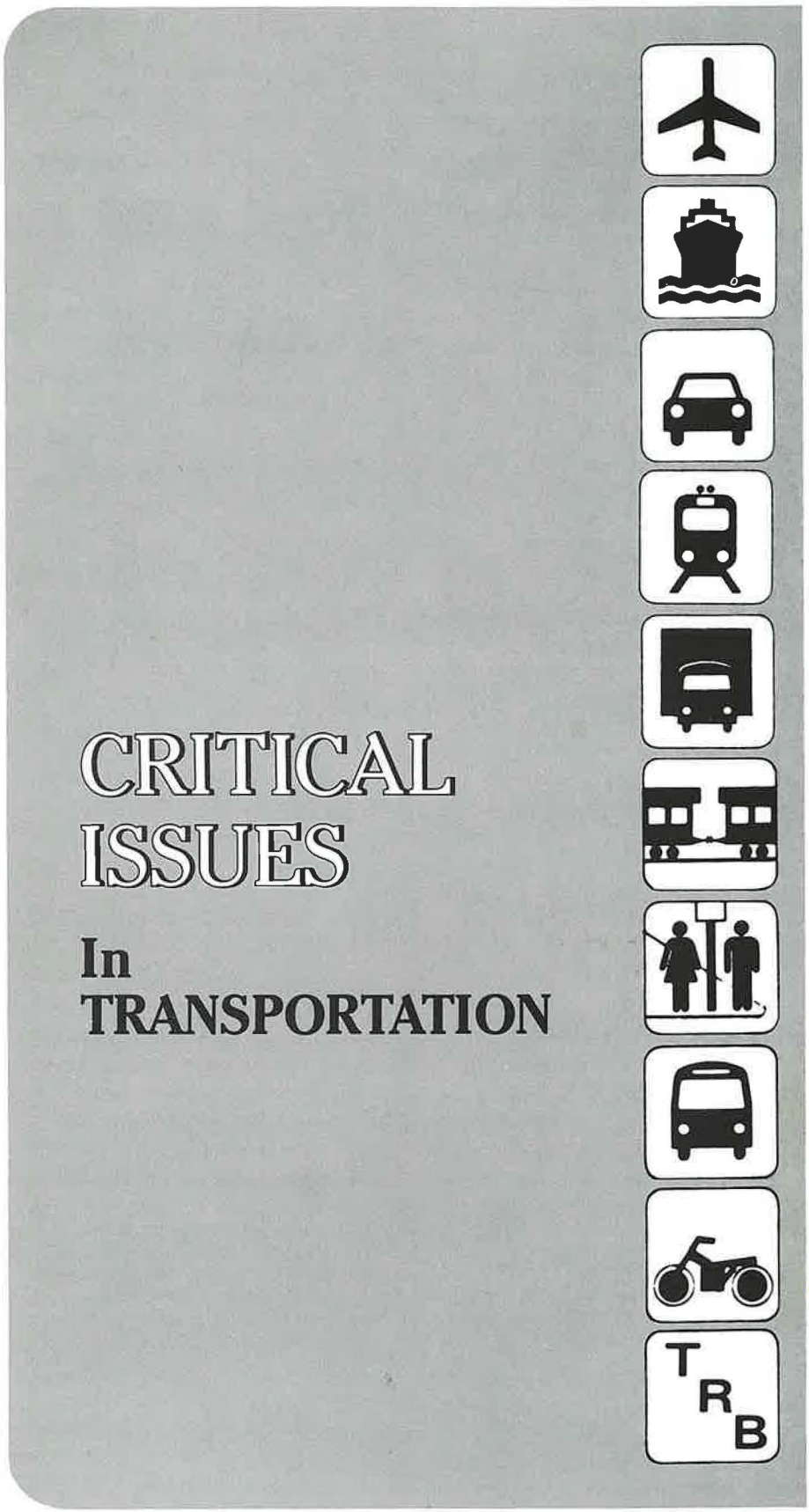


Transportation is constantly adjusting to new surroundings as a result of new technologies, new problems, new opportunities, new expectations, and new needs. Because transportation touches, and is touched by, so many aspects of human activity, periodically it is useful to reassess how well it is adjusting to its current context. In particular, it is helpful to focus on the critical issues, defined here as those unresolved aspects of transportation, national in scope, on which there are a wide variety of viewpoints, for which the impacts of possible actions are not known, and on which decisions will be made at the policy level. Enumerating these issues serves many purposes: (a) to highlight areas in which research may be particularly useful; (b) to focus discussion on important unresolved questions and thereby contribute to their resolution; (c) to condense the many complex topics facing the transportation sector into a format conducive to understanding and cooperation from outside the sector; (d) to challenge researchers to respond to the broader context into which their efforts fit; and (e) to challenge administrators to attend to the unresolved questions that require research efforts.

The development of a list of critical issues by the Transportation Research Board several times in recent years has proven to be a useful device for stimulating discussion, understanding, and resolution of issues both within and surrounding the transportation sector. In 1976 TRB developed a list of 10 critical issues that included finance, safety, energy, environment, regulation, and land use. This list was revised in 1978, and many of the earlier issues reappeared, although with a somewhat different complexion. In the list of critical issues developed by TRB in 1981, many of the previous topics, such as finance and energy, reappeared, along with such emerging concerns as the viability of the railroads and the survival of transit systems.

On the basis of discussions by the TRB Executive Committee and the TRB

Subcommittee on Policy Review, the following list of issues currently believed to be the most critical was developed. Included are many veterans from earlier lists: finance, regulation, safety, environment, economic development, and energy. Also included are several that, although embodied in previous discussions, have increasingly moved toward center stage: highway goods transport, capital investment, and decommissioning of transportation facilities. The brief descriptions provided here, while necessarily incomplete in detail, highlight some of the key questions currently surrounding transportation. Concerted focus—through awareness, discussion, research, and action—can contribute significantly to the resolution of these issues.

IMPROVED MANAGEMENT OF PUBLIC CAPITAL INVESTMENTS IN TRANSPORTATION

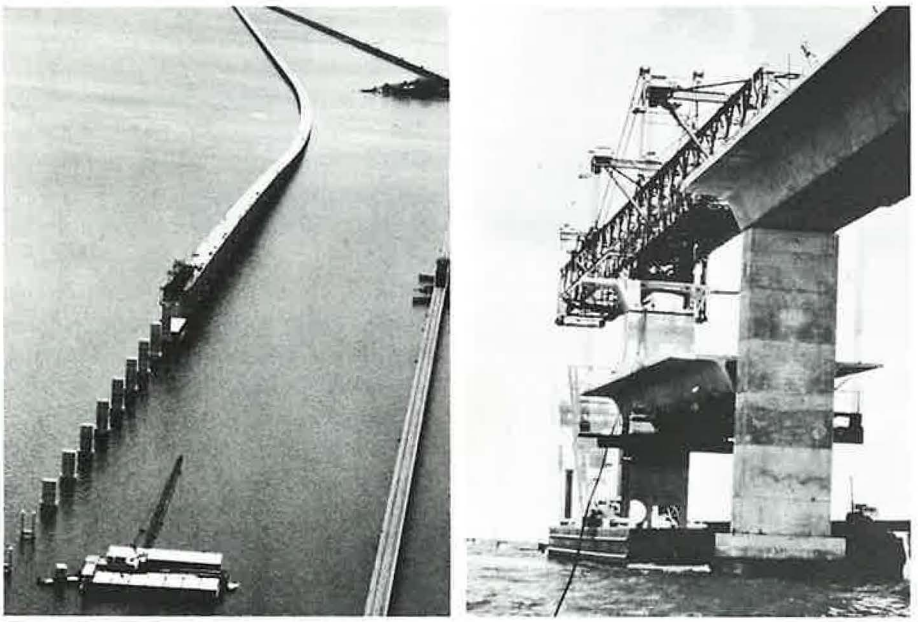
Access to and the quality of transportation have frequently not kept pace with public expectations. The infrastructure crisis that has captured public attention in recent years raises fundamental questions about the procedure for making public capital investments in transportation. Are resources adequate? Are they directed at the right modes and locations? Are they efficient in their design and maintenance requirements? Are they financed using an appropriate mix of funds from users and various levels of government? Can the budgetary and legislative processes that control the nation's infrastrucutre be made more responsive and more efficient? Questions of how best to manage capital investments involve virtually all modes—passenger as well as cargo movements, intercity as well as urban transportation, domestic as well as international travel, new technology as well as old.

Generally, efficient targeting of transportation investments requires an understanding of the underlying capital/operating trade-offs. In the case of highways, for example, the life of pavements can be extended by designing stronger pavements, by limiting the loadings that they must carry, and by maintaining them in specific ways. This balance between capital and maintenance is presumably influenced by the specific climates, soils, traffic volumes, and local materials involved. Research on how each of these elements affects the longevity of pavements can lead to engineering practices that improve our capital investments in transportation. Similar trade-offs between capital and operating costs underpin capital investments for railroads, airlines, waterways, trucking, and transit.

The procedures by which transportation investments are made are needlessly cumbersome in some cases. Current budgetary procedures may unduly subordinate long-term investments to short-term budgetary pressures, whereas more businesslike procedures could enhance efficiency in the long run. Other decision-making procedures, such as the time-consuming legislative approval of the Interstate Cost Estimate, could be substantially streamlined.

Solutions to the nation's infrastructure problem will require financial, organizational, and procedural improvements. Also required is increased technological understanding. The complex engineering relationships that characterize construction and maintenance must be improved and linked to real investment decisions. Research leading to a better understanding of these relationships can be a force for improvement of the nation's management of its capital investments in transportation.

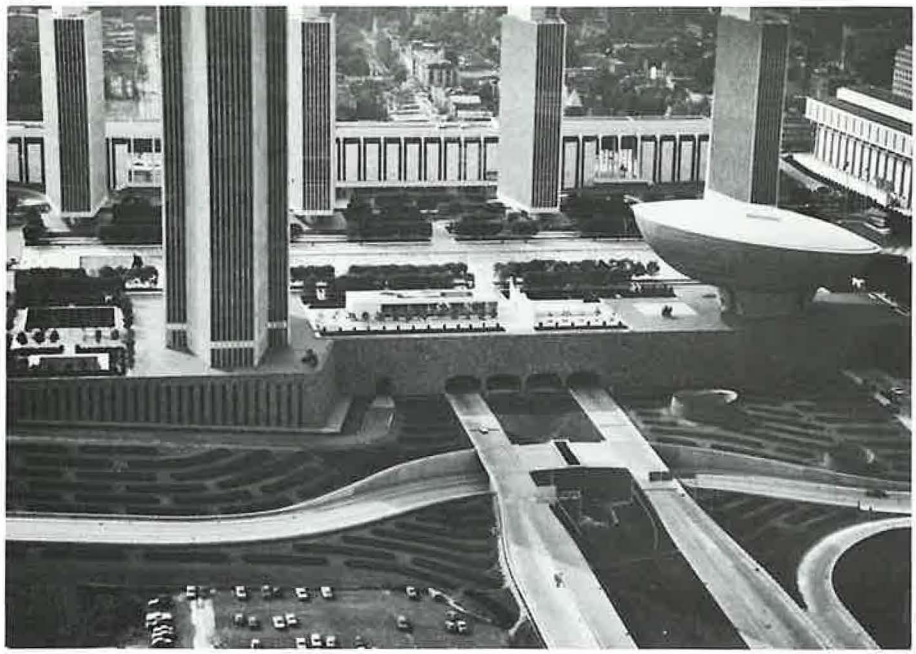
Seven Mile Bridge under construction in the Florida Keys. Completed in 1982, it is currently the longest continuous segmental bridge in the world: 35,000 ft.



IMPROVED TRANSPORTATION PRODUCTIVITY

Transportation productivity is crucial not only to every mode of transportation, but also to the economy as a whole. Because transportation is an essential factor in virtually all industries, improved transportation productivity will affect the price and competitiveness of nearly everthing produced by the nation.

Improvements in transportation products and services have been so pervasive in recent history that the public



The superb blending of arterial highway with landscaping and architecture results in an admirable urban environment at the Empire State Plaza in Albany, New York.

takes continued progress for granted. Jet aircraft, Interstate highways, container ships, automated transit systems, unit trains, and thousands of other innovations have led to safer, less expensive, faster, and better transportation that has substantially changed the economic structure of the world and the mobility of people. Countless engineering advances and laboratory successes have led to these gains. Whereas further improvements in transportation products and services can bring continued advances in economic conditions and life-styles, achieving these advances requires investment in innovation. Public/private partnerships for research and development may be effective in many instances.

In the public sector of transportation, investment in innovation is lost because of tight public agency budgets, the uncertainty of research results, diffused organizational responsibility, the extended development periods associated with innovative techniques, and the short office terms of key officials. The U.S. highway industry, for example, devotes less than one-fifth of one percent of its total spending to research and development, although the payoffs of many research and development initiatives could repay their costs many times over.

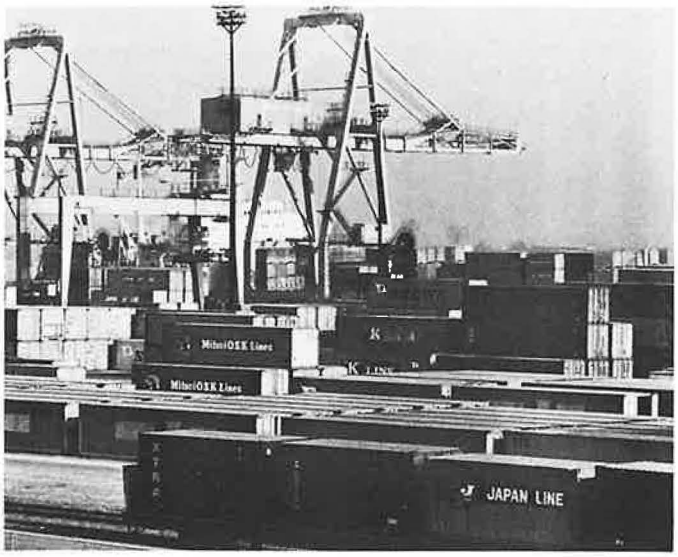
The Strategic Transportation Research Study, completed by the Transportation Research Board, has identified some major high-payoff areas to which new research could be productively targeted. The challenge at this time is for state and federal transportation agencies to find a cooperative way to commit a critical mass of research and development resources to promising major projects with high potential for major breakthroughs in productivity.

TRANSPORTATION AND ECONOMIC DEVELOPMENT

Throughout history good transportation systems have been recognized as being essential to commerce. Nevertheless, most transportation investments are made with little knowledge of their full economic consequences. Because transportation funds are limited, they must be targeted to areas in which they will most benefit the economy. All modes of transportation, from public transportation to inland waterways, influence economic development; investments in these modes could be improved through a fuller understanding of their consequences.

Investments in transportation depend primarily on expected economic return, but there has been little research to define how and to what degree transportation investments influence the economic development of a country, a region, or an industry. Government policies, subsidies, and taxes influence which mode carries goods, but there is little information on the effect of transportation costs on the competitiveness of products or regions. For example, as financial constraints force companies to reduce their inventories and rely on "just-in-time" receipt of raw materials and parts, transportation becomes a key to uninterrupted production. This situation exemplifies the importance of having knowledge of the costs and value of high-speed predictable transportation services and how these costs should be apportioned.

Governments regulate the transportation of passengers and freight. They at-



Wharfside container-handling activity at the Port of Portland.

tempt to assure the public and industry of a sound, safe transportation system available at a reasonable price, and they control the merger of transportation providers because of the potential adverse impacts on economic development. Yet they must act with little information about the economic consequences.

Improved investment, regulatory, and operating decisions could result from better understanding and evaluation of the relationships between transportation services and economic development at industry, firm, national, regional, and local levels.

IMPROVED TRANSPORTATION SAFETY

Of all transportation issues, safety captures the most public attention. Whether the issue is air traffic control, railroad derailments, increased use of larger trucks, or drunken drivers, the public is keenly aware of the risks of transportation and is constantly seeking ways to reduce them. Many of these risks affect all forms of transportation. For example, drinking and driving is not just an automobile problem; a similar problem is confronted in other modes, such as pleasure boating, private flying, and railroads.

Although safety issues pervade the entire transportation sector, they are particularly prominent in the area of highways. Severe anti-drunken-driver laws, air bags, seat-belt- and child-restraint-use campaigns, the 55-mph speed limit, motorcycle helmet laws, design standards for road rehabilitation, designated truck routes, truck widths, motor-vehicle recalls, and a myriad of other highway safety issues are dominant in today's news.

Research has been particularly effective in improving the safety of transportation. Fatality rates for all the major modes have been dramatically reduced over the years through continuous improvements to vehicles, constructed facilities, and operations. For example, fatalities on Interstate highways, which incorporate some of the most advanced safety features, occur at the rate of only 1.54 fatalities per 100 million vehicle-miles. This is less than one-half of the rate experienced on primary highways (3.72 fatalities per 100 million vehicle-miles) and less than one-third of the rate experienced on rural secondary routes (5.34 fatalities per 100 million vehicle-miles.)

Although the number of deaths from highway accidents has been decreasing recently, the current total of approximately 45,000 per year is still unacceptably high. And when the 1.7 million disabling injuries and the $41 billion in medical costs and lost wages are considered, the magnitude of the problem continues to demand research priority. A companion need is improved technology transfer between safety research and the government units that use the research.

Research has been particularly effective in improving transportation safety; fatality rates for all modes have been dramatically reduced over the years.

The increased attention being given by the media, the legislators, and the public to transportation safety problems will not lead to workable solutions unless the underlying behavioral, technological, economic, legal, and organizational issues are assessed carefully and unemotionally.

PUBLIC-SECTOR TRANSPORTATION FINANCE

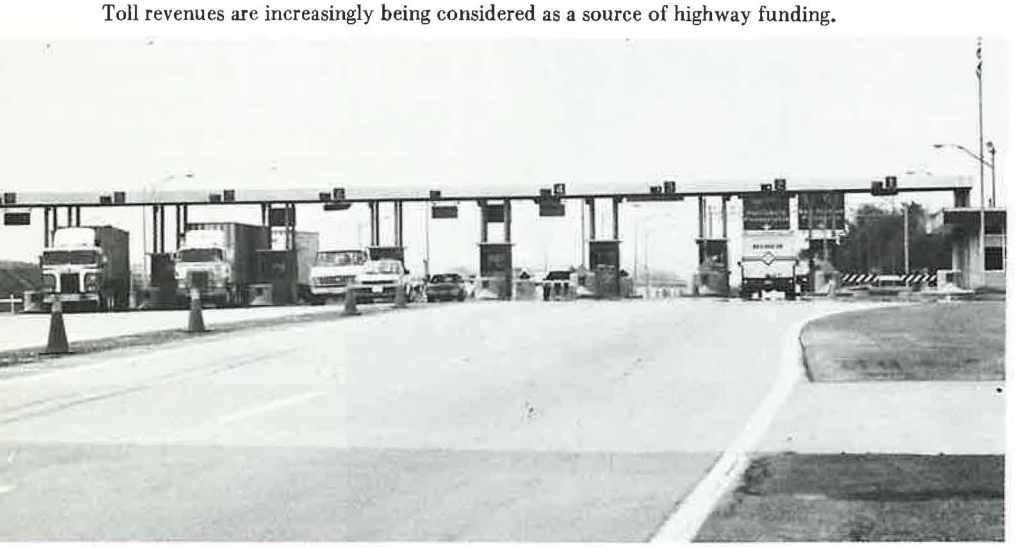
Public finance of transportation facilities remains critical because of uncertainties and delays stemming from competition for scarce investment funds among regions, modes, and programs; economic pressures throughout the economy; realignment in the roles of the different levels of government and the users of transportation systems; and the organizational context in which public investment decisions are made.

The proper role of user fees to finance public investment in highways, air travel, waterways, ports, and transit will continue to be a major issue in transportation finance. For the modes that have in the past relied mostly on general revenues, the issues include (a) determining what fraction of costs should derive from fees and the forms that pricing structures should take, and (b) balancing the advantages of user financing against the purported social payoffs of subsidies.

In the case of highways, the recent federal gasoline tax increase has relieved some of the immediate pressure, but in a few years additional financing will be needed. In addition, several fundamental issues remain to be resolved. State and local governments are concerned that federal money be distributed equitably and reflect a balanced approach to requirements for preservation, safety, and new construction. At the same time, federal funds for highways are being stretched thin because of reductions in revenue caused by the gasahol exemption and other exemptions from the motor fuels tax. Future revenues will be even more thinly stretched as gasoline consumption per vehicle declines owning to the introduction of more fuel efficient vehicles. These revenues could be further diminished and equity among users impaired if the taxes for heavy vehicles, approved by the Congress in 1982, are repealed.

The financial problems facing urban public transit are unique among the various modes, because of their severity and because of the uncertainty over whether future funding levels will be adequate to sustain present operations and finance planned expansion and renewal. Transit is dependent on an ad hoc amalgam of federal, state, regional, and local revenue sources for capital and operating subsidies, and these arrangements are subject to drastic revision on short notice. Transit desperately needs to find stable and predictable long-term revenue structures.

Toll revenues are increasingly being considered as a source of highway funding.

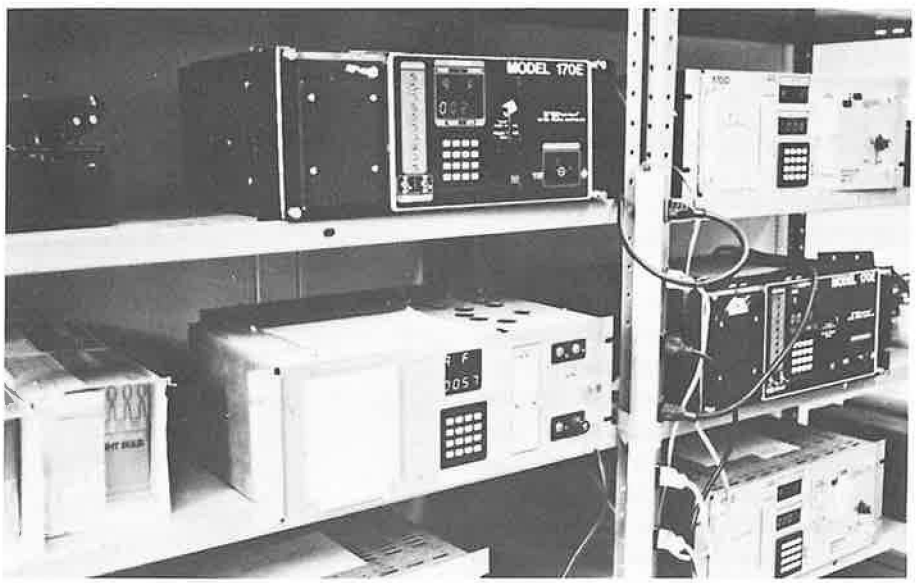


PROCEDURAL COMPLEXITY OF GOVERNMENT TRANSPORTATION DECISIONS

Government transportation decisions affect many areas of public concern, including residential dislocation, noise, environmental damage, costs, inflation, dissection of urban neighborhoods, developmental consequences, transit patronage, and budgetary deficits. Responsible public decisions must reflect all such concerns, but the mechanisms that have been created to ensure that these varied voices are heard may be far more cumbersome than necessary.

All modes of transportation must interact with public agencies. Airport flight patterns, bus schedules, truck routes, and many other transportation actions must meet various public safeguards. Because of their extraordinary visibility, however, construction decisions for highways, transit, and airport facilities are particularly subject to review, and procedures have been established to ensure attention to environmental, aesthetic, and social concerns.

Many of the safeguards are necessary reactions to substantial problems. But the safeguards themselves have been abused, and the excessive restrictions that are used to delay or thwart beneficial projects impose real social and economic costs. Effective new techniques must be found to cut through the delays so that the payoff of new transportation investments is not lost because of procedural paralysis.



State-of-the-art solid-state controller used to activate intersection signal lights.

CHALLENGE OF THE HIGH TECHNOLOGY/INFORMATION AGE

Breathtaking advances in computer and microprocessor technology bring new opportunities and challenges to every aspect of transportation. During the past 25 years, computers have become a familiar part of operations in airlines, transit, railroads, trucking, and every other form of transportation. As computer applications become faster, less expensive, and more powerful, they should proliferate, improving the efficiency and effectiveness of transport services. But at the same time, technological advances are ushering in an information age that will change the demands and expectations placed on transportation systems.

Already computers are used to monitor and regulate vehicle movements in the air, on the seas, and on the highways and the railroads. New technology provides the opportunity to continue these trends with more sophisticated and safer air traffic control systems, efficient computer-based highway traffic signal and metering systems, and advanced and economical signal and switching systems on railroads. Researchers will be able to use advanced vehicle simulators to assess the human factor element of design in a safe environment. Automated data gathering, computer-based fare collection, and improved management information are other systems that are operating more effectively by means of the new technology.

While providing opportunities for safer, more efficient transportation systems, new technology will also foster basic changes in the economic and social structure of the United States that will alter the demands for transportation services. An information-based society will be less concerned with the movement of bulk raw materials than is a society based on heavy industries. Advanced communication systems will permit more dispersed residential patterns, perhaps rejuvenating small and medium-sized cities. Commuting patterns will shift if more employees work at home or adapt to more flexible work hours.

Thus the new technology provides enormous opportunities to improve and enhance our transportation systems. However, at the same time it will challenge managers, administrators, and planners to keep these systems responsive to changing transportation needs.

TRANSPORTATION AND THE U.S. COMPETITIVE POSITION WORLDWIDE

Sound domestic transportation policies can improve the U.S. position in world trade. The United States has lost ground in world competition due to many factors, including high monetary exchange rates, high domestic labor and production costs, foreign trade barriers, and foreign government subsidies. Internal transportation policies may also have contributed to this decline by making U.S. exports more costly to deliver to world markets. Bulk, relatively low-valued exports such as coal and grain are particularly sensitive to increases in transportation costs. Actions that affect the transportation of these goods, par-

Grain shipping from Michigan to the East Coast for transshipment to foreign markets.

ticularly policies affecting waterways, railroads, and maritime transportation, can significantly influence the balance of trade.

Many public policy questions relate to transportation and international trade. For example: Will enactment of domestic user fees place domestic firms at a comparative economic disadvantage? Should there be a redefinition of U.S. maritime policy, and what would be the consequences on exports and imports? Should there be an aggressive policy to capture a greater share of world shipping, especially for U.S. exports and imports? U.S. policy on such issues is currently in flux. Research on the impact of alternative policies can help to develop sound policies.

As the cost of inventory in shipment increases, greater concern will be given to reducing transportation costs, improving the quality of service, and reducing the time in transit. Some improvements in the U.S. international trade position will come through private-sector investments in improved transportation facilities. Other improvements in trading strength could be made through public-sector actions that exploit current technological capability and that keep public actions attuned to changing needs.

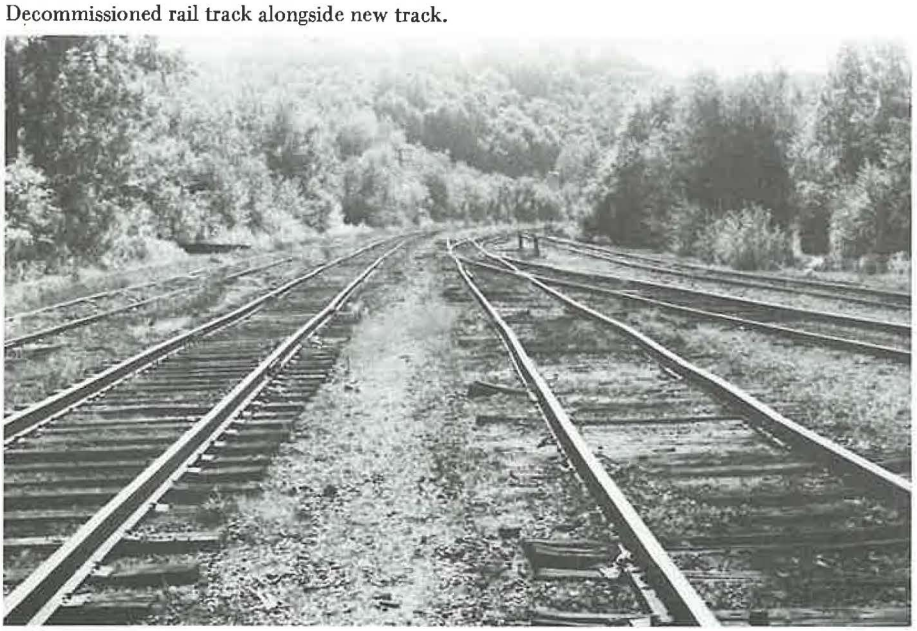
DECOMMISSION OF EXISTING INFRASTRUCTURE

The decommission of low-priority infrastructure is just as important as the repair of high-priority facilities. Although much well-deserved attention has been focused on deferred maintenance, part of the infrastructure problem has been an inability to concentrate support on the most crucial and most essential facilities. Inadequate attention has been concentrated on the most important facilities partly because resources are spread too thin and priorities are too diffused.

Selected railroad branch lines, primary highways that have been superseded by Interstate routes, declining transit routes, and various other parts of the transportation infrastructure may have outlived their usefulness, and continued public attention to them diverts resources from more pressing problems. But decommissioning is difficult. The firms and people that have located around existing facilities may be significantly hurt by a denial of continued public support for them.

The decommissioning of outdated, redundant, or inefficient infrastructure involves identifying unnecessary facilities, and exploring other alternatives for their support (such as increased user fees or direct subsidies from the industries or localities affected) or withdrawing them in as fair and nondisruptive a manner as possible.

Decommissioned rail track alongside new track.



ECONOMIC REGULATION OF TRANSPORTATION

Government no longer plays its former role of economic regulator and protector in most transportation industries, but now simply referees the competitive struggle. As a result, carrier managements have greater freedom—including the freedom to fail. Recent reductions in the amount of economic regulation of transportation industries have profoundly shifted the relationships among government, carriers, and consumers. Labor, in particular, is affected by the regulatory changes that have been made for airlines, railroads, trucking firms, and intercity bus operators.

In an era when each market was served by only one or a few regulator-approved carriers, all firms faced similar operating costs, and prices and revenues were generally set by the regulators. In such a sheltered environment, labor was deeply insulated from competition elsewhere in the work force. Some wages, especially those of pilots, locomotive engineers, or other skilled workers in key positions, rose appreciably.

As regulatory barriers began to weaken, new firms entered the field. Small, more efficient, and often nonunion firms offered tough competition, especially in the regulated carriers' most lucrative markets. High labor costs started to become a burden to unionized operators.

United Airlines advertisement demonstrates one of the effects of airline deregulation.

CHANGING CHARACTER OF URBAN TRANSPORTATION SERVICES

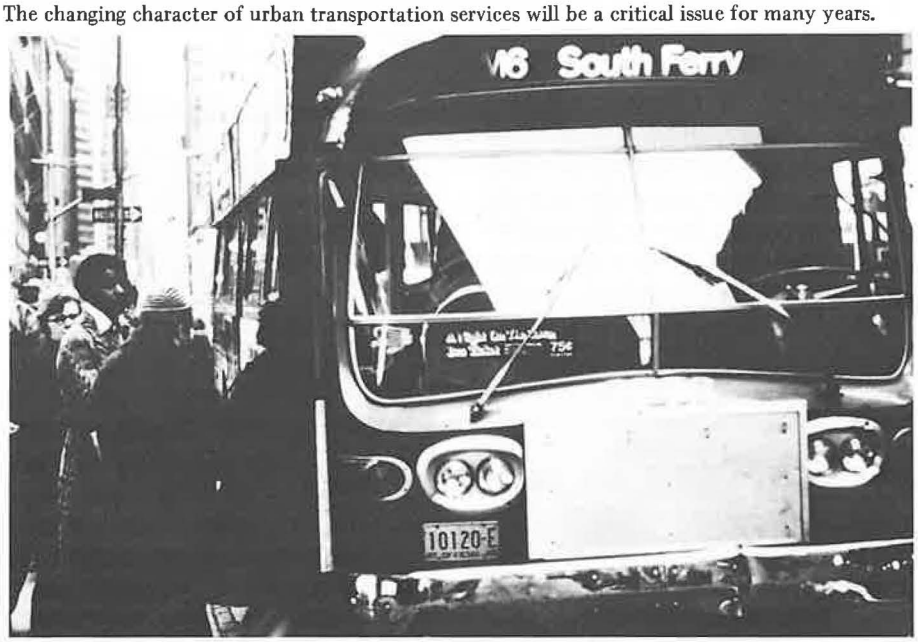
Changing attitudes at all levels of government are bringing to a head the clash between expectations and realities in urban public transportation. Expected to operate like a private enterprise financially, transit services are nonetheless severely constrained by law and custom in exercising normal managerial discretion in fare-setting, service decisions, labor negotiations, equipment purchasing, day-to-day supervision, and numerous other aspects of service. Federal, state, and local regulations compound the problem. Yet the character of these services is changing to reflect new patterns of urban development, new levels of affluence and automobile dependency, new expectations of government services, and new attitudes of public-sector management. New, locally tailored solutions that balance passenger convenience, budgets, local political control, managerial autonomy, and federal concerns are critically needed.

The strain of paying for existing urban transportation services is approaching the breaking point in many localities. The public continues to voice support for transit while it refuses to approve funds for needed repairs and services. Public outcry to add more and better services frequently is not matched by subsequent patronage. Public officials, feeling the squeeze between high public expectations and limited financial support, increasingly respond by involving themselves in operating decisions. Many of the long-term solutions—hiring part-time drivers, subcontracting selected services, enforcing reasonable production levels on staff, or facilitation of competing private-sector services—involve complex labor negotiations and appear prohibitively remote and cumbersome to management. Many transit managers face a host of urgent short-term crises and simply cannot afford to spend time on some of the fundamental structural shortcomings.

The changing character of urban transportation services will be a critical issue for many years, and analysis of the services, organizations, and policies that reflect these changing conditions can contribute substantially to an effective resolution of this complicated issue.

Since deregulation, management, labor, and government have been adjusting to far-reaching changes. As firms and services change, consumers are faced with fluctuating prices and unstable services. Particularly in small towns, users are complaining about discontinued service or increased prices. The safety of deregulated industries is also becoming a dominant issue. The current talk of reregulation may be premature, but it reflects a deep, permanent concern: finding a stable government role that will create enough competition to encourage productivity, afford enough security to permit employees to lead normal lives, and give consumers safe, convenient, and reasonably priced services.

The changing character of urban transportation services will be a critical issue for many years.



Improved highway maintenance is essential.

IMPROVING TRANSPORTATION MAINTENANCE PRACTICES

All forms of transportation rely on the good operating condition of their vehicles and constructed facilities. Variations in human performance lie at the heart of maintenance; adequacy of maintenance cannot be easily gauged from the measured input of work, materials, and equipment. Inadequate maintenance can impose severe burdens in terms of safety and rehabilitation expenditures.

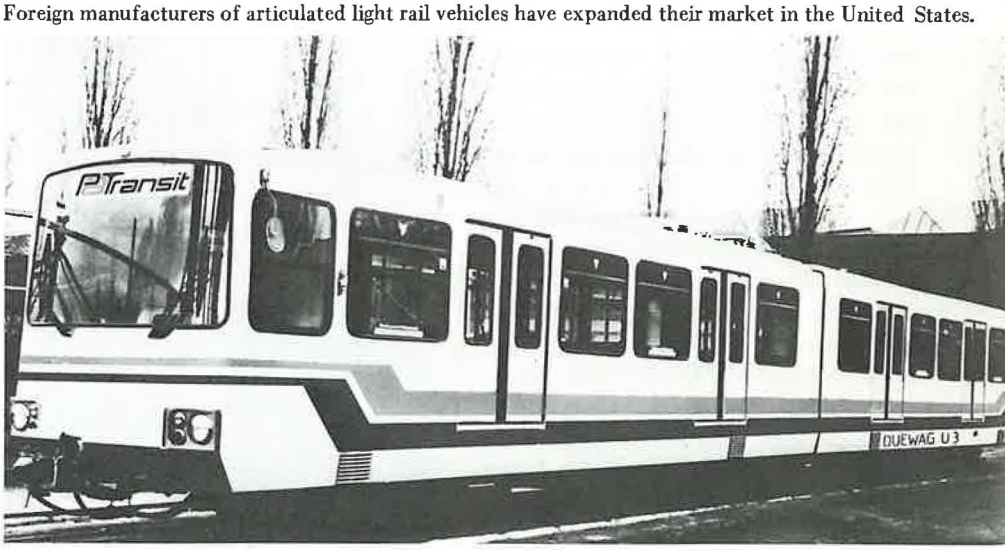
Although substantial data on highway maintenance management and practices have been collected, no comprehensive body of procedures or methodology has yet been conceived to apply or correlate these data in making better decisions on deferred maintenance, preventive maintenance, or routine maintenance. Recently developed systems concepts have received little application within highway maintenance. Vehicle designs have not given adequate attention to maintainability and to the consequences of actual field maintenance practices. Much attention is given to where transportation systems are to be located and to the choice of the system, but little or no attention is given to initial planning of the expected life of components; e.g., bridge deck, guardrail, whether components will be repaired or replaced when failure occurs, and the maintainability of the system during its projected lifetime.

Improvements in the efficiency, effectiveness, and productivity of methods and manpower can come from automation, better records, and improved use of records. But these gains will be realized only by systematic resolution of the problems in transportation maintenance.

LOSS OF THE TRANSPORTATION EQUIPMENT MANUFACTURING INDUSTRY

For many years U.S. automakers completely dominated the domestic automobile industry. However, foreign producers have now made substantial gains in the U.S. market. Similarly, fewer domestic firms manufacture transit buses than in previous years, and they account for a reduced share of sales to American cities. Of the five domestic railcar manufacturers that supplied rapid transit cars in 1975, only one still produces transit vehicles today, and that one has become a subsidiary of a German steel manufacturer. Except for U.S. naval vessels, few ships are built today in American yards. Even commercial aircraft manufacturers face increased competition from abroad. Foreign competitors have captured the small commercial plane market, and overseas consortia are even threatening the domestic U.S. dominance in large-plane production. In the area of new transport technologies, such as high-speed trains, magnetic levitation development, air-supported ground-effect vehicles, and other advanced design equipment, the U.S. position is far behind countries such as France, West Germany, and Japan. This loss of man-

Foreign manufacturers of articulated light rail vehicles have expanded their market in the United States.



ufacturing output threatens the very survival of some segments of the transportation equipment industry.

In many ways, the experience in transportation equipment manufacturing mirrors what has happened in other areas of the economy. Foreign competitors, often subsidized by their governments, have made substantial inroads into U.S. markets and have driven American producers from many world markets. But there are strategic reasons for wanting to preserve a healthy domestic transportation equipment manufacturing sector. Measures that enhance the strong research and development capability of this sector may be a key to its long-term survival. Solutions are complex because this is predominantly a private-sector issue. Because many areas of national interest are intertwined, the government must coordinate closely with the private sector to ensure that public concerns are addressed.

CONGESTION OF TRAFFIC FACILITIES

Many factors influence the use of transportation facilities. The economy fluctuates; the population grows or shrinks or moves to new locations; inaccurate predictions may lead to undesirable actions; or accurate predictions are not acted upon because of budget constraints or interpretations of the public will. As a result of these influences, many existing transportation facilities are congested, causing inefficient operations.

Congestion plagues all forms of transportation, but it is particularly severe for air and highway transportation. The introduction of new, large-capacity aircraft and new air traffic control devices has helped to offset airway congestion. Deregulation, however, encourages the use of small aircraft, which increase congestion. Continued growth in air traffic will further compound the problem. Furthermore, as air traffic volumes continue to increase, the capacity of the ground facilities at airports will be increasingly strained.

Highways, particularly suburban highways, are severely congested in many areas. Engineering solutions to many of these problems are intertwined with environmental, safety, and aesthetic concerns. Research on techniques to increase the capacity of existing facilities and on methods to increase the capacity of facilities in ways that are harmonious with other community objectives will shape innovative solutions to highway congestion problems in the years ahead.

Solutions to highway congestion must consider environmental, safety, and aesthetic concerns.

TRANSPORTATION AND ENERGY

Since the oil embargoes of 1973-1974 and 1979, the United States has been acutely aware of its dependence on imported petroleum and particularly awakened to the economic disruption that dependence can create. Transportation, which uses more than half of all petroleum consumed, is more affected by this threat than any other sector of the economy.

All modes of transportation—automobiles, trucks, airlines, railroads, and transit—continue to develop more energy-efficient vehicles and operations to keep costs down and to provide insulation from the shocks of possible future disruptions in energy supply. Automobiles have undergone major changes in power plant, transmission, aerodynamic design, and lubricants. Truck designs have exploited high torque-rise engines, lock-up clutch fans, and a variety of methods to diminish air resistance. Airlines have introduced new jet engines, materials, and designs that are substantially more fuel efficient than their predecessors. Railroads have developed efficient new locomotives and are conducting major research programs to shave energy use throughout their operations.

Streamlined operations have also helped to save energy. Increased load factors on airlines, trucks, and railroads have reduced the energy required per unit transported. Computers and improved equipment will continue to consolidate loads, exploit efficient routings, and make other improvements that reduce the consumption of energy. Systemwide energy efficiency will be further improved through intermodal transfers as long-term location and shipping choices reflect higher energy prices.

Although improvements in energy ef-

More energy-efficient vehicles and operations continue to be developed for all modes of transportation. This truck design incorporates a windshield to diminish air resistance.

ficiency pervade transportation equipment and operations, research to provide further advances continues to be a top priority. The possibility of future disruptions in the supply of petroleum poses a constant threat to mobility and the economy. Increased energy efficiency can greatly diminish the disruption associated with curtailments of petroleum supply. Making these long-term improvements requires continued stress on energy efficiency, even when energy supplies appear adequate.

ENVIRONMENTAL CONSEQUENCES OF TRANSPORTATION

Transportation, concentrated by its nature around industrial and population centers, frequently conflicts with the environment. Noise, air pollution, visual blight, water pollution, harm to wildlife, and dislocation of existing activities count among the byproducts of transportation. Technology has greatly helped to diminish many environmental problems, but as more and more goods and people are being transported, environmental issues continue to dominate many decisions.

Although all modes of transportation make noise, emit chemical pollutants, consume valuable space, and otherwise affect the environment that surrounds them, the greatest environmental disputes appear to center around road and air transportation, owing to their scale and noisiness, respectively. Remnants of the incomplete combustion of carbon-based fuel can cause respiratory irritation; traffic noise can cause both physical and psychological harm; water quality can be impaired as chemicals used on roads leach into the soil; scenery can be scarred as highways are constructed through geographically interesting or architecturally noteworthy areas; homes and businesses may be forced to relocate because of highway construction; and wildlife may also be displaced by roads and their traffic. Public agencies have taken numerous actions to improve the harmony between highways and the environment. Despite the impressive ingenuity and adaptability of the highway sector in combating environmental problems, the ubiquitousness and massive proportions of the nation's highway system mean that environmentally damaging aspects of this system will require continual attention.

Aircraft noise also commands priority attention among transportation environmental issues. As air traffic continues to grow, many airports are expanding. So too has urban growth near airports, which has often been permitted to go unchecked. Airports have been unable to establish noise covenants that would help ensure that growth in surrounding areas is compatible with the environment. Passenger preferences for convenient, close-in air terminals and for frequently scheduled flights have resulted in high noise exposure for many urban neighborhoods. New aircraft and flight plans have greatly reduced the noise for individual flights, but communities continue to struggle for better solutions.

Research can create a more harmonious relationship between transportation systems and the environment through advances in vehicular technology, by refinement of operating practices, and by altering transportation decision-making procedures to accommodate growing environmental concerns.

INVOLVING THE PRIVATE SECTOR IN THE PLANNING PROCESS

Construction of transportation facilities affects, and is affected by, many private decisions involving zoning, development, expansion, and the like. This is particularly so for transit facilities, which are heavily intertwined with the communities they serve. Because of this interaction, the private sector has a legitimate voice both in building new systems and in determining who is best equipped to provide existing services.

In regard to building new facilities, such as new rail transit lines, private development decisions and private decisions about transit subsidies for employees or customers are closely linked to system success and should be part of the planning process. Also, because private land owners are the chief beneficiaries of increased property values re-

Barrier constructed along highway to help reduce traffic noise.

Private van pools can complement or substitute for public transit service.

sulting from transit development, the private sector should help government to improve the methods by which the public gets a fair share of these gains.

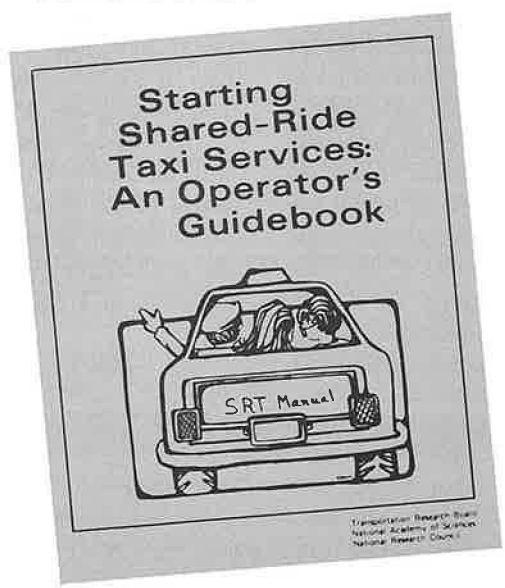
On the operating side, private van pools, subscription buses, and other services can either complement or substitute for public services. Achieving the best match-up again requires substantial private-sector involvement.

In brief, the tradition that has evolved, in which public transportation planners perceive themselves as ombudsmen for transit riders, should expand to represent private-sector interests that are affected by transit, private firms that provide various forms of transportation services, and public participation generally.

HIGHWAY GOODS TRANSPORTATION

Highway goods transportation is one of the most important issues of our time. Highway design, condition, finance, productivity, and safety are all profoundly influenced by truck traffic. The allocation of highway cost responsibility of the large commercial vehicles is a hotly contested topic. Nonetheless, the condition of the nation's highways in undoubtedly affected by this traffic, as is the efficiency of operation of the carriers themselves. The size and weight of the vehicle fleet affect the costs of building and repairing roads, and the user fees established to recover these costs reflect an understanding of the basic technological and cost relationships. The safety of highway goods vehicles gains more public attention as wider and longer vehicles are now permitted to operate on large portions of the nation's highways, and also require reasonable access to terminals.

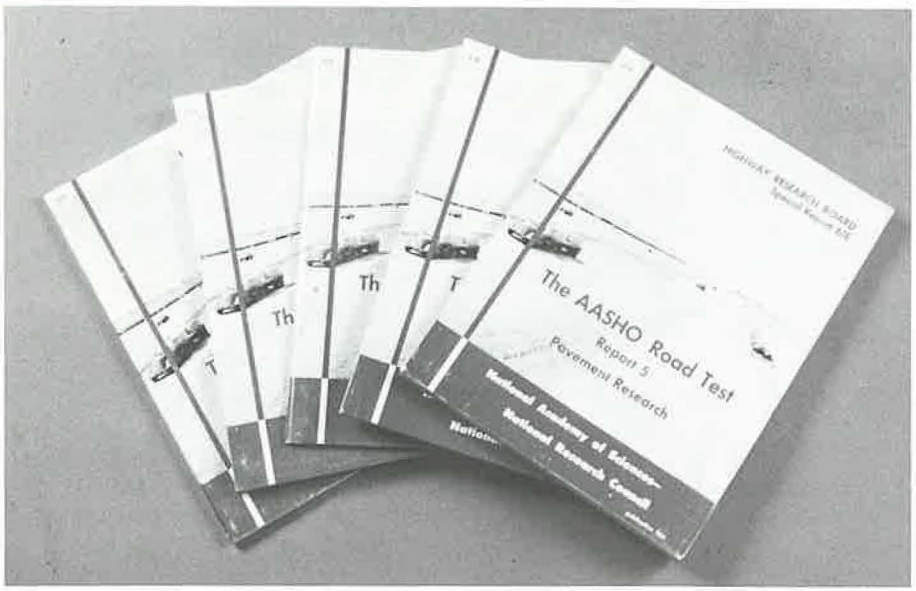
Guidebook, published by TRB in 1983, provides information on starting a shared-ride taxi service.



Highways are vital to the economy, carrying some 90 percent of the goods consumed in the country at some stage of their production or distribution. Many communities are dependent on highway goods transportation for all of their supplies. The cost of neglecting issues in this area, or dealing with them ineffectively, could be immense.

At the same time, for a variety of reasons, public awareness of and involvement in highway goods transportation is increasing. Some communities are asking that various highways be closed to trucks for safety or environmental reasons. Misconceptions of those problems abound in public perception. Achieving a balance between the need for trucks and concern about consequences of their use is becoming increasingly difficult.

The deregulation of highway transportation further confounds truck policy. The emergence of many new small carriers creates serious problems in anticipating and controlling truck movements. Enforcement of truck safety regulations has become more difficult as the number and territory of carriers have expanded. The difficulties of collecting certain truck taxes are evident. Such problems could place the large, visible, for-hire carriers at an unfair disadvantage with respect to other segments of the industry that are not as



The results of the AASHO Road Test, which provided data on the interaction between pavements and trucks, were published in 1962.

carefully monitored. Safety, efficiency, highway finance, and fairness could be compromised if all segments of the industry do not have to meet the same requirements.

Research on truck productivity, communications, safety, and road wear will continue to play a significant role in resolving these issues. The AASHO Road Test conducted a quarter of a century ago provided key data on the interactions between pavements and trucks. Long-term monitoring of the system could greatly improve how roads are built, operated, and financed in the years ahead.

CALL FOR ARTICLES

Professionals in the transportation field are invited to submit to the *TRNews* Editorial Board topical articles on innovative or state of the art aspects of the various modes of transportation. 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.

Letters to the Editor are encouraged that offer commentary on feature articles or responses to point-of-view articles, or in general discuss issues related to transportation research or to TRB activities. Comments are also welcome on the changes in format, design, and contents, since the change in editorship of *TRNews* beginning with the January-February 1984 issue.

All articles and letters received will be reviewed by the Editorial Board of *TRNews* for suitability for publication. For further guidelines, see Information for Contributors on the inside back cover.

—Nancy A. Ackerman, Editor