI encourages a shared understanding of the issues by placing the technologies in a social context.

The authors are with the Policy and Systems Analysis Team, University of Kentucky Transportation Center, Lexington.

People who have different cultural backgrounds, or who live in different environments, or who have different occupations, do not see a landscape in the same way. They do not respond uniformly to the same design in different modes of visual presentation. Therefore professionals must investigate the properties of each visualization mode and develop an understanding of the tools before using them to investigate public preferences. In this way, infrastructure planning and design processes can be oriented around people's wants and needs.

Sample Approach

A highway authority wanted to evaluate potential road improvements in a culturally and economically sensitive location in Kentucky's Bluegrass area. For the pilot project, the tasks were to evaluate the properties and usefulness of 2-D, 3-D, and virtual reality (VR) visualization modes, and then to use the best mode with a novel visual assessment methodology, Casewise Visual Evaluation (CAVE), to evaluate public preferences for specific road design elements. An electronic scoring system allowed data to be gathered rapidly, unobtrusively, and democratically from a diverse local focus group.

The results showed that the 3-D rendering mode was preferred to the 2-D and VR modes, but also that any visualization should complement, not replace, more traditional performance information such as capacity and design speed. Several human factors affecting the efficiency of visualization were identified, including the participants' previous experience with visualization. This information helped in interpreting the results of the preference survey.

The preferred 3-D mode was used to present several potential roadway design scenarios. The group preference data were processed with fuzzy logic software to generate a preference knowledge base for use by designers and planners in evaluating public preferences for specific designs (*2*).

Scoring Preferences

Unlike traditional visual assessment methodologies—such as the widely-used Visual Preference Survey—CAVE can compute preferences for individual design elements in a scenario even if the elements are not scored one by one. This is advantageous because preferences are nonadditive—that is, they develop in a complex, nonlinear manner. For example, if people prefer wide lanes and also prefer wide shoulders in response to separate questions, this does not mean

that they would prefer a design combining wide lanes and wide shoulders.

With CAVE, people score complete scenarios with all the design elements. CAVE then works to break down, or "decompose," the preference interrelationships.

Another critical advantage of the CAVE method is not having to score every possible combination of elements to generate an accurate and useful understanding of the preferences. If each of five design elements has three "states"—for example, road width may be "narrow," "moderate," or "wide"—several hundred combinations are possible. However, CAVE does not require building and scoring hundreds of potential scenarios. The fuzzy-logic modeling system fills in the gaps in the knowledge base, so that as few as 12 or 15 scenarios can be scored to generate useful output.

With relatively limited data acquisition from public forums such as focus groups and public meetings, CAVE can generate detailed, quantitative guidance on design elements for planners and authorities. This approach keeps demands on the public's time to a minimum.

Seeing advanced methods translate preferences directly and quickly into useful output without inordinate numbers of meetings builds confidence in the public involvement process, stimulates interest, and encourages input. In the case study, survey results showed that the focus group was "very satisfied" with the technology.[1]

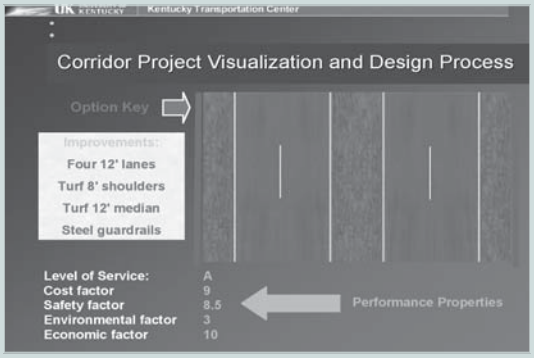
Adapting to Context

For maximum benefit, the use of advanced technologies must be considered in a social and institutional context. Some important questions include the following:

- If visualization is to be used, which mode is appropriate? Which human factors influence reception of these methods in the context?
- What kinds of landscapes are best portrayed with 2-D, 3-D, and VR methods?
- If the methods of decision theory are to be used in evaluating options, how are the choices to be defined, and who will define them?

By centering public involvement around the participants and fitting the technologies properly to the context and questions at hand, SPI offers several advantages:

[1] On the same 10-point scale used in evaluating road designs, the focus group rated the technology 8.6—higher than any of the proposed road designs.



Performance indicators for design elements (lane width, shoulder width and type, median width and type, and guardrail type) in corridor project visualization.

Electronic scoring keypad used by focus group participants to indicate preferred design scenarios.

- Increased stakeholder buy-in, contribution, and satisfaction;
- Increased transparency; and
- Clearer recommendations for planners, designers, and engineers.

With funding from the TRB Transit-IDEA (Innovations Deserving Exploratory Analysis) program,[2] the PSA team is now working with Louisville's transit authority and with the Urban Design Studio[3] to develop and evaluate design options for a proposed transit station and transit-oriented development in Smoketown–Shelby Park (see box, page 34). Focus group meetings are under way in Louisville neighborhoods, modeling public preferences with electronic scoring and the CAVE methodology. Highly detailed VR visualizations showing the preferred elements will be evaluated by the community later this year.

References

1. Bailey, K., T. Grossardt, and J. Brumm. Integrating Visualization into Structured Public Involvement: A Case Study of Highway Improvement in Central Kentucky. In *Transportation Research Record: Journal of the Transportation Research Board,* TRB, National Research Council, Washington, D.C., 2002 (in press).
2. Bailey, K., T. Grossardt, and J. Brumm. Towards Structured Public Involvement in Highway Design: A Comparative Study of Visualization Methods and Preference Modeling Using CAVE (Casewise Visual Evaluation). In *Journal of Geographic Information and Decision Analysis,* 5:1, pp.1–15. www.geodec. org/Bailey.pdf.

Websites

PSA Visualization Gallery, http://cvoz.uky.edu/psa/TCSP/TCSPVisualizations.htm

SPI Program, http://cvoz.uky.edu/psa

3-D Nature (samples of award-winning work), http://www.3dnature.com/imagesofthemonth.htm

[2] Transit-IDEA Project T-33: Community Visualization in the Design of Light Rail Transit–Oriented Developments.

[3] A joint venture of the University of Kentucky College of Architecture, the University of Louisville Department of Urban and Public Affairs, and the Louisville Development Authority.

Public Involvement and the Organizational Landscape

State Departments of Transportation Undergo Culture Shift

LYNDA J. SOUTH

The author is Public Affairs Director, Virginia Department of Transportation, Richmond, and a member of TRB's Public Involvement in Transportation Committee.

A remarkable culture shift is occurring in some departments of transportation (DOTs) across the United States—a new commitment to public involvement is permeating organizations. Public involvement professionals have become part of the organizational landscape in at least three DOTs. These professionals are not engineers but come to the DOT with conflict-management, presentation, problem-solving, negotiation, facilitation, and team-building skills. They work in DOT regional offices, close to the publics they serve.

In at least one DOT, the expanding movement toward context-sensitive design (CSD) has driven the emphasis on public involvement. The Federal Highway Administration defines CSD as a "collaborative, interdisciplinary approach that involves all stakeholders [in developing] a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility." Several states are piloting the CSD approach to transportation projects (see box, page 19).

In other states, emphasis on public involvement is simply a recognition of change. Public interest groups have made the development of better methods for highway design a major part of their agendas. These groups often give priority to protecting historic and natural resources and residential neighborhoods instead of following a DOT's high-capacity designs.

Public Pressures

High-capacity designs often already have incurred substantial preliminary engineering costs before submittal for public comment. More and more, the public wants a say in how transportation improvements fit into the character of their communities and is challenging the plans of highway engineers. The public also wants opportunity for input early in the process, before the first line is put on paper.

A DOT's credibility is questioned constantly, and engineers are learning that stopping projects after 30 percent of the design work is complete is neither good business nor a wise investment of taxpayer dollars. Some state DOTs are discovering that a successful highway design process includes early and continuous public involvement.

DOTs have provided opportunity for good public involvement but usually on a high-profile, project-by-project basis. Engineering divisions typically oversee the projects, and the design consultants often subcontract the public involvement process. Most public involvement occurs when a project reaches construction, particularly if the project affects large volumes of traffic.

But public involvement is more than a line item in a consultant engineering budget. Some agencies are changing their organizational structure significantly and hiring people with skill sets not associated with DOTs. These DOTs also are providing a stronger role for their public affairs departments.

Yet many DOTs are struggling over how to become more proactive in involving the public in project development. Three DOTs that are blazing new territory and attempting to make public involvement a part of their core business can serve as models.

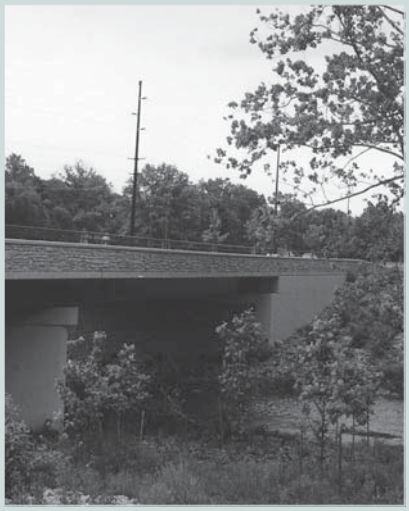
Wyoming DOT: Formal Framework

For the past 25 years, Wyoming DOT's environmental program has handled public involvement activities. The assignment arose from the agency's need to follow guidelines and meet requirements for producing documents—including environmen-

What Is "Context-Sensitive Design"?

Context-sensitive design (CSD) is an approach that involves a community's many stakeholders at the earliest stages to create a highway appropriate to its use and environs, that links bicyclists and pedestrians to other transportation modes, and that is safe, durable, and low-maintenance. CSD carefully fits the highway to its surroundings.

The approach comes from a growing demand for more public involvement in decisions about new or improved highways that will affect local communities. In May 1998, the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials, the Maryland Department of Transportation, and the Maryland State Highway Administration sponsored a national workshop, "Thinking Beyond the Pavement." The workshop produced agreements on the specific qualities of excellence in highway design and the characteristics of the process contributing to excellence. Following are some of the workshop findings.



Kentucky applies context-sensitive design to build roads and bridges.

Qualities of Design Excellence

- The project satisfies the purpose and needs as agreed to by a full range of stakeholders. The agreement is forged during the earliest phase of the project and is amended as warranted.
- The project is a safe facility for users and the community.
- The project is in harmony with the community and preserves environmental, scenic, aesthetic, historic, and natural resource values of the area.
- The project exceeds the expectations of designers and stakeholders and achieves a level of excellence.
- The project involves efficient and effective use of resources, including time and budget.
- The project is designed and built with minimal disruption to the community.
- The project adds lasting value to the community.

Contributing Characteristics

- Communication with all stakeholders is open, honest, early, and continuous.
- A multidisciplinary team is established early—with disciplines matching the needs of the specific project—and includes the public.
- A full range of stakeholders joins transportation officials in determining the project's scope, clearly defining the purposes of the project, and reaching consensus before proceeding.
- The highway development process is tailored to the circumstances, examines multiple alternatives, but results in a consensus approach.
- Top agency officials and local leaders are committed to the process.
- The public involvement process, which includes informal meetings, is tailored to the project.
- The landscape, the community, and valued resources are understood before the engineering design begins.
- A full range of tools for communication about project alternatives is used—for example, visualization techniques.

CSD Pioneers

Five states—Connecticut, Kentucky, Maryland, Minnesota, and Utah—and FHWA's Federal Lands Highway Division have been the first to explore CSD. Efforts include strategic plans, extensive training for employees and project participants, incorporating the approach into project development, and creating implementation resources. More details are available on FHWA's CSD website, www.fhwa.dot.gov/csd.

"Any Time, Anywhere, with Anybody"

Agency's Public Involvement Mantra Pays Off

BRUCE MANSFIELD

The Ohio Department of Transportation's (DOT's) metropolitan planning process is setting new standards for public involvement. The agency has found that programs focusing on outreach and tailored to a specific community's needs and issues produce community partnerships that enhance project outcomes and public acceptance.

Ohio DOT's Cleveland Innerbelt Project team has adopted the mantra of "any time, anywhere, with anybody" for meetings with the public. Key aspects of the public involvement program are

Ohio DOT contracts for onsite child care so that parents can participate in public meetings.

- No request for a meeting is denied;
- The steering committee is inclusive, with strong neighborhood representation;
- Graphics are sensitive to neighborhood issues and resources;
- Newsletters and resource materials are multilingual (in English and Spanish, with selected portions translated into Chinese by community volunteers);
- Newsletter items relate to neighborhood concerns and cultural resources;
- Paid advertising is used to publicize events and meetings;
- Small-group neighborhood workshops and charrettes[1] increase one-on-one interaction;
- Press briefings result in media coverage and accurate reporting;
- The website offers opportunity for e-mail input (www.innerbelt.org); and
- Community organization meetings can provide forums for discussion and input.

The response to Ohio DOT's outreach has been extraordinary participation, appreciation for the planning process, and a community partnership.

"Because we've taken the time to educate the public and listen to their input, we've ended up with more cost-effective project alternatives," notes Suzann Gad, Ohio DOT's Administrator of Urban and Corridor Planning. Citing the long hours of meetings and workshops with community groups, Gad adds, "It's amazing to watch citizens defend us now at neighborhood meetings [when someone challenges Ohio DOT's process]. Proactive public involvement campaigns may appear to cost a fortune, but you couldn't buy this positive public relations any other way."

[1] A charrette is a gathering of various groups in a community to resolve common problems with the assistance of outside experts.

The author is with Burgess & Niple, Columbus, Ohio.

tal impact statements—required by the National Environmental Policy Act and other regulations.

"It's a role that has expanded continuously over the years—although our employees were meeting the letter of the law, they wanted to do more than just the bare minimum," says Public Affairs Specialist Bruce Burrows. "Nevertheless, a few years ago, during some difficult proposed projects, the department was portrayed by certain interest groups as riding roughshod over communities and citizens and was inaccurately accused of not having sufficient and meaningful public involvement."

As a result, the agency's director publicly announced an increased commitment to the public involvement process and appointed an agency task force. The task force comprised representatives from the design, environmental, right-of-way, and public affairs programs, as well as the local government coordinator.

"The task force concluded that generalists with excellent communications skills and conflict resolution in their backgrounds should coordinate public involvement, not engineers," Burrows recalls. "They equated public involvement with good customer service, which is supposed to be everybody's responsibility at Wyoming DOT. Doing better meant dedicating more resources, a possible back-breaker if any one program had to assume all the responsibility."

Next steps included the development of a public involvement policy that specified goals and guidelines for program managers and district engineers. The task force referred to guidelines developed by Montana DOT to determine the appropriate level of public involvement in project activities. For example, Level A projects, which typically include maintenance, require the least amount of public involvement, but Level D projects—activities such as environmental impact statements, major realignment, all new alignment projects, and major urban projects—require extensive public involvement.

The agency also approved hiring six public involvement coordinators: one in the headquarters public affairs office and one in each of the state's five districts. The department plans to recruit and fill the positions soon. The five field coordinators will report to the district engineers but also will work closely with the public involvement coordinator at headquarters.

Wyoming DOT is assembling a handbook to guide expanded public involvement efforts. "Our approach will be to give employees a solid understanding of the guiding concepts for effective public involvement, instead of simply providing a bunch of prescriptions to fit specific situations," Burrows says. "The district personnel will have flexibility and discretion—knowing the philosophical framework will serve them well."

"This is not an overnight process," Burrows comments. "It has taken us more than a year to get this far. We'll continuously evaluate the effectiveness of public outreach and make adjustments along the way." But Wyoming DOT will have a formal framework from which to work and some much-needed resources, Burrows points out.[1]

Kansas DOT: Bill of Rights

Kansas DOT also has taken a formal approach to public involvement. With several controversial projects on the horizon, the agency decided to improve its public involvement efforts. Before 1998, the agency's centralized engineering and design staff had handled public involvement, and the districts were responsible only for construction and maintenance projects.

A consulting firm was hired to develop a public involvement plan to guide future changes. The plan was based on input from surveys of Kansas DOT employees, the traveling public, cooperating agencies, legislators, other state departments of transportation, consultants, and contractors. Recommendations included the following:

- Kansas DOT's organizational structure and culture should be more responsive to the public's need for communication, for example by empowering employees at local levels to address communications issues.
- The project planning and development process should be changed to allow the public to participate in a timely and meaningful way.
- Training should increase awareness of what public involvement is and provide Kansas DOT employees with the tools necessary to complete their jobs successfully.
- Internal communication should be improved, to address public concerns and issues throughout the process.

In addition to the overall recommendations, specific recommendations were made for bureaus within the departments of Planning and Development, Engineering and Design, and Operations. The recommendations addressed Kansas DOT's efforts in three areas: public involvement programming, project-specific public involvement, and organizational public relations and involvement.

Setting Priorities

Because timing, resources, and training were important to the plan, the public involvement recommendations were prioritized. For example, highest priority efforts included

- Assigning districts a larger role in annual forums;
- Adding public involvement professionals to implement some of the initiatives and ensure consistency of internal and external communications;
- Creating a project delivery group, a production line of individuals who evaluate the scope, budget, schedule, and communications issues associated with the project; and
- Providing the agency's bureaus with templates or communications materials such as news releases, fact sheets, and a "Customer Bill of Rights."

[1] For information about Wyoming DOT's public involvement initiatives, contact Bruce Burrows at Bruce.Burrows@dot.state.wy.us; telephone 307-777-4439.

Positive Feedback in the High Desert

Community Outreach in Rural Arizona

DEBRA BRISK AND JOAN BECKIM

The Arizona Department of Transportation's (DOT's) Kingman District, in the high desert of the northwestern part of the state, has learned in the past five years that an ongoing dialogue with its customers can be a positive experience. The dialogue has developed better agency–customer relationships, has helped design and construction projects run more smoothly, and has produced a better end product for highway users.

Although the Kingman District is considered rural, tourists and residents rely on its hundreds of miles of highways—the roads are heavily traveled. Many local residents drive more than 60 miles to places of employment. Thousands of tourists pass through the area en route to Las Vegas and Laughlin, Nevada; to Hoover Dam and Lake Mead National Recreation Area in Arizona; and to Los Angeles, California. The US-93 Corridor and portions of Interstate 40 are part of the CanaMex Corridor for North American Free Trade Agreement traffic. The cities of Phoenix, Arizona, and Las Vegas provide area residents with major medical services and shopping opportunities not available in their own communities.

Brisk is Deputy Director, Arizona Department of Transportation, and former Kingman District Engineer; Beckim is Project Manager, Kaneen Advertising and Public Relations, Tucson, Arizona.

Arizona DOT staffers make a presentation to one of several community groups targeted in the Kingman District outreach campaign.

About five years ago, the district began implementing innovative and proactive community outreach and communication programs as part of its everyday operations and has worked with a communications consultant specializing in transportation. The district's communications team has continued redefining and improving the programs with feedback from the public. Although the primary focus of the communications is on the details of design and the impacts of construction on the traveling public, the district has found that expanding the efforts and listening to stakeholders make a difference.

The communication effort begins with those who will be performing the design and construction of the transportation improvement projects. In addition to traditional methods of public commu-

Traditionally, Kansas DOT's communications with the public had tended to be one-way. Survey participants received most of their information from the newspaper or by word-of-mouth. According to the survey, the majority said that public involvement should begin at the lowest level, with the Kansas DOT employees who are in contact with the public at the area and subarea levels.

As part of the new public involvement plan, Kansas DOT created the Customer Bill of Rights to demonstrate commitment to customer service and public involvement. The Bill of Rights serves as a reference point for employees and has become a keystone of employee orientation materials.

Organizational Structure

Organizational structure also received attention. Ron Kaufman, who joined the department in 1998, was one of the first public involvement liaisons in the headquarters Division of Public Affairs. He helped hire two other public involvement liaisons for headquarters and one for each of Kansas DOT's six districts.

Today Kaufman heads up the Bureau of Public Involvement, part of the Division of Public Affairs. The headquarters staff report to Kaufman and work closely with the engineering divisions on high-profile projects. The district public involvement liaisons report to the district engineers, but Kaufman coordinates, guides, and advises them.

Although addressing all facets of public involvement in planning, project delivery, and operations, Kansas DOT's organizational plan did not include the public in the process of programming or selecting projects. The consultants have advised the agency to examine how the public could become involved in the selection process, maintaining that Kansas DOT could

nication, the district works with contractors to develop and implement innovative contracting approaches to projects and then communicates the innovations to the public.

Face-to-face meetings with the public are a key part of the district's outreach, as are the use of nontraditional communication tools and research efforts to measure and evaluate communications programs. For example, the district relies on feedback from project-specific stakeholder mail-in surveys and also manages a speakers bureau that sends staff volunteers to make presentations and answer questions at meetings of regional organizations, business groups, homeowner associations, and the like. The district also has learned that in-place communication programs can help in responding to unanticipated incidents on the highways or to crisis situations—for example, on September 11, all communications outlets were used to inform commercial traffic and travelers of the immediate restrictions on roadways near the Hoover Dam.

Customers can obtain project information directly from staff at the Kingman District office.

Communicating with residents, tourists, and those who frequently travel through the area requires an ongoing, yet flexible effort. The Kingman District's goal is to "get out in front" on major transportation improvement projects, talking with the public during planning and design, well in advance of construction. Citizens have appreciated the advance notice and the opportunity to identify access and general transportation needs early in the process. This proactive approach also provides an opportunity to inform project managers, contractors, and the agency's construction staff about citizen expectations and to defuse potential issues.

The public outreach program is part of improving service to the customer. Advance communication takes into consideration, and attempts to alleviate, citizen concerns. Even if the communication cannot mitigate the impact of construction on citizens, having project managers talk with citizens, do what they can in response, and then keep citizens informed throughout the project can result in all stakeholders working together to make the process run more smoothly—which means a better, more quickly built final product.

Local television station interviews contractor's project manager about innovative procedures to minimize disruption of traffic during construction.

strengthen its relationship with customers by using customer input to define priorities and select projects.[2]

Utah DOT: Context Sensitivity

CSD is driving many of the changes in Utah DOT's public involvement process. Utah is one of five states piloting the CSD approach to transportation projects—although the DOT prefers the term, context-sensitive solutions (CSS).

"Even before Utah DOT became a pilot state for CSS, we were making changes to our public outreach program," says Clare Wardle, a Utah DOT project manager who has been involved with the changing public involvement process. "The department had considered placing public involvement coordinators in each highway district."

When Utah became a pilot state for CSS, the DOT hired a consultant to help launch the new process. For CSS to succeed, Utah DOT would have to link the delivery of transportation services with stakeholder relations.

Crafting the Philosophy

The consultant recommended a Futures Conference to convene internal and external stakeholders from around the state. The purpose was to gather input on how the agency should conduct its business and to craft a philosophy for CSS.

Although the conference report indicated a diversity of opinions, the themes on which all stakeholders could agree became a "common futures" list. In particular, the suggestions for a more focused public involvement noted that the agency should identify all stakeholders, start earlier in the process, perform at the

[2] For information about Kansas DOT's efforts, e-mail Ron Kaufman at rkaufman@ksdot.org or telephone 785-296-3769.

Effective public involvement practitioners match different techniques to specific audiences.

local level, enhance two-way communication, and ensure continuous public participation from inception to project competition.

The Futures Conference and subsequent agency and stakeholder meetings defined a successful project as "technically credible and … accepted by other agencies and stakeholders." Three principles guide the buy-in to a credible transportation solution:

1. Address the transportation need;
2. Be an asset to the community; and
3. Emphasize compatibility with the natural and built environments.

The first principle states Utah DOT's reason for being. The second and third principles indicate how Utah DOT should conduct business to be perceived as successful by the community.

With input from the Futures Conference, the consultant concluded that stakeholders viewed Utah DOT as having only one interest, "building highways." According to the report, Utah DOT can improve its credibility with most, if not all, of the project stakeholders, "by thinking strategically about alternatives that address transportation demand."

The consultant identified the need for an "integrated transportation decision-making process" if the agency was to be successful at CSS. The process must be "strong, but a flexible interdisciplinary, interagency collaboration" on technical issues and delivery of services. Additionally, the process must allow for stakeholder involvement from planning through construction or maintenance.

Commitment and Training

This new way of doing business to emphasize public involvement was a message that needed to come from the top, according to Wardle—and it did. The Utah DOT Director and the Deputy Director, who oversaw the agency's regions, embraced the commitment to public involvement.

"They were strong and vocal about their commitment," Wardle says. However, design engineers initially protested the idea of increasing public involvement: "They were concerned that it would mean additional costs and a compromise of design standards."

To shift away from this attitude, the consultant recommended an aggressive training program for all project managers, functional managers, and core design team members. The training focused on how Utah DOT delivers projects and how teams could work together effectively in project delivery.

Utah DOT also hired public involvement coordinators for the regional offices. The coordinators report to regional managers but maintain a "dotted line" or ancillary reporting relationship to the public affairs director. They, too, have received the training.

The primary responsibility of the public involvement coordinators is to ensure that an effective public involvement process is in place throughout a project. At the same time, the regional director and project manager are accountable, with responsibility for ensuring that public involvement occurs and that the correct values, processes, and resources are used.

Establishing New Ways

Evelyn Tuddenham, one of Utah DOT's public involvement coordinators, points out that the agency had the philosophy in place long before the processes were identified and implemented. She emphasizes the importance of meeting with staff from other areas and understanding what they do.

"You really have to understand why and how a certain division does something before you can work together to put in place an effective public involvement process," she notes.

According to Tuddenham, a plan has been devised for all major projects: "It's a simple plan formatted on a single piece of paper. The plan lists the stakeholders, the messages, and a set of strategies and objectives."

Tuddenham and others in the agency have recognized that traditional methods of public involvement in project development—such as open houses and public meetings—have limited effect. The agency now is looking into focus groups, meetings with city and county planners, and personal one-on-one meetings with selected stakeholders as part of the process. Surveys and public education efforts also are under consideration.

Tuddenham thinks that new ways of involving the public in the transportation process will become the rule, not the exception, at state DOTs. But is the new way of doing public involvement working? According to Wardle, one gauge is media coverage: "Two years ago, we were beat up in the media on everything, but now I've seen a shift in how articles are coming out, and I think public involvement has been a key."[3]

Acknowledgment

Donna Purcell Mayes, Assistant Public Affairs Director, Virginia DOT, contributed to this article.

[3] For more information about Utah DOT's efforts, contact Clare Wardle at cwardle@dot.state.ut.us or Evelyn Tuddenham at etuddenham@dot.state.ut.us.

Public Involvement by Minorities and Low-Income Populations

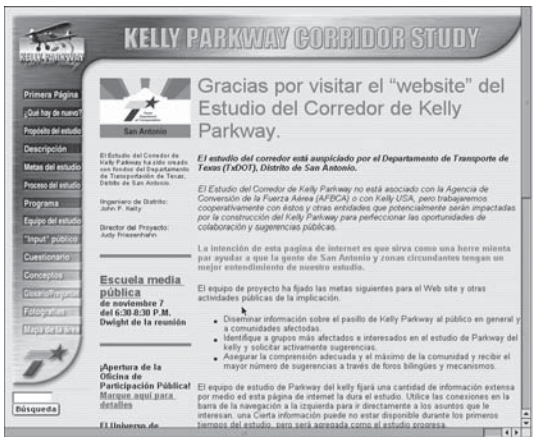
Removing the Mystery

JENNIFER L. WEEKS

The author is with Parsons Brinckerhoff, Baltimore, Maryland.

The transportation industry is expected to integrate social equity into the development and operation of systems, plans, and projects. Achieving transportation equity in any geographic area requires the proper involvement of all communities affected by a proposed action, particularly communities that can be hardest to reach—racial and ethnic minorities, and low-income populations. This involvement ensures that transportation needs and concerns are adequately identified and addressed—an expectation explicit in many of the federal laws that govern transportation decision making.

"An effective public involvement process ensures all communities of early, full, and open access to transportation planning and project-related decisions," according to Gloria Shepherd, Director of the Federal Highway Administration's (FHWA's) Office of Human Environment.



Bilingual website demonstrates Texas DOT's commitment to reaching out to ethnically diverse community affected by the Kelly Corridor project in San Antonio.

Initial Challenges

Many agencies struggle to obtain meaningful participation and input and then to integrate the results successfully into transportation decisions and products. Even the best intentions can lead to lackluster public interest and participation. Because of the time and money required to conduct public involvement, sponsoring agencies may be tempted to forgo proactive public involvement procedures.

The challenges can be more acute in gaining the input of economically and socially disadvantaged populations, such as many racial and ethnic minority communities and low-income populations.[1] Interaction with these populations may be difficult, because they often have fewer resources to apply to involvement in transportation actions that affect them. Additionally, a history of distrust for the government may discourage individuals or groups from participating in public discussions with officials.

Nevertheless, these groups may have more to lose from not engaging in decision making. Agencies that seek input from all affected parties must develop a strategy to approach and engage all communities, successfully overcoming any obstacles to participation, and identifying and integrating public needs and concerns into the decisions.

Reasons for Trying

Considering the difficulties, why should transportation

[1] Not all ethnic and racial minorities are "socially and economically disadvantaged." The focus is on involving disadvantaged groups characterized by language barriers and by income and resource shortages.

Lessons Learned

Cordes Junction Interchange

Arizona Department of Transportation (DOT) staff learned firsthand what happens when the public gets involved late in the decision-making process. A draft Environmental Assessment was completed for the Cordes Junction Interchange—located at Interstate 17 and SR-69 midway between Phoenix and Flagstaff—in October 1998. In 1999, an upgrade of regulations implementing the National Historic Preservation Act placed additional emphasis on the role of federally recognized tribes in Section 106 reviews.

An internal review of a cultural resources assessment in August 1999 revealed significant resources in the area that the project alignment could not avoid. Moreover, area tribes had not received the required opportunities to participate in the decision-making process.

FHWA and Arizona DOT worked together to generate a list of federally recognized tribes with ancestral links to the affected area and invited tribal representatives to participate in reviewing and evaluating the sites. A tour by leaders of the Hopi and Salt River Pima–Maricopa Indian community revealed resources not identified in the original inventory.

Arizona DOT contracted with a cultural preservation specialist from the Hopi Tribe to aid in the review of the sites. Several additional sensitive spots were discovered, including possible burial sites. Arizona DOT designed new alignments to avoid all of the sensitive sites.

Careful documentation included written records of orally expressed issues and concerns that then were shared with all of the affected tribes. The goal was to facilitate a good working relationship with the tribes and to encourage participation in future projects.

SOURCE: FHWA Environmental Justice Case Studies, Cordes Junction Interchange, Arizona, www.fhwa.dot.gov/environment/ejustice/case/case9.htm.

agencies try to seek the input of hard-to-reach communities proactively? The most compelling reason is the law. However, other practical and philosophical reasons should generate agency interest in going beyond the minimum of compliance to engage representatives of all communities.

Federal prohibitions against discrimination in transportation decision making date back to Title VI of the Civil Rights Act of 1964. Some of the federal laws that require the consideration of race in relation to the effect of transportation actions on human health and the environment—as well as the economic or social impacts and possible discrimination—include the National Environmental Policy Act of 1969 and the amended Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

More recently, President Bill Clinton's Executive Order 12898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, and subsequent actions by the U.S. Department of Transportation have reinforced those requirements.[2] In particular, Executive Order 12898 has spurred federal officials to focus on how minority and low-income populations are treated in transportation planning and project development processes, products, and outcomes. The Executive Order also created recognition of environmental justice as an expected outcome of any transportation action.

The technical process therefore must include a means of identifying potential environmental justice issues and any actions to avoid or mitigate "disproportionately high and adverse human health and environmental effects of federal programs, policies, and activities on minority populations and low-income populations." In addition, careful consideration must be given to the distribution of benefits from transportation systems, projects, plans, and other actions to "prevent the denial of, reduction in, or significant delay in the receipt of benefits" by minority and low-income residents.

Public officials make clear the expectation that public involvement early in the process is important to identify and obtain agreement on how to solve potential environmental justice problems.[3] Federal officials consider fulfillment of this requirement an integral component of any transportation decision. State and metropolitan transportation agencies can expect federal interest in how and to what extent community input is sought on environmental justice.[4]

Benefits to Agencies

Yet the benefits to transportation agencies far surpass legal compliance. Seeking input proactively from minority and low-income populations makes practical sense and is the right thing to do. As the U.S. population continues to grow and diversify ethnically and racially, agencies increasingly will need to gain confidence in approaching and interacting with every community. According to recently released U.S. population estimates and projections, the percentages of Hispanic Americans and Asian Americans are each expected almost to double by

[2] For more information on federal laws, regulations, and actions on environmental justice and Title VI, see the FHWA Environmental Justice website, which also includes environmental justice case studies: www.fhwa.dot.gov/environment/ejustice/.

[3] The Facts. U.S. Department of Transportation, Federal Highway Administration, www.fhwa,dot.gov/environment/ejustice/facts/index.htm/. Also see Executive Order 12898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, 1994.

[4] U.S. Department of Transportation Order on Environmental Justice. *Federal Register*, April 15, 1997, Vol. 62, No. 72. Also Wykle, K. R., and G. J. Linton. Memorandum: Implementing Title VI Requirements in Metropolitan and Statewide Planning, October 7, 1999.

2020, and the proportion of Caucasians is expected to decrease, from approximately 76 percent to 64 percent of the population.[5]

It is never too early to involve the full spectrum of the public in transportation decisions. Involving communities in shaping the vision and policies that lead to projects, programs, construction, and operational decisions is key to achieving fluid execution.

Agencies can use public involvement to make an ordinary transportation plan or project into an extraordinary transportation plan or project. For example, in response to public concerns over safety, design, aesthetics, and community revitalization, agencies are expanding their use of context-sensitive highway design, transit-oriented development, streetscape planning, and other "people oriented" design techniques.

The goal for any agency's public involvement process is to generate not only broad public consensus on a transportation action, but public ownership and excitement that builds the political will to implement the proposed action. Generally, such ownership occurs only when there is an opportunity for all parties affected by a proposed transportation project or plan to work together to develop a consensus on a decision or set of decisions.

Achieving broad public acceptance of decisions requires good channels of communication between those participating in the consensus building and the communities affected. A public that understands the decision-making process—and the avenues available to participate and be heard by decision makers—is more apt to support the resulting decision, even if not in complete agreement.

Partnerships with religious and other community leaders can help capture the interest of targeted groups. Planners in Jacksonville, Florida, worked with ICARE, an interchurch coalition of 35 largely African American congregations, to sponsor a workshop to obtain feedback from the African American community.

Tricks of the Trade

There is no single approach to public involvement that successfully engages minorities and low-income populations. Among the primary objectives of any public involvement process are to build public trust in the agency and in the process and to generate meaningful participation.

Public trust reflects confidence that the agency regards public concerns as important to address in decision making. Meaningful public participation provides the information necessary for agencies to define and execute transportation actions that adequately address public needs and concerns.

[5] Resident Population Estimates of the United States by Sex, Race, and Hispanic Origin: April 1, 1990 to July 1, 1999, with Short-Term Projection to November 1, 2000, and Projections of the Resident Population by Race, Hispanic Origin, and Nativity: Middle Series, 2006 to 2010 and Middle Series 2016 to 2020, U.S. Bureau of the Census.

Creativity and Persistence

Verona Road–West Beltline Project

Wisconsin Department of Transportation's foresight in aggressively pursuing the involvement of a key lower income, mixed-race neighborhood in a corridor analysis, before the start of project planning, generated valuable information that might never have been identified or that might have been identified late in the project, when modifications can be costly.

The targeted community, isolated by several major road corridors in the southwestern part of the city of Madison, was transient and therefore difficult to engage. With creativity and persistence the agency crafted a toolbox of techniques—community meetings, workshops, and open houses—as well as involving youth in identifying pedestrian and bicycle needs and also developing a transportation and land use curriculum unit at the local middle school. These approaches generated the necessary input and contributed to a smooth and satisfactory project development.

SOURCE: FHWA Environmental Justice Case Studies, Verona Road–West Beltline Needs Assessment Study, www.fhwa.dot.gov/environment/ejustice/case/case1.htm.

Boosting Community Connectivity

Baltimore Transit Plan

In Baltimore, transit agency officials have hired a respected community leader as a consultant to conduct outreach through a series of public meetings on a regional rail system plan. In addition, the agency is seeking the advice and participation of nonprofit community advocacy groups. The public involvement strategy includes targeted outreach to the region's lower-income and Hispanic communities.

SOURCE: Maryland Transit Administration.

Practicing Persistence

Dedication and persistence are the primary requirements for any agency engaging a socially or economically disadvantaged community in transportation decision making. As much as possible, agencies should build flexibility into the processes to allow reaction to unanticipated circumstances while still reaching public involvement goals.

Agencies should be willing to put decisions on hold until assured that the public is satisfied with—or at least recognizes—the plans, projects, and other actions. This can be difficult, particularly when funding and other inputs crucial to a project have narrow timetables. For this reason, early engagement and input are critical—leaving time to tweak strategies and to reallocate resources to ensure success.

Making connections with a targeted community requires giving respected members high-profile roles in the planning process, for example as moderators of public forums or workshops.

Overcoming Cultural Differences

Building a bond of trust and partnership with the public requires an understanding of cultural and community frameworks. Addressing language and cultural considerations should be a priority in reaching out to ethnic groups.

Agencies that do not understand or do not adhere to cultural expectations face barriers to gaining participation from residents and create long-term mistrust that could affect participation in future activities. For example, representatives from a state department of transportation who addressed church congregations from the main pulpit—a place reserved for the ministry—received a cool reception, until realizing the faux pas and addressing congregations from other platforms.[6]

Similarly, agencies with jurisdictions that include American Indian tribes must approach the tribal governments as sovereign nations. The involvement process must integrate proper protocols in communicating with tribal representatives, in addition to activities and techniques to communicate with residents.

One way to become educated on the expectations and needs of a community is to seek the partnership, advice, or expertise of a respected community leader. One-on-one interviews with leaders are critical in introducing a proposed action that will affect the community and in obtaining advice on how to work with and involve the people. Interviews with leaders are also useful for identifying other groups and individuals to work with, as well as for gaining tips on local media preferences, cultural activities, and other events that agencies can explore and use for outreach.

Forming Partnerships

Whenever possible, identify community leaders who can champion the plan or the project development process or who can act as a liaison, to build trust and encourage participation. Partnerships also may introduce resources for extending community outreach.

For example, the Jacksonville Transportation Authority in Florida partnered with a popular African American Congresswoman to plan and sponsor a public workshop for a corridor study. In addition to sponsoring the project and workshop, the Congresswoman donated staff time for community outreach, including a mailing to more than 1,000 constituents. These efforts produced public recognition of the project, not only among residents but also among other agencies and local elected officials. In addition, the organizing efforts provided opportunities to discuss with the

[6] Hoover, J. How To Succeed in Ethnic and Minority Outreach by Really Trying. Presented at Rail-Volutions '98, Portland, Oregon, September 1998.

Outreach to Minority and Low-Income Groups

Public Meeting Tips

- Focus the outreach on why the transportation decision is important to the public and why the public should become involved.
- Partner as much as possible with community leaders and institutions—such as clergy, local officials, and neighborhood associations—to gain visibility for meetings.
- Whenever possible, attend and appear at community events and meetings. Request a place on the agenda to address the group or to put up a display with staff on hand to engage in a dialogue with attendees and to record comments.
- Hold larger public meetings at several locations and varied times and days, since many service and minimum-wage employees do not work the typical 9-a.m.-to-5 p.m., Monday-through-Friday schedule.
- Create opportunities for informal discussion among community residents, to debate issues and articulate positions that can be incorporated into decision making.
- Provide amenities such as food, day care, and reimbursement of expenses, to overcome barriers and to encourage participation.

agency other issues of importance to the Congresswoman's constituency.[7]

If forming partnerships proves difficult, engage staff and consultants with recognized connections to the communities. Many agencies directly hire or make use of Disadvantaged Business Enterprises to gain a range of outreach and technical services. Tri-Met in Portland, Oregon, for example, hired professionals with direct ties to a targeted community to obtain public consensus on the Interstate MAX light rail extension project. A team of multilingual outreach specialists from several agencies, including Tri-Met, Metro, and the city of Portland, engaged in more than 75 meetings with neighborhood associations and other civic groups.[8]

Using Multiple Techniques

The ideal outcome of any public involvement process is to generate public consensus on and ownership of a plan or project. It is important, therefore, to provide all members of the public with multiple avenues for learning about and participating in the plan or project development. A combination of passive and active or interactive techniques helps provide a cushion for persons of all backgrounds to participate in decision making.

Passive techniques include newsletters, mail-back surveys, project hotlines, and websites that provide the luxury of voluntarily learning about and responding to proposed actions. However, in producing and distributing written materials, consider the language of the target audiences and develop versions in multiple languages if appropriate. Active and interactive techniques include public meetings, workshops, charrettes, telephone surveys, advisory committees, and focus groups.

Public meetings, small or large, provide important face-to-face time with public officials and with other residents and communities. Meetings offer forums for debating issues and generating consensus. Technology such as computer simulations can help participants visualize—and even vote on—preferred project and plan outcomes (see articles, pages 9–17).

An important objective is to include a role for members of minority and low-income communities

Interviews with leaders can build relationships with a targeted community. The outreach strategy for a comprehensive corridor study in Jacksonville, Florida, included 17 interviews with leaders of the region's African American population.

[7] Aranda, J., and J. Hoover. How Jacksonville Succeeded in African American Outreach. Presented at the American Public Transportation Association Annual Conference, San Francisco, California, September 2000.

[8] Ontiveros, A., and B. Watts. *A Light Rail Project That Mirrors the Community*, 2000.

in the decision-making process. Establishing advisory committees that represent the spectrum of stakeholders is one possible strategy. However, it is important to pair these strategies with grassroots opportunities to ensure that a community's interests are sufficiently represented. Charrettes and workshops are two well-used techniques that give residents hands-on participation in the outcomes of a proposed transportation action.

Research Needed

Agencies should pursue proactive public involvement that includes meaningful interaction with low-income and minority populations. Case studies and examples indicate how the industry is meeting the challenge, offering lessons to apply (see boxes, pages 32 and 34). Agencies should work to identify and address potential inequities so that transportation plans, projects, and other activities serve the interests of the population as a whole.

Nonetheless, conclusive research is needed to document the benefits—quantitative and qualitative—for agencies that conduct public outreach. Anecdotes can provide lessons to learn and models to emulate but tend to highlight successes. Missing from the discussion are the lessons learned from less-than-successful efforts.

The research community therefore should study

Successful, Substantive Community Participation

Los Angeles Neighborhood Initiative Model

MARIAN BELL

Communities and transportation professionals have different views of community participation in transportation project planning. Although committed to improving people's lives through transportation, professionals often complain that communities either cannot make decisions or cannot overcome the "not in my backyard" mentality. On the other hand, community stakeholders who commit many weekend and evening hours to the process often complain that the participation is considered token and is undervalued.

These divergent viewpoints indicate that the concept of community participation has gained acceptance, but that the implementation is often nominal, unconsidered, or inexpert, leading to frustrated parties, delayed projects, and deteriorating community relations. However, the solutions developed by the Los Angeles Neighborhood Initiative (LANI) provide an example of best practices in community participation.

Involving the Community

In the eight years since its inception, LANI has earned national recognition for going beyond community participation to deliver substantive community decision making in transportation-related improvements. LANI has received the imprimatur of President Bill Clinton, the U.S. Department of Transportation, and the Southern California Association of Governments.

A nonprofit organization, LANI jump-starts community-driven neighborhood revitalization and improves transit access in transit-dependent neighborhoods. LANI's community-planned improvement projects also are designed to spur economic development and improve quality of life for transit users, pedestrians, and the community at large, providing 13 designated communities with

- Seed funding for community-planned improvement projects;

*With community stakeholders in North Hollywood, California, leading the development, design, construction, and maintenance, a bus stop adjacent to a fenced property (*above*) was transformed into NoHo Transit Arts Park (*below*).*

the relationships between public involvement and transportation project outcomes, focusing on the impacts of involving communities of color, ethnic minorities, and low-income groups:

◆ Have these communities been better served as a result of public involvement opportunities?

◆ Are there any long-term benefits that can be attributed to these interactions—such as a public more knowledgeable about transportation issues, improvements in transportation services or access, or improvements in the economic status of communities?

◆ What are the impacts on costs, the changes in the planning and project development processes, and other modifications to agency operations that can be attributed to greater attention to environmental justice and improved public involvement?

◆ Which involvement techniques work and which do not?

◆ What influences the success or failure of different public involvement strategies?

Research on these topics would solidify the case for public involvement and move the discussion from the anecdotal and rhetorical to the factual. Until then, some agencies will remain unconvinced and will hesitate to make public involvement a priority.

◆ Hands-on training in project planning and implementation; and

◆ Assistance in the development and support of ongoing community organizations.

Guiding Projects

In each project area, LANI works with the local community and its city council member to convene a representative stakeholder board—a balanced neighborhood group, including residents, business and property owners, and leaders of community organizations. With LANI's technical assistance and resources, these groups guide all the initiative's projects and activities in the neighborhood.

Beyond providing input, LANI's community stakeholder organizations generate transportation enhancement projects and then oversee the design and the implementation of the projects. Typical tasks include creating community work plans for transportation-related and non-transportation-related projects; developing and prioritizing projects; devising budgets; selecting designers and contractors; signing contracts; approving designs; and addressing cost overruns and unforeseen field conditions during implementation. LANI has completed public improvement projects with budgets totaling $13 million and has leveraged grants with an additional $22 million in neighborhood investments.

Reaping Benefits

The LANI experience demonstrates the following benefits of substantive stakeholder engagement:

◆ *Better projects.* With detailed knowledge of the neighborhood's strengths, needs, and history, local stakeholders are qualified to lead project selection, design, and implementation. Meaningful participation produces a sense of community ownership, which reduces such problems as vandalism and litter, and improves maintenance.

◆ *Increased coordination and leveraging.* Working through community groups and nonprofits, transportation planners can integrate and leverage project resources with economic development, public safety, and other initiatives normally outside the purview of transportation agencies, but which can have a substantial impact on the efficacy of transportation projects. Cross-disciplinary coordination frequently has introduced new, nontransportation funding and resources.

◆ *Superior community relations.* A proactive, thoughtfully planned stakeholder engagement process builds relationships and credibility in the community. Issues of contention are inevitable, but good relationships and credibility facilitate productive coordination with property owners and elected officials and can be the first step in developing constituencies to advocate for transportation funding and policy issues.

Sharing the Lessons

The LANI model incorporates the following tips for successful community decision making:

◆ Engage the community consistently from project development to completion.

◆ Design community involvement around a predetermined, tangible product.

◆ Define the process with clear parameters.

◆ Engage in nontraditional partnerships with nonprofits.

Website

Los Angeles Neighborhood Initiative, www.lani.org/.

The author is Deputy Director, Los Angeles Neighborhood Initiative, California.

Measuring Up to Environmental Justice

MARIE S. KEISTER

When President Bill Clinton issued the 1994 Executive Order to address environmental justice, it was unclear how government agencies should proceed. However, it was clear that the U.S. Department of Transportation would hold metropolitan planning organizations (MPOs) accountable for how well their transportation plans and programs avoided adverse effects on human health and the environment for minority and low-income populations.[1] MPOs that could not meet this standard would lose federal funds.

How should public agencies avoid disproportionate impacts on these populations when siting infrastructure improvements? How should planning efforts incorporate input from disadvantaged populations? The Mid-Ohio Regional Planning Commission (MORPC) in Columbus, Ohio, grappled with these questions.

"We needed to engage stakeholders who don't usually show interest in our planning," recalls MORPC Engineer Nick Gill. "But we weren't sure how to measure how that input would affect decision making and reduce disproportionate impacts [from major infrastructure projects]."

With input from members of its Citizen Advisory Committee, its Transportation Advisory Committee, and the Columbus Area Transportation Coordination Program, MORPC developed a series of measures to compare the relative treatment of the target populations and nontarget populations for the projects in the long-range Regional Transportation Plan and the short-range Transportation Improvement Program.

MORPC first collected demographic data on the target populations—such as minorities, low-income populations, and households without cars—and also extended the definition to include people with disabilities.[2] The baseline demographic data were entered into the MPO's travel forecast demand model, used by transportation agencies in the Columbus metropolitan region to predict how transportation investments will meet future mobility needs. The forecasting process incorporates basic land use and transportation system information and estimates the effect of proposed transportation projects on future travel patterns and volumes.[3]

[1] www.fhwa.dot.gov/environment/ejustice/facts/index.htm/.

[2] MORPC Environmental Justice Report, Executive Summary, April 2000, p. 2.

The author is Transportation Public Involvement Technology Lead, CH2M HILL, Columbus, Ohio.

MORPC also identified the transportation needs of the target populations, especially of residents with low incomes, so that adverse impacts could be measured or forecast in the travel demand model. The needs can be summarized as

- A reliable, accessible, affordable, convenient, and timely transportation system that can respond to an individual's full range of daily activities;
- Commitment to transportation and public transit by employers and the general public; and
- Alternative modes of transportation.[2]

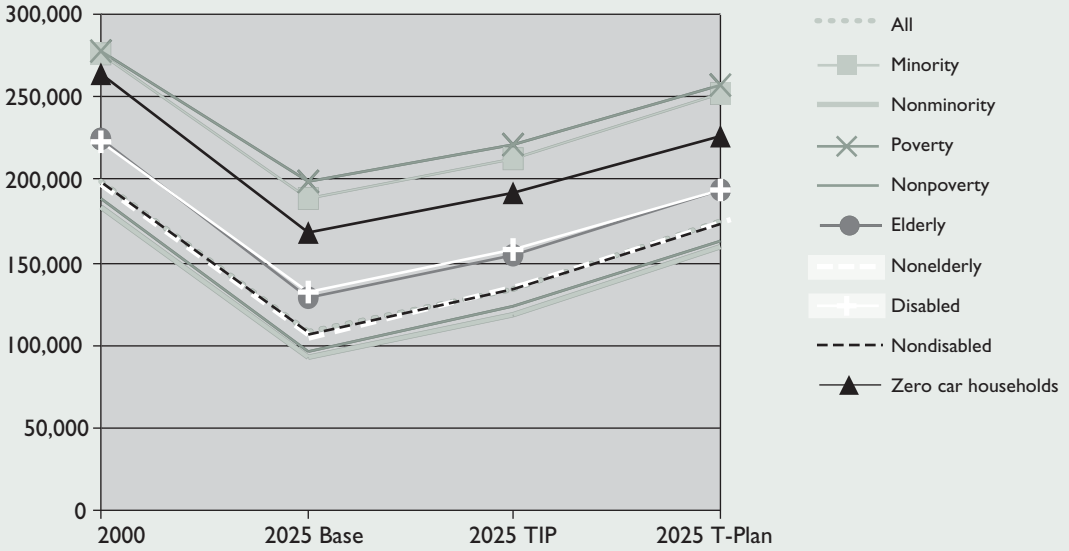
To quantify how those needs are being met today and how they may be met tomorrow based on population growth and projected land use, MORPC applied its model to estimate the following measures with and without the planned projects:

- Average numbers of local job opportunities, of home-based shopping opportunities, and of other home-based opportunities;
- Percent of the population within certain travel times to a college, to a hospital, and to a major retail destination;
- Average travel times for work trips, home-based shopping trips, other home-based trips, all home-based trips, and to the Columbus central business district (CBD);
- Transit accessibility to the Columbus CBD;
- Percent of travel in congested traffic; and
- Amount of highway investments.[2]

Values were estimated for the whole population, the minority population, the population in poverty, the minority population in poverty, the population with disabilities, and seniors. Charts were prepared to show how the measures changed for each population group under the various transportation projects.

MORPC also used this information to gain input from people most affected by the Transportation Improvement Program, inviting members of the target populations to participate on the Citizen Advisory Committee, seeking input at public meetings, and making presentations to neighborhood groups. Reaching the targeted populations and gaining feedback required communication channels that made best use of available labor resources and a limited budget.

[3] MORPC Environmental Justice Report, April 2000, p. V-5.



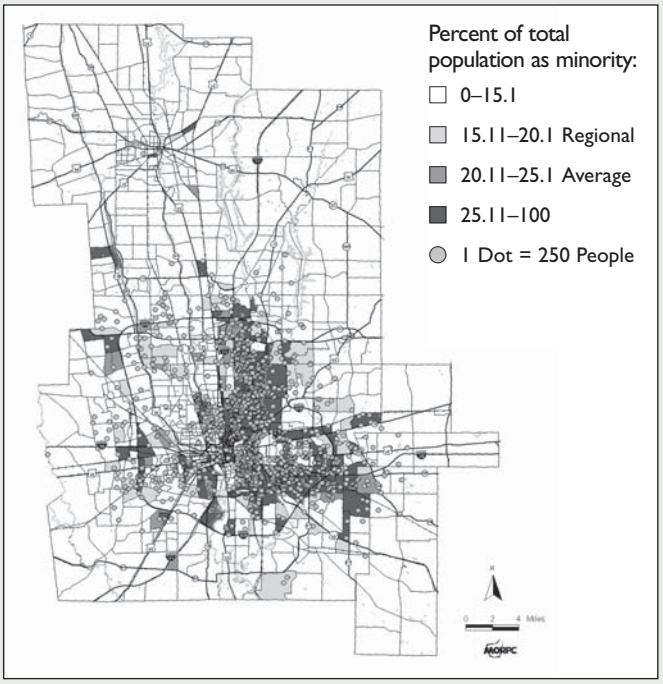
Average number of jobs within 20-minute peak-period drive time. (TIP = Transportation Improvement Plan; T-Plan = Regional Transportation Plan.)

"If we've made a reasonable effort to communicate, but people don't participate, at least we've provided the opportunity," says MORPC Planner Bernice Cage. "Some years ago, we won a lawsuit on a highway project because we could document all our outreach efforts, showing that we made a good-faith effort to seek everyone's input."

By using these measurements and working to increase feedback for the planning process, MORPC was able to demonstrate that the proposed transportation projects in the Regional Transportation Plan and Transportation Improvement Program would not have disproportionately adverse impacts on the environmental justice population groups. The analysis also indicated that the benefits of the transportation investments were distributed proportionately among the target and nontarget groups.

MORPC has identified some limitations to the measurements—such as outdated census information, inability to gain current information efficiently from local sources, and the lack of comprehensive data for other measures. However, the measurements have provided a benchmark for future analyses, and MORPC believes that the subjective measures will be more quantitatively defined as the agency gains experience with the process.

The Federal Transit Administration, the Ohio Department of Transportation, and the Federal Highway Administration have commended MORPC for adapting "existing applications to better understand the unique needs of various socioeconomic groups …[and] then using the information to identify and meet with community leaders to develop avenues for discussion on the planning process."[4]



Distribution of Columbus, Ohio, region's minority population by traffic zone, 2000. SOURCE: U.S. Bureau of the Census

[4] www.fhwa.dot.gov/environment/ejustice/case/index.htm/.

Louisville Transit Outreach

Building Consensus, Defusing Controversy

NINA WALFOORT

The Transit Authority of River City (TARC), Louisville, Kentucky, has made public involvement and environmental justice the cornerstones of an effort to develop a light rail system for Greater Louisville. TARC initiated its rail planning efforts, dubbed Transportation Tomorrow (T^2) in 1996. T^2 has established citizen and public agency advisory and policy groups and has developed an extensive outreach program to facilitate discussion of the issues and to achieve public support.

"A well-conceived and well-implemented public involvement program leads to better decisions," says TARC Executive Director J. Barry Barker. "When all stakeholders are included in the decision-making process, environmental justice and other issues are essentially resolved before they become matters of dispute or litigation."

Inclusiveness is the hallmark of the T^2 outreach. Everyone who wants to participate in the T^2 work group is welcome to attend meetings and to voice opinions. Technical experts and citizens tackle project issues together, learning from each other. Decisions are reached by consensus, not resolved by vote. Those who disagree with decisions are encouraged to share their views. TARC addresses the concerns wherever possible, and if a concern cannot be resolved, provides a complete explanation.

Since 1997, the TARC T^2 team has held 282 community meetings, 132 meetings with public agencies, and 162 interviews with key leaders and stakeholders. Input from these meetings has shaped the project in significant ways:

◆ TARC signed a partnership agreement with two minority neighborhoods in the study area—Smoketown and Shelby Park—to ensure that a detailed neighborhood plan, increased neighborhood employment, and an economic development strategy would result from the project. TARC also agreed to work with the neighborhoods to address such issues as parking, property value increases, and taxes.

Environmental justice consultant and transit authority project manager collect input for the Transportation Tomorrow (T^2) project from residents of Americana Apartments, a multinational community in Louisville, Kentucky, as part of a series of focus groups on environmental justice issues.

Residents of the Louisville neighborhoods of Smoketown and Shelby Park review design concepts for a transit-oriented development project related to the proposed T^2 light rail system in February 2002.

◆ TARC hired a community and economic development manager to work with the Shelby Park and Smoketown neighborhoods to promote economic development and to resolve urban design issues to the benefit of the community. T^2 is helping all the neighborhoods along the 15-mile route to establish guidelines that will ensure that low-income residents will not be displaced by possible increases in land values along the rail line.

◆ TARC has worked closely with the Toonerville neighborhood, which had expressed adamant resistance to locating the rail line on streets in front of homes. Several meetings were convened to reach a compromise—the rail line will pass behind the homes on an Interstate right-of-way instead of running along one of Toonerville's main streets as originally proposed. The T^2 urban designers are working with Toonerville residents to clean up the neglected right-of-way, investing in landscape and design improvements. After initial charges that TARC had created "an atmosphere of despair," the Toonerville neighborhood, in a September 2001 letter agreeing to support the light rail line, concluded, "You all deserve to be congratulated for taking to heart the public's input."

This open and proactive approach has made the T^2 community involvement process a model for the region. The local newspaper, *The Courier-Journal*, commended TARC for its outreach in a September 1999 editorial, and the weekly publication, *Business First*, headlined an October 1999 editorial, "Light-Rail Plan Shows Way To Seek Input." In addition, the Federal Highway Administration and Federal Transit Administration have noted TARC's "masterful job of getting and keeping the public involved in [the] Transportation Tomorrow initiative" and have recommended that the regional metropolitan planning organization apply the TARC model.

The author is T^2 Outreach Manager, Transit Authority of River City, Louisville, Kentucky.

Measuring the Effectiveness of Public Involvement Approaches

JOSEPH S. SZYLIOWICZ

The author is Founder, Intermodal Transportation Institute, and Professor, Graduate School of International Studies, University of Denver, Colorado.

Any attempt to create a sustainable transportation system must examine the ways that transportation policies and projects are designed and implemented. The traditional patterns of decision making often do not result in policies and projects that promote sustainability. Practitioners and scholars therefore have attempted to develop new approaches, most of which have a common element—more effective and meaningful public involvement. The role of the public is critical, since policies cannot be adopted and implemented without popular support.

Despite the general consensus that extensive public involvement is desirable, despite the increased efforts by federal and state officials and administrators, despite the emergence of practitioners and organizations committed to public involvement, and despite significant legislation—such as the Intermodal Surface Transportation Efficiency Act (ISTEA) and the Transportation Equity Act for the 21st Century—few efforts at public involvement have had an impact. As one researcher has concluded, "People are only marginally more able to influence their transportation choices now than they were before the passage of ISTEA" (*1*). The situation in Europe is similar (*2, 3*).

Few have attempted to measure the effectiveness of public involvement efforts. Without rigorous evaluations of public involvement, current practices may continue to waste resources and may fail to promote larger societal goals. Public involvement programs are expensive, requiring investments of human and financial resources.

A systematic evaluation not only assesses the effectiveness and efficiency of an effort but also provides feedback to help in modifying and improving programs or in developing new, more effective programs. If public involvement programs are to promote democratic processes and improve the quality of transportation systems, rigorous evaluation is essential.

Defining Partnerships

Evaluations, however, are problematic. First, there is no consensus on what "public involvement" involves. Public involvement is a complex process that can take many forms and can achieve various ends, but genuine participation requires a partnership between the public and policy makers.

Yet there is no agreement on the role that public involvement should play in the policy process. Many issues are technical and require expert knowledge that the general public does not have. One way of dealing with this issue is to consider the specific roles that key participants can and should play in the planning process. For example, the following responsibilities have been suggested for key players:

◆ Planners—developing and implementing the necessary studies;

◆ Citizens—identifying the goals and objectives, defining the problem with the aid of the transportation agency's staff, and developing and evaluating alternatives; and

◆ Officials—decision making, implementing, monitoring, providing feedback, and determining goals and objectives (*4, 5*).

For this approach to be effective, planners, citizens, and officials must understand their roles and must have the necessary values and knowledge to fulfill their responsibilities.

Overcoming Barriers

Many barriers must be overcome. Some barriers may be within the organization that is carrying out the public participation process. For example, the organization must be committed to the process, and this is not always the case (*6, 7*). To implement meaningful public involvement, the organization must allocate sufficient funds, as well as personnel with the necessary skills (*8*). Even then, the project can fail for such reasons as poor planning and program design, a lack of incentives, conflicting goals and norms, and different perceptions by public and private participants.

In addition, the tools and techniques of rational decision making can be abused to limit participation (*9, 10*). An appropriate organizational culture and resources are necessary for any approach to public involvement to be effective and for any evaluation to be useful.

Reviewing the Literature

Practitioners committed to public involvement can find only limited guidance in dealing with these difficulties, despite a rapidly proliferating literature. A useful publication is the National Cooperative Highway Research Program's *Innovative Practices for Multimodal Transportation Planning for Freight and Passengers* (*11*), which contains several case studies. The Transportation Research Board's (TRB's) Committee on Public Involvement in Transportation also has published significant cases and studies, including a valuable overview (*7*).

But much of the transportation-related literature remains primitive in theoretical and conceptual terms and is parochial in scope, consisting of either descriptive and anecdotal case studies or guidebooks and manuals to assist public officials in developing policy with the public. Little attention has been paid to related work in such fields as environmental decision making, technology assessment, risk analysis, public administration, and nuclear power. Moreover, most of the literature is based on American cases and techniques, with little attention to developments in Europe, which include innovative work, especially on mechanisms—that is, the general approach to involving the public.

European practitioners and scholars have produced some interesting comparative studies (*12, 13*). Barlow's study is noteworthy for focusing on public participation in the urban sectors of the United Kingdom, France, and Sweden in the context of the relationship between government structures and the policy process (13). Also useful is Seargeant and Steele's *Consulting the Public: Guidelines and Good Practice*, which draws lessons for practitioners from specific cases, matching an organization's goals to specific approaches and then evaluating the outcomes (*14*).

Nevertheless, the literature provides only limited insights for practitioners interested in measuring outcomes and improving processes. An assessment in a recent work on participatory mechanisms for environmental decision making also applies to the literature for transportation:

> First, … most of the recent literature has focused either on specific case studies or manuals for conducting practical applications. Second, the traditional forms of public participation—hearings and advisory committees—certainly have advantages, but are not able to fulfill popular demands for widespread and meaningful public participation in environmental decision making. Third, there is a perceived need for new models of participation. Fourth, a systematic framework for evaluation on any but the most abstract level is completely absent. This is needed if those who implement participation are to appropriately match purpose to method. (*15*)

Identifying Mechanisms

The development of an evaluative framework requires a focus on mechanisms, not techniques. Mechanisms developed in the United States and Europe include negotiated rule making, citizen review panels, participatory analysis, consensus conferences, science shops,[1] interpretive panels, and community risk analysis. One study identifies eight mechanisms, each of which may involve various techniques (*16*). The mechanisms differ in terms of (*a*) the kinds of participants involved, (*b*) the recruitment of participants, (*c*) the types of issues addressed, (*d*) purposes, and (*e*) relevance to particular policy situations.

Seargeant and Steele identified 14 methods—mechanisms and techniques—and analyzed each in

[1] A local storefront facility staffed by a technical expert available to answer questions and to provide consultation on a proposed project.

terms of origin, objectives, process, and outcome (*14*). The study found that each mechanism varies in terms of the degree to which it promotes democratic processes, yields decisions of technical merit, and accords legitimacy to the outcome.

Building a Framework

An intellectual base is needed to identify and categorize a method's relevance to transportation policy making or to evaluate a method with normative, instrumental, and substantive criteria. Developing a framework is an important first step in identifying how effective public involvement programs are in furthering the goal of a sustainable transportation system. A framework also will facilitate the development and refinement of programs, enhancing utility and effectiveness, and demonstrating worth in terms of the human and financial resources invested.

Nonetheless, a second stage is necessary—linking the mechanisms to specific problems and issues. Transportation decision making covers a range of activities, issues, and levels. Therefore it is necessary to categorize the planning process and to apply specific criteria to relate activities to particular mechanisms.

There are several ways of approaching the task—such as focusing on the definition of the problem, the consensus on goals and means, the intensity of the conflict, or the problem's complexity (*15, 16*). Another possible approach is to differentiate between project planning and project decision making. Planning decisions can be subdivided into commonly used categories such as corridor planning, major investment studies, and systems planning at the local, state, regional, or national level, and projects can be categorized by size and potential impacts—for example, megaprojects, midsize projects, and small projects.

The key question is, What public involvement mechanisms are most amenable to genuine, constructive participation in transportation decision making? The answer must (*a*) identify public involvement practices; (*b*) develop criteria to evaluate the practices; (*c*) develop a typology of transportation policies and projects; (*d*) analyze the case material to ascertain relationships between policy and project types and appropriate mechanisms; and (*e*) undertake additional research to fill the gaps. From the outset, a public involvement project should have a built-in, carefully designed, evaluative component to measure effectiveness.

Evaluating Efforts

Developing and implementing a measure is not easy. As Beierle has observed, "no consistent method has emerged for evaluating the success of individual processes or the desirability of the many participatory methods" (*17*).

In the field of transportation, an evaluation often means a set of conclusions drawn by the sponsoring agency or consultants. This type of evaluation usually measures success either by the degree to which the sponsoring agency's activity is viewed favorably by the public or by the extent to which the agency's program or plan proves acceptable to stakeholders. For example, the U.S. Department of Transportation hailed the "positive results" of the Little Rock, Arkansas, Metroplan (*18*), although some stakeholders had alleged that the process only yielded the results desired by the middle class (*19*).

A second common approach is for evaluations to focus on the degree of success achieved by the process itself. The TRB Committee on Public Involvement sponsored the development of an innovative self-evaluation tool by its Subcommittee on Performance Measures in Public Involvement, chaired by David Boyd. Posted on the committee's website for practitioners to fill out,[2] the self-assessment instrument asks such fundamental questions as: Are the public participation programs effective? How can success be measured? Can the costs be justified?

The TRB committee's questionnaire consists of 14 indicators and 32 metrics focused on two general sets of variables—the first dealing with the nature of the process (openness, representation, learning, impact, etc.) and the second with the direct and indirect costs. This pioneering project meets an important criterion for evaluation studies—measuring tangible outcomes in a coherent and structured manner.

Elaborating the Criteria

Although process and agency issues are important, larger public issues must be addressed. Selecting the appropriate mechanism for a particular policy or project requires explicit evaluation criteria. However, only a few have attempted to elaborate or to apply criteria.

One study provides guidelines for measuring a mechanism's consonance with democratic theory (*20*). Using a framework based on Habermas's theory of communicative action, another evaluation of eight European and U.S. mechanisms for environmental decision making offers a preliminary attempt at matching mechanisms to environmental problems (*15*). Along the same lines, an evaluation of the appropriateness of three European mechanisms for technology assessment concluded that each was relevant for a different kind of problem (*16*).

The framework developed by Beierle for environmental decisions explicitly links evaluative criteria to public participation mechanisms, outlining the degree to which various types of participatory mechanisms

[2] www.ch2m.com/trb_pi/assessmenttool.doc/.

achieve specific societal goals, including public education, incorporating public values into the decision process, improving the decision, reducing conflict, and increasing public trust (*17*). Beierle identifies sets of mechanisms by the direction of information flow, the stakeholder interactions, the types of representation, and the role accorded to the public.

The first set of mechanisms includes surveys, focus groups, and public comments—the information flows to the agency. The mechanisms in the second set provide information to the public—for example, public hearings and public educational efforts. The third category encompasses the many forms of citizen advisory committees, including citizen juries. As Beierle points out, this approach points to a need for additional research, notably into the relationship between mechanisms and issues.

Pursuing the Goals

Public participation is not a panacea for the difficulties in achieving sustainable transportation systems. Any decision process has inherent problems, and even a good process may not produce a good outcome. Implementation may be poorly conceived or badly executed, or some unexpected event may produce adverse effects.

The tendency may be to select high-cost projects or policies that minimize the impacts on communities and that may not conform to professional analyses and judgments. Conflict lurks in the background of any decision, and the decision-making process itself may intensify and broaden a conflict.

But despite these caveats, public involvement is here to stay. Europeans and Americans alike are demanding a voice in projects and policies that have an impact on their lives. A sustainable transportation system requires widespread, genuine public involvement. This challenge can be met only by learning how to use available mechanisms in the most productive ways and to develop new mechanisms that enhance the quality of transportation decision making.

The place to begin is with rigorous evaluations of current practice, to identify the most effective ways of minimizing conflict, enhancing the quality of transportation decisions, and restoring the public's trust in government institutions. Democracy and sustainability require no less.

References

1. Khisty, C. J. Education and Training of Transportation Engineers and Planners Vis-à-Vis Public Involvement. In *Transportation Research Record 1552*, TRB, National Research Council, Washington, D.C., 1996, pp. 171–176.
2. Bruzelius, N., B. Flyvbjerg, and W. Rothengatter. Big Decisions, Big Risks: Improving Accountability in Mega Projects. *International Review of Administrative Sciences,* Vol. 64, No. 3, 1998, pp. 423–440.
3. Dron, D., and M. C. deLara. *Pour une Politique Soutenable des Transports*. Documentation Française, Paris, 1995.
4. Dickey, J., et al. *Metropolitan Transportation Planning*. McGraw-Hill Book Company, New York, 1983.
5. Hoch, C. J., L. C. Dalton, and F. S. So. T*he Practice of Local Government Planning*. International City–County Management Association, Washington, D.C., 2000.
6. Schreibman, L. Are We There Yet? Is There REAL Public Participation Under ISTEA? *Planners Network Online,* No. 125, 1997.
7. O'Connor, R., M. Schwartz, J. Schaad, D. Boyd. *State of the Practice: White Paper on Public Involvement*. TRB Committee on Public Involvement in Transportation, www.ch2m.com/trb_pi/default.asp/.
8. Khisty, C. J., and S. Leleur. Societal Planning: Identifying a New Role for the Transport Planner, Parts 1 and 2. *Innovation,* Vol. 10, No. 1, 1997, pp. 17–36.
9. Hummel, R. P. *The Bureaucratic Experience*. St. Martin's Press, New York, 1982.
10. Kweit, M. G. and R. W. Kweit. The Politics of Policy Analysis. In *Citizen Participation in Public Decision Making* (J. DeSario and S. Langton, eds.). Greenwood Press, New York, 1987.
11. *NCHRP Report 404: Innovative Practices for Multimodal Transportation Planning for Freight and Passengers*. TRB, National Research Council, Washington, D.C., 1998.
12. Johnson, W. C. *Citizen Participation in Local Planning in the UK and USA*. Pergamon Press, Oxford, United Kingdom, 1984.
13. Barlow, J. *Public Participation in Urban Development: The European Experience*. Policy Studies Institute, London, 1998.
14. Seargeant, J., and J. Steele. *Consulting the Public*. Policy Studies Institute, London, 1998.
15. Renn, O., T. Webler, and P. Wiedemann. *Fairness and Competence in Citizen Participation*. Kluwer Academic Publishers, Dordrecht, Netherlands, 1995.
16. Fixdal, J. Public Participation in Technology Assessment. Ph.D. dissertation (TMV No. 37–98), University of Oslo, Norway, 1998.
17. Beierle, T. C. Using Social Goals to Evaluate Public Participation in Environmental Decisions. *Policy Studies Review,* Vol. 16, No. 3–4, pp. 75–103, 1999.
18. Metroplan (Little Rock, Arkansas): Pouring Water on Dry Ground. U.S. Department of Transportation, 1997.
19. Shore, W. B. Public Participation: Where It Stands; Where It Should Be Going. *IPA Report,* 1998.
20. Laird, F. Participatory Analysis, Democracy, and Technological Decision Making. *Science, Technology, and Human Values,* Vol. 18, Summer 1993, pp. 341–361.

Websites

Fundación Ambiente y Ricursos Naturales (FARN), www.farn.org.ar/docs/pp/en_index.html/.

International Association for Public Participation, www.iap2.org/.

Institute for Public Policy Research, Public Involvement Program, www.ippr.org.uk/home.

SD Gateway, Public Participation Sector, www.sdgateway.net/topics/241.htm/.

TRB Committee on Public Involvement, www.ch2m.com/trb_pi/default.asp/.

TRB Meetings 2002

July

7–9 Joint Summer Meeting and Conference of the Committees on Energy, Air Quality, and Alternative Fuels
Port Huron, Michigan
Kimberly Fisher

7–10 Transportation-Related Noise and Vibration Summer Meeting
Austin, Texas
Kimberly Fisher

8–10 Hydrology, Hydraulics, and Water Quality Committee Meeting
Croabas, Puerto Rico
Stephen Maher

11–13 Joint Summer Meeting of the Planning, Economics, Finance, Management, Freight, and Transit Committees
Providence, Rhode Island
Kimberly Fisher

14–16 1st International Conference on Bridge Maintenance, Safety, and Management*
Barcelona, Spain
Frank Lisle

21–23 Freeway Operations and Traffic Signal Systems Midyear Meeting
Salt Lake City, Utah
Richard Cunard

21–24 Roadside Safety Features Midyear Meeting
Pacific Grove, California
Stephen Maher

25–26 Multipurpose Transportation Applications of Uninhabited Aerial Vehicles (UAVs) Conference*
Cambridge, Massachusetts
Thomas Palmerlee

28–Aug. 1 Photogrammetry, Remote Sensing, Surveying, and Related Automated Systems Meeting
Cody, Wyoming
Thomas Palmerlee

28–Aug. 1 Landscape and Environmental Design Midyear Meeting
Topeka, Kansas
Stephen Maher

29–Aug. 1 Committee on Environmental Analysis in Transportation Summer Meeting
Durham, New Hampshire
Kimberly Fisher

30–31 Safety-Conscious Planning Leadership Conference (by invitation)*
Washington, D.C.
Richard Pain

30–Aug. 1 Utilities Committee Meeting
Marco Island, Florida
Stephen Maher

August

2–6 7th International Conference on Application of Advanced Technology in Transportation*
Cambridge, Massachusetts
G. P. Jayaprakash

4–9 T2002: 16th International Conference on Alcohol, Drugs, and Traffic Safety*
Montreal, Canada
Richard Pain

13 Design and Construction of Transportation Facilities in Melange: Block in Matrix
San Luis Obispo, California
G. P. Jayaprakash

17–22 9th International Conference on Asphalt Pavements*
Copenhagen, Denmark
Stephen Maher

17–22 National Community Impact Assessment Conference
Madison, Wisconsin
Claire Felbinger

18 DAWG Forum on Pavement Performance Data Analysis
Copenhagen, Denmark
A. Robert Raab

September

3–6 Pro-Bike, Pro-Walk Conference
St. Paul, Minnesota
Richard Pain

8–11 Providing a Transportation System to Support Smart Growth: Issues, Practice and Implementation
Baltimore, Maryland
Kimberly Fisher

10–12 Human Factors in Railroad Operation Safety
Irvine, California
Richard Pain

18–20 12th International Workshop on Future Aviation Activities (by invitation)
Washington, D.C.
Joseph Breen

Additional information on TRB conferences and workshops, including calls for abstracts, registration and hotel information, lists of cosponsors, and links to conference websites, is available online (www.TRB.org/trb/calendar). Registration and hotel information usually is available 2 to 3 months in advance. For information, contact the individual listed at 202-334-2934, fax 202-334-2003, or e-mail lkarson@nas.edu/.

*TRB is cosponsor of the meeting.

Innovative Management System for Rock Cuts

Assessing Roadway Hazards in New Hampshire

MARC FISH AND RICHARD LANE

The New Hampshire Department of Transportation has developed a geographic information system to track and centralize statewide rock cut data, assess roadway hazard risk from rock falls, and prioritize rock cut projects according to risk-reduction and cost–benefit scenarios. The analytical capabilities of the system assist in informed decision making on where and how to spend limited construction funds.

Fish is Geologist, and Lane is Research Geologist, Bureau of Materials and Research, New Hampshire Department of Transportation, Concord.

The New Hampshire Department of Transportation (DOT) initiated its first hazard survey of rock cuts in 1975. Since then, the program has more than doubled in size and includes four different rock fall hazard ratings. The program has developed a geographic information system (GIS) to access and analyze all the data.

Problem

New Hampshire DOT's Engineering Geology Unit stored written reports, photographs, structural data, and other information on most of the rock cuts within the state on a computer database. The inspection reports, however, were scattered. Determining the last inspection of a rock cut and what the conditions were at that time was difficult, requiring a complicated information retrieval process. Revisiting a rock cut and collecting duplicate information was easier, but time-consuming, and resulted in additional cost to the DOT.

Solution

Choosing a System

New Hampshire DOT initiated in-house research to identify how the rock cut information was used. The research indicated a need for a management system that would combine different data types with spatial information and would facilitate the tracking, retrieval, and display of information through a personal computer.

The next phase involved the development of an easily accessible and updatable data management system to combine all the data for the 380 rock cuts in the state. A GIS was chosen to house the management system because GIS increases accessibility of the data to a broader audience and provides the ability to conduct spatial analyses.

The GIS centralizes several types of data: digital photographs, new and historical text data, readings of structural data, and two-dimensional laser profiles. The digital photographs include the cut as a whole and specific problem sections within the cut. The text data include potential instabilities, recommended remedial measures, and hazard assessments.

The structural data can be viewed in text form or in the form of rose diagrams, stereonets, and density plots. The two-dimensional profiles are cross-sectional side views of a rock slope taken at selected locations with a laser-measuring device linked to a handheld computer. The profiles aid in rock cut remediation and can be input into a rock fall simulation program.

Assessing the Hazards

The GIS also contains the hazard assessment of the rock cut—a color code indicating the degree of risk for each rock cut feature. With spatial referencing, data on rock cut features can be correlated, and other data layers—roadways, topographic maps, aerial photographs, town lines, and bedrock geology maps—can show the locations of the rock cuts.

A query-building feature can be used to call up data. The answers are displayed on a map or within the current view of the GIS, providing key pieces of information for rock cut analysis and decision making.

The GIS also can be used to establish rock cut remediation priorities. The estimated cost for the recommended remediation for each rock cut can be compared with the amount of risk reduction associated with the remediation. Remedial rock cut projects can be prioritized statewide using several different risk-reduction and cost–benefit scenarios. The analytical capabilities of the GIS support informed decision making on where and how to spend limited construction funds.

Application

New Hampshire DOT uses the rock cut management system to identify rock cuts that need remediation within the limits of large roadway resurfacing and safety improvement projects. Using the four different rock fall hazard ratings, the GIS determines which rock cuts pose the greatest hazard and identifies the causes.

The potential for a rock fall event and the degree of risk to the traveling public can be computed from the information stored in the GIS. Some of the rock cut laser profiles have identified errors on the project cross-sections, which have led to plan revisions. The structural data and stereonets are used to develop specific guidance on rock cut excavations.

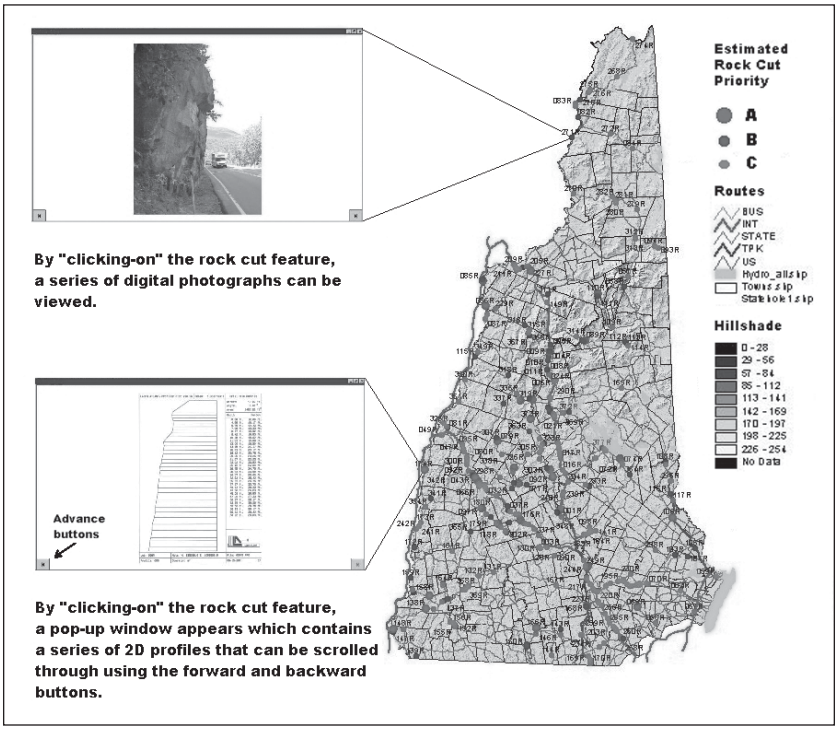
New Hampshire DOT also has used the rock cut management system to maintain rock cut inspection schedules. The GIS analyzes previous inspection dates to assure that all rock cuts are visited within a specified time. As rock cuts are inspected, the system updates the database by adding new records, leaving the previous records as historical data.

Benefits

The rock cut GIS has become a valuable asset management tool, saving time and money. Having the required information—such as past inspection records and photographs—available through the GIS saves hours every day during field inspections. The system also enhances the ability to identify and locate rock cuts that need inspection.

Rock cut work decisions are made with information from the GIS. By using information that is already available, additional visits to a particular rock cut can be reduced or eliminated. Inspection reports, structural data, and two-dimensional profiles are used to develop remedial rock slope measures and to estimate rock quantities and construction costs.

The rock cut GIS has become a valuable tool in the DOT's budgeting and planning process. Rock cut work can be prioritized, and the remedial costs associated with risk reduction can be determined, allowing the most effective use of available design and construction resources.



Screen view of New Hampshire's statewide rock cut management system.

The rock cut management system can save an estimated 2,000 work-hours and $75,000 annually. This time and money savings is comparable to a geologist's annual salary, benefits, and travel expenses for performing rock cut inspections. Through the careful collection and management of rock cut data, a limited staff can sustain a rigorous rock cut inspection schedule while performing other responsibilities and job duties.

For further information contact Marc Fish, Geologist, New Hampshire Department of Transportation, Bureau of Materials and Research, Box 483, Stickney Avenue, Concord, NH 03302-0483 (telephone 603-271-3151, fax 603-271-8700, e-mail mfish@dot.state.nh.us).

EDITOR'S NOTE: Appreciation is expressed to G. P. Jayaprakash, Transportation Research Board, for his efforts in developing this article.

Suggestions for "Research Pays Off" topics are welcome. Contact G. P. Jayaprakash, Transportation Research Board, 2101 Constitution Avenue, NW, Washington, DC 20418 (telephone 202-334-2952, e-mail gjayapra@nas.edu).

David J. Forkenbrock

University of Iowa

David J. Forkenbrock, Director, Public Policy Center, and Professor, Graduate Program in Urban and Regional Planning and Department of Civil and Environmental Engineering, University of Iowa, centers his teaching and research around the notion that transportation can be an effective tool for achieving public policy objectives such as economic development, positive influence on urban and land use patterns, and social equity. He also incorporates his interest and experience in transportation finance.

In the 1980s, Forkenbrock designed the Revitalize Iowa's Sound Economy (RISE) program mandated by the state legislature. "RISE has had an annual budget of about $35 million, but the program has been credited with attracting upwards of $2 billion in private capital investments and stimulating the creation of thousands of jobs," he reports. Forkenbrock also designed a similar program, the Oregon Opportunity Fund.

"Transportation planning and policy analysis are highly interdisciplinary....I greatly enjoy fostering this sort of research and believe it can materially enhance the quality of people's lives."

Later in the 1980s, with funding from the Federal Highway Administration (FHWA), Forkenbrock developed a framework to account for the effects of economic development when evaluating large-scale highway projects. His methodology was applied to three of the highway corridors identified as nationally significant in the Intermodal Surface Transportation Efficiency Act of 1991. A key innovation was his distinguishing relocated jobs and other economic activity from actual new growth due to lower transportation costs.

"In my work on urban land use patterns I seek to develop a practical method for predicting how a given transportation investment will influence emerging land use patterns," says Forkenbrock. "Rooted in transportation economics, my approach enables changes in relative accessibility to be predicted; relative accessibility, in turn, affects which land uses will occupy each location. Thus, one can blend facility attributes with land market dynamics to influence urban form in a positive way."

In 1987, Forkenbrock organized the Public Policy Center at the University of Iowa as an interdisciplinary research unit. Faculty, staff, and students from several fields explore transportation planning, economics, engineering, and human factors issues.

"Transportation planning and policy analysis are highly interdisciplinary. Each team member has a unique educational and experiential background that enables him or her to make a special contribution," Forkenbrock observes. "I greatly enjoy fostering this sort of research and believe it can materially enhance the quality of people's lives."

Forkenbrock's recent work on National Cooperative Highway Research Program (NCHRP) Project 25-19 led to the development of *NCHRP Report 456: Guidebook for Estimating the Social and Economic Effects of Transportation Projects,* which contains 52 different methods, tools, and techniques to forecast the impacts on accessibility, aesthetics, community cohesion, economic development, noise, property values, and other areas. Through the follow-up NCHRP Project 8-41, Forkenbrock is exploring methods for predicting the environmental justice effects of a transportation project.

One of Forkenbrock's more recent cutting-edge projects involves designing a completely new approach to assessing road user charges for FHWA and 15 state departments of transportation. He explains, "These agencies recognize that emerging hybrid fuel and hydrogen fuel-cell vehicles will not pay much or any motor fuel taxes. Using Global Positioning Systems and geographic information systems technology and a simple onboard computer, we are developing a practical mileage-based user charge system."

He adds, "Road user finance is at a crossroads. The historic mainstay, motor fuel taxes, cannot be expected to be very productive in a few years when alternative propulsion systems become commonplace. The change will not occur suddenly, but it will happen—we need to develop practical, fair, and stable new approaches."

Active as a member or chair of many TRB committees and task forces for more than 20 years, Forkenbrock currently serves on the Taxation and Finance and the Transportation and Economic Development committees, and on the Task Force on Environmental Justice in Transportation. He chairs the Committee on Transportation Economics.

Forkenbrock received the Year 2000 Mid-Continent Award for Transportation Excellence from the Iowa Department of Transportation and Iowa State University. In 2001, he was selected to be a National Associate of the National Academies and was elected to the American Institute of Certified Planners College of Fellows. He earned his bachelor's degree in architecture from the University of Minnesota, a master's degree in urban planning from Wayne State University, and a doctorate in urban and regional planning from the University of Michigan.

Jane C. Stutts

Highway Safety Research Center, University of North Carolina

"Transportation safety research is truly a multidisciplinary field," observes Jane C. Stutts, Manager of Epidemiological Studies at the University of North Carolina's Highway Safety Research Center (HSRC), Chapel Hill. With multidisciplinarity comes teamwork, a hallmark of HSRC, which Stutts describes as "an assemblage of engineers, social psychologists, statisticians, computer analysts, technology specialists, research librarians, and support staff working together to create successful project outcomes."

For Stutts, who has been at HSRC for 26 years, success means "putting research into practice—this is one thing that makes the field so appealing to young people." She recently has directed projects in a range of topics, including older drivers, pedestrian and bicyclist safety, driver distraction (including cell phone use), drowsy driving, and novice driver education, "all of which have important implications for educating the driving public and for formulating public policies."

"Putting research into practice … is one thing that makes the field [of transportation safety] so appealing to young people."

"We have the opportunity to influence public policy in a way that can help reduce crashes and save lives, and improve the quality of people's lives," Stutts notes. "There are few other areas where research can have such immediate and far-reaching impact."

The researcher's original vision and training, however, were to be in early childhood education, but missing out on teaching positions after a move to Chapel Hill, she decided to take biostatistics and computer courses for work in the research community. She hoped to interview at HSRC for a programming position but was hired as a research associate.

"I realized early on that if this was going to be my career, then I needed to further my education," Stutts recalls. She postponed educational plans while caring for two young daughters and then entered the University of North Carolina's doctoral program in epidemiology.

"There was not one course I took that did not relate directly to my research at HSRC," Stutts recalls. "In my research methods course, I wrote a proposal that was incorporated later into a grant application; for my cardiovascular epidemiology class, I wrote a paper on medical conditions and driving; for my occupational epidemiology class, I studied farm vehicle crashes and injuries; and in my statistics courses I always had real data that was waiting to be analyzed."

Her dissertation, on identifying older drivers at increased risk of crashing, similarly developed from an HSRC project funded by the Centers for Disease Control and Prevention. Her doctoral studies also opened contacts in the university's schools of public health, nursing, medicine, and pharmacy.

"One of the greatest challenges facing transportation research today is how to effectively join our efforts with those of public health professionals to create communities that foster increased mobility options," Stutts comments. "The concept of healthy transportation environments includes opportunities to drive but also the opportunity to walk, bicycle, or use public transportation."

But the multidisciplined researcher also points out, "It is difficult keeping up in so many areas—it's both challenging and at times frustrating. At the same time, there is always something new to learn, new ideas and new ways of looking at things, new people to talk with and learn from."

Much published, Stutts has received three Best Scientific Paper Awards from the American Association for the Advancement of Automotive Medicine and has served as a member of the group's Scientific Program Committee. She has been associated with the journal *Accident Analysis and Prevention* as book review editor (1980–1983) and as a member of the editorial advisory board since 1998.

For the Transportation Research Board, Stutts has contributed to the work of the Committee on Bicycling since 1987, including two consecutive terms as chair (1993–1999), and is a member of the Committee on Safe Mobility of Older Persons and the Transit Cooperative Research Program project panel on Transit Operator Fatigue: A Toolbox for U.S. Transit Operators. Previous involvement includes membership on the Technical Activities Division Group 3 Council (Operation, Safety, and Maintenance of Transportation Facilities), the Committee on Motorcycles and Mopeds, and the Steering Committee for the Conference on Transportation in an Aging Society: A Decade of Experience.

A member of Phi Beta Kappa and of the honorary mathematics society Pi Mu Epsilon, Stutts earned a bachelor's degree in psychology at Wake Forest University and a master of education degree at Georgia State University. She points to another advantage of her multidisciplinary endeavors: "One of the greatest pleasures of my work comes from the people I have had the opportunity to work with."

Experts Advise Government on Combating Terrorism

In the aftermath of September 11, the National Academies, TRB's parent organization, established a distinguished committee to advise the government on how best to marshal the nation's science and technology capabilities to combat terrorism. The Committee on Science and Technology for Countering Terrorism, headed by Lewis M. Branscomb and Richard D. Klausner, consists of members with a wide range of backgrounds, from public health and nuclear technology to transportation systems and national security (see box, page 45).

Former U.S. DOT Deputy Secretary Mortimer L. Downey, a member of the committee, chairs a special subcommittee of experts in transportation management, operations, research, and security. The 17-member transportation subcommittee (see box, page 45), managed by TRB, will offer advice on using the nation's science and technology capabilities to strengthen security in the transportation sector. The subcommittee is paying particular attention to the new Transportation Security Administration and its prospective role in devising effective security systems for all transport modes and serving as a focal point for security-related research and technology development.

PHOTO BY JAMES R. TOURTELLOTTE

U.S. Customs Blackhawk patrols the coastline of Southern Florida.

The subcommittee's report will include recommendations on the kinds of research and development that deserve early attention and on ways to ensure that this critical work gets done. The report will be published as part of the full committee's report, scheduled for release in June 2002, and TRB will publish it concurrently in its Special Report series.

Cooperative Research Programs News

New Projects, New Proposals

The American Association of State Highway and Transportation Officials' (AASHTOs') Standing Committee on Research (SCOR) met in March to select the recommended projects for the National Cooperative Highway Research Program's (NCHRP's) Fiscal Year 2003 program. From a list of 155 candidates, SCOR selected 42 new projects and recommended the continuation of 17 projects. Costs for new and continued projects total $25 million.

Subject to the approval of AASHTO's Board of Directors and acceptance by the National Academies, TRB will form individual panels of experts to address each of the recommended projects. Panels will meet throughout summer 2002 and will issue requests for proposals. TRB's website (www4.trb.org/trb/crp.nsf/) posts project lists and offers automatic notification of postings.

Administered by TRB, NCHRP is supported on a continuing basis by funds from participating member departments of AASHTO, with the cooperation and support of FHWA. NCHRP is an applied contract research program committed to providing solutions to operational problems facing highway and transportation engineers and administrators.

NCHRP Hosts Peer Exchange

NCHRP conducted its first peer exchange in March. The concept of the peer exchange originated in the Intermodal Surface Transportation Efficiency Act of 1991, which required each state DOT to conduct regular reviews of its research and technology (R&T) program. According to FHWA regulations, states should conduct reviews by inviting a group of peers from R&T programs in other state DOTs, FHWA, and other research agencies to visit the host agency and discuss its policies and procedures.

Many participants in state DOT peer exchanges thought that the concept could also apply to NCHRP. "We've heard very positive comments from participants in other peer exchanges, and we thought we could learn a lot from the experience," noted TRB Cooperative Research Programs Director Bob Reilly.

The NCHRP peer exchange team was chaired by Dave Huft, Research Manager of South Dakota DOT, and Chair of the AASHTO Research Advisory Committee. He led a team of nine other participants from state DOTs, universities, FHWA, and transportation associations. The team met with TRB staff for two and a half days, discussing issues from program development and project management to information dissemination and implementation of research results. During one session, several NCHRP contractors shared their opinions of the program.

"We were very pleased with the outcome," said Reilly. "Through thorough and detailed discussion, we came up with a list of 26 action items for NCHRP—adjustments to the way we do business that will make this program more effective and efficient."

For further information contact Christopher Hedges, TRB (telephone 202-334-1472, e-mail chedges@nas.edu).

National Academies Committee on Science and Technology for Countering Terrorism

Lewis M. Branscomb, Harvard University, Cochair
Richard D. Klausner, The National Academies, Cochair
John D. Baldeschwieler, California Institute of Technology
Barry R. Bloom, Harvard School of Public Health
L. Paul Bremer, Marsh Crisis Consulting
William F. Brinkman, Lucent Technologies
Ashton B. Carter, Harvard University
Charles B. Curtis, Nuclear Threat Initiative
Mortimer L. Downey, PBConsult
Richard L. Garwin, IBM, Thomas J. Watson Research Center
Paul H. Gilbert, Parsons Brinckerhoff International, Inc.
M. R. C. Greenwood, University of California, Santa Cruz
Margaret A. Hamburg, Nuclear Threat Initiative
William Happer, Princeton University
John L. Hennessy, Stanford University
Joshua Lederberg, The Rockefeller University
Thomas C. Schelling, University of Maryland
Maxine F. Singer, Carnegie Institution of Washington
Neil J. Smelser, University of California, Berkeley
Philip M. Smith, McGeary & Smith
P. Roy Vagelos, Merck & Co., Inc. (retired)
Vincent Vitto, The Charles Stark Draper Laboratory, Inc.
George M. Whitesides, Harvard University
R. James Woolsey, Shea & Gardner

Subcommittee on Transportation
Mortimer L. Downey, PBConsult, Chair
H. Norman Abramson, Southwest Research Institute
Lisa M. Bendixen, Arthur D. Little, Inc.
Anthony J. Broderick, Independent Consultant
Noel K. Cunningham, Port of Los Angeles
Thomas G. Day, U.S. Postal Service
John J. Fearnsides, George Mason University
Stephen E. Flynn, U.S. Coast Guard and Council on Foreign Relations
Francis B. Francois, American Association of State Highway and Transportation Officials (retired)
Ernest R. Frazier, National Railroad Passenger Corporation
Robert E. Gallamore, Northwestern University
Henry L. Hungerbeeler, Missouri Department of Transportation
Brian M. Jenkins, RAND Corporation
Daniel Murray, American Trucking Associations Foundation
Edmond L. Soliday, United Airlines (retired)
Richard A. White, Washington Metropolitan Area Transit Authority
James A. Wilding, Metropolitan Washington Airports Authority

Developing Tools To Improve Asset Management

Transportation agencies wishing to improve the management of a wide range of assets may be constrained by analytic limitations of their legacy management systems and existing business practices. Management systems previously put in place often lack decision-support capabilities such as economic optimization of investment alternatives, customized decision rules, or estimates of costs and benefits accruing to customers. Current systems procedures in planning, program development, and program delivery may not be geared to investigation of the full range of investment options or to the analyses needed to compare and conduct tradeoffs among alternatives. While initial steps already may have been taken to define performance measures, some agencies may lack the capability to conduct trade-off analyses for different investment levels.

Cambridge Systematics, Inc., has been awarded a $750,000, 30-month contract (NCHRP Project 20-57, FY 2002) to develop user-friendly analytical tools for adaptation and use by state DOTs and other transportation agencies that will improve their ability to identify, evaluate, and recommend investment decisions for managing assets.

The tools should incorporate analyses of the trade-offs associated with (1) different approaches to sustaining an asset through its service life, such as capital improvements versus preventative maintenance treatments; and (2) competing policy objectives such as preservation, mobility, access, safety, and economic development. The primary emphasis should be on the analysis of trade-off decisions within the highway mode, but should also include limited development of tools for making multimodal investment trade-off decisions. The tools should be compatible, to the greatest extent possible, with the existing range of legacy systems (pavement, bridge, and other asset management systems) currently used by state DOTs, and be easily used by practitioners with varying levels of technical capability.

For further information contact Christopher Hedges, TRB (telephone 202-334-1472, e-mail chedges@nas.edu).

Reports Address Highway Security Research

Two contractors' reports, prepared for the AASHTO Security Task Force with funding provided through the National Cooperative Highway Research Program, are available on the AASHTO web site at http://security.transportation.org/community/security/guides.html. *A Guide to Highway Vulnerability Assessment for Critical Asset Identification and Protection* was prepared by Science Applications International Corporation, and *A Guide to Updating Highway Emergency Response Plans for Terrorist Incidents* was prepared by Parsons Brinckerhoff–PB Farradyne.

PHOTO BY JAMES R. TOURTELLOTTE

U.S. Customs Service plays key role in maintaining highway security.

TRB Moves Downtown

On July 19, TRB offices and staff will move to a new location—500 5th Street, NW, Washington, DC 20001. The site is diagonally across from the MCI Center and the Building Museum and is convenient to three Metro stops—Gallery Place/Chinatown, Judiciary Square, and Archives/Navy Memorial.

Staff telephone numbers, fax numbers, and e-mail addresses will remain unchanged. Conference rooms have been available for use in the new building since mid-June. Committee members and guests can park in the building's garage at no charge and sign in as directed by the entrance security attendants.

Geophysics Conference CD-ROM Available

Geophysics 2002—the Second International Conference on Application of Geophysical and Nondestructive Testing (NDT) Methodologies to Transportation Facilities and Infrastructure—was held in Los Angeles, California, in April.

Conference presentations covered various geophysical and NDT methods, including ground-penetrating radar and nondestructive evaluation of foundations, pavement, landslides, and rockfalls. In addition to the technical sessions, 17 workshops provided overviews and details of specific methods. A CD-ROM of papers and abstracts of the various workshops is available from Sarah Skeen, FHWA (telephone 916-498-5023, e-mail sarah.skeen@ fhwa.dot.gov).

The 140 conference attendees represented 8 countries, including the United States. Thirty percent of the participants were from state DOTs. FHWA and California DOT sponsored the conference, with TRB as a cosponsor.

Transit-IDEA Program To Fund Innovative Security Concepts

TRB is accepting proposals under the Transit-IDEA (Innovations Deserving Exploratory Analysis) Program for development of new and innovative concepts and methods for advancing transit practice. Proposals are due September 1, 2002.

The Transit-IDEA panel has added a strategic initiative to encourage proposals that address transit security. The program provides funds for "proof of concept" investigations to demonstrate the validity of unproven concepts and innovative approaches and supports development of concepts or technologies at a critical early stage.

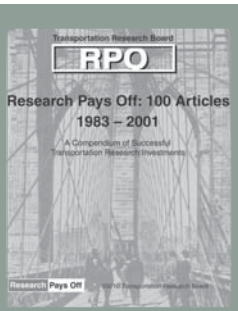
The other high-priority focus area for Transit-IDEA proposals is bus rapid transit (BRT). Two specific research needs are precision docking and wheelchair accommodations for BRT vehicles. The Transit-IDEA panel established the BRT strategic initiative to encourage proposals addressing these needs.

The Greater Cleveland Regional Transit Authority was selected for an $86,950 contract to develop and test a mechanical precision-docking system for BRT vehicles. The objective is to develop a low-cost method to increase efficiency, safety, and passenger access, and to speed the flow of buses on BRT facilities.

Transit agencies, universities, or private companies may submit proposals. Investigators are encouraged to work with transit agencies in developing IDEA proposals and to include participation by transit agencies in testing. Letters confirming agency participation should be included with proposals.

The Transit-IDEA Program, a part of the Transit Cooperative Research Program, is funded by the Federal Transit Administration and is managed by TRB. Additional information on the program and how to submit proposals is available on the IDEA website at www.TRB.org/trb/idea/.

For further information contact Harvey Berlin, TRB (telephone 202-334-2441, e-mail hberlin@nas.edu).



CD-ROM Marks Milestone

Research Pays Off: 100 Articles, 1983–2001, is a compendium of cost-effective solutions to transportation-related problems. This CD-ROM marks the milestone publication of the 100th article in the Research Pays Off series with "Rumble Strips: Finding a Design for Bicycles and Motor Vehicles," in the July–August 2001 issue of *TR News*. The first RPO article, "Kansas DOT Saves Its Bridges… and $1 Million Besides," was published in the January–February 1983 issue.

Compatible with both IBM and Macintosh systems, the CD-ROM includes Adobe Acrobat 5.0 and extensive search functions. Users can search by title, subject area, agency, or keyword. The CD-ROM costs $10.00 and can be purchased through the TRB Bookstore, www.TRB.org (*also see Publications Order Form in this issue*).

TRB Publications

Static and Dynamic Lateral Loading of Pile Groups
NCHRP Report 461
An improved design method for pile groups under static and dynamic lateral loads—associated with earthquakes, hurricanes, and vessel impacts—is presented. The report includes recommendations for estimating the distribution of load to piles in a group and provides guidance on analytical methods for predicting dynamic response. The findings could significantly increase confidence in and reduce the cost of foundations subjected to dynamic loads.

2001; 117 pp.; TRB affiliates, $25.50; TRB nonaffiliates, $34. Subscriber categories: bridges, other structures, and hydraulics and hydrology (IIC); soils, geology, and foundations (IIIA).

Quantifying Air Quality and Other Benefits and Costs of Transportation Control Measures
NCHRP Report 462
The report addresses improvements to the analytical framework for assessing air quality benefits, other benefits, and costs of transportation air quality-control strategies. Short- and long-range improvements that enhance metropolitan planning models are included. The report also explains how a monitoring program can augment quantitative analysis for a fuller understanding of the air quality impacts of transportation control measures. *CRP CD 15*, which contains the report's technical material, is a companion piece.

2001; 61 pp. and CD-ROM; TRB affiliates, $21; TRB nonaffiliates, $28. Subscriber categories: planning and administration (IA); energy and environment (IB).

Track-Related Research, Vol. 1: Broken Rail Detection, Control of Wheel/Rail Friction, Wide-Gap Welding Techniques
TCRP Report 71
The results of three research tasks are discussed. The first task evaluated alternative broken rail detection technologies: three technologies were evaluated for ease of installation, operating reliability, and susceptibility to false and missed events. The second task was a prototype demonstration of a film coating to reduce noise and wear: data from a field demonstration suggested that noise generated from top-of-rail-to-wheel-tread contact was reduced immediately after coating application. The third task studied in-track rail welding: a field test of wide-gap thermite welds in transit tracks was conducted to determine the feasibility of reducing the cost and time of track occupancy in repairing rail or rail weld defects.

2001; 108 pp.; TRB affiliates, $30; TRB nonaffiliates, $40. Subscriber category: special distribution.

Transportation on College and University Campuses
TCRP Synthesis 39
On college and university campuses, land use, travel patterns, density, and centralized policy control often result in innovative solutions designed to provide transit and non-auto solutions to address contemporary mobility issues. Campus communities, from small college towns to large urban areas, have implemented or are studying policies to manage parking, provide transit, and shift mode choice. This synthesis focuses on recent efforts to introduce comprehensive, high-quality public transit services, such as limited access systems, and incorporates insights into lessons learned and issues related to planning, implementing, and operating campus transit systems. Included are the issues of ownership and operation, financing, safety and security, and the role of students.

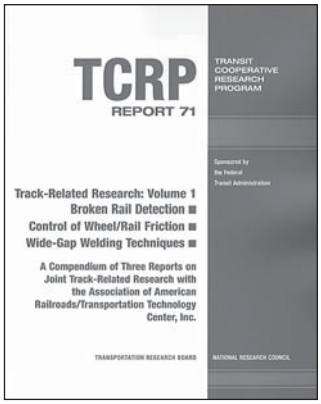
2001; 62 pp.; TRB affiliates, $21; nonaffiliates, $28. Subscriber category: public transit (VI).

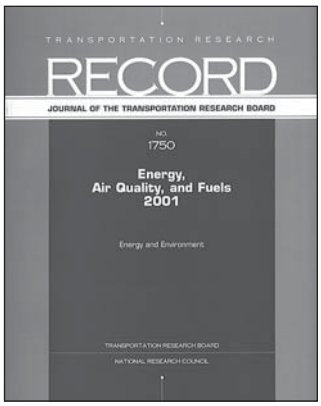
Performance Measures for Research, Development, and Technology Programs
NCHRP Synthesis 300
Performance measures—a component of public and internal accountability—have become increasingly popular within the past decade, particularly among public agencies. This synthesis presents performance measures as they are used to evaluate the effectiveness and impact of transportation research, development, and technology programs. Performance measures examined include cost–benefit analyses, qualitative alignment of proposed projects with organizational strategic goals, and peer assessments. This synthesis serves as a tightly focused complement to *NCHRP Synthesis 238,* and is an outgrowth of the activity involved with *NCHRP Synthesis 280.*

2001; 97 pp.; TRB affiliates, $24.75; nonaffiliates, $33. Subscriber category: planning and administration (IA).

Energy, Air Quality, and Fuels 2001
Transportation Research Record 1750
Part 1 evaluates the fuel economy goals of the Partnership for a New Generation of Vehicles. Part 2, on air quality, covers validation efforts for a comprehensive modal emissions model, soak-time distribution of trips for forecasting mobile source emissions, accelerated vehicle retirement programs, vehicular emission estimation, and more. Part 3, on alternative fuels, looks at shared, small, battery-powered electric cars as a component of transportation system sustainability and effectiveness of policies to promote alternative-fuel vehicles.

2001; 91 pp.; TRB affiliates, $25.50; nonaffiliates, $34. Subscriber category: energy and environment (IB).





Publications Order Form

Please send the following:

Qty	*Title*		*Price* *Nonaffiliates*	*Price* *Affiliates*
_____	*TR News:* ☐ Annual Subscription		$ 55.00[1]	No charge[2]
	☐ Single Copy (TRN___)		9.50	$ 7.13
_____	SHRP Product Catalog		No charge	No charge
_____	Bridge Aesthetics Around the World	☐ Hardcover (BAATHC)	85.00	63.75
		☐ Softcover (BAATSC)	65.00	48.75
_____	Highway Capacity Manual, 2000 ed. (HCM 2000), U.S. customary print version		100.00[3]	75.00[3]
_____	☐ HCM 2000, Metric print version		100.00[3]	75.00[3]
_____	☐ HCM 2000, Multimedia CD-ROM (includes both versions)		90.00	67.50
_____	☐ HCM 2000, U.S. customary print version and CD-ROM		145.00[3]	108.75[3]
_____	☐ HCM 2000, Metric print version and CD-ROM		145.00[3]	108.75[3]

NCHRP REPORTS

_____	461	Static and Dynamic Lateral Loading of Pile Groups (NR461)	34.00	25.50
_____	462	Quantifying Air Quality and Other Benefits and Costs of Transportation Control Measures (NR462)	28.00	21.00

TCRP REPORT

_____	71	Track-Related Research, Vol. 1: Broken Rail Detection, Control of Wheel/Rail Friction, Wide-Gap Welding Techniques (TC071)	40.00	30.00

NCHRP SYNTHESIS OF HIGHWAY PRACTICE

_____	300	Performance Measures for Research, Development, and Technology Programs (SYH 300)	33.00	24.75

TCRP SYNTHESIS OF TRANSIT PRACTICE

_____	39	Transportation on College and University Campuses (TS039)	28.00	21.00

TRANSPORTATION RESEARCH RECORD

_____	1750	Energy, Air Quality, and Fuels, 2001 (R1750)	34.00	25.50

[1] $70.00 overseas.
[2] One subscription included in affiliate fee; additional subscriptions, $35.00.
[3] HCM only: for overseas orders, add $18.00 per book for surface mail and $38.00 per book for airmail to Central & South America & Europe; $50.00 for all other destinations.

Payment must accompany orders. Foreign payments must be in U.S. funds drawn on a U.S. bank or by international money order (payer must bear all bank charges). Return this form with payment to Transportation Research Board, Lockbox 289, Washington, DC 20055 (telephone 202-334-3213, fax 202-334-2519). **Orders may also be placed through the TRB online bookstore: *www.TRB.org/trb/bookstore*.**

Payments for deliveries to Calif., D.C., Fla., Md., Mo., Tex., and Canada must include applicable sales tax/GST.

For surface delivery outside North America, add $4.00 for first item and $1.00 for each additional item, except as noted.

☐ Please send information on TRB affiliates program.

☐ Check or money order enclosed

☐ Charge to: ☐ Visa ☐ MasterCard ☐ American Express

_____/_____/_____/_____ _____/_____
CARD NUMBER EXPIRATION DATE

_____
SIGNATURE

_____ _____
DATE AFFILIATE NO.

_____
NAME

_____
AGENCY

_____
STREET

_____
CITY

_____ _____
STATE ZIP

_____
TELEPHONE

Please detach and mail

INFORMATION FOR CONTRIBUTORS TO

TR NEWS

TR News welcomes the submission of manuscripts for possible publication in the categories listed below. All manuscripts submitted are subject to review by the Editorial Board and other reviewers to determine suitability for *TR News*; authors will be advised of acceptance of articles with or without revision. All manuscripts accepted for publication are subject to editing for conciseness and appropriate language and style. Page proofs will be provided for author review and original artwork returned only on request.

FEATURES are timely articles of interest to transportation professionals, including administrators, planners, researchers, and practitioners in government, academia, and industry. Articles are encouraged on innovations and state-of-the-art practices pertaining to transportation research and development in all modes (highways and bridges, public transit, aviation, rail, and others, such as pipelines, bicycles, pedestrians, etc.) and in all subject areas (planning and administration, design, materials and construction, facility maintenance, traffic control, safety, geology, law, environmental concerns, energy, etc.). Manuscripts should be no longer than 3,000 to 4,000 words (12 to 16 double-spaced, typewritten pages), summarized briefly but thoroughly by an abstract of approximately 60 words. Authors should also provide appropriate and professionally drawn line drawings, charts, or tables, and glossy, black-and-white, high-quality photographs with corresponding captions. Prospective authors are encouraged to submit a summary or outline of a proposed article for preliminary review.

RESEARCH PAYS OFF highlights research projects, studies, demonstrations, and improved methods or processes that provide innovative, cost-effective solutions to important transportation-related problems in all modes, whether they pertain to improved transport of people and goods or provision of better facilities and equipment that permits such transport. Articles should describe cases in which the application of project findings has resulted in benefits to transportation agencies or to the public, or in which substantial benefits are expected. Articles (approximately 750 to 1,000 words) should delineate the problem, research, and benefits, and be accompanied by one or two illustrations that may help readers better understand the article.

NEWS BRIEFS are short (100- to 750-word) items of interest and usually are not attributed to an author. They may be either text or photographic or a combination of both. Line drawings, charts, or tables may be used where appropriate. Articles may be related to construction, administration, planning, design, operations, maintenance, research, legal matters, or applications of special interest. Articles involving brand names or names of manufacturers may be determined to be inappropriate; however, no endorsement by TRB is implied when such information is used. Foreign news articles should describe projects or methods that have universal instead of local application.

POINT OF VIEW is an occasional series of authored opinions on current transportation issues. Articles (1,000 to 2,000 words) may be submitted with appropriate, high-quality illustrations, and are subject to review and editing. Readers are also invited to submit comments on published points of view.

CALENDAR covers (*a*) TRB-sponsored conferences, workshops, and symposia, and (*b*) functions sponsored by other agencies of interest to readers. Because of the lead time required for publication and the 2-month interval between issues, notices of meetings should be submitted at least 4 to 6 months before the event. Due to space limitations, these notices will only appear once.

BOOKSHELF announces publications in the transportation field. Abstracts (100 to 200 words) should include title, author, publisher, address at which publication may be obtained, number of pages, and price. Publishers are invited to submit copies of new publications for announcement, and, on occasion, guest reviews or discussions will be invited.

LETTERS provide readers with the opportunity to comment on the information and views expressed in published articles, TRB activities, or transportation matters in gen-eral. All letters must be signed and contain constructive comments. Letters may be edited for style and space considerations.

SUBMISSION REQUIREMENTS Manuscripts submitted for possible publication in *TR News* and any correspondence on editorial matters should be directed to the Director of Reports and Editorial Services, Transportation Research Board, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418; telephone 202-334-2972. All manuscripts must be submitted in duplicate, typed double-spaced on one side of the page and accompanied by a word-processed diskette in Microsoft Word 6.0 or Word Perfect 6.1. Original artwork must be submitted. Glossy, high-quality black-and-white photographs are preferred; if not available, we will accept color photographs. Slides are our third choice. Digital camera photographs and computer-generated images are not acceptable. A caption must be supplied for each graphic element submitted. Any graphs, tables, and line art submitted on disk must be created in Microsoft PowerPoint (do not use Harvard Graphics software). Required style for units of measurement: The International System of Units (SI), an updated version of the metric system, should be used for the primary units of measurement. In the text, the SI units should be followed, when appropriate, by the U.S. Customary equivalent units in parentheses. For figures and tables, use only the SI units, providing the base unit conversions in a footnote.

NOTE: Authors are responsible for the authenticity of their articles and for obtaining written permissions from publishers or persons owning the copyright to any previously published or copyrighted material used in their articles.