Ten Most Critical Issues in Transportation

1981 UPDATE

Five years ago, the Executive Committee of the Transportation Research Board (TRB) established a list of the Ten Most Critical Issues in Transportation. The list was published in the November-December 1976 issue of ***Transportation Research News.*** It was recognized at the time that the usefulness of such a list was governed by its periodic updating. This was done once more in 1978, and a revised list was published in the November-December 1978 issue of the ***News.***

The following 1981 list involved suggestions and ranking by TRB's group council members and committee chairmen and final selection by the Executive Committee.

Once again, some of the issues are amenable to solution through research. These are considered to be in the province of TRB, which encourages the initiation and implementation of such research.

Other issues involve policy that is established or changed through the political process or by transportation administrators. Although TRB does not often recommend policy, it acts as a neutral forum for the dissemination of research results into policy-related problems and alternatives and for the illumination of all sides of policy issues.

Once again, in this third edition, the procedure used in selecting and rating issues has brought to the top the issues considered most critical to those in all modes of and roles in transportation. At the same time, it is recognized that still other problems exist that are of serious concern both to the transportation specialists and to the nation, and they will continue to receive attention. Among them are several aspects of transportation safety, technical aspects of materials availability and use, and continuing concerns for changing vehicles and protection of the environment.

The TRB list of these issues is not in order of priority.

Financing Transportation and Equitable Allocation of Resources

Problems that relate to adequate financing of our transportation systems are pervasive. Systems within the purview of the government—whether federal, state, or local—are faced with declining revenues and increased competition for scarce public funds. Systems within the private sector continue to suffer from profits too small to attract adequate capital for upgrading and new equipment. In both the public and the private sectors, this lack of money is causing deferred maintenance practices such that physical deterioration of transportation systems is becoming widespread. Thus, funds for system maintenance are becoming a particularly important issue.

Some of the specific questions that need resolution in developing new sources of revenue are, How should multimodal needs and priorities be defined within given resources? To what extent should capital, maintenance, and operating costs be borne by users? What are the appropriate roles and funding responsibilities of federal, state, and local governments? How can an inflation-resistant funding basis be provided? How should transportation services be priced?

The pricing structure and the cross-modal impacts of different regulations and subsidies also become increasingly important.

For government systems, this issue combines several topics related to financing and the allocation of limited resources. Inflation and requirements for motor vehicle fuel efficiency are seriously eroding the purchasing power of road-user revenues earmarked for transportation. Maintenance and recapitali-

zation of transportation facilities have not kept pace with the demand for services. Highways are experiencing a continued growth in vehicle miles of travel while revenues tied to fuel consumption decline. Public transportation systems continue to experience difficulty in increasing patronage and require ever-greater government subsidy to continue operations.

Improved Use of Existing Facilities

The development of the existing U.S. transportation system has proceeded through the years with little delay other than that imposed by financial constraints. However, today and in the future, development will be constrained not only by economics but also by desires to reduce congestion, pollution, fuel consumption, and hazard, and to control land use. Management practices in the existing systems frequently fail to achieve optimum conditions and, in fact, often may contribute to delay, fuel waste, increased pollution, and frustration.

While technology related to the handling of people, services, and goods can and should be further improved through research, much greater levels of improvement might be achieved by overcoming barriers to better application of existing technology. These barriers are social, economic, political, and institutional. Much is known about them and their causes, but effective mechanisms for overcoming them are lacking. Similarly, schemes for managing the demand for transportation, such as ridesharing, flexible work hours and days, corridor management and control, and differential pricing of congested modes, facilities, and time periods (e.g., airports and downtown parking) are underused for a variety of reasons. For aviation there is also a need for a long-term plan to achieve widespread application of time-slotted four-dimensional air traffic control.

As more attention is inevitably given to desirable constraints or new capital improvements and as resources dwindle, it becomes more and more important to develop the mechanisms to overcome the barriers that inhibit improved use of existing systems.

Need for Specific, Measurable, and Attainable Transportation Goals at National Level

During its transportation history, the nation has gone through periods of unified attitudes toward the development of transportation systems. In the past there was general support for the development of waterways, railroads, aviation, and private, regulated transit systems. The nation and states made major efforts in developing 3.8 million miles of roads and streets and getting the nation "out of the mud".

The past half-century has seen the completion of these systems and a growing realization that transportation is not an unmixed blessing. Public concern has been reflected in regulation to control transportation systems in areas such as environmental pollution, safety, fuel economy, fares, levels of service, service abandonment, and the competitive and labor practices of industry. Major segments of the transit and rail industries have been experiencing declines in passenger and freight demand. At the same time, political pressure has been brought to bear to maintain and expand transportation services for the poor and otherwise disadvantaged. There has been growing public reaction against further growth of transportation systems, especially in urban areas, and against the continuing increase in public expenditures for transportation. Past common goals for transportation are no longer accepted. There is now a multiplicity of often conflicting goals and values.

In order to plan for future transportation systems and to allocate current scarce resources among the existing transportation systems' needs for construction, operation, and maintenance, a thorough review of national, state, and local goals for transportation is needed.

Intergovernmental Responsibility for Transportation Systems

The roles and responsibilities of federal, state, and local governments for all modes of transportation continue to undergo major reevaluation. The appropriate roles and functions of each government level in funding, construction, management, regulation, and control need to be examined. Highways, air, rail, waterways, urban transit, rural transportation, environment, land use control, and energy are of interest to all levels of government. Responsibility for the planning and implementation of transportation programs is still not well defined and must be clarified before there is assurance that transportation policy and plans can be implemented.

One of the most significant factors affecting the quality of areawide transportation systems is the nature of institutional arrangements for delivering transportation services. In many areas, the patterns of transportation service delivery and the assorted geographic, fiscal, labor, and regulatory constraints contribute to service gaps so that transfers from one mode to another are often more difficult, time-consuming, and costly than necessary. In other areas, innovative solutions to transportation problems stem from measures of reducing or changing travel demand. In addition, although proposed programs may promise real benefits to the community, the costs and benefits may be distributed unevenly among private and governmental participants, causing some necessary institutions to be unwilling to participate.

These problems raise the questions of who should be the lead agency and whether metropolitan areas and other regions need areawide institutions to coordinate and fill gaps in the broad spectrum of transportation services. Furthermore, the regulatory roles of federal, state, and local governments should be made more

compatible with one another so that the complexity of some regulatory systems will be reduced and different regulatory systems affecting transportation will be better coordinated to prevent disruption of the orderly development of total transportation systems.

Transportation System Maintenance Technology and Management

The U.S. transportation system is now essentially in place; there appears to be a rapid deterioration of the existing plant in all modes—in some more than in others—but no firm commitment to upgrading. Fully effective management of the revenues allocated to maintenance is not now being attained. The key decisions on how much maintenance is enough are being made on the basis of subjective judgment. That the U.S. transportation system is rapidly deteriorating is widely accepted, but the rate of deterioration and the actual existing level have not been established by a well-conceived and well-executed measurement process. These facilities eventually need to be rehabilitated, but proper maintenance increases the life of facilities. A program for improving maintenance and increasing maintenance funds is needed.

A number of related issues are involved:

1. A way must be sought to locate and isolate points of weakness and provide measures to prevent or ameliorate distress prior to breakdown.
2. As highway agencies concentrate their reduced revenues on maintenance, it becomes critical that service-level decisions be made on the basis of objective criteria, which do not currently exist; until sufficient attention is committed to their development, opportunities for making maximum use of reduced highway revenues will continue to be missed.
3. Our vast street, highway, airport, railroad, and waterway systems must be maintained to properly and efficiently serve their purpose; funding levels between and within modes, funding management, and maintenance services must be studied to develop the best possible methods for keeping the present systems operable. Research into better methods and materials, traffic handling, financing, administration, and preventive maintenance is also needed.

Transportation System Performance Criteria and Design Standards

Design standards for modal transportation systems have been developed empirically over time; there have been changes in response to such influences of the moment as beautification, economy, safety, preservation, conservation, and environmental protection. Performance criteria for modal systems have often been clouded by political, economic, and societal considerations so that objective evaluations of changes have not been possible. Performance criteria for multimodal transportation systems are practically nonexistent, in large measure because of the lack of practical goals for such systems. Clearly, design standards and performance criteria by which change can be evaluated must follow the adoption of practical policies and goals for transportation systems at every level of government.

Needed are performance criteria by which operating characteristics can be prescribed and by which such variables as time, cost, energy, quality of service, pollution, land use, and safety can be related. Such criteria are needed not only for each mode of transportation but also for multimodal transportation systems. Only through analytical processes in which these performance criteria are considered in evaluating alternatives can administrators make rational choices among design standards and the many options for capital expenditures.

Interrelationship Between Transportation and Economic Development

The national interest and concern about economic competitiveness and general future prosperity have grown apace recently to the point where large capital improvements often cannot be justified except in terms of their impact on the nation's economic betterment. But the understanding of these interrelationships is so imprecise as to make such justifications quite subjective and insufficiently quantitative.

While economic growth in some parts of the country has slowed, other areas are growing rapidly and new transportation facilities are urgently needed. In slower-growth areas the U.S. transportation system may be more extensive than can be economically justified. Whether the problem is new facilities or maintaining the old, needs are so much greater than financial resources that choices must be made between the essential and the merely desirable based, more than in the past, on economic criteria. To accomplish this will require the analyses of the transportation system as an integral part of the industrial and service economy it serves.

Accordingly, one of the major issues facing decision makers is to find ways to make transportation decisions with more assurance that such decisions are compatible with major economic goals.

Transportation and Energy Conservation

As petroleum reserves diminish, it becomes increasingly important that the best use be made of these fuels and that new sources of energy for transportation be developed. Research should concentrate on improving the efficiency and use of transportation systems; on determining the impact of energy conservation on society, including the transportation systems themselves; and on developing alternate sources of energy for transportation.

Urban transportation facilities continue to be

planned, built, and operated in isolation from associated land development and from other modes of transportation. To conserve energy, activities and transportation that serves the activities need to be coordinated. For example, the development of metropolitan areas to encourage people to live closer to their employment could save energy that is now being used for commuting.

Viability of Important Components of U.S. Railroads

Because of the low rate of return on investment, the railroad industry is faced with increasing difficulty in raising capital. Even railroads in the best financial condiction are forced to forgo many opportunities that could improve their return on investment. Less profitable railroads have been forced to defer maintenance of plant and equipment, which has led to deterioration of service. Several formerly bankrupt eastern railroads have been combined into a public corporation that is having difficulty in attaining self-sufficiency.

Research is needed to improve operating methods for better service to shippers and to lower transportation costs, as well as to improve technology to reduce the cost of maintenance and the number of derailments. Greater productivity is needed to compete with other modes. There is also a need for a better understanding of optimum management strategies to employ in increasingly deregulated environments.

Because of the need to conserve petroleum, protect the environment, and minimize construction of new facilities, the railroad system must provide a large part of the country's transportation. Unless profitability of railroads can be improved, the issue of partial nationalization may have to be faced. Continuation of present trends may mean the loss of significant components of the railroad system.

Survival of Public Transit Systems

Public transit in major metropolitan areas is facing a double-edged crisis of increasing costs and declining sources of funding, including federal operating subsidies. This situation is exacerbated by deteriorating equipment and facilities, serviceability of new equipment, leapfrogging fare increases, costly labor practices and agreements, institutional and jurisdictional conflicts, and intermodal competition. The critical issue is to devise new ways to provide for public transportation services.