

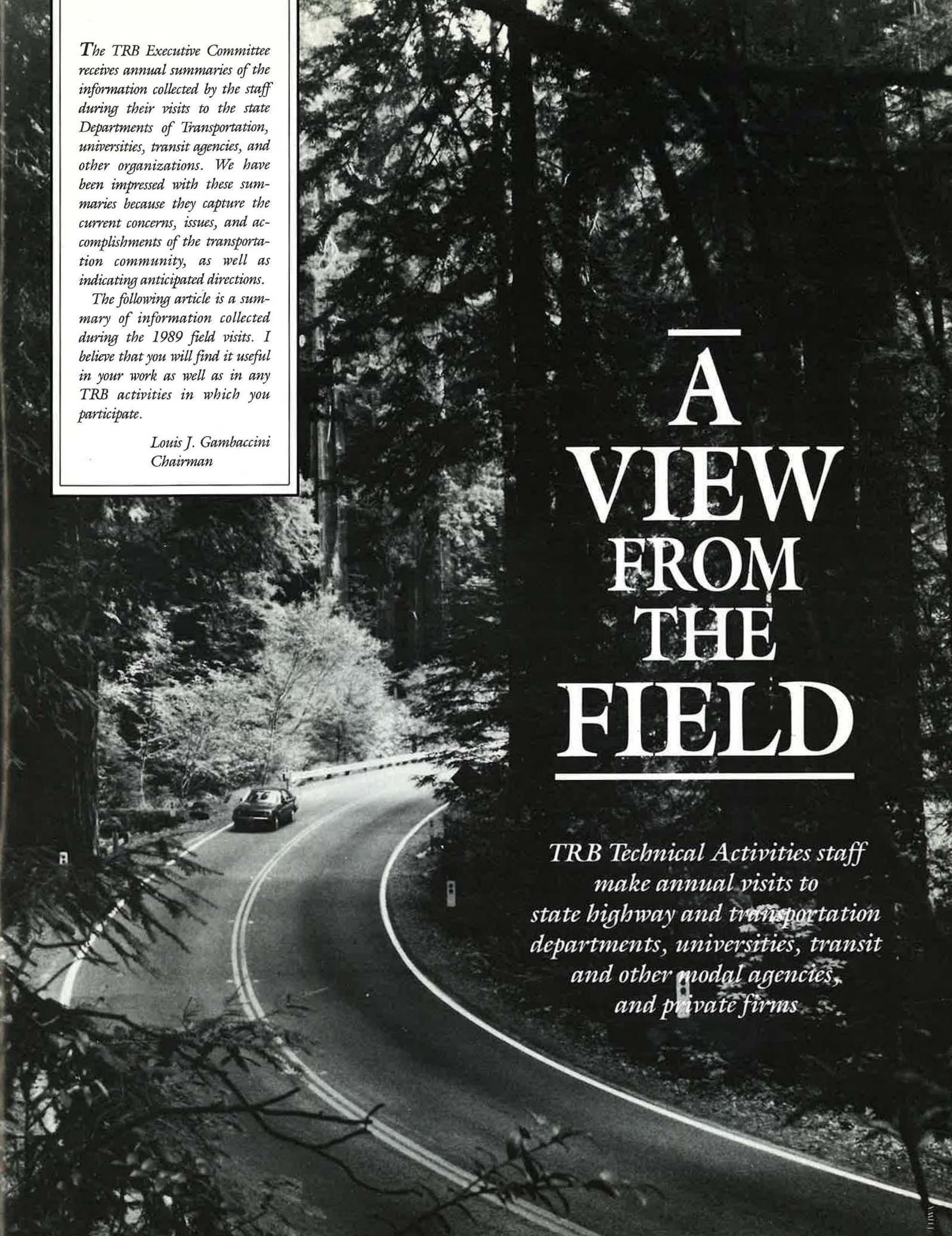
*The TRB Executive Committee receives annual summaries of the information collected by the staff during their visits to the state Departments of Transportation, universities, transit agencies, and other organizations. We have been impressed with these summaries because they capture the current concerns, issues, and accomplishments of the transportation community, as well as indicating anticipated directions.*

*The following article is a summary of information collected during the 1989 field visits. I believe that you will find it useful in your work as well as in any TRB activities in which you participate.*

*Louis J. Gambaccini  
Chairman*

# A VIEW FROM THE FIELD

*TRB Technical Activities staff  
make annual visits to  
state highway and transportation  
departments, universities, transit  
and other modal agencies,  
and private firms*



*Congestion is getting worse*

*Air quality standards are not being met*

*Transportation professionals are an endangered species*

*Federal transit funds are being cut*

*Aircraft safety is a concern*

**T**he news from the field in FY 1989 was not altogether rosy, but in most cases long-term plans and legislation are being developed to contend with these and other transportation issues. During the year, 11 TRB Technical Activities staff traveled thousands of miles to visit all state highway and transportation departments, a number of universities, transit and other modal agencies, and private firms, continuing a tradition that began in 1945.

By meeting with transportation professionals, TRB staff can learn of problems that face the organization they visit and share solutions; they can learn of ongoing or proposed research there and inform the organization of other research that is already in progress to avoid duplication of effort; and they can identify new methods that might have application elsewhere. In short, personal visits allow one-on-one discussions of the state of transportation in the United States.

In addition to their function as a bridge between TRB and the transportation community, field visits can help to identify potential candidates for TRB standing committees, NCHRP panels, and special project committees.

Of course, not all the news for 1989 was bad. Intelligent vehicle and highway systems offer an exciting prospect; computer-aided design packages are helping states digitize maps and monitor traffic; and seat belt use is on the rise, and drunken driving is on the decline.

Following is a summary of the individual reports submitted by Technical Activities staff. The subject areas covered are planning and administration;

environment; design; materials and construction; soils, geology, and foundations; traffic operations and safety; maintenance; and transit, aviation, rail, and water transport.

### Planning and Administration

Information being gathered in the Transportation 2020 Consensus Program indicates that changes will most likely be needed in state and urban planning. Some states are currently reviewing their procedures before shifting emphasis, for example, from new construction to rehabilitation.

Suburban congestion is receiving increased attention as innovative traffic management techniques to reduce it are considered. States are initiating planning, research, development, and implementation strategies on advanced vehicle and highway technologies. This surge in interest has resulted from worsening traffic congestion and the inability of many urban areas to meet Environmental Protection Agency air quality standards. Financial and human resources, cooperation between public and private groups, standardization of components, intergovernmental cooperation, and liability are all important considerations.

As part of the overall planning process at the state and local levels, more attention is being paid to the development of near-term operational plans and long-range comprehensive plans, with greater emphasis on long-range planning. There is considerable interest in applying the

Geographical Information System (GIS) to transportation. GIS permits many types of transportation information to be inventoried and mapped together. The introduction of this technology into day-to-day operations of state and local departments of transportation can be expected soon.

### **Finance**

During the past decade, the real price of gasoline, discounted for inflation, has decreased despite continued hikes in state and local motor fuel taxes. The demand for motor fuels has been increasing (2 percent forecast this year), and the United States is once again demanding more foreign oil. There has been a radical change in the market structure of the oil industry, and a few companies are greatly adding to their market share, thereby reducing price competition. At the same time, the refining capacity of the industry is reaching its limit. As a result of sales of larger and higher-performance vehicles and the elimination of leaded gasoline, more highly refined fuels are necessary. Even though fuel economy standards have doubled during the past decade, many urban areas cannot meet the required air quality standards.

Consequently, there is growing interest in enacting federal motor fuel taxes for nonhighway general fund purposes. Proposals for a fuel tax of 10 cents to 1 dollar a gallon for deficit reduction are being discussed. Opponents of such use of motor fuel taxes assert that it would

1. Decrease economic activity and the number of jobs;
2. Induce inflation and higher Social Security Cost of Living Adjustment payments;
3. Be regressive, and would hurt poor and rural families most;
4. Increase the annual costs of operating a motor vehicle by \$5.25 for every cent of tax increase;
5. Decrease the ability of states to raise fuel taxes for transportation;
6. Decrease automobile production, especially U.S. manufacturers, resulting in layoffs; and

7. Reduce total fuel consumed and thus decrease current levels of user tax revenues.

Proponents, on the other hand, believe the tax would

1. Lower fuel consumption and thereby decrease dependence on foreign oil;
2. Decrease air pollution in urban areas and reduce the greenhouse effect;
3. Encourage improvements in motor vehicle fuel economy;
4. Not be regressive, because the real price of fuel has declined in the past decade;
5. Maintain producers' current prices, because consumption does not exceed production capacity; and
6. Not substantially affect the economy, because fuel consumption has proved to be a relatively inflexible demand.

Chrysler and Ford Motor Company have indicated that they would support a tax increase of 15 cents a gallon. A stand-alone bill might easily be defeated in Congress and vetoed by the president, but it might have a chance of enactment if it were combined with environmental issues or included in an omnibus appropriations bill, or both. Regardless of the outcome, such discussions may indicate a political unwillingness to exclude transportation funds from the normal unified general fund appropriation process.

About 20 states raised their motor fuel taxes during the past year. Half of these states had increases made effective by previous legislation. Currently, 33 states have motor fuel tax rates of 15 cents or more a gallon; half a dozen have rates of 20 cents a gallon. At the same time that transportation interests

are attempting to protect the dedication of highway user taxes, the states are stepping up the use of nonuser taxes such as bond funds, sales taxes, and general funds for highways and other modes. Legislatures are giving local governments the power to enact local motor fuel, sales, and income taxes to fund transportation programs.

### Manpower

State transportation departments continue to witness the retirement of employees who joined the agency shortly after World War II and these departments are now aggressively recruiting on college campuses. Engineer trainee programs are being improved; they generally consist of giving a new engineer experience in several divisions of an agency before a permanent assignment is made. Training programs are also being expanded for technicians and first-line supervisors such as maintenance superintendents.

Most civil service and merit systems were established in states to protect employees from undue political influence and favoritism in job selection and continuance in employment. Many states now find these systems too inflexible to encourage superior effort or performance from employees.

Legislatures have been declassifying key positions in transportation agencies and making the incumbent serve at the pleasure of the governor. Some states are reducing the number of job classifications and modifying the criteria for eligibility for positions. One key issue is the ability to recruit from outside the classified service for mid- and upper-level positions.

Although transportation programs continue to expand, governors and legislatures have been reluctant to raise authorized staffing levels, and transportation departments are relying increasingly on outside consultants and contractors to perform needed services.



James Scott (*center*), TRB transportation planner, is briefed on research under way at California Transportation Laboratory in Sacramento by technician Ronald Edwards (*left*) and Raymond Forsyth, former laboratory chief.

O'ROURKE, CALTRANS

## Environment

Several important environmental issues continue to be of concern to transportation agencies: (a) failure to meet air quality standards in urban areas; (b) use of hazardous materials in transportation rights-of-way; (c) environmental restrictions on transportation construction programs, especially wetlands; (d) needed alternative fuel sources; and (e) continued demand for noise barriers. Another administrative issue is the continual delays that occur when environmental impact statements are sent to outside federal and state agencies for review and comment.

### Air Quality

Under the Clean Air Act, states and cities were required to meet federal air quality standards for carbon monoxide and ozone by December 31, 1987. Congress extended the deadline to August 1988, but the 100th Congress failed to enact a new Clean Air Act. This left EPA with no power to enforce sanctions. Even though the motor vehicle fuel economy standards have almost doubled the average number of miles a gallon, air quality levels in more than 50 urban areas still fail to meet the mandated standards because of expanding urban development. When the EPA attempted to impose construction bans in a number of cities, Congress would not support the action and has not established definite sanctions for noncompliance. EPA is now attempting to establish a policy by which states would develop a new implementation plan for complying with clean air standards by 1990.

More stringent control of engine emissions and other environmental pollutants will be on the agenda of federal and many state regulators during the next few years. New diesel engine emission requirements for transit buses will take effect in 1991. The transit industry

Across the United States, millions of miles of roadway pass through or near wetlands such as this marsh near the Southern Tier Expressway in Erie County, Pennsylvania.

has requested that EPA grant a delay until 1994, when all diesel engines on new trucks will have to meet the same requirements.

### Hazardous Materials

As highways are widened and improved to meet growing traffic needs, a prime concern in the acquisition of rights-of-way is the potential existence of hazardous materials. Cleanup of surface contamination and leaks from submerged tanks and containers is costly and time consuming. Courts and enforcement agencies take a "deep pockets" approach under which transportation departments bear a disproportionate share of the costs. In addition, the rules for handling hazardous materials and their containment are not definitive, and the amount of cleanup needed is open to debate. EPA has issued final regulations for underground storage tanks.

### Wetlands

Environmental groups and the EPA continue to demand policies to maintain the nation's wetlands. Because of pressures to build on land, especially around coastal metropolitan areas, an estimated 450,000 acres of wetland are eliminated every year. EPA is intensifying its enforcement of wetlands regulations, and transportation agencies are required to mitigate wetland losses by creating new wetlands, often in substantially greater amounts than are lost in the taking of rights-of-way.

### Energy

Congress indicated concern over future energy sources by passing the Alternative Motor Fuels Act, which encourages the production of motor vehicles that operate on alcohol-based fuels. The act did not reduce the current 6-cent gasoline fuel tax exemption.



Diminishing domestic petroleum production has resulted in growing dependence on oil imports. In 1987 transportation alone consumed more petroleum than the United States produced. This dependence on foreign sources raises the question of whether the United States will continue to enjoy an uninterrupted and adequate supply of petroleum.

Alternative fuels are being considered as a means to ensure not only energy independence but also reduction of pollutants in the environment. The TRB conference "A Look at the Future, Year 2020" emphasized that although in the near term the petroleum-based supply is adequate to meet our energy requirements, worsening air quality and the greenhouse effect might be the driving forces that expedite the transition to alternative fuels.



FHWA

## Noise

Demand is increasing for new barriers along existing freeways. A good body of literature on their design exists, but there are still questions about noise reflection. Depending on the location and design of parallel barriers, there is a danger of raising the noise level caused by reflection from the barrier on the opposite side of the roadway. A better understanding of the dynamics of this phenomenon is needed.

## Design

In state highway agencies pavement management is administered either by planning, by pavement design, or by materials offices. States with good coordination between "hard side" and "soft side" interests appear to be making the most progress toward an effective pavement management program.

As a result of recent bridge collapses on major routes because of scour that undermined the foundation during floods, FHWA issued Technical Advisory T5140.20 in late 1988 to assist in evaluating scour potential, developing scour countermeasures, and improving the design of new bridges to resist scour. TRB recently conducted a review of the FHWA research program on scour.

A number of states are concerned with the length of time (three to five years) required for the design of new projects. A "hurry-up" design was reported to take two years.

Concern over design and construction specifications and anticipated future problems associated with the rehabilitation of concrete segmental and cable-stayed bridges has caused some states to avoid using these types of structures. Development of improved specifications and better techniques for repair of these bridges, especially the decks, could further their acceptance and use.

States that have computer-aided drafting and design (CADD) systems are rapidly advancing from drafting applications to digitized mapping and Geographical Information Systems.

As more pavements reach the end of



RENG

Repairs in progress to correct rutting in the heavily used outside lane of a western Interstate asphalt concrete pavement.

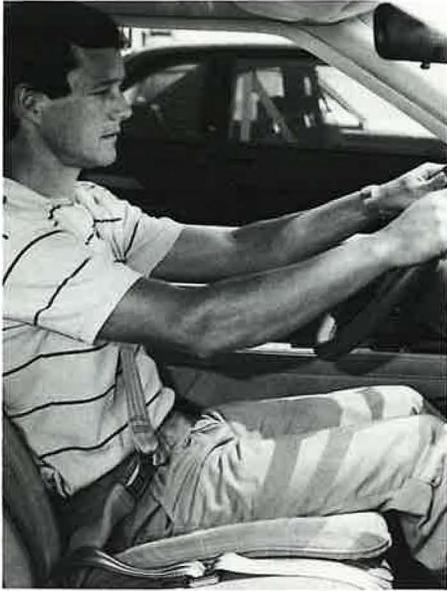
their design life, it is becoming evident that factors other than those originally considered in the design of pavements are important to their performance. As a result, SHRP is studying asphalt and the design of asphalt concrete mixtures that will better resist higher tire pressures and increased numbers of very heavy truck loads. Similarly, a recently completed FHWA study of 80 concrete pavements indicates that pavements built on well-drained bases and nonstabilized dense-graded aggregate bases outperformed those built on soil cement and lean concrete bases.

## Materials and Construction

States are considering the use of roller-compacted concrete for highways. At least one state will be using it for paving during the 1989 construction season.

Asphalt pavement rutting remains a major problem in most states. Wet asphalt pavement causes hydroplaning and wheel spin during acceleration. Research is being done on larger aggregate mixtures (1½ inch maximum) and changes in the sand fraction.

The need for well-trained people in construction is critical and will probably continue for the next five to ten years. TRB is currently working on an asphalt paving handbook; a college textbook is being written at the National Center for Asphalt Technology at Auburn University, where faculty also is trained; and Purdue University conducts six-week courses on highway materials engineer-



Seat belt use is about 46 percent nationwide.

INSURANCE INSTITUTE FOR HIGHWAY SAFETY

Some states have used insulation under pavements to reduce distress caused by frost heave. A better understanding of the effects of cyclic freezing and thawing on resilient moduli of soils is needed to develop a reliable method for calculating the magnitude of the frost heave.

More states are considering the use of open-graded bases or edge drains, or both, to provide adequate drainage of pavements. Use of geotextile aggregate and prefabricated drainage cores on highway projects is growing, although there is a lack of data on long-term performance.

Geosynthetics are being used more frequently in highway projects. In fact, selecting a geosynthetic for highway design can be difficult because of the number and diversity of products that are now available.

## Traffic Operations and Safety

### Operations

Traffic congestion remains a serious problem for U.S. urban and suburban areas. Many transportation departments are seeking alternative sources of revenue for these areas through local fuel or sales taxes and traffic impact fees. However, the potential of a federal gas tax increase of up to 50 cents for deficit reduction is raising concern over the ability of highway agencies to benefit from any voter-approved hike. Privately financed and operated toll roads are also under consideration in a few states.

Advanced technological remedies for the problems of highway operations are receiving more interest in both the public and private sectors. Intelligent vehicle and highway systems (IVHS) include (a) advanced traffic management systems, (b) in-vehicle driver information systems, (c) automated vehicle control, and (d) automatic vehicle identification and location for heavy vehicles. IVHS are considered by many to offer the best potential for obtaining the quantum increase that is needed in capacity. As a result, IVHS have become a major element of the proposed future highway program.

TRB, through Annual Meeting sessions, committee activities, NCHRP projects, and in-house staff activities, is focusing on the potential application of advanced technologies to highway operations. The private sector is also examining IVHS technology, although the need for standards, such as standards for communication between the roadway and the vehicle, is inhibiting industry's involvement to some degree.

Remedies for traffic congestion that are currently being applied by states include: (a) more effective use of existing street widths through provision of reversible and HOV lanes, shoulder use during peak hours, restriping to provide additional lanes, and parking prohibitions; (b) management of demand through staggered work hours and other traffic mitigation approaches; (c) freeway incident detection and management; (d) ramp metering; and (e) improved traffic signal control and optimization.

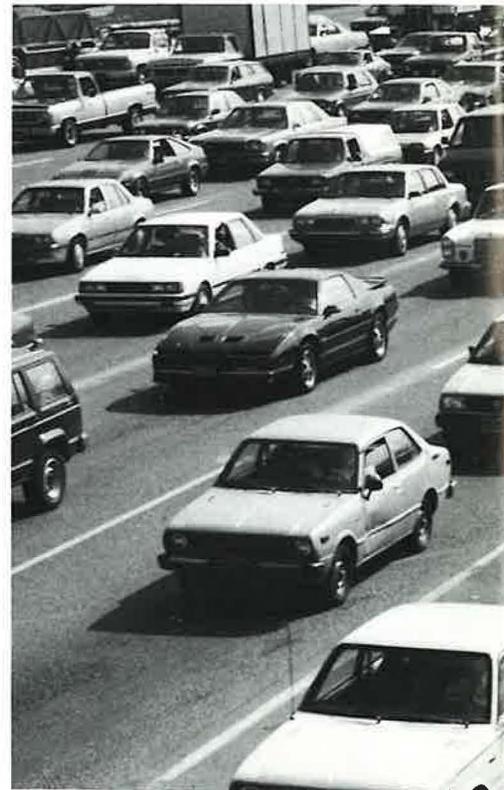
ing for the National Highway Institute.

Pressure is growing to use waste materials in highway construction. The large quantity of used tires that are accumulating around the country is cited most frequently, and incinerator residue and wastes associated with local industries add to the problem.

PYRAMENT™ has been shown, on a limited number of projects, to develop enough strength in concrete mixes to handle traffic within four hours. This makes "fast track" paving and rapid repairs feasible when the trade-off between time saved and extra cost can be justified.

### Soils, Geology, and Foundations

Many states use fly ash in pavement base courses even though it is not a federal requirement. Lime-fly ash aggregate bases have performed satisfactorily, but extensive groundwater monitoring is required to identify contamination caused by fly ash. States that have used fly ash as embankment fill material are concerned about corrosion of metal strips used for stabilizing the fill material.



## Safety

Analysis of preliminary 1988 data indicates a rise in the number of highway-related fatalities, but because of higher traffic volumes the fatality rate remained at 2.4 per hundred million miles of vehicle travel. States are investigating the methods and associated costs of leveling off or reducing the number of fatalities.

Seat belt use is about 46 percent nationwide. Substantial reductions in injuries and fatalities are being achieved by belt use; approximately 11,000 lives were saved between 1983 and 1987. Belt use laws were responsible for saving 6,900 of those lives, according to an NHTSA report. Further emphasis on raising use of occupant restraints is necessary to realize a full measure of success from this countermeasure. TRB has completed a study, *Special Report 224: Safety Belts, Airbags, and Child Restraints*, that recommends further research to help local, state, and federal governments attain higher occupant restraint use rates.

Drivers that have blood alcohol concentrations (BAC) above legal limits continue to be a major traffic safety problem; however, the various government and private efforts to reduce drunken driving are having some success. Statistics released by NHTSA, for example, show that the number of intoxicated drivers killed in traffic crashes decreased from 13,110 in 1980 to 10,103 in 1987; the percentage of drunken drivers killed in traffic crashes decreased from 46 percent in 1980 to about 38 percent in 1987; and the percentage of drunken drivers in fatal crashes who were 15 to 19 years old decreased from 28 percent in 1982 to 19 percent in 1987. The minimum drinking age law, a program used by all states, was reported by NHTSA to be responsible for a 12 percent reduction in fatalities for the drivers affected. To continue this trend several states are considering lowering the legal BAC to 0.08. A federal standard for a BAC level of 0.04 for commercial drivers was adopted along

with specific penalties for first and subsequent offenses.

The commercial driver's license (CDL) test materials (tests and model driving manuals) were operationally tested, revised, and completed. Work on developing the commercial driver's license information system (CDLIS) continued on schedule.

Tracking the effect of the 65 mph rural Interstate speed limit is a continuing concern at state and federal levels. NHTSA reports a rise of 19 percent in fatalities because of the higher speed limit.

Several states have gradually added corridor analysis and remediation programs. One state is examining some 27 arterials with speed limits of 40 to 45 miles per hour and about 50 fatalities a year per arterial. When capital improvement funds are not immediately available, driver behavior modification, for example, special signing and enforcement, would be applied to lower the incidence of accidents.



BOB COLIN, CALTRANS/INSTITUTE OF TRANSPORTATION STUDIES

HOV lanes have become increasingly popular in most states.

Driver education and licensing, though not priorities in NHTSA's program, are a growing concern at the state and local levels. More integration of education, training, and licensing is being discussed in several states.

TRB released its special report on older drivers, *Transportation in an Aging Society: Improving Mobility and Safety for Older Persons*, and states continue to develop local programs to adapt the highway system to the capabilities of an older user population.

There appears to be a growing use of and strength in community-based and community-run safety programs. In several states safety professionals find this an important development and believe that future improvements in safety should and will depend on community level programs.

## Maintenance

---

State and local governments have made great efforts over the last two decades to improve their management process, including performance standards.

State work forces are remaining constant or decreasing despite a heavier workload. The need is being met primarily by contracting out maintenance work and by emphasizing training and promotion of existing employees. States are making cost comparisons of performing highway maintenance, design, and inspection projects by using either state personnel or contractors. One state compared the quality of seal coat work performed by contractors with that performed by state personnel and concluded that there was little difference.

Development of bridge maintenance systems is a high priority in many states. Twenty-four states have agreed to participate in a value engineering study of the methods, materials, work crew loading, and equipment that may be used for safe and efficient maintenance, repair, and protection of bridge decks. The Organization for Economic Cooperation and Development is preparing a report on bridge management and one state has developed a maintenance manual for use on cathodic protected decks. Re-

moval and disposal of the residue when recoating with lead-based paints pose a major problem for a number of states.

Sensors to measure pavement temperature and moisture have been installed in about 40 states. Most are limited to demonstrations or installations at a critical site, but some have been incorporated into regional or statewide systems, sometimes with pavement weather sensors and weather stations. A study of the effect of the type of road surface (asphalt, concrete, brick) on the performance of deicing chemicals was unable to distinguish any differences in the quantity of chemicals required for snow and ice control.

Better patching methods have received considerable attention—cold mixes that incorporate fibers improved durability as did a fog seal over patches after placement. Infrared heating and the use of hot mix also provide durable patches but require extra effort.

## Transit, Aviation, Rail, and Water Transport

---

### Transit

As has been the case for many other domestic programs, federal transit funds have been sharply cut in recent years. Since 1980 transit funds have been slashed in half and further reductions can be expected. In the future, project applications for federal transit grants that are matched by local funds will be given higher priority consideration by the Urban Mass Transportation Administration (UMTA). These trends and changes clearly indicate that the federal government considers urban public transportation primarily a local issue, to be paid for by those who directly benefit from it.

To relieve grantees of some burdensome application requirements, UMTA continues to rely on self-certification provisions. Doing so should help minimize review periods and result in quicker approvals of grants. Other grant management improvements are being put into place; for example, UMTA

plans to put transit agencies on line with its computerized grant management system, which is designed to track financial, performance, and other management controls.

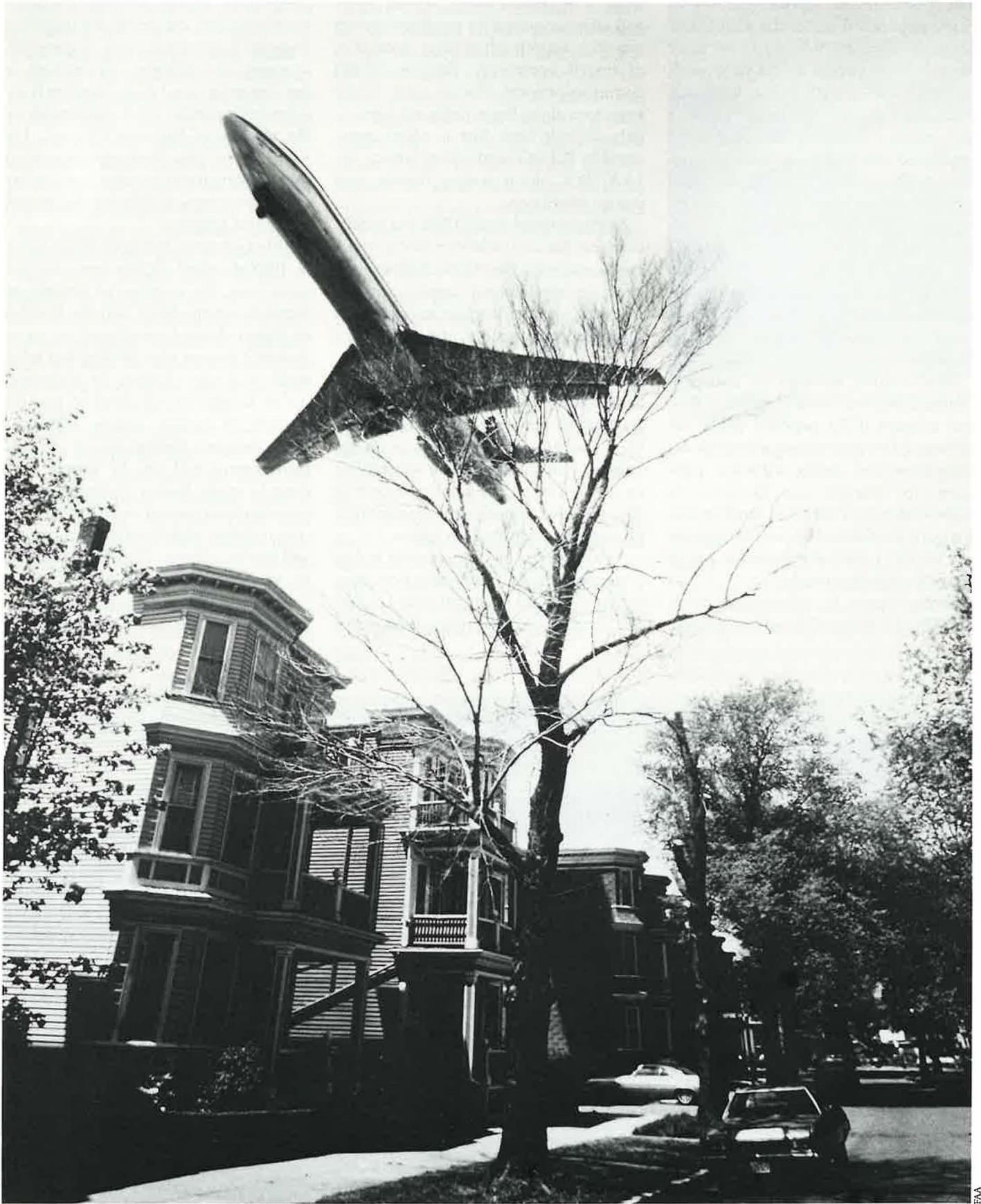
Two new federal legal requirements will have a major impact on transit agencies. For most transit agencies the requirements of UMTA's Antidrug Regulations will place additional management responsibilities as well as costs on transit agencies. A compliance program must be in place by the end of 1989 at large agencies and by the end of 1990 for Section 18 grant recipients and agencies that serve urban areas with a population of less than 200,000. State agencies have assumed the lead role for drug testing in four states to relieve local areas from the direct responsibility of administering the program.

By April 1992 all drivers that operate a motor vehicle that can carry more than 15 occupants must obtain a commercial driver's license. In addition to passing a test of driving skills, drivers must show knowledge of the safe operation of the vehicle, proper procedures for loading and unloading passengers, and so forth. Although the new commercial driver's license requirements will be uniformly applied nationwide, enforcement is the responsibility of each state.

With the shifting of UMTA research funds to UMTA mission-oriented programs, there continue to be pressing unmet needs for research on the day-to-day operating problems that plague transit providers. The American Public Transit Association has embraced the recommendations by TRB to establish a National Strategic Transit Research Program with a significant change from the original recommendation of allocating a dedicated 0.5 percent set-aside of the federal formula grant money. APTA decided that the transit industry should seek a special \$10 million a year appropriation from Congress, a proposal that APTA has included in its 1989 legislative program.

### Aviation

Maintaining air service to small communities is a major concern in many states.



Aircraft noise is a major source of conflict between airports and neighboring communities.

The Essential Air Service (EAS) program, established under the Airline Deregulation Act of 1978, has undergone severe budget cuts in recent years, with funding now at such a low level that EAS subsidies are inadequate to meet the needs. Funding for FY 1989 amounted to a little more than \$15 million compared with an estimated need of \$50 million. State agencies have no funds or legislative authority to fill this gap, and their efforts are concentrated on helping small communities faced with the loss of service effectively demonstrate their need to the U.S. Department of Transportation and to Congress.

State aviation agencies are also concerned about the continuing loss of general aviation (GA) airports, which are threatened by encroaching suburban development and strong economic pressures to convert the facilities to higher-value land uses. GA landing sites are being abandoned or converted at the rate of 300 a year—a nationwide loss of about 2 percent annually.

Encroachment by nonaviation development also affects GA airports in other

ways. Complaints about aircraft noise and safety concerns by property owners near GA airports often force restriction of aircraft operations. Erection of tall communications towers and other structures along flight paths is a particularly difficult issue that is often aggravated by lack of coordination among the FAA, FCC, local zoning boards, and private developers.

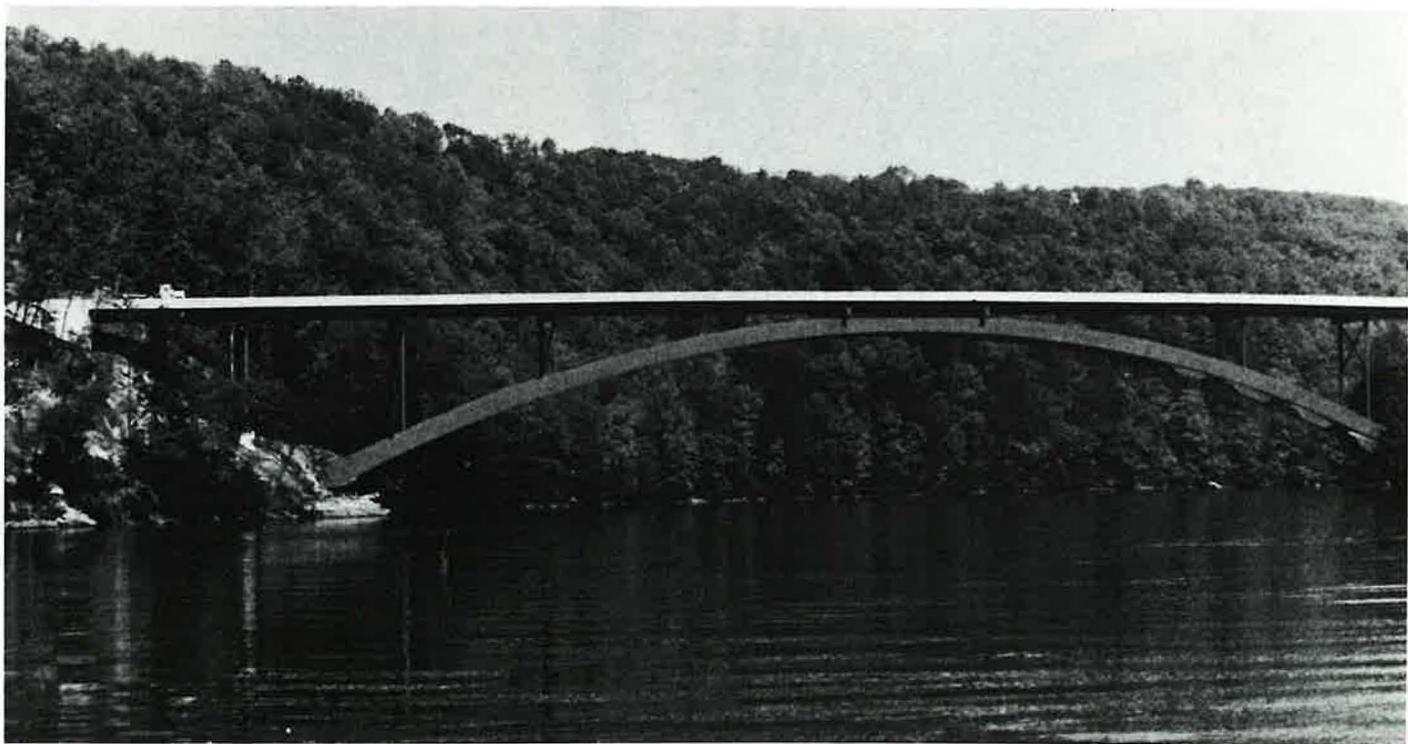
At the national level, 1988 was a difficult year for civil aviation. Safety was a prime concern. The Aloha Airlines incident, in which metal fatigue caused a major part of the fuselage to peel off in flight, led to a general investigation of the airworthiness of aging aircraft. The subsequent report of the Aging Aircraft Task Force recommended an extensive program of replacing components on a fixed schedule instead of relying on the current system of periodic inspections to detect faults. The estimated cost of this proposed change in maintenance procedure is roughly \$1.4 billion.

Airworthiness of older aircraft is but one safety issue. The destruction by a bomb of a Pan Am aircraft over Lockerbie, Scotland, in December 1988 led to

heightened airport security measures worldwide and the search for improved baggage-inspection and passenger-screening technologies. Congestion in the airspace around major airports is another critical issue. FAA restrictions on the number of flights at Chicago, Los Angeles, and New York airports indicate that growing travel demand is taxing not only airport capacity but also the air traffic control system.

Although total hours of flight delays in 1988 dropped slightly from the previous year, the number of airports affected by severe delays and the number of flights delayed continued to grow. Boston's plan to raise landing fees selectively at Logan Airport to discourage use by smaller aircraft failed to pass the scrutiny of judicial review, indicating that economic techniques of demand management will not be simple solutions to apply. Recent challenges to the proposed new airport in Denver suggest that building additional airport capacity will also be difficult. FAA has asked TRB to study strategies for meeting long-term airport capacity needs.

Airline fare hikes in late 1988 (and



Designed to blend into its surroundings, this single steel-arch bridge reopened access to Clarion, Pennsylvania, from US-322.

continuing into 1989) have given rise to speculation that price competition may be weakening in the industry, which is becoming more concentrated. Airlines contend that they have raised fares only to offset rising costs, to bring earnings more in line with other economic sectors, and to build reserves for new capital investments needed to modernize their fleets and airport facilities.

Restructuring of the airline industry continues and the share of traffic controlled by the largest carriers is still increasing. In 1978, for example, the top four carriers accounted for about 54 percent of passenger miles; in 1988 their share was over 60 percent. Overall, the eight major carriers had a combined traffic share of 92 percent in 1988.

Airline industry profits on the whole were up slightly in 1988, but the pattern was far from uniform across the eight major carriers. The weak financial performance of Pan Am, TWA, and Eastern makes these three airlines likely targets for mergers or selective liquidation of routes and equipment. Even healthy second-tier carriers such as America West and Midway, which have developed national economic bases under deregulation, may be subject to takeover by major airlines. The outlook is for further consolidation over the coming two or three years, with the result that the U.S. airline industry may consist of no more than five or six major carriers by the early 1990s.

## Rail

System restructuring by Class 1 railroads continues to be a major concern of state rail planners. Their concerns fall into two broad categories: how to measure the impacts of branch line abandonments and how to preserve essential rail freight services.

State rail planning historically has depended on analyzing the benefits and costs of preserving individual branch lines. In more and more states, impacts on the highway system are being included in benefit-cost analyses that account for the costs associated with the shift of traffic from rail to truck when branch lines are abandoned. Some mid-

western and western states are evaluating the financial impacts on rural roads of rail line abandonments and are developing methodologies to evaluate the trade-offs between railroad branch lines and rural roads. The outcome of these studies may be that the states cannot afford to maintain both rail and highway facilities in some rural areas for bulk movements of agricultural commodities and that some choices will have to be made.

Most states are actively involved in preserving branch lines that meet the benefit-cost criteria. The three major avenues of preservation that have been open to the states are now each restricted to some extent, making the process more difficult. First, the federally-funded Local Rail Service Assistance program ends September 30, 1989. Without these funds, the future of many state rail programs is in jeopardy. Second, sales of Class 1 railroads' lines to privately owned regional and shortline railroads continue to be in doubt. Finally, state-funded rail freight programs lack a predictable funding base to enable them to continue from year to year.

Rail passenger services are important to a number of states. These services include Amtrak intercity, regional commuter, and high-speed intercity services. Amtrak intercity services continue to be valuable in many areas, and some states have developed feeder bus systems to provide greater access to these services. Regional commuter systems are providing an effective option for reducing traffic congestion in many metropolitan areas by using existing conventional rail lines thus reducing startup capital costs. Several states are developing plans for high-speed intercity rail systems to relieve congestion in densely populated corridors and to provide a viable alternative to crowded highways and airports.

Recognizing the tremendous growth in intermodal freight transportation in recent years, a number of states are including intermodal projects in their rail planning and program activities. Projects of interest to various states include creation of inland intermodal transload facilities.



Flight delays continued to grow at the nation's airports.

## Water

Under the Federal Water Resources Act, states and local port authorities are providing between 10 and 50 percent (depending on channel depth) of the costs of dredging harbors and deepening channels. Dredging is proceeding incrementally in a number of ports; less-than-full-depth and outbound channels are the first projects. Frequently, dredging contract bids have been substantially below cost estimates.

Port activities are in strong competition with each other, and a gain in one port's tonnage may result in a loss from another port. With larger container ships (up to 4,300 equivalent container units), there is a growing trend for carriers to concentrate their ports of call to fewer "load center" ports, from which containers are further transhipped by smaller vessels, railroads, or trucks to their destination.

The transportation of containers is one of the most profitable activities of railroads, and railroads are building new facilities on or near docks to handle containers that pass through the ports. The use of double-stacked container trains carrying 200 or more units per train is expanding. Load center ports combined with double-stacked container service to

inland destinations such as Chicago, or across the country, is revolutionizing the way both international and domestic high-value freight is being transported. There are serious consequences for some ports that are losing business to double-stacked "land-bridging."

A chronic issue with ports is labor contracts and the need to find a method of protecting jobs in an industry that is rapidly automating. One of the techniques that unions have employed in labor contracts is the "50-mile rule." The rule stipulates that any container that is filled within 50 miles of the port can be emptied and repacked by port union workers. The 50-mile rule was recently overruled by the U.S. Supreme Court as discriminatory to shippers. Finding new ways to protect port jobs will be considered in new bargaining agreements.

## Continuing Tradition

From an internal review of the field visit program in Fall 1988, potential improvements were identified. The following features will be incorporated into the FY 1990 visit program:

1. A special publication will be prepared from information, furnished by all states, on a specific topic;
2. The list of universities will be restructured to identify those that should continue to be visited yearly and those that should be visited every two or three years; and
3. Staff will be briefed on research currently being conducted by SHRP and FHWA and inform the states and universities of it.

The field visit program, also known as the Research Correlation Service (RCS) of TRB, has grown considerably in its 44-year history and remained faithful to its objectives of providing liaison among the various sectors. In the September 1945 *Highway Research Abstracts*, which announced the formation of the RCS, then Executive Director Roy W. Crum cited evidence that "much valuable research is done but never reported. Committee work is an important factor in bringing the results of research . . . to fruition, for few fundamental improvements in practice are the result of one man's work. . . . Through the Correlation Service such work . . . will be put on a more adequate and productive basis."



Operating on western routes, Amtrak's new bilevel superliner cars will set a new standard for luxury and reliability in rail travel.