

New Initiatives in Wisconsin

DOT—University Joint Policy Research

KENNETH J. LEONARD

The following article on an innovative policy research arrangement by the Wisconsin Department of Transportation that is closely connected to the University of Wisconsin should be of interest to other state DOTs that have not undertaken such joint policy research efforts. The specific research being conducted under this program involves transportation issues currently being faced by many states.

Although all states are involved in transportation research, most of these research efforts are concentrated in physical research in the highway field with some of the research linked to university centers.

In Wisconsin, in addition to physical research activities, the Department of Transportation conducts a policy research program that is closely linked to its university system. Even though it is sometimes difficult to distinguish between policy and physical research in Wisconsin's effort, policy research relates to all topical areas (social, energy, economic, environmental, and so forth) but largely excludes consideration of structural or material matters, which are handled by the engineering research personnel of the department. Never-

theless, some overlap in research efforts does occur; but this can be advantageous as long as it is well coordinated and does not involve duplication of efforts.

Purpose

In 1983 the Wisconsin Department of Transportation (WisDOT) entered into an agreement with the University of Wisconsin to establish a University of Wisconsin—Transportation Policy Studies Institute (UW—TPSI). Under this contract, the institute administers policy research projects that address key

Kenneth J. Leonard is Director, Bureau of Policy Planning and Analysis, Wisconsin Department of Transportation.

In 1983 the Wisconsin Department of Transportation entered into an agreement with the University of Wisconsin to establish a Transportation Policy Studies Institute.

transportation issues and recruits qualified researchers from the university system to perform research in their respective areas of expertise. In addition, UW—TPSI organizes and conducts workshops and symposiums on specific issues related to transportation. The institute's goal is to gain recognition as a research institute that maintains a high degree of objectivity, responds to local, state, and national research needs, and uses the best resources available in the university to address transportation issues.

The primary purpose of this research arrangement is to bring the state government and the university together for a mutually beneficial cause, allowing WisDOT to make use of the university's resources. The institute serves as a focal point for transportation expertise. When WisDOT lacks specific expertise on its staff, it may obtain that service from the university. Others, such as legislators, local agencies, industry, and business, also have access to the university transportation expertise. In addition, the institute provides a source of unbiased expertise that the department can call on in the case of controversial issues in which WisDOT might be viewed as partial (for example, impacts of road salt). Also, the university has experience and knowledge in organizing and conducting workshops, seminars, and training sessions that can be applied to transportation topics.

From the university perspective, this research arrangement not only brings in some additional research funds, but, more important, helps increase interest from students and faculty in transportation by exposing them to the "real world" problems in the transportation field and providing material for classroom use. In addition to in-class training, students benefit from working on

problems similar to those they will address as working professionals, and being given the opportunity to make the connection between classroom theory and pragmatic problem solving. Obviously, WisDOT also benefits from the increased student interest and exposure because the students may fill future positions in the department.

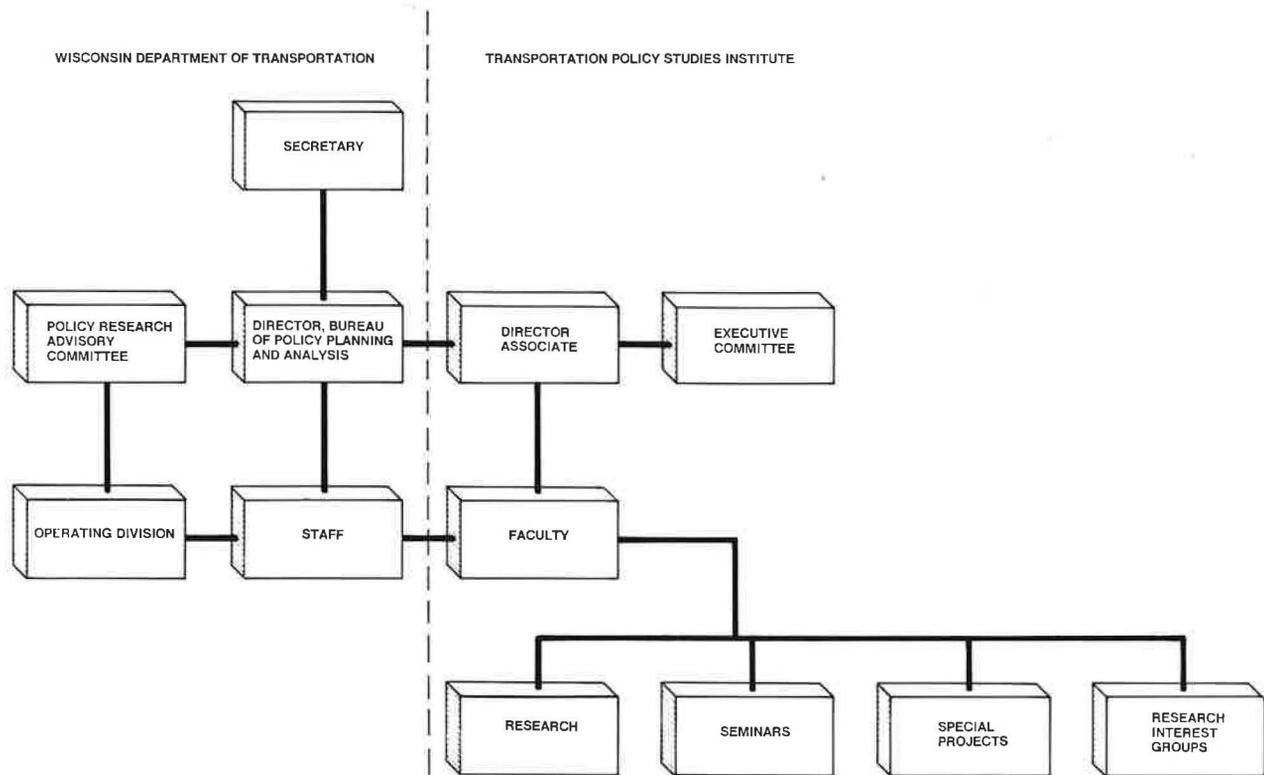
Organization

Although the Transportation Policy Studies Institute is housed at the University of Wisconsin in Madison, it is a systemwide function. Faculty on all of the 14 four-year campuses are encouraged to participate in transportation policy research, studies, seminars, and symposiums. The institute is governed by an executive committee composed of six faculty members; committee membership reflects the broad interdisciplinary nature of the institute with engineering, planning, geography, economics, and other disciplines represented. The institute is administered by a director and associate director who are faculty members but spend part of their time on institute matters.

WisDOT's participation in the partnership is managed by its Bureau of Policy Planning and Analysis. Generally responsible for analyzing key transportation issues and assisting in the development of departmental policies, the bureau is policy and research oriented and well staffed to administer this arrangement and to work closely with faculty researchers.

The Bureau of Policy Planning and Analysis is assisted by a nine-member advisory committee composed of WisDOT upper management representing each of the six divisions in the department and a representative of the FHWA. This committee identifies policy research needs, recommends topics for funding to the WisDOT secretary, reviews research proposals and research results, and serves as a catalyst for implementation of approved policy research results. The structure of the committee membership also provides a link between this policy research effort

WisDOT benefits from the research program in that increased student interest may lead to students filling future positions in the department.



and the department's physical research activities. In addition, the committee advises on in-house research and provides a forum for intradepartmental communication on policy research.

The organizational relationship between the Wisconsin Department of Transportation and the University of Wisconsin in this policy research effort is shown in the accompanying figure.

Process

To identify research needs, the members of the advisory committee annually solicit suggestions from their respective areas of WisDOT. Most of the research topics lend themselves to applied research or pragmatic problem solving. Problem statements, which clearly describe the problem and the research objective, are developed. In addition, the recommendations are solicited from faculty researchers in their areas of interest. Joint meetings are held between WisDOT and the institute to discuss and clarify research ideas. The WisDOT advisory committee establishes priorities among the research needs and makes a recommendation to the WisDOT sec-

retary who makes the final decision on which projects to pursue with research contracts.

Requests for Proposals are issued on the selected topics. The proposals must include a concise but complete description of the methodology to be used, a step-by-step activity list with timetable, a description of the final product, faculty and staff required to complete the project, and a proposed budget. The detailed proposals are reviewed by a faculty committee and the WisDOT advisory committee whose recommendations are then used by the WisDOT secretary in making a decision on funding. The research is carried out according to a contract based on the proposals.

Progress on the research is monitored by the institute and by WisDOT staff who work in the areas related to the research. The WisDOT staff work closely with the researchers, providing advice on the research and maintaining the relationship between the applied research and the problem it is intended to address. The contracts require written quarterly progress reports by the researchers, as well as a final report. At the end of the research effort, the prin-

cipal researcher also presents an oral report and answers questions from WisDOT representatives and university peers. WisDOT staff and the advisory committee review the final research results before they are accepted by the WisDOT secretary.

Progress

During the first year, six symposiums and workshops were organized and the institute conducted year-long research efforts on four topics. Also, information on critical transportation topics was presented at legislative hearings.

Symposiums and Workshops

Symposiums on the following topics have been held by the institute: (a) the relationship between land use and transportation was reviewed and alternative state responses were debated; (b) the future of Wisconsin's economy was presented by both academicians and business leaders to provide a common understanding of the future setting for transportation; and (c) the relationship

The results of the workshops held by the Transportation Policy Studies Institute have been applied in decision making and policy formulation by WisDOT.

between highway improvements and economic development, along with ways for the state to consider economic development in its decision making, was discussed.

Three workshops dealing with the following subjects have also been conducted: (a) the future availability of transportation energy, the likelihood of future fuel shortages, and the appropriate response by WisDOT in its provision of transportation services; (b) the effects of road salt, including positive and negative impacts, such as the environmental impacts on ground and surface water, practical and cost-effective alternatives, and alternative WisDOT actions; and (c) the energy and economic efficiencies of gasohol, the impacts of a fuel-tax exemption for gasohol on the financing of transportation improvements, and the impact of the exemption on the agricultural economy of Wisconsin, particularly the corn commodity price.

The results of these symposiums and workshops have all been applied, to some extent, in decisions and policies formulated by WisDOT and, in some cases, by the Wisconsin legislature.

First-Year Research

During the first full year of the joint research arrangement, the institute undertook the following research efforts:

- Assessment of the relationship between private and public sector cooperation in the provision of transportation facilities and services,
- Multiobjective decision making in transportation,
- Analysis of the impact of public investment in transportation on Wisconsin's economy, and
- Assessment of secondary land-use impacts of highway projects.

In addition to the four research efforts listed, the institute provided, at no cost, guidance on the development of a pavement distress index (PDI). PDI is a measure of pavement structural adequacy and reduces the pavement distress information (cracking, raveling, distortion, and so forth) for all state truck highways into a single summary statistic for each highway segment.

Public-Private Cooperation

Under this research project, the concept of public-private cooperation in funding transportation improvement projects was explored, the forms this cooperation can take were identified, and policy alternatives provided for the state

to consider in encouraging such cooperation in transportation. There has been increasing consideration of public-private cooperation in transportation projects during recent years. Public sector budgets have been strained and the private sector wants public access for economic development. Public-private projects provide benefits to both sectors. This is a particularly timely topic that is receiving national attention.

A range of strategies appropriate for use in Wisconsin was developed: (a) private developers could contribute a portion of the cost of transportation projects that directly benefit them; (b) WisDOT could require local governments to use land-use planning or exercise controls to protect the state's investment in transportation improvements; (c) WisDOT could include direct private contributions in the criteria for highway project selection; (d) the state could act as a broker by promoting and marketing a development project; (e) Wisconsin could make a direct investment in land

Policy Research at TRB

Responding to today's transportation challenges requires research on broad policy questions, as well as on more traditional technical issues. Recognizing the importance of policy research, the Governing Board of the National Research Council (NRC) and TRB's Executive Committee decided in 1982 that TRB would become significantly involved in policy-oriented studies on a continuing basis. The decision was given added impetus by the passage of the Surface Transportation Assistance Act (STAA) in 1982, which mandated five policy studies to TRB through the National Academy of Sciences.

TRB's Special Projects Division, which has a history of conducting policy-oriented studies dating back to the days of the AASHO Road Test, is responsible for conducting TRB's policy studies, most of which have been congressionally mandated. A typical study is conducted over a 1- to 2-year period. Topics examined have included the costs and benefits of the 55 mile-per-hour speed limit, the safety risks and pavement wear of double-trailer trucks on the Interstate highway system, and the safety cost effectiveness of geometric design improvements to existing highways. The STAA of 1987 has mandated five additional policy studies addressing a variety of topics including school bus safety, historic bridges, highway maintenance practices, transportation needs of older drivers, and general policy issues related to trucking.

adjacent to an improvement project and later sell it using the profit to defray part of the cost of the improvements; (f) a special-purpose authority could be established for large transportation projects; and (g) the state could finance, execute, and own a development.

Multiobjective Decision Making

Public decisions require choices among alternatives that are in conflict and have various attributes that may be valued differently by concerned individuals and groups. For instance, a highway improvement may relieve traffic congestion and reduce accidents, but also contribute to urban sprawl or air pollution. Although decision makers may attempt to consider all factors and to balance competing objectives, most often decisions are made by maximizing a single criterion by looking for good, rather than the best, solutions, or by ignoring troublesome attributes or criteria. This research project involved examining alternative multiobjective methods, testing and evaluating these methods, and making recommendations for application by WisDOT.

Economic Development Impacts

Economic development is and will continue to be important to local and state officials, who understand that transportation improvements contribute to increased economic development, increased employment, and an expanded tax base. The purpose of this research project was to establish a procedure for describing or measuring the probable employment, tax base, or other economic development impacts of project or program alternatives. Background information was provided on methods and techniques that could be used in assessing the economic impacts of transportation investments within the state.

Specifically, the research addressed four areas: (a) a description and critique of alternative methodologies or models; (b) an analysis of the applicability of the various assessment methodologies to transportation projects that are likely to be evaluated by WisDOT; (c) a descrip-

tion of the relationship of assessment methodologies to analytical techniques currently used by WisDOT; and (d) recommendations concerning how economic impact assessment can or should be incorporated into the department's evaluation system.

Land-Use Impacts

A potentially important impact of any highway project is its effect on the spatial distribution of urban development. This type of impact is often referred to as a secondary land-use impact. Secondary land-use impacts have included regional shopping center development, urban sprawl, and economic decline of central business districts.

The purpose of this research activity was to determine the applicability of existing techniques for assessing highway-related impacts in small and medium-sized communities. Existing techniques were categorized as (a) assessment by experts, such as an expert panel or gaming simulation; (b) computer simulation; or (c) qualitative assessment, such as a series of short questions, a checklist, or a cross-impact matrix. A representative technique was selected from each category and evaluated by applying it to one or more case study projects.

The techniques recommended were a multiple-round, structured expert panel that was derived primarily from the Delphi Method; a Lowry-based computer model of the relationship between transportation and land use; and two sample checklists that guide manual assessment by a professional. Each of these techniques has both strengths and weaknesses. In certain cases, one of these techniques may be most appropriate; in other cases, a combination of techniques may produce the best results.

More Recent Research

Eight research topics have been pursued since the first year:

- Establishment of the relationships between (a) pavement roughness and user satisfaction with ride quality, and (b) pavement roughness and willingness to pay for a smoother road;

The current emphasis in the WisDOT–University joint policy research program is on implementation.

- Updating the highway investment analysis package (HIAP) model by incorporating current highway capacity analysis procedures, recalibrating the methodology for estimating operating speeds, and modifying operating cost data;
- Identifying and estimating the benefits of local highways and determining the distribution of these benefits among beneficiaries in Wisconsin;
- Analyzing and determining the distribution and magnitude of the benefits of intercity bus service in the state;
- Collecting and analyzing data on local road expenditures in Wisconsin, comparing this information to that from other states, and explaining any differences;
- Developing and managing a series of workshops on future implications of social and technological change for state transportation policies and programs;
- Analyzing the distribution of net benefits for a sample of transportation projects and identifying the impacts; and
- Evaluating past and present efforts at habitat replacement as a means of mitigating adverse effects or loss of waters and wetlands in the state.

Future Activities

The current emphasis, in this research arrangement, is on implementation. The implementation phase of a research program is as important as the research itself.

The first step in the implementation process is identification at the start of research needs that relate to current issues and the decision-making process. Thus, the research generally is directed at pragmatic problem solving. Next, the research effort should involve the key

decision makers, especially in identifying topics and evaluating results. Then it is likely that these decision makers will take the research results back to their operating unit to be used. In addition, the research must be clear, understandable, and of good quality. This can be accomplished by staff involvement and critical review including peer reviews by other faculty members. Finally, there must be a deliberate and structured attempt at implementation. At WisDOT, a series of meetings have been held with management and staff to discuss the results of the research and its applicability. On the basis of these reviews, it has been necessary, in some

cases, to train staff members in new techniques and processes, and to integrate the work into ongoing activities.

Results of the Joint Policy Research Program

Overall, the results of the joint research arrangement between WisDOT and the University of Wisconsin have been successful. Some of the research has led to policy and program revisions that have helped WisDOT to continue providing an efficient transportation system.

As is to be expected in most research programs, a few projects have produced only marginal benefits. In addition, at

the beginning of the research program, there was a large, pent-up demand of research topics, which is now beginning to taper off. The level of future activity will depend on joint interest, number of topics, and availability of funds.

For additional information on these research arrangements and activities, contact Kenneth Leonard, Bureau of Policy Planning and Analysis, Wisconsin Department of Transportation, P. O. Box 7913, Madison, Wisconsin 53707 (608-267-7754); or John Klus, Transportation Policy Studies Institute, University of Wisconsin-Madison, Room 725, Extension Building, Madison, Wisconsin 53706 (608-262-8819).

CALL FOR ARTICLES

Professionals in the transportation field are invited to submit to the Editor of *TR News* topical articles on innovative or state-of-the-art aspects related to all transportation modes. Articles that highlight the role played by research are especially desired. Feature articles should be 1,500 to 3,000 words in length and accompanied by appropriate, high-quality illustrations and corresponding captions.

Letters to the Editor are welcomed that offer comments on feature articles or responses to point-of-view articles, or in general discuss issues or raise questions related to transportation research or to TRB activities.

All articles and letters received are subject to review by the Editorial Board of *TR News* for suitability for publication and to editing for purposes of length and clarity. For further guidelines on submitting news items or full-length articles, see Information for Contributors on the inside back cover.

—Nancy A. Ackerman, Editor