A1C07: Committee on Transportation Planning Applications
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Transportation Planning Challenges and Opportunities

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The Transportation Research Board (TRB) Committee on Transportation Planning Applications is concerned with advancing the state of the practice by accelerating the pace of innovation in transportation planning practice. For the past 12 years, the Committee on Transportation Planning Applications has hosted a biennial conference showcasing innovative planning methods. Our findings on the state of the practice derive from presentations made at these conferences. Those methods and procedures that have served well for the past 40 years seem increasingly unable to address the issues of most concern to decision makers. On the eve of the third millennium, entirely new transportation planning methods are needed.

TRAVEL DEMAND MODELING

Travel demand modeling remains a cornerstone of the transportation planning process. Travel demand models have achieved a sophistication unimaginable by those who laid their foundation in the 1950s. The current generation of travel demand models, however, is unable to analyze many transportation policies under consideration in urban areas, such as pricing, demand management, and air quality strategies. Modern travel demand models can predict highway volumes reasonably well in many circumstances, but they lack precision in several critical areas. These areas include prediction of latent and induced travel demand, intermodal impacts, and land use/transportation relationships.

Widening highways and developing new highway corridors in built-up urban areas are often impractical and always expensive. Shortly after suffering the cost and disruption of adding highway capacity, communities see congested conditions return long before the end of the useful life of the facility and well in advance of travel-model horizon years. Although much of this congestion can be attributed to induced demand—that is, to travelers shifting from unimproved to improved routes—some is also the result of realized latent demand—that is, to travel resulting from a decline in the cost of travel. We understand this phenomenon only in terms of observed trends but not in terms of the underlying behavioral forces that cause it to occur. Models capable of predicting latent demand are necessary to properly simulate the effect of transportation policies over prolonged periods.

Urban transportation development has traditionally been organized by mode. The Federal Highway Administration and the 50 state highway departments have successfully developed an extensive system of high-capacity roadways throughout the country, while the Federal Transit Administration has undertaken public transportation development in cooperation with transit operators. Modeling follows a similar modal orientation. Simultaneous transit and highway modeling is possible but seldom pursued, in part because

of different network coding protocols and assignment methods. Even when cross-modal impacts are explicit, planners and decision makers often ignore or misinterpret the results.

Travel demand models are not designed to predict land use changes resulting from transportation improvements. The modeling stream accepts a land use scenario as given and proceeds to predict the traffic associated with it. In reality, land use and transportation development are mutually dependent. Although the tremendous decentralizing influence of modern urban freeway systems is apparent to all, we are unable to simulate this basic process. As a result, we tend to use "trend" type land use forecasts, which help justify the need for ever greater highway expansion, when in fact such policies may not produce the types of urban environments we as a society seek. Land use models exist that can interface with travel demand models, but they are data intensive and mysterious to the profession. These impediments should not be considered fatal flaws but challenges to overcome. The relationship between land use and transportation is an area of intensive current research offering hope of dramatic improvements in modeling. It is encouraging to see research in dense urban areas which enjoy strong transit patronage, so that the relationship between urban form and mode choice can be expressed mathematically.

FREIGHT AND COMMERCIAL TRAFFIC

The transportation planning process has given short shrift to the urban commercial and freight transportation sectors for many years. The focus on passenger transport derives from the high levels of congestion in peak periods. Nevertheless, the commercial sector incurs significant economic losses from off-peak traffic delays. Lack of data and credible forecasting tools leads transportation planning agencies to aggregate commercial traffic into categories such as truck and non-home based travel. This distinction is inadequate to enable development of facilities and programs to benefit the commercial and freight transportation sectors.

Although new models and forecasting capabilities are under development, the freight sector itself is poorly represented in the planning process. The appropriate divide between public sector interest in improving competitiveness and private sector interest in making a profit remains to be established.

TRANSPORTATION PLANNING PROCESS

Although current transportation planning processes are dominated by the interagency, interdisciplinary team approach, institutional issues continue to impede innovative solutions to urban congestion. Foremost among these is lack of coordination between land use and transportation planning agencies. Other issues include overly restrictive funding programs, the proliferation of unfunded mandates, overlapping jurisdictions, and the phenomenon known as "everyone is a transportation planner because they have a model."

Areas convenient to transportation facilities are very attractive for private investment. All too frequently transportation planning agencies fail to anticipate this development, rendering transportation facilities functionally obsolete long before they have reached the end of their design life. Obviously, land use plans need to be coordinated with transportation plans; although all agencies purport to adhere to this principle, the reality is quite different. Legal separation of the planning processes is one of many impediments to coordination. Land use planning is principally the domain of local government; transportation planning, however, is a regional function. The planning and project approval

processes are quite distinct, as are the stakeholders. Despite extensive institutional experimentation, agencies remain reluctant to surrender any of their discretion.

Funding programs also contribute to the problem. Motor fuel taxes are used to fund highway construction, producing an institutional momentum that is difficult to contain. Transit agencies have their own constituencies and funding programs. Developing coordinated multimodal responses to transportation problems in this environment has eluded most urban regions. The categorical nature of transportation funding programs also frustrates innovative approaches to improved mobility. These problems are manifest in transportation improvement programs organized by mode and funding program.

The increase in unfunded mandates has complicated transportation planning. Past conferences have included many presentations on planning processes that incorporate archeological assessments, wetland preservation, conformity analysis, and endangered species protection. These planning requirements all have merit, but they have considerably increased the expense and lengthened the amount of time required to bring new projects on line.

The final institutional problem is related to the travel demand issues previously discussed. It is relatively easy and inexpensive to acquire travel demand modeling software. Most packages contain default values that allow inexperienced persons to forecast travel demand. Consequently, decision-making bodies can be confronted with conflicting forecasts. It is possible to justify or undermine virtually any project by changing assumptions or data inputs. The democratization of travel demand forecasting has much merit, but it is unreasonable to expect decision-making bodies to have the technical knowledge to reconcile dramatically different projections of future transportation needs and conditions.

TRAINING AND TECHNOLOGY TRANSFER

Transportation agencies and firms find it difficult to hire qualified personnel. Many technically oriented students opt for careers in fields that offer higher salaries and more rapid advancement than transportation planning. Increasingly, transportation planning agencies and professional societies fill entry-level positions with people who lack formal training in the field. Although federal modal agencies, university continuing education programs, and professional societies sponsor many short courses, which are generally well attended, heavy workloads at local agencies make it impossible to provide the on-the-job mentoring necessary to adequately prepare the next generation of transportation planners. Of all the problems confronting transportation planning today, the graying of the profession may be the most serious. We are in danger of losing enormous institutional experience and knowledge over the next 20 years.

A related problem concerns the widening divide between the state of the practice and the state of the art. Substantial research and development are undertaken in the field of transportation planning, but transfer to actual practice tends to be slow. Efforts to bridge this divide include specialty conferences; features in trade journals on innovative research; technology sharing programs, and TRB’s cooperative research. All of these efforts need to continue. Strengthening university-based transportation planning programs is especially important because that is where the next generation of planners is currently in training. Sponsored university research with strong student involvement instills an understanding of the planning process and the importance of technological progress.

RECOMMENDATIONS

Although the challenges are great, the path to improvement is also apparent. Progress in certain areas is critical.

1. **Improve travel demand modeling.** There are several ongoing efforts in this regard, including the development of microsimulation, activity-based demand forecasting, and freight modeling. Some approaches are radical and require conversion to new paradigms. Other approaches are incremental, focusing on improvements to modeling processes. These and other innovations must be pursued aggressively.
2. **Integrate land use forecasting models with travel demand models.** Despite many years of effort, land use and travel demand models remain separate domains. This is due to the separation of the land use and transportation planning processes, a lack of technical innovation, and poor technology transfer. Progress will require institutional and professional adjustments, which at present do not appear forthcoming.
3. **Develop and deploy commercial travel demand models.** Transportation investments that reduce the cost of doing business lead to lower prices and a more competitive economy. Despite this obvious relationship, transportation planners know little about the travel patterns or impacts of commercial travel, which comprises commodity flows as well as passenger travel. An aggressive program is needed, including data collection, model development and testing, and technology transfer.
4. **Better coordinate the transportation and land use planning processes.** This common recommendation remains a key to ameliorating traffic congestion. Although assessments of site-related traffic impacts are common, regional forums to consider urban alternatives, akin to the metropolitan planning organization function for transportation, do not exist. Transportation planners can contribute to innovation in this area by simulating interaction between land development and travel at the regional level.
5. **Improve the technical capabilities of transportation planners.** There would be great improvement in transportation planning if planners made use of the many good practices already available. Progress requires strong technology transfer and continuing education programs.
6. **Strengthen university transportation planning programs.** Long-term progress in transportation planning requires strong training programs beginning at the university level. All levels of government, as well as the private sector, must recognize their own interests by sponsoring university research, providing scholarships, and developing short courses.