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Report to the Secretary of Transportation

December 1989

TRANSPORTATION INFRASTRUCTURE

Panelists' Remarks at New Directions in Surface Transportation Seminar

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Resources, Community, and
Economic Development Division

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December 28, 1989

The Honorable Samuel K. Skinner
The Secretary of Transportation

Dear Mr. Secretary:

This publication is the second volume of our report to you on issues central to the upcoming reauthorization of the federal highway and mass transit program and of concern to the principal participants in reshaping the nation's surface transportation programs. In the first volume, entitled Transportation Infrastructure: Reshaping the Federal Role Poses Significant Challenge for Policy Makers (GAO/RCED-90-81A, December 1989), we synthesized the presentations of nationally acknowledged transportation authorities who attended our "New Directions in Surface Transportation Infrastructure" seminar. This report contains the presentations in their entirety.

We are sending copies of this publication to the appropriate congressional committees, seminar participants, and other interested parties.

Sincerely yours,

Kenneth M. Mead
Director, Transportation Issues

Preface

This volume supplements our report on the issues central to the upcoming reauthorization of possibly $90 billion for a 5-year federal highway and mass transit program and of concern to the policy makers reshaping the nation's surface transportation programs.[1] This volume contains the presentations, in their entirety, delivered by 19 nationally acclaimed transportation authorities at our seminar on "New Directions in Surface Transportation Infrastructure" held June 20, 1989, at our Washington, D.C., headquarters.

The seminar brought together members of the transportation community from all levels of government and the private sector who represent, develop, use, and evaluate the various systems that comprise the highway network. The seminar format included four panel sessions and a series of roundtable discussions. The presentations, which addressed (1) a general overview of critical transportation issues; (2) the federal-aid highway system preservation and research needs; (3) recasting the federal government's role, including a discussion of block grants; and (4) innovative highway financing through the use of tolls, can be found in Parts 1 through 4, respectively, of this volume. Part 5 contains a brief biographical sketch of each participant.

[1]Transportation Infrastructure: Reshaping the Federal Role Poses Significant Challenge for Policy Makers (GAO/RCED-90-81A, Dec. 1989).

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Abbreviations

ACIR	Advisory Commission on Intergovernmental Relations
AASHTO	American Association of State Highway and Transportation Officials
AAA	American Automobile Association
AIDS	Acquired Immune Deficiency Syndrome
APTA	American Public Transit Association
ARTBA	American Road and Transportation Builders Association
ATA	American Trucking Associations
AVHS	Advance Vehicle and Highway Systems
AVI	automatic vehicle identification
CA	certification acceptance
CRP	Combined Road Plan
CRT	Cathode Ray Tube
CTB	Commonwealth Transportation Board
EPA	Environmental Protection Agency
DOT	Department of Transportation
FHWA	Federal Highway Administration
GAO	General Accounting Office
GNP	gross national product
GRS	General Revenue Sharing Funds
CAS	Center for Auto Safety
HP&R	Highway Planning and Research
HRB	Highway Research Board
HUF	Highway Users Federation for Safety and Mobility
IBTTA	International Bridge, Tunnel & Turnpike Association
LTPP	Long-Term Pavement Project
MPOs	Metropolitan Planning Organizations
NGA	National Governors' Association
OT	Office of Transportation
PennDOT	Pennsylvania Department of Transportation
PS&E	plans, specifications, and estimates
R&D	research and development
SEPTA	Southeastern Pennsylvania Transportation Authority
SHRP	Strategic Highway Research Program
SRP	Secondary Road Plan
UMTA	Urban Mass Transit Administration
USDA	U.S. Department of Agriculture
TRCV	Toll Road Corporation of Virginia
TRB	Transportation Research Board
VMT	vehicle miles traveled

Panel 1: Transportation Overview

Remarks by Lester P. Lamm

MR. LAMM, President, Highway Users Federation for Safety and Mobility: I would like to congratulate GAO for having this forum today. Transportation is going to be a very busy item on the congressional agenda over the next couple of years, we hope. It should be.

Highway Users Federation looks at highways from the standpoint of people whose economic livelihood depends on good roads and safe roads. Our members are all private-sector industries that ship goods of all kinds over the road system and depend on adequate roads to conduct their business. Our members get concerned when the quality of the nation's highway system deteriorates.

Federal Role

I would like to focus on the federal role, which I believe is critical and the main focus of this seminar. Basically, there has been a federal responsibility for some element of the road program since 1893—almost

100 years. Since 1916, the federal role has emphasized capital investment, that is, federal money distributed to states and local governments to help them carry out capital investments in roads.

Since 1956, that capital investment program has been focused on building the national system of interstate and defense highways. That job is almost over. In the next few years, the final funds will be distributed to close the remaining gaps in the Interstate Highway System. The country needs to be looking ahead to the future direction of federal highway policy.

There is, however, no current, long-term national transportation plan or policy or program. The Secretary of Transportation, Samuel K. Skinner, is starting a program to put together a long-term transportation policy. The surface transportation elements of that policy will be very significant to my members and to everyone who uses the highway system nationally. We want to work very closely with the Department of Transportation for the rest of this year and on into 1990, and then begin working with congressional staffs and others that are involved in the authorizing process.

Up until very recently, comments heard about a federal highway role suggested it should be a minimalist role. The former Secretary of Transportation, James H. Burnley IV, had a fairly strongly established point of view that the federal government should, in effect, turn back everything—perhaps with the exception of the Interstate Highway System—to the states and concentrate on other activities.

Today's Highway System

I would like to set the stage for what is happening to the highway system from the standpoint of the traveling public. To no one's surprise—you see it driving around any part of the country—the demands for roads are going up. Traffic has been increasing on the highway system throughout the 1980s at about 4 percent each year. Since 1956, when we kicked off the construction program for the Interstate system, traffic has tripled on the road systems of the country.

Looking ahead, traffic will keep growing in the next 30 years, but not as fast as it has been growing. Between now and the next 30-year period (the year 2020) road traffic in this country is expected to double. In many growth areas around the country—we happen to live in one around the Washington, D.C., area—a number of Sun Belt states, and basically all the suburban rings around every big city, I expect road

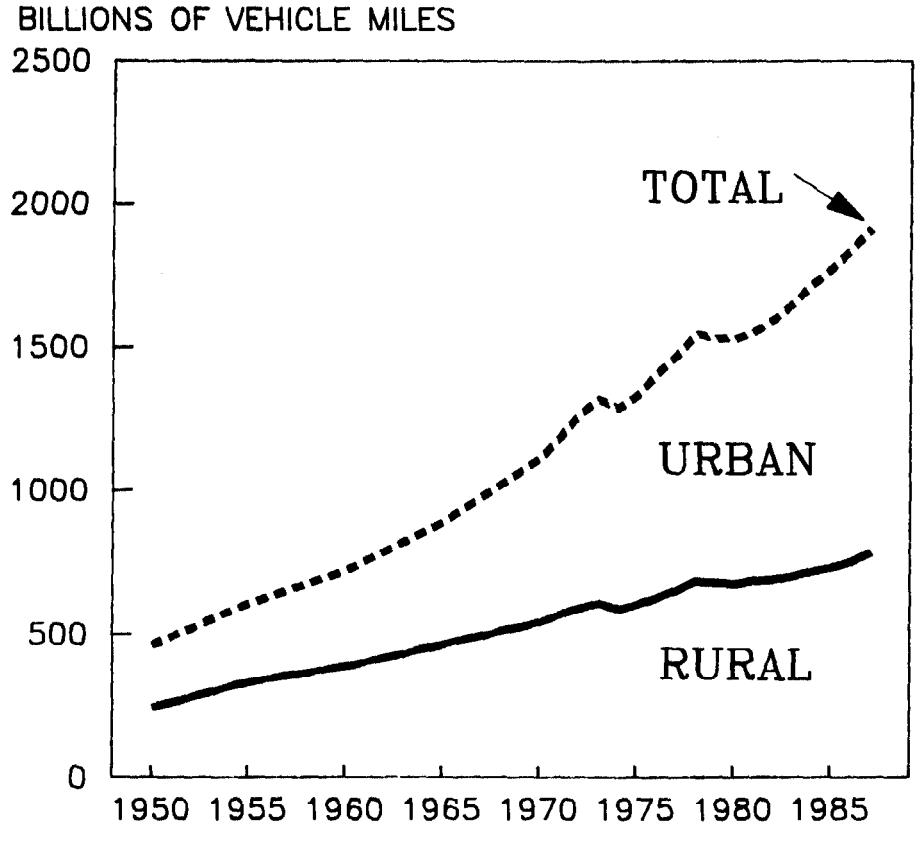
traffic to double between now and the turn of the century. Truck traffic is growing a little bit more rapidly than general traffic.

The transportation systems were generally located, in the earlier part of the century, to take traffic from the suburbs and feed it into the central city. However, we have chosen, for the most part, to live in suburban locations, bring our families up in the suburbs, and in many cases commute to jobs that are located in another suburb. Consequently, in our living patterns we are dispersed to the point that, I think most observers would agree, conventional rail transit is less likely to serve a very large portion of the traveling public in the future.

Transit will continue to be important, but we need to redefine what we mean by "public transit." Frankly, I think federal activity should concentrate on moving people, not being concerned about the definition of what is transit, and so forth.

I mentioned the growth in highway travel. Figure 1.1 shows that historically some of the growth has been in rural areas, but the bulk of the growth has been in the urban regions. Out beyond 1989 you see a couple of alternate consequences.

Figure 1.1: Vehicle Miles of Travel

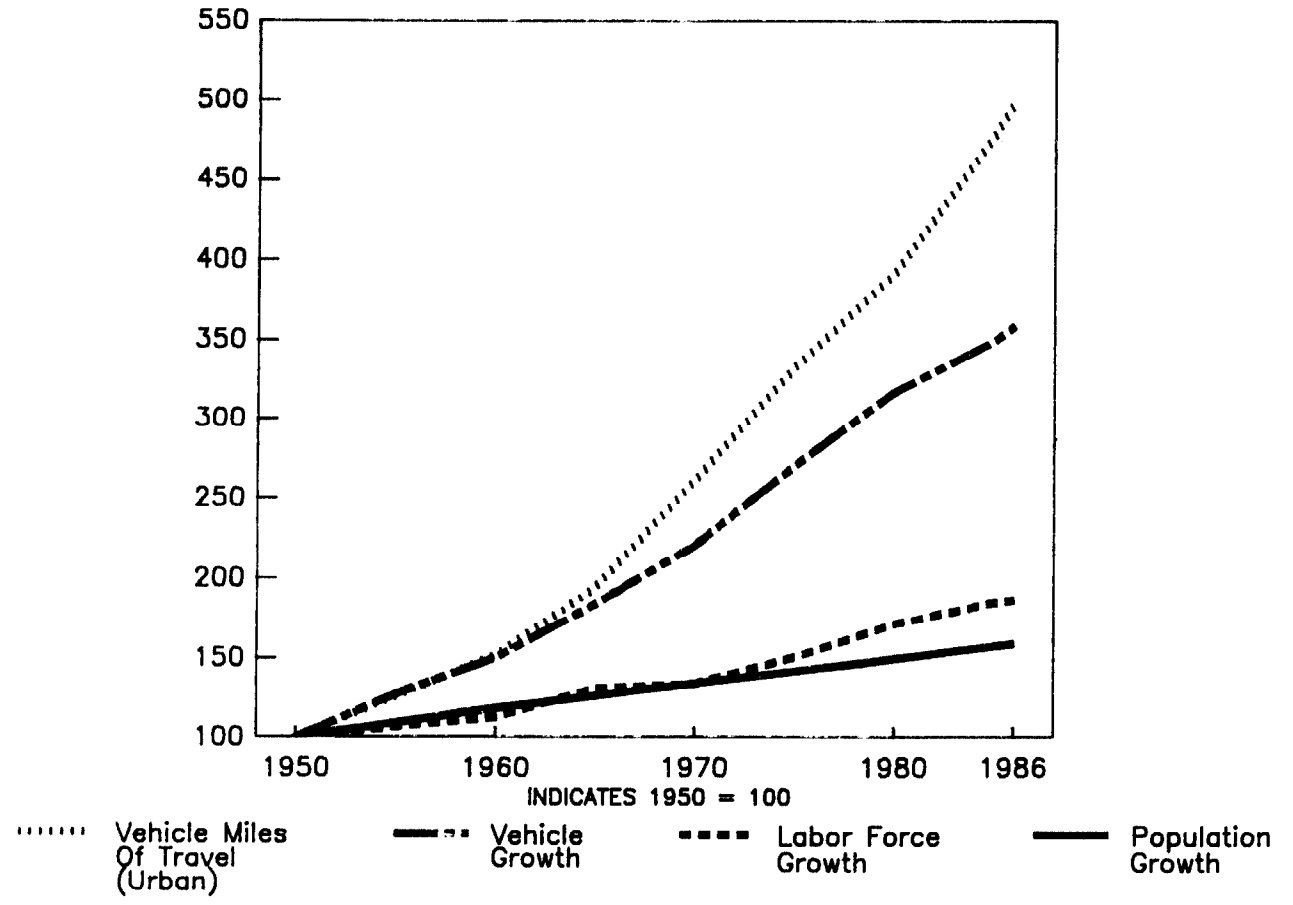


We believe that it is probably good public policy to plan for the eventuality that traffic will not drop off as quickly as currently expected. I have been involved with highways since 1955, and it has been a constant, during that 35-year period, that everybody's estimate of traffic growth has been low. Again, if we want to plan for a worst-case future

situation, a good policy would be to plan for some sort of continuation of current travel growth.

Figure 1.2 looks at a number of characteristics that contribute to urban travel growth.

Figure 1.2: Population, Labor Force, Vehicle and Urban Travel Growth (1950-1986)

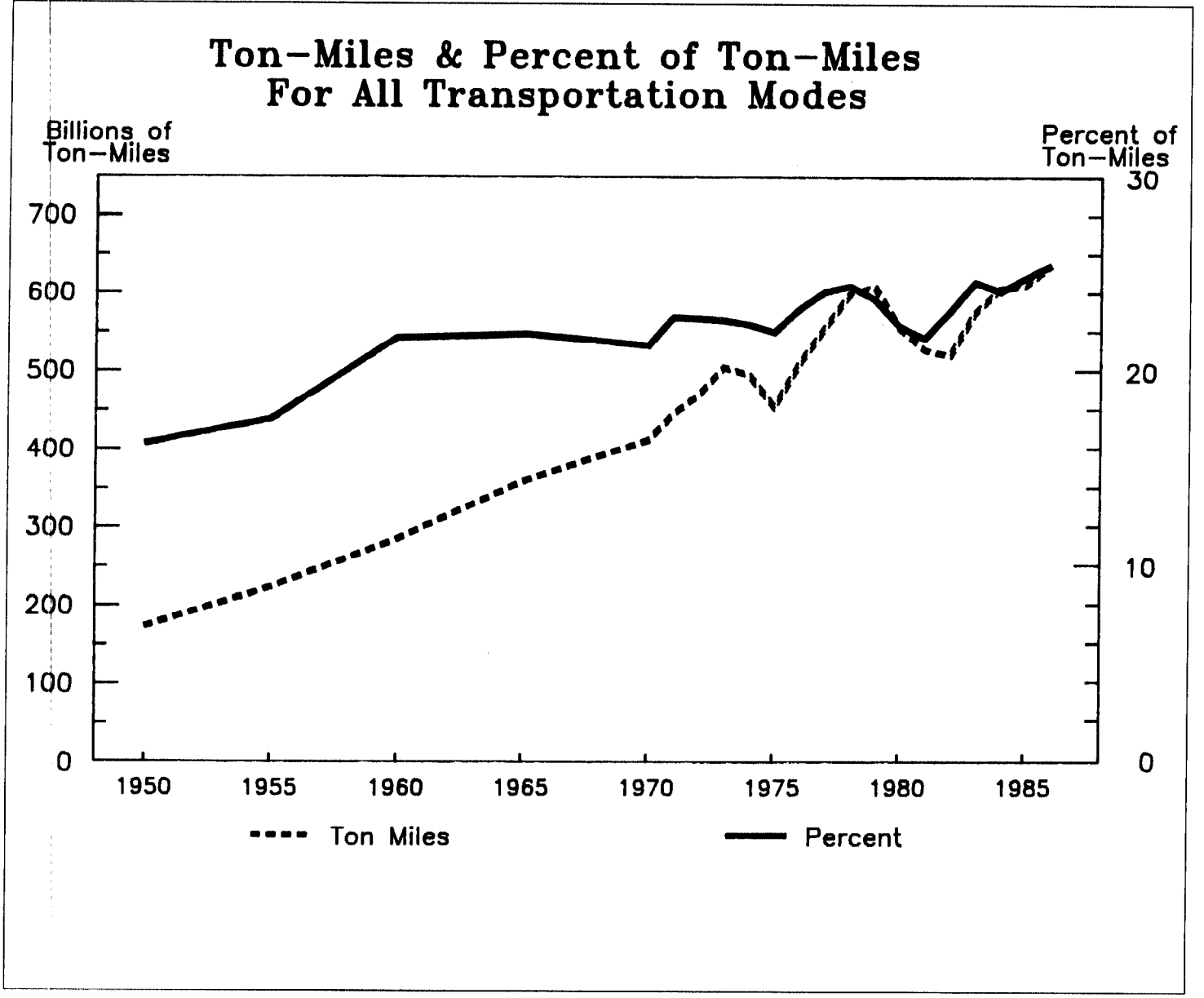


The line on the bottom is population growth which, for most of this chart's 50-year period, has been in the range of 1.3 percent per year. This figure shows that jobs, particularly during the 1980s, have been growing at about 2 percent per year. Also, vehicle registrations have been increasing about 3 percent per year. Thus three determinants of urban highway travel—population, jobs, and registrations—are all going up a little bit.

Further, the figure shows urban travel has been increasing about 6 percent per year for the last 10 to 15 years. It is higher in growth areas—in the Washington area the growth is normally closer to 8 percent per year, and some urban regions experience annual highway traffic growth of 9 to 10 percent per year.

Figure 1.3 shows all U.S. freight movements that are carried by truck.

Figure 1.3: Intercity Truck Freight Movement



As can be seen, there are big fluctuations in the curves for truck travel because the health of the trucking economy is very heavily dependent on what is going on in the U.S. economy in general. In good years, trucking movements go up considerably; in years when the condition of the economy is poor, they decline.

If you straighten out both the curves for truck travel, there is a tremendous upward swing. One of the big reasons is something that has been determined by American manufacturers to be good domestic policy. This new policy is a process called "just in time" scheduling of deliveries.

Assume I operate an assembly line somewhere that manufactures some kind of hard goods. I get parts, components, and raw materials from 10 to 15 suppliers. In the old days, I would have gotten those supplies by rail. I would have had a branch line coming up to the factory, and deliveries would be made once a week or every 2 weeks or so. A train would drop off perhaps 6 months' worth of supplies. I would have had a big warehouse right next to the train yard where the goods would be stored.

American industry has taken a page out of a chapter of the Japanese industrialists. In Japan, where there is not a lot of land to build warehouses, they schedule deliveries by computers. Deliveries are timed so that suppliers get their products to the assembly line within 2 or 3 hours of when the assembly line needs them. Consequently, the Japanese manufacturers do not have to build warehouses. What they do is store their raw materials and their component parts on the highway system in transit in trucks.

The American manufacturers, in the spirit of international competitiveness, have bought this idea. Ford, for instance, which is one of my big members, deals with more than 800 suppliers in the United States and around the world. Ford has asked every one of its suppliers to observe this "just in time" process. Instead of getting axles or glass for windows at their assembly plant every 2 weeks, they get them within a 2- or 3-hour period. So an assembly plant, instead of having 5 to 10 trainloads per week coming in, now gets 100 truckloads a day.

That is what has contributed to this shift in travel demand called for by trucks. Frankly, with the benefits that this has provided to the U.S. economy, the bottom line for industrial America today has not been this good since the end of World War II. And I do not expect American manufacturers will ever go back to the old way of shipping goods.

Consequently, if future traffic congestion around urban areas, for instance, gets so tight that you cannot make these truck deliveries, what is going to happen? I do not think we should fool ourselves and say that American manufacturers are going to shift back to rails. What they are going to do is move out of the cities, locate in a place where they can

continue to get their trucks moving, and create another suburban sprawl growth-ring around the urban area.

That's the demand side of the curve. What are you, the congressional staffs, and the Federal Highway Administration, doing to supply funding for this increase in highway demand?

Highway Financing

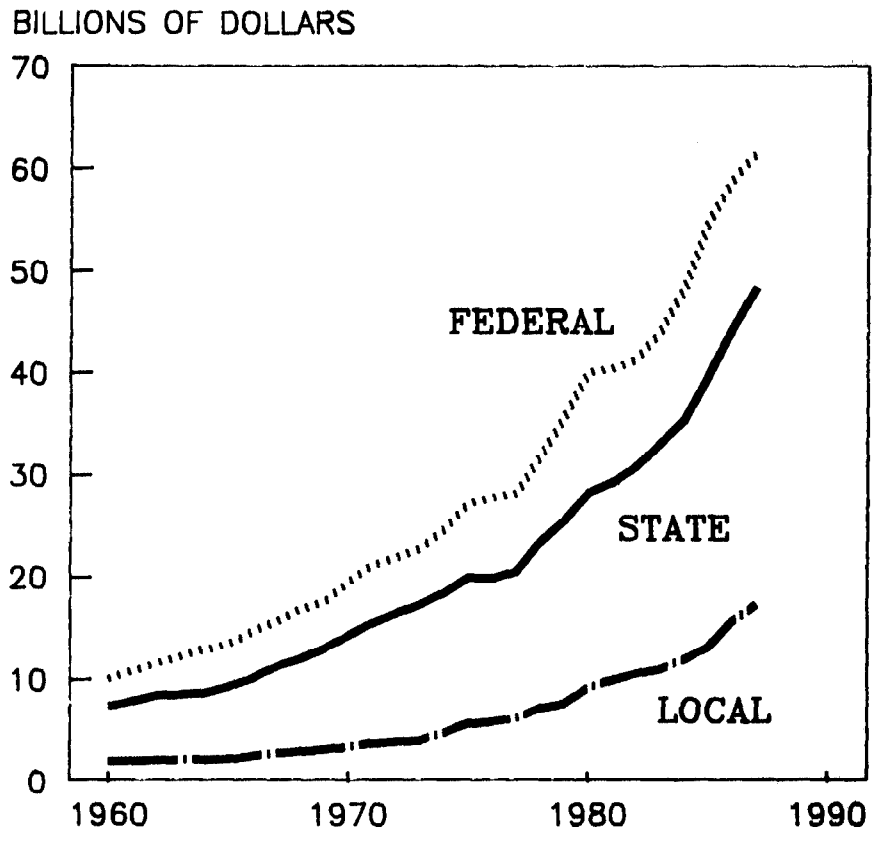
Highway finance has a different story. Instead of everything going up, everything is going down. At the federal level it has been a long time since any political candidate talked about the need for more highway funding. What they talk about is the need to bring the federal budget deficit into control; consequently, funding programs like the federal-aid highway program have decreased in recent years.

At the state level, there have been a lot of attempts to raise state highway revenues to make up for the decrease in federal financing. However, it is tough to get a state tax increase implemented. At the local level, few mayors and county commissioners even have the option of raising gas taxes or any other kind of highway user revenue. Consequently, you see people all over the country who want to build a new highway facility thinking of nontraditional ways to get it done—maybe a toll road; maybe a developer-financed project; ad hoc, one-of-a-kind financing arrangements pointed specifically at individual highway projects.

The American Association of State Highway and Transportation Officials (AASHTO) has some figures—which we agree with—that show total investment for roads should be increased by 50 percent just to keep up with the backlog of highway capital needs. This is not planning for future travel; just keeping up with the backlog.

Figure 1.4 shows total financing of $71 billion last year; 25 percent of that comes from local government, 52 percent from the states, and a little bit less than 23 percent from federal activities.

Figure 1.4: Total Financing for Highways



The state, obviously, is the dominant financing figure. But believe it or not, when you look at capital investments and actual roadway and bridge improvements, the federal funds dominate. A lot of the state money and almost all of the local money is used for the routine costs of upgrading the system, policing the system, maintaining the roads, and so

forth. In most parts of the country, to build something new or greatly increase an old road's capacity, federal funds are needed.

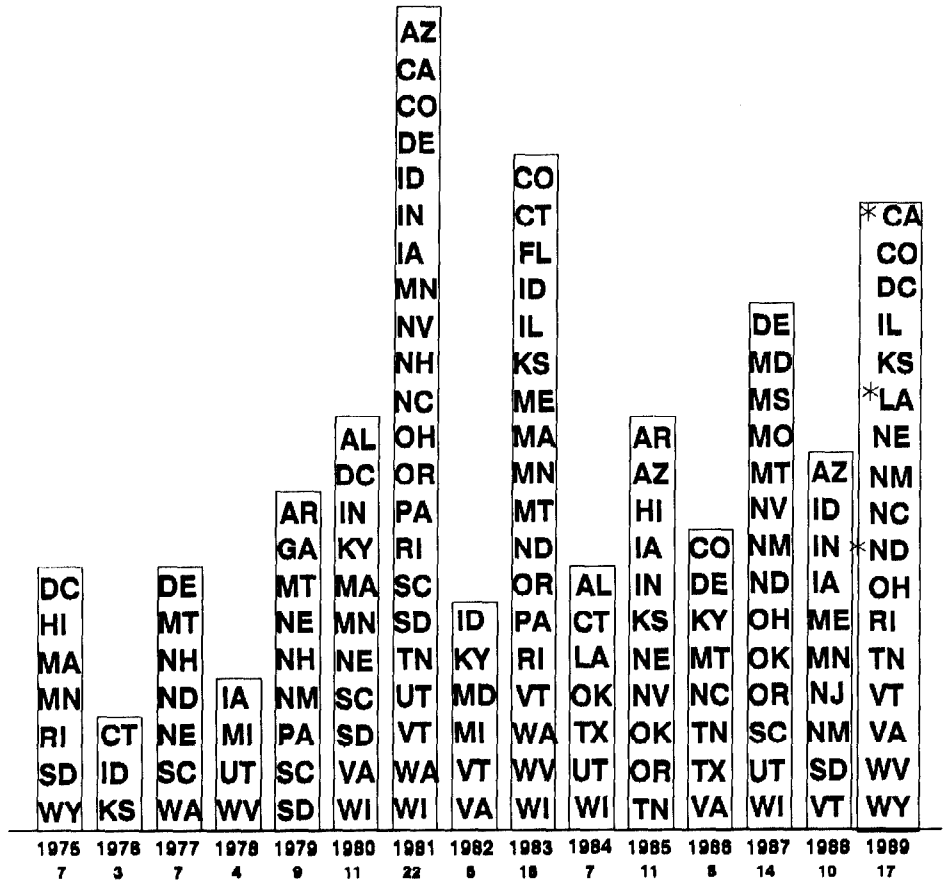
I want to look a little bit more closely at the federal funds. Figure 1.4 showed obligation authority from the Highway Trust Fund every year since 1956. These are funds that are made available for new project starts each year. The time scale has a very big jump between 1982 and 1983, when the nickel-a-gallon gas tax bill passed. And then, federal highway funding went up in 1984, 1985, and 1986.

What happened in 1986? Gramm-Rudman-Hollings passed. As I mentioned, we got very concerned about the size of the federal budget deficit, and you can see what that did to the highway programs. If the actual 1990 budget is similar to the proposal sent to Congress, then obligational authority will come down about another $900 million.

Looking at the buying power of the dollar, you get a different picture. We are spending less in current dollars than in 1983, the first year after the nickel gas tax passed. That's bad enough. In constant dollars, though, we're spending less than in 1960. Since highway traffic has increased two and a half times since 1960, that is really our problem.

The state issue is that year after year between 25 and 40 states try to raise additional highway revenues on their own, but figure 1.5 shows the ones that succeed.

Figure 1.5: State Legislative Actions to Increase Motor Fuel Tax Rates



* Increase must be approved by voters in a referendum.

In normal years, fewer than half of the states that try are successful in raising revenue.

The "bottom line" is that traffic continues to go up and the buying power of the dollar goes down. The gap has accumulated visibly in the

last 5 years, and I think it is going to dominate highway programs for years to come. As a result—and I think as a direct result—I can see some things happening that I do not like. First of all, fatalities are up. Second, the road and street conditions around the country are worse than they have been in a long time. And the third area is urban and suburban traffic congestion.

These issues are high on the public's agenda. People all over the country, when asked what their worst problems are, put traffic congestion right up there next to drugs and crime. People are beginning to be very frustrated about travel. I think those of you who work on congressional committees and your bosses will hear increasingly from constituents back home that traffic congestion is an issue and that in the near future conditions are going to get worse.

Five years ago the annual traffic fatality toll in this country was close to 43,000. Last year, it was very close to 47,000. We're moving in the wrong direction. If traffic keeps going up, the best we can do is hold at today's fatality rate, or make very minor gains. If this happens, by the year 2000 we may have as many as 75,000 traffic deaths, which is totally intolerable.

There are Federal Highway Administration reports to Congress showing the physical condition of pavement and bridges. These reports state that more than 40 percent of the bridges and 50 percent or more of the pavement are in some kind of deteriorated condition and that urban congestion is going up in every part of the country.

The situation is this: (1) the interstate building era is ending, (2) every single federal dollar devoted to highways, to bridges, to transit, and to highway safety is due to expire in 1991, and (3) we do not have any long-term national transportation policy.

This lack of a national transportation policy is what has led a group of organizations to work on what we call "Transportation 2020." The concept is to look ahead to the year 2020 and try to decide what kind of surface transportation quality we want for the country in the year 2020 and what kind of public policies we need to adopt today to help us get there.

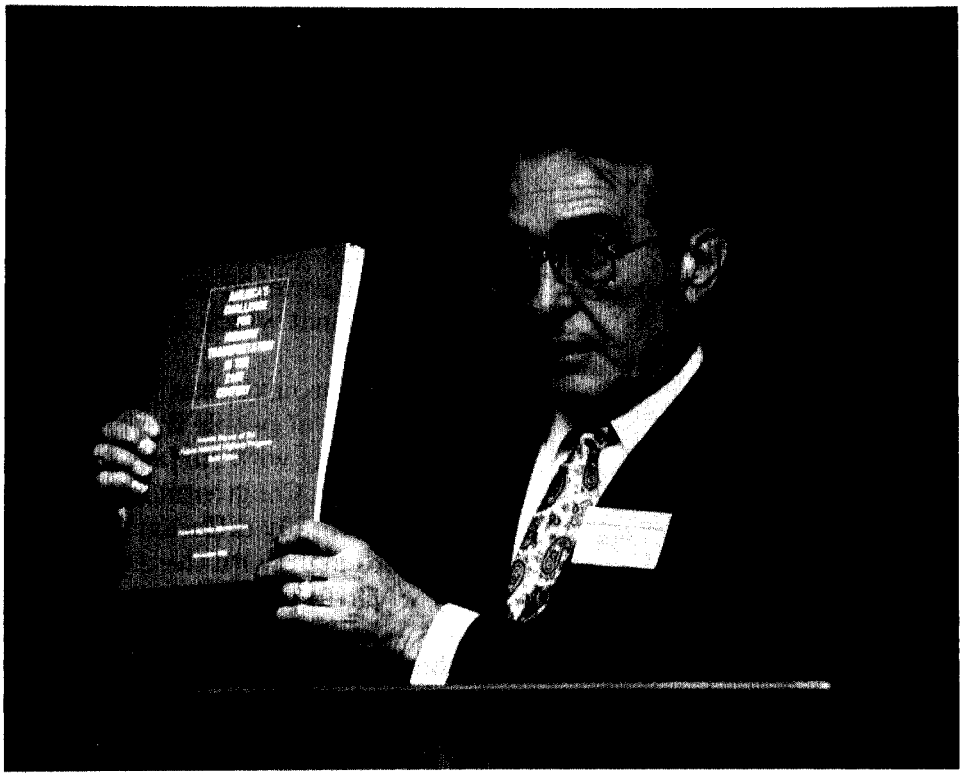
The American Association of State Highway Transportation Officials—and I want to praise Frank Francois, who has been a tower of strength

on this total issue—has been trying to pull the public sector organizations—the mayors, county commissioners, public works directors—together behind Transportation 2020. The Highway Users Federation is trying to do the same thing with big businesses, with chambers of commerce, with hotel and motel associations, and with the people who traditionally have been worried about highways, such as the construction industry, the engineering consultant firms, and so forth. We started out by trying to identify how bad the problem is around the country through a series of public forums. The national results were reported in the document which came out in mid-1988 called Beyond Gridlock.

By this time next year, we want the congressional committees to hear a wide range of people from all over the country say, "We don't like what is happening with surface transportation, and we have some suggestions for you, Mr. Congressman, on what we think you can do in the future." This is a totally different approach: trying to work on legislation from the bottom up with the users of the system telling the people in authority what the users believe is happening.

I have tried to set the stage for what we see as happening with the highway program and surface transportation. I have some very definite opinions on the direction of the federal role in the post-Interstate era, but I am going to conclude my comments in the interest of having my fellow panelists tell you what they see happening. I look forward to participating in the discussion group.

Remarks by Richard D. Morgan



MR. MORGAN, Executive Director, Federal Highway Administration, U.S. Department of Transportation: For the last couple of years, the Federal Highway Administration has been working on legislation to present to the Congress in 1991. Our primary job is to work through the states to implement legislation, but we also have a role in developing policy and legislation.

In November of 1988, we issued a report entitled America's Challenge for Highway Transportation in the 21st Century. This report establishes the need and states the case for a new highway program. Tom Larson, the nominee for Federal Highway Administrator, is leading the effort to develop a national transportation policy for Secretary of Transportation Samuel Skinner. Our goal is to develop specific highway legislation that will find a secure and firm niche in the national transportation policy. I would like to see a national policy built around our legislation, but frankly, in a modal administration, that would be utopia.

We at the Federal Highway Administration (FHWA) believe an appropriate framework for the future highway program should include a mission statement of national highway program objectives and an identification of the obstacles and issues facing the Congress in 1991.

Changing Issues in Transportation

The highway issues we have faced in the past are not the same as those we must face today. The Interstate system, which has been our standard bearer for the past 30-plus years in highway legislation, is generally completed and is not going to be an issue in the future. The Interstate system, of course, will remain with us for many years as a rehabilitation issue. The problems of urban and suburban mobility will emerge as a major issue as demand grows, population increases, and travel patterns change.

Decisions we make now based on information obtained in forums such as this seminar, other outreach efforts, and efforts associated with the Highway Users Federation, the American Association of State Highway and Transportation Officials, local interest groups, and transit interests are going to determine the form and character of transportation into the 21st century. FHWA's efforts as well as others currently ongoing will provide the basis for the 1991 legislation.

The Role of the Federal Government

"What should be the federal role in the highway program?" is one of the questions that many transportation officials, including FHWA, have a profound interest in answering. In order to do this, however, we must reevaluate the ideal level of federal involvement in highways. Often this level is driven strictly by funding, which may be appropriate. Yet the federal government's involvement reaches all the way down to the local level, and we must ask ourselves, "Should it be this way?" As we determine the proper federal role, we must restructure the highway program to fit that role.

There is a Constitutional basis for federal involvement in highways: national defense and interstate commerce. However, other justifications for federal involvement exist. First, there is the equity issue. In the absence of federal involvement, extreme polarization of the transportation system would prevail—a condition we cannot afford. Federal involvement assures equity in the distribution of resources and equity in the number of highways in the less wealthy states which are necessary to meet the needs of interstate commerce.

Second, there is the issue of uniformity. A certain amount of uniformity is necessary in the form of highway system standards—both structural and geometric—and safety. A driver must be able to expect, when crossing a state line, that the same type of highway will exist on the other side.

Finally, there is the issue of efficiency. One could argue that the federal government is not efficient, although certain things done at the federal level are done quite well. These areas should remain federal responsibilities. Safety and design standards, research and development activities, and technology transfer efforts are just a few examples of activities that are better handled by the centralized federal government than by each state acting independently. This is especially true when the research is high-risk and long-term but with potentially high payoffs. The federal government is much better able to afford this type of effort. Think of where we would be if every state tried to get to the moon. We would still be firmly anchored to the earth.

National Objective of the Highway Program

FHWA sees the national objective of the highway program as containing several components. First is the national defense. Second, and perhaps most important, is international commerce, competitiveness, economic vitality, and productivity increases. Meeting these national objectives depends upon the transportation of people and goods. It is essential that we have an excellent—not just a good—highway system. This degree of quality is imperative to all modes of transportation, but I believe that the highway system is the most critical. Third, our nation must address the problems of rural accessibility and intercity access. Certain rural areas lack adequate highway access, a problem that has been neglected throughout the Interstate program. This is especially true in some of the large agricultural centers where the railroads have been abandoned, forcing all movement of goods and products onto an inadequate highway system. Fourth is the issue of urban and suburban mobility. Finally, though not least in importance, is system preservation—keeping what we have.

Emphasis on Preservation and Improved Operation

Our new highway program must emphasize preservation and improved operation. Construction in some areas is still possible and necessary to increase capacity, but first we must look at the existing system and decide on how it can be managed more effectively. Such measures may include system surveillance and control systems, high occupancy vehicle

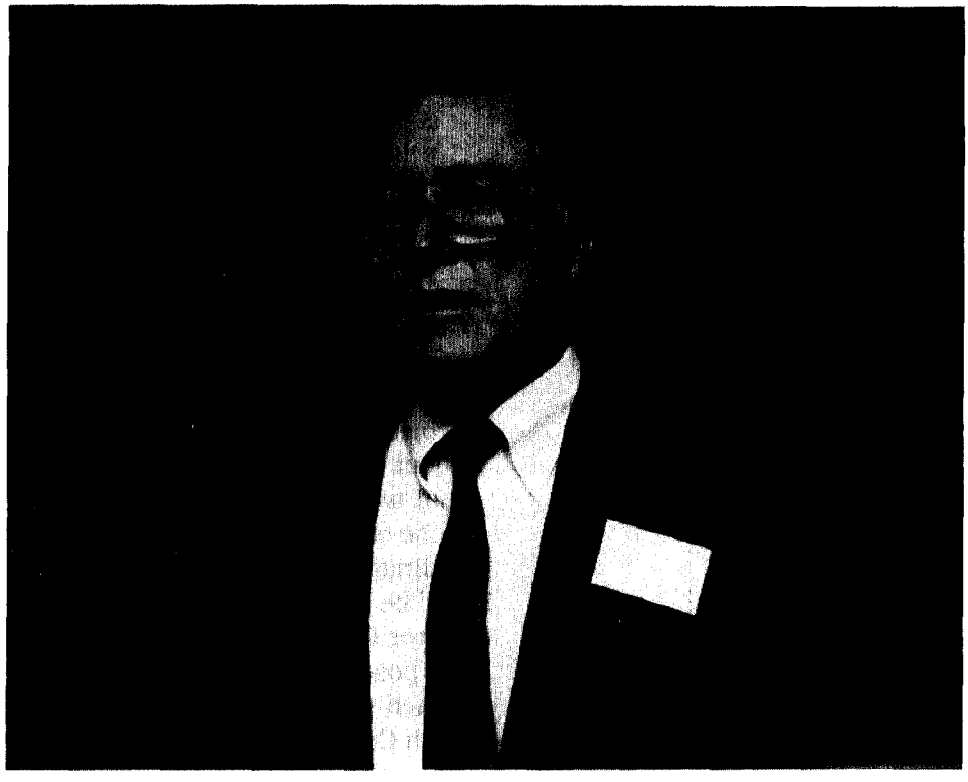
provisions, and incident management—efficiently removing an incident so that traffic is not obstructed.

It is imperative that we consider system management trade-offs with the investment necessary to create new capacity. Systematic management of our highways and bridges is essential to know when and where to improve so that our surface transportation investment is maximized.

Challenges Involved in Achieving National Objectives

One of the greatest challenges of achieving long-term, broad objectives for the entire nation is bringing together diverse interests to agree upon a uniform approach. A related concern is the 150-plus demonstration projects authorized in the 1987 Highway Act. We are very concerned about the number of these demonstrations and feel that it is imperative that we find a leader for our new highway program who will subvert some of the special interests reflected in these projects. Also, obligation ceilings need to be eliminated so that highway money that is authorized will be available. Finally, we must fight against the diversion of federal motor fuel tax revenues for deficit reduction or other, nontransportation purposes. These challenges will prove to be very difficult obstacles, ones which we will surely have to overcome. We will have to work together with Congress to arrive at a commonality of purpose to circumvent these obstacles and develop a program that will serve the national interest.

Remarks by Thomas B. Deen



MR. DEEN, Executive Director, Transportation Research Board, National Academy of Sciences: I appreciate the opportunity to participate in this important seminar, looking ahead for "new directions" in our surface transportation programs. There are a lot of things one could say under such a broad subject heading. The letter of invitation asked that I try to focus my remarks on the Transportation Research Board's (TRB) perspectives on current opportunities that new technology offers our surface transportation network.

Perhaps transportation technology can be characterized like so many other things—that is, it's "good news and bad news." The "good news" is that technology does seem to offer significant contributions to many of our most difficult existing and growing transportation problems. The "bad news" I'll talk about later. So let me begin by indicating a number of issues to which I think we can reasonably expect technology to make a real contribution.

Infrastructure Preservation and Maintenance

While I recognize that the Strategic Highway Research Program (SHRP) will be addressed later, any overview would be incomplete if it ignored the potential contribution of that project and its extended Long-Term Pavement Project (LTPP). LTPP will continue for 15 years after SHRP is completed. LTPP will enable us to design pavements with more precision to meet the needs of specific environments considering traffic loading, climate, local soil conditions, materials, and design alternatives. Pavements should last longer and premature failures should occur less frequently. We should also be able to make better judgments about maintenance and rehabilitation decisions—specifically, how to manage our whole network of pavements, considering the resources available. In short, we should be able to do the job for less cost than we otherwise would.

SHRP also should enable us to do better at other expensive tasks such as snow and ice removal, bridge deck repair, and many other maintenance chores. One barrier to progress in the pavement area is our rigidity concerning low first-cost bidding for contracting awards. Private contractors actually do most of our construction work and our procurement system provides them with relatively little incentive to find ways to do the job better for less. SHRPS' output could provide the knowledge needed to move to more innovative contracting arrangements that require the contractor to produce a performance related product, e.g., one which assures longer life—rather than one which follows a certain recipe. A lot of experimentation and demonstration will be required in the years to come if we are to fully exploit the new knowledge coming from SHRP.

Advanced Vehicle and Highway Systems

Europe and Japan are making major investments in the development of Advanced Vehicle and Highway System (AVHS) and there is rapidly growing interest in this country in undertaking a similar program. Some of the technology under the AVHS umbrella is fully developed and simply needs implementation to make a significant contribution. For example, second- and third-generation automated vehicle-responsive traffic signal control systems have demonstrated their capacity to make a cost-effective contribution to improved traffic flow. Similarly, freeway control systems, including a variety of sensing, metering, and motorist information technology, are ready for implementation. Such technology can and should be employed with transit and other high occupancy vehicles where appropriate, adding further benefits. Continuing experience and research on such installations should further improve their performance. Given the difficulties of expanding our road infrastructure in

urban and suburban areas, technology that provides the basis for more efficient use of existing infrastructure must be a part of any future strategy.

Similarly, vehicle manufacturers are already adding electronics and other information devices to new vehicles, with prospects for more of the same in future years. These include cellular phones, fax machines, radar type proximity devices, and in-vehicle route information devices. Other countries already have operating systems providing visual displays of travel advisory information through the car radio system. Several U.S. companies are experimenting with dashboard cathode ray tube (CRT) multicolor map displays capable of guiding the motorist to his or her destination.

The potential for linking the electronics of the road with that of the vehicle provides the driving force for AVHS. A "smart" road network that knows on a real-time basis where the traffic is and the performance of each part of the road system should be able to communicate such information to a "smart" car. This will provide the driver with information about how to avoid congestion by traveling lesser used links of the system or, in the worst case, turning back and trying later. Analysts with an even longer horizon look for the time when the vehicle itself might be controlled, leading to increased system capacity and safety.

While the promise of large benefits is attractive, the institutional barriers to progress are significant, especially in a society which possesses a sparse history and large suspicions of prospects for effective private-public cooperation in large undertakings. Nevertheless, the apparent fit between our need for better system performance on the one hand and the growing battery of vehicle electronics on the other, makes this an opportunity that is not likely to go away. We have got to find a way to move ahead on this technology.

Systems Management and Planning

Electronics and information systems will continue to affect surface transportation systems in the future in still other ways. Managers of truck systems will continue to improve their methods by using advanced technology for more efficient management of their fleets and operations. Location systems will provide centralized information about movement of vehicles and shipments, driver performance, and vehicle effectiveness. Improved identification devices will enable better management of containers whether by rail, water, truck, or aircraft. Electronic identification devices that indicate a vehicle's type, its make, and when it was

built should, when coupled with automatic weigh-in-motion devices and vehicle counters, provide for improved automated data systems useful for infrastructure planning, design, and management.

A more systems-oriented look at the question of pavements and heavy vehicles will also likely provide large benefits. Designers of pavements have largely done their work accepting the vehicles and their characteristics as given. Designers of heavy vehicles and tires have designed their suspensions, wheel, and tire configurations without regard to pavements except as may be specified in regulations. Opportunities for thinking about the whole are great.

A soon-to-be-released study by the TRB looking at the so-called "Turner truck"—a vehicle with higher allowable gross weight but lower allowable axle weights achieved through added axles—appears to provide a win-win situation: greater efficiencies for truck operators and lower costs for highway agencies. But this small study has by no means exhausted the opportunities for such technical innovation. Improved regulations, cheaper highways, and better trucks may be possible through further examination of the heavy vehicle-highway system.

New Systems

Opportunities for new systems (or subsystems) of transportation are also available and likely to be in service in the coming decades. Some high-intensity corridors have been developing plans for high-speed rail or magnetic levitation systems. As travel demand continues to grow, some of these are likely to be implemented, relieving stress on parallel, highly congested road links. Some special truck links in selected corridors may also prove feasible. Variable speed walkways may expand the effective radius of rail transit stations, and the dual mode urban bus systems, available now in Germany, may find application here.

Technology and Safety

Technology is likely to add to the safety of future systems. The Advanced Vehicle-Highway Systems discussed earlier could contribute to system safety. Antilock brakes, radar anticollision devices, better passive restraints guarding all occupants (not just drivers), and improved vehicle design standards for small trucks and vans will all make a contribution.

The cost and effectiveness of enforcement is a growing issue as some areas see decreasing compliance with safety regulations. Technology

could provide cost-effective answers to problems of speed regulation, signal violations, and other types of noncompliance.

Improved sophisticated driving simulators may provide insights into human factors that will improve design of both roads and vehicles for better safety.

The National Highway Traffic Safety Administration and FHWA are sponsoring a new project in TRB to look at a long-term future research strategy for highway safety, including human factors, vehicle design, and road systems. Doubtless some of the recommendations of this project will include technology innovations related to safety.

Transportation and Air Quality

One of our most difficult tasks is to convince a concerned public that new transportation projects will not add to existing air quality problems. To the extent that we make progress in this area, we not only make for a better environment, but we also reduce one of the perceived negative aspects of expanded transportation infrastructure. Included in any reasonable air quality strategy are improved vehicle emission control devices, alternate fuels, higher mileage vehicles, and improved fueling stations. All of these items will be the subject of intensive research and development in the years to come. In some areas more intrusive strategies impinging on travel demand and lifestyles may also be required—but improved technology must play a leading role.

The Bad News: Too Little Research

Some of the improvements I just described are likely to happen either because they depend on efforts in the private sector driven by competitive pressures, or because some of them are within the range of current public sector transportation research efforts, modest as they are. And they are modest.

Public spending on surface transportation research tends to run at less than 0.2 percent of overall system expenditures. This is less than one-fifth the level of research effort by even the least technically oriented segments of the private sector, and it is less than a twentieth of the research efforts of the vehicle production sector. And some public sector efforts are still declining. Research in the public transit area, for example, has almost disappeared in recent years. This important component of transportation, costing upwards of $15 billion annually, is heavily dependent on electric and mechanical technology. That it spends almost nothing on finding ways to improve its vehicles, methods, operations,

finance, administration, etc., is not appropriate for an industry looking for ways to improve through innovation.

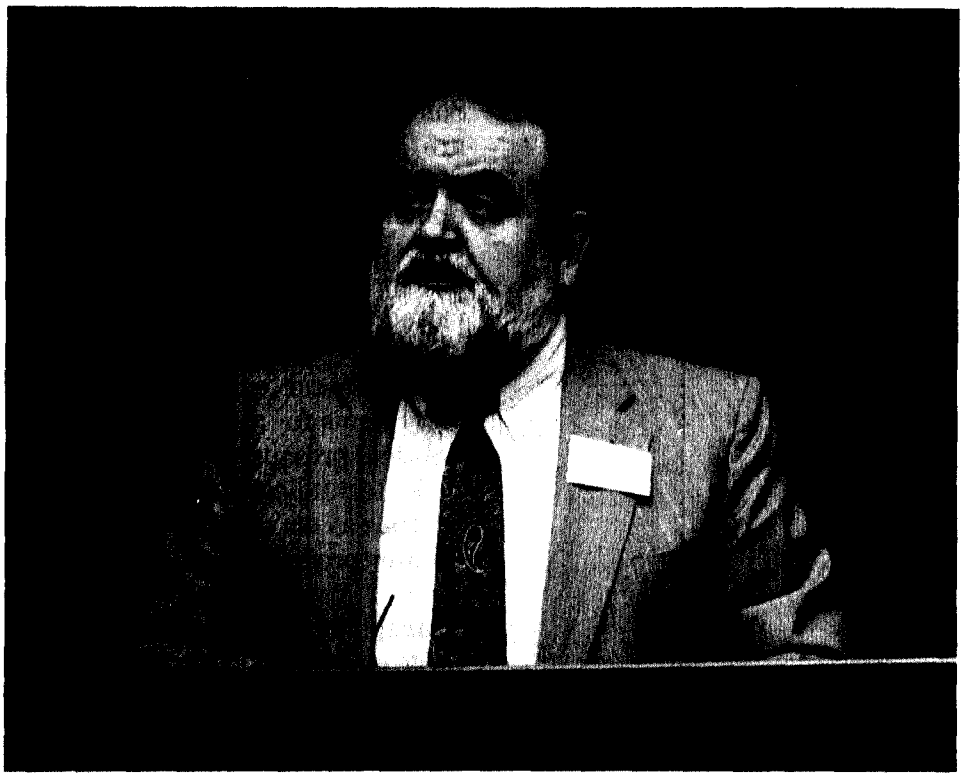
Some of the organizations working on the 2020 Consensus Programs[1] are, as part of their planning, looking at ways to increase research efforts. Some have endorsed significant increases in research and development as a general goal. AASHTO is working hard on fleshing out such concepts, and alternatives under current discussion would increase specific programs in ways that would be responsive to many of the issues raised earlier in this presentation.

Research and technical innovation will always be second and third priority items for management in surface transportation. Financial and political pressures will always combine with management turnover to make technology somewhat of a stepchild. Despite this, there are opportunities as we set the stage for future transportation programs to make greater progress in these areas than we have in the past.

Transportation is properly organized as a largely decentralized and very large enterprise in our country. Such decentralized industries have a strong tendency to underspend on research and technological innovation. Our history has shown that one of the most important roles of the federal government in transportation is encouraging research. Any discussion of future roles must take this history into consideration.

[1]This effort was initiated by the American Association of State Highway and Transportation Officials (AASHTO). The program's goal is to develop a national consensus on surface transportation requirements through the year 2020.

Remarks by Francis B. Francois



MR. FRANCOIS, Executive Director, American Association of State Highway and Transportation Officials (AASHTO): I am very pleased to appear today at the opening session of this seminar to present an overview of surface transportation issues.

The role of the states in meeting the surface transportation requirements of our nation is large. Historically, it is the states, with important funding support from our federal partner, who have planned, constructed, and maintained the highway network that provides America with the highest mobility for people and goods of any nation on earth. Especially over the past two decades, the states have become more involved with the public transportation, railroad, and water transportation modes. I would like to begin my remarks with an overview on each of these four surface transportation modes.

Transportation Modes

Public Transportation

Turning first to the nation's public transportation system, since World War II, we have seen it move from an essentially private sector activity to the public sector. Federal programs were created by Congress to support public transportation, which peaked in available funding in 1980. The decline in federal support since then has increased the fiscal burdens on local communities and states. Especially since 1980, we have seen increased activity on the part of a growing number of states in supporting public transportation, to the point where the 1988 annual AASHTO Survey of State Involvement in Public Transportation establishes that, collectively, states are now putting more funding into this important transportation mode than the federal government. Specifically, in 1988 states spent some $3.9 billion to support public transportation, while the federal contribution was $3.2 billion.

Is public transportation funding now adequate? Frankly, no. We know this from work done by AASHTO over the last 2 years to produce our analysis of surface transportation requirements, entitled Keeping America Moving—The Bottom Line. This report was prepared as part of the AASHTO-initiated Transportation 2020 program.[2] The Bottom Line report states that our public transportation systems could effectively use at least another $1 billion per year, just to update and reduce the age of transit operating equipment. This infrastructure investment would substantially improve the reliability of our nation's public transportation system, which would contribute importantly to increased ridership. It would also reduce operating costs, to the benefit of everyone.

The role of public transportation is critically important to the survival of mobility in many of America's cities, especially as we endeavor to provide clean air. In rural America, there is a continuing and growing need for public transportation, especially to serve the requirements of the handicapped and an increasingly aging population.

Railroads

Moving to railroads, over the last 20 years we have seen thousands of miles of railroad lines abandoned in our nation. Today, in part because of those abandonments and in part because of deregulation at the federal level, our trunkline railroads are healthy. But those trunkline railroads do not serve America as our railroad industry once did. In many states, the development and survival of shortline and regional railroads

[2]The 2020 program is a coalition of transportation business leaders and government officials working to develop a consensus plan to deal with transportation needs through the year 2020.

is vitally important to meeting transportation needs of local industries, mines, and agriculture. Our states have become increasingly involved with railroad issues over the last 20 years. Today, the only effective public sector railroad planning is being done at the state level.

The future of our freight railroad industry is of concern to our state departments of highways and transportation and should concern every American. The continued viability of Amtrak and passenger rail is also a concern. Looking ahead, we recognize that one way of meeting urban mobility requirements in many of our more intensely developed regional corridors may be through high-speed rail. The railroad industry in America has been and is changing. One era of its history has closed, but another important era lies ahead. Our challenge is for our federal and state governments to recognize the role of rail and to work to assure a healthy, effective industry in the coming new railroad age.

Water Transportation

Turning to water transportation, the infrastructure problems of our nation's inland waterway system are well known. Many of our locks and dams are in need of repair, and other capital needs exist. These must be satisfied, because it is important that the cost-effective movement of goods by water remain a choice for our shippers. Our harbors today are taking on increasing importance, as we face a restructured world economy in which the United States is positioned between an emerging and economically uniting Europe and Pacific rim nations that are becoming the manufacturing centers of the world. The movement of goods into and out of ports is vital to the economy of our states and the nation, and we must be certain that these facilities are adequately supported.

Highways

Our highways are the cement that binds together all other transportation modes. Without an efficient national highway system, the other transportation modes could not effectively perform their roles, and our nation would be a very different place economically and socially. It is our highway system that has allowed the distribution of factories and other economic activities across the nation into all states. It is our highway system that provides the means, through trucks, to move the great majority of commodities and goods in our nation. And it is our highway system that assures a vibrant travel and recreational industry.

What constitutes our highway system? The part that receives federal aid totals 847,000 miles. This includes our 43,844 mile Interstate and Defense Highway System that alone carries 21.3 percent of the nation's traffic. Overall, the federal-aid highway system carries 80.7 percent of our highway traffic. But it would be of little use to Americans without

the over 3 million miles of state and local highways, roads, and streets that connect us to the federal-aid system and accommodate local and intraregional traffic requirements.

Today, our nation's highway system is facing the need for a new consensus on its overall mission. Nationally, our highway system mission since 1956 has centered on the construction of the Interstate and Defense Highway System, a task that is nearly accomplished. The goal of the AASHTO-initiated Transportation 2020 effort is to reach consensus on a new mission, and a program to accomplish it.

Looking across America, the AASHTO Bottom Line report makes clear that pressing requirements on our national highway system must be met. Collectively, in 1987 all levels of government spent $66 billion to construct, repair, maintain, and operate our 3.9 million miles of streets, roads, and highways. AASHTO's technical review of our highway requirements indicates that the total expenditure level should be $80 billion annually just to adequately maintain what we now have. If we hope to meet the suburban congestion, rural mobility, and other highway needs of Americans, we should be spending in the $100 billion range. Further, we need to sustain this level of funding on an annual basis into the foreseeable future.

These are not unrealistic numbers, huge as they may sound. Currently, Americans are driving about 2 trillion vehicle miles per year. The $66 billion spent in 1987 equates to about 3.2 cents per mile, or less than 10 percent of the estimated mileage cost of operating an automobile. Clearly, America's highways are bargains for those who drive on them. We can as a nation afford the additional funding necessary to assure an adequate highway system, and as our Bottom Line report makes clear, the return on investment ratio is very positive.

Surface Transportation Overview Issues

The overview issues in planning America's transportation infrastructure are several, from an AASHTO viewpoint. The following are some of those issues, presented in no particular order:

Transportation Interreliance

We need to recognize the reliance of the several transportation modes on each other. No one mode can meet our diverse transportation requirements. State and federal planners must take into account the individual capabilities of each mode and how the modes relate to each other. We must also increasingly ensure that we have adequate intermodal capability.

With respect to intermodal movements, one finding of our AASHTO work is that there are large unmet needs in the intermodal area. Specifically, through surveys of the states we have identified an annual requirement of about $1 billion to properly connect airports, harbors, and railheads to our nation's highway and transit systems. These are requirements that are not in anyone's program.

Maintenance/Rehabilitation

We must recognize the laws of engineering, which tell us that transportation facilities deteriorate and wear out and that they must be maintained and periodically rehabilitated. If rehabilitation needs are not satisfied, then Americans will pay the cost through traffic and transit delays, reduced industrial productivity, increased accidents, injuries and vehicle repairs, necessary life-style changes, and in other ways. Looking at the nation's bridges, for example, we know that about 200,000 of them will need to be repaired, rehabilitated, or replaced between now and the turn of the century. The cost of doing this is high, but ignoring the problem is even more expensive.

Flexible Planning

In designing our surface transportation programs for tomorrow, we must recognize that America has changed over the past few decades, and will continue to do so. These changes are driven by demographics, economics, technology, world developments, and other factors.

From a national viewpoint, we must ensure that there is a national transportation network that meets interstate and interregional transportation requirements. Looking at each state, we must acknowledge that no one transportation solution fits all conditions. The analysis by AASHTO of our nation's transportation requirements, and that of many others who have looked at the issue, tells us that we must be able to design transportation solutions at the state and local level tailored to the unique problems to be solved. This means that our states and local governments must be free to work with each other to devise specific solutions and that needed federal programs must recognize and provide for this flexibility.

Funding

We must have an adequately funded transportation research program, one that will ensure effective transportation solutions and fully utilize America's technical capabilities. Our research should of course include new materials, and a search for better ways to build transportation facilities. But it should also extend to improved management and such new concepts as intelligent vehicle and highway systems that hold promise, especially for increasing safety and relieving urban congestion.

Strategic Planning

We must think more strategically and systematically about transportation. We need to be more effective in integrating our transportation modal programs and the roles of the public and private sector. Beyond this, we need to integrate transportation planning and decisions with factors such as clean air goals and concerns about global warming.

Today we are looking nationally at alternate fuels, such as gasohol and methanol, as possible solutions to clean air. It needs to be recognized that these two solutions to clean air can significantly affect our transportation system in ways that are not now being discussed. For example, large-scale use of gasohol without removing the current 6 cents per gallon federal fuel tax exemption could devastate revenue to the Highway Trust Fund.

In looking at large-scale methanol usage, there are private sector issues to be decided involving who will manufacture the fuel and how it will be distributed and sold. On the public sector side, the fact that essentially twice as much methanol is required as gasoline means that use of this fuel will require twice the number of tank trucks on crowded urban freeways, raising new highway safety problems. Further, it will mean the probable construction of new pipeline and tank farm capacity, which will require governmental land use, transportation, and environmental decisions. We should be thinking systematically about these issues, but currently we are not really structured to do so.

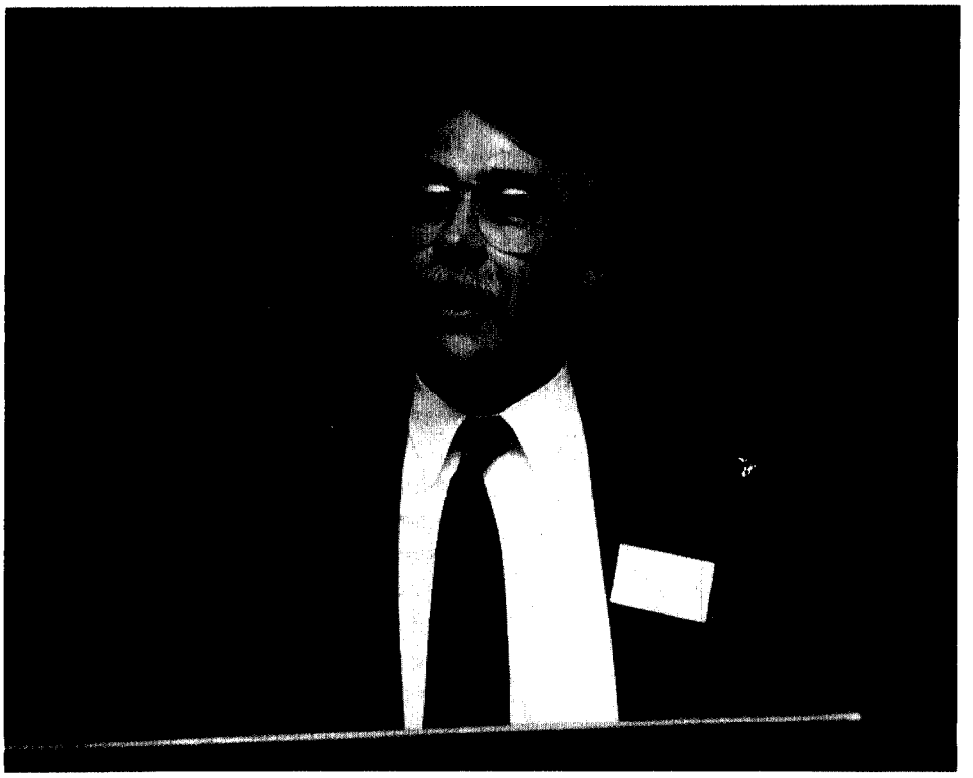
The Future

Particularly with respect to developing new surface transportation legislation at the federal and state levels, we need to take the occasion of completing construction of the 43,000 mile Interstate and Defense Highway System to re-think the mission of federal surface transportation programs and the future of our traditional federal-state-local partnership, particularly in the highway and public transportation modes.

AASHTO is developing its specific recommendations on the future of the nation's surface transportation system. Our report, New Transportation Concepts for a New Century, details our work to date and we will be pleased to keep you advised of our efforts in the months ahead.

To conclude, AASHTO is very pleased that the General Accounting Office is holding this seminar on the future of our nation's surface transportation infrastructure. We stand prepared to be of further assistance wherever possible.

Remarks by Robert G. Stanley



MR. STANLEY, Deputy Executive Director for Policy and Programs, American Public Transit Association: I would like to add my thanks to GAO on behalf of the American Public Transit Association (APTA) and the transit industry for initiating this discussion of surface transportation infrastructure issues. It is important to have a forum, other than those that transportation industry groups have created for themselves, to discuss the problems we face and the possible approaches to be taken.

APTA is an organization that represents the public transit industry in the United States. APTA has approximately 900 members, half of which are public transit operating agencies, ranging in size from one- and two-bus operations to the systems serving New York City, Los Angeles, Chicago, and even some large international transit systems. The other half of our membership is composed of government agencies, manufacturers, and suppliers of equipment and services to the industry. APTA covers virtually the whole spectrum of transit operations and has a central interest in the equipment, technology, research and development, and operational issues that must be considered in formulating new national policy.

I would like to talk briefly about four points this morning. The source of my remarks is an effort that parallels and intertwines with the "Transportation 2020" project that was mentioned by earlier speakers.[3] APTA's effort, entitled "Transit 2000," has been underway for approximately 2 years. Transit 2000 has brought together 50 of the best and brightest people in our industry to outline the actions necessary for public transportation to reach its greatest potential in the decades ahead. Transit 2000 issued an interim report last fall and will produce a final report and several background papers this fall. These papers will contain our initial ideas on how to frame and shape the reauthorization of the Surface Transportation Program in 1991.

The first of the four issues I wish to discuss is declining mobility, the problems it causes, and their dimensions and implications. The second involves the importance of linking our policies on transportation investment to other national goals and objectives. The third issue includes problems with current policy and programs at the federal level, as seen from a transit perspective. Finally, I would like to provide you a quick laundry list of some of the proposals APTA thinks ought to be incorporated into the national transportation policy as the Secretary of Transportation and Congress begin to decide the shape and direction of the new federal program.

Mobility

We are clearly losing the battle for mobility. Daily, we hear of or personally experience declining mobility—most often in the form of congestion. In the next 30 years or so, we will add as much new traffic to our highway system as we have added in the last 32 years—a sobering thought given today's experiences. This raises questions about whether it is wise and whether we are prepared to accommodate this kind of growth in travel demand in the same ways we have in the past. In the past, accommodation of increased travel demand was dominated by highway construction, the demise of transit in its private form and its rebirth as a public service, and the overwhelming dominance of single-occupancy vehicles.

Currently, we are not prepared to address the projected travel demand and growth in a reasonable way. One observation that has been very useful to us is that if 20 percent of the projected demand for new highway capacity on new rights-of-way cannot be built, the demand for

[3]The 2020 project is a coalition of transportation business leaders and government officials working to identify and develop a consensus plan to deal with transportation needs through the year 2020.

transit would double over current levels. Under these conditions, it appears inevitable that public transit will become increasingly necessary and important in the decades ahead.

However, neither the transit industry, federal policy, nor the federal transit program is prepared to meet such a demand. It appears to us that we cannot rely on a federal surface transportation program of the nature we have had in the past 30 years. The question is, "How should it change?" One part of this equation has to be an increased commitment to a greater reliance on all forms of high-occupancy, shared-ride services. These services must be tailored to meet the demands of specific markets, in specific locations, and during specific time periods if we are to be successful in enhancing mobility. Options to address the single-occupant auto problem depend on both time factors and geographical elements throughout the country.

The Impact of Transportation Policy on National Goals

Beyond the mobility question, what are some of the other major goals and problems that we are facing now? What are the implications for redesigning national transportation policy programs? It is clear to us that it is no longer possible to make transportation investment decisions or planning decisions in a vacuum. We must address our mobility needs, but we have to look more carefully at the consequences of our transportation decisions.

The most obvious example is the air quality problem. Mobile sources are estimated to represent 40 to 60 percent of ozone precursors, 70 to 80 percent of carbon monoxide, and 30 percent of carbon dioxide emissions. For carbon dioxide, which contributes to the greenhouse effect, the transportation sector is the area in which the emissions are growing the fastest. Poor air quality currently affects over 100 urbanized areas around the country and roughly half the population of the United States. We are not going to be allowed the luxury of acting independently on our transportation investment decisions without considering the air quality consequences and, indeed, contributing to their solution. The same is true for social objectives, energy goals, and economic development plans.

Transit and environmental interests have begun to converge fairly strongly on a number of points. In the past, environmental interest groups have been preoccupied with tailpipe emissions reduction. They have recently concluded, however, that the most significant problem is

vehicle miles of travel (VMT)—specifically, the increase in miles of travel.

The Environmental Protection Agency (EPA) projects that the emissions resulting from increasing VMT will overwhelm any emissions reductions that may come from tailpipe standards that are being considered in clean air legislation.

So the issue of travel demand and VMT growth is not just a mobility question, it is a major environmental focus for the future. Because these concerns intertwine, it becomes absolutely essential to try to promote, within national policy, significant increases in high-occupancy, shared-ride vehicle use.

Problems Related to Current Programs and Policies

Through our work and jointly with others in the transportation community, we have identified a number of problems related to the current programs and policies. Some of these are common problems; others reflect specific transit concerns. The first problem is too little investment. Calculations show that between 1960 and 1980 we lost roughly half the buying power of the investment in surface transportation relative to the size of the gross national product. In effect, we have experienced a major disinvestment in transportation for over two decades. Since 1980, federal transit programs have lost roughly half of their purchasing power—a similar disinvestment but in half the time.

The projections of necessary investment cover a wide range, but there is clear agreement that we need to invest more. The projections range from the conservative position of the Highway Users Federation that investments need to increase by no more than 50 percent over the next 4 to 5 years, to the view held by the National Council on Public Works Improvement, which said we must double our investment.

The transit industry feels that we need to have a doubling of investment in public transportation and that doubling should occur at all levels of government, including federal. That would equate to federal transit investment of $6 to $8 billion per year compared to the $3 billion program now in existence. This would restore federal funding to past levels, adjusted for inflation, that existed before 1980 when program cuts began. If we are true to our objective of significantly increasing the use of high-occupancy, shared-ride services, much more than the $6 to $8 billion will be needed at the federal level.

Another problem with current policy and programs is their separateness. Congress, state transportation officials, transit agencies, and transportation industry organizations make investment decisions through different and often independent processes. This is an issue that needs to be explored thoroughly as we move ahead. We have a large degree of separateness in our planning, our programming, our allocation of funds, our construction programs, and our maintenance activities. This characteristic is not serving us well any longer. We have too many categories of funds driving independent decisions; we have too few trade-offs and too little flexibility in how the money is spent; we have agencies that are responsible for modes but we have no agency responsible for mobility; we have money that flows to modes but we have no money available for mobility. We lack a multimodal perspective. I think these shortcomings should set the tone for a new degree of flexibility and multimodalism as we restructure federal policy.

Finally, one last shortcoming with current policy and programs is that we use the wrong yardsticks to measure the success and value of our transportation investments. The result is that we are trapped by tradition. For example, why measure modal splits—roadway and transit—on a 24-hour or on an annual basis? Why focus on national aggregate modal splits? That seems to disguise the essential value of high-occupancy, shared-ride services during critical times and in critical locations.

Why focus so single-mindedly on transit internal operating efficiencies when the transit manager will be increasingly subjected to requirements to meet much broader, often conflicting goals? Goals that relate to economic development, social services, the environment as well as efficiency. APTA remains very committed to improving efficiencies within our own operations, yet we find that we are increasingly constrained by mandates and external forces that affect the transit industry. These often have the effect of reducing our ability to maximize revenues, directly increasing our costs, and/or restraining our ability to increase ridership. The transit industry has been thrown into a setting where conflicting and competing objectives abound. APTA believes the measures applied to the industry to assess its success and value must be broadened significantly to reflect these demands.

Lastly, why should we continue to measure only vehicle accommodation as we look at travel demand in the future? Doesn't it make more sense to be measuring how we accommodate passengers? The occupancy question and the use of high-occupancy, shared-ride services become fundamental features of a new set of programs and policies when our problem

and possible solutions are viewed in passenger, not vehicle terms. As we set future goals, we have to also adopt measures that reflect the goals we need to accomplish. We have clearly not done that very well in the past.

Ideas for a New Federal Policy

Finally, let me identify several ideas that are emerging from our Transit 2000 program that go to the heart of what a federal policy and a new federal program should look like. First, the question of clear, distinct goals. Is it in the national interest, for instance, for us to aggressively promote increased use of high-occupancy, shared-ride services? We believe that it is. That concept spans everything from carpool, vanpool, and shared-ride services to the most capital-intensive heavy-rail investments. We would propose that this goal is central to a new national policy and we endorse this expanded definition of transit for the future.

Second, we need increased, direct, and dedicated federal investment. In addition to adequate funds needed to meet facility and service needs, it is increased investment that is going to allow us to drive a significant change in program structure. Put another way, in order to adopt a more imaginative and bolder program structure, increased federal investment is necessary. APTA believes that increased investment ought to come from increased motor fuels taxes. We advocate, within the transportation community, an immediate increase in federal motor fuels taxes. There are claimants for these resources that threaten our ability to use them in the future. We believe that it is incumbent on the transportation industry to be aggressive and act immediately to increase and retain these resources for transportation use.

We believe that we need to provide a direct, categorical source of federal money for maintenance and reinvestment in both transit and highways. We must not trade off or lose sight of the need to meet the maintenance requirements on existing systems. The needs are relatively easy to estimate, and we need to look at our current systems and provide the necessary money as directly as possible.

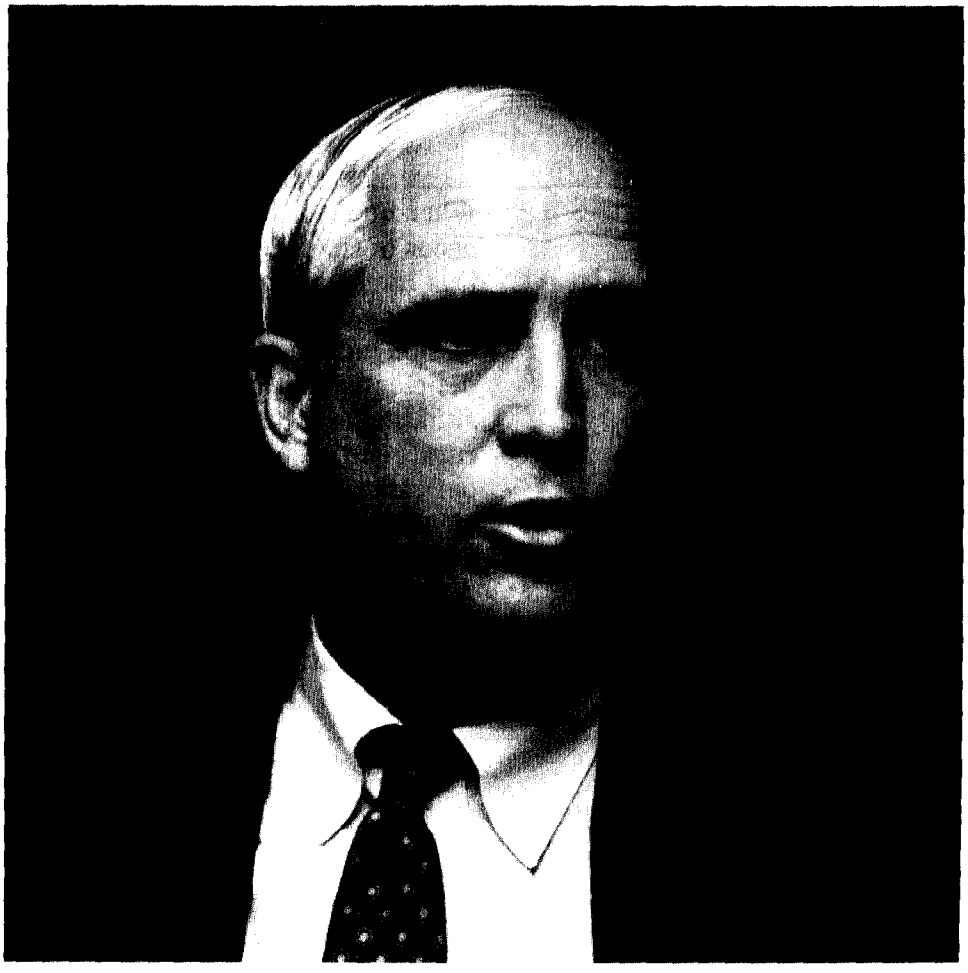
On the other hand, we should think about pooling, sharing, or amassing a resource that can be used for major capacity expansions without regard to mode. We should deliver that resource to the metropolitan level. In this way, regional concerns and local government interests can have a much stronger hand in the decisions and trade-offs necessary to channel money to new transportation investments suited to their needs, circumstances, and priorities.

Finally, I think all of this suggests that we should make "no little plans." We ought to be as bold and as aggressive as we possibly can in trying to match the needs that we see across the country to resources and the level of investment that is required to get the job done in the future. As part of the process, we see public transportation as an essential element as we move forward.

On behalf of APTA and Transit 2000, I look forward to the continuing evolution and debate on these and other concepts. Thank you.

Panel 2: Federal-Aid Highway System Preservation and Research Needs

Remarks by Dr. T. Peter Ruane



DR. RUANE, President and Chief Executive Officer of the American Road and Transportation Builders Association: Let me begin by briefly explaining that the American Road and Transportation Builders Association (ARTBA) is a trade association representing some 4,200 companies throughout the country which comprise the entire spectrum of the transportation construction industry. This includes the actual contractors and construction companies that do the work of building the nation's highways, bridges, airports, or subways, as well as engineers who plan and design the work, suppliers who provide the materials, and providers of services underlying the various products. One of our divisions includes public officials and is heavily oriented toward the county engineering sector that represents local transportation agencies.

I have been asked this morning to talk about ARTBA's views on the condition of the federal Interstate Highway System and what solutions are needed to address problems that are apparent or anticipated with that system.

Deficiencies in the Highway System

When one looks at the preservation, rehabilitation, and maintenance needs of the federal highway system, one must look at the investments that have been made over the years. A couple of facts underscore the situation existing with this system. First, the Federal Highway Administration has classified 11.6 percent of Interstate highways as being in deficient condition. The funding commitment necessary to correct this situation is $132 billion over the next 15 years. The primary urban and rural road systems have problems also. Urban roads are 5.5 percent deficient, rural roads are 6 percent deficient, and secondary road deficiencies total 11 percent.

Additionally, some 41.3 percent of the nation's bridges—over 200,000—have been classified as deficient. Approximately 22 percent of this total is actually structurally deficient as opposed to functionally obsolete.

Inadequate Federal Investment in Highways

ARTBA, as a federation of transportation construction interests, has a wide range of interests in the nation's highway system. We believe that the investment by the federal government and by the entire public sector over recent years has been inadequate. There has been major disinvestment in our transportation infrastructure over the last 10 years.

Bridges have been an area of considerable concern to us, primarily because of the safety aspects involved. We have recently assembled a 12-minute video with the U.S. Chamber of Commerce which dramatizes the nation's inadequacy relative to its bridges and highway system. It provides a rather depressing picture of not only the current situation, but the future outlook as well.

We have also looked at suburban and urban congestion as part of a problem that can be tied in some ways to the lack of maintenance and preservation efforts by both the government and some private sector users of our system.

New Initiatives Needed

ARTBA is supportive of a number of new initiatives to address these problems. We have recently completed and voted upon a new highway

and bridge policy. First, we have underscored the need for new transportation corridors to serve primarily emerging-growth areas. Second, ARTBA has gone on record again to oppose the use of highway tax revenues for nontransportation purposes. Historically, we have asked that the Highway Trust Fund be excluded from use in the general federal budget. Third, we have recently reevaluated the issue of the federal tax subsidy on the sale of gasohol. The $500 million per year in lost revenue to the federal Highway Trust Fund, a direct result of the gasohol tax exemption, could go a long way toward meeting some of the preservation needs of our existing system.

More and Continued Support for Research Programs

In the area of research, ARTBA has a division, comprised of 40 of the nation's leading civil engineering schools, which is heavily oriented toward technology transfer. ARTBA wholeheartedly supports the research conducted by these organizations and is calling for, in its new policy, even greater federal support in this area, so that the results of these centers' research can be disseminated more widely throughout the nation. We also fully endorse the research efforts now underway by the Strategic Highway Research Program (SHRP).[1]

ARTBA is advocating a much larger transportation safety research program, which we believe has not, in the past, received the level of funding or attention that it deserves. This program includes construction work zone safety as well as the day-to-day use of our nation's highways. We support a larger research program for urban mass transportation. Often our organization is identified almost solely with the road-building industry, but we are comprised of engineering firms and contractors who have also built subways, light rail systems, and major mass transit projects throughout the country.

We support the investments being made in the intelligent vehicle and highway system efforts. The United States' commitment to research in these fields has been approximately $2 million—the bulk of which has provided funding for some experimental programs in the Southern California area. The investments by our overseas competitors in this type of new technology are staggering. Japan has invested about $700 million in these projects, and Europe is currently expending about $750 million. We believe these programs have great merit and potential for the United States; yet our major competitors around the world are out-spending us by 700 to 1.

[1]SHRP is a 5-year, $150 million program supporting research on highway construction.

Privatization

As part of our new highway policy, we have articulated a specific and strong stance relative to supporting privatization as another means of bringing added revenues to meet the nation's infrastructure needs. I do not think there has been much comparative research conducted on the merits of the various projects, some of which are complete and some of which are embryonic. We believe that these efforts should be part of the research agenda for the nation's transportation programs, particularly in the next year prior to the reauthorization program.

ARTBA is currently involved in the areas of economic development and productivity. We would advocate even greater attention to these fields because historically there has been insufficient research on and attention paid to the basic benefits of highway and transportation programs to economic development and productivity. Most people consider the relationship as a given entity, but there have been few meaningful efforts to correlate these activities to demonstrate the major beneficial relationship. We would recommend that some objective evaluation of this relationship be conducted in advance of authorization hearings.

Increased Motor Fuel Tax

Finally, in the past 7 years, there have been over 40 individual reviews of the nation's transportation needs and problems. The range of financial projections to meet these needs is quite dramatic—over $100 billion to address total needs and $80 billion per year to meet current needs. This leads us to the next logical step—not an anathema to ARTBA—which is to strongly advocate increases in federal and state motor fuel taxes to compensate for the shortfall in funding. We could debate all day the tactics, timing, and merits of this increase, but one must return to reality. Unless the studies and the data and the reviews that have been done in the past 5 years are to be discredited, how can we sit back and say that we are going to meet these massive needs without addressing the funding issue? And this funding, in ARTBA's opinion, is dramatically short in preservation, maintenance, and new construction.

As part of ARTBA's new legislative program and the new national highway and bridge program, we will be advocating a major increase in federal motor fuel taxes to accommodate an expanded $40 billion per year federal highway program. This will make some people very uncomfortable and will probably not contribute to making them long and dear friends of our organization. But we believe that we must consider the interests we represent and take an aggressive stance rather than leaving the high ground to others. Many other claimants are going after these resources. We are going to continue our traditional stance of increased

federal funding, and we will continue to pursue a much greater federal commitment in the years ahead.

Remarks by E. Dean Carlson

MR. CARLSON, Associate Administrator for Engineering and Program Development, Federal Highway Administration, U.S. Department of Transportation: I would like to begin by providing some background on the condition of the federal-aid highway system. Since the 1982 act was passed, the pavement condition and road surface condition—what most people refer to when they discuss the quality of highways—has improved on nearly every system. Improvement began in 1982 and continued until about 1987.

While the number of deficient bridges has increased slightly, so too has the total number of bridges—resulting in the percentage of deficient bridges remaining constant. Not all of the bridges that we classify as deficient will ever be corrected. The Federal Highway Administration (FHWA) is required to inventory all bridges, including those which serve

only one or two families. For these bridges—and there are many of them—it may be better to build a new bridge than spend limited funds to repair a particular type of bridge. So the 587,000 bridges in the inventory may be an inflated number due to the many minor bridges included in this count.

While we have been able to meet our construction goals since about 1982, in the last year or two we have been seeing some problems. However, the present decline in the amount of highway construction our dollar buys is small compared to the inflationary times from 1973 to 1982. Yet, even with the 1982 Highway Act, we have failed to attack the backlog of highway improvement needs which accrued during the previous years of neglect.

Another alarming condition FHWA is noticing is that the system which currently appears to have the most problems is the Interstate system. Increasingly, more and more bridges on the Interstate system are being classified as deficient. This should come as no surprise given that the majority of these bridges are close to 30 years old. With these odds against us, I expect we will continue to find even more bridges on the Interstate system to be deficient.

Furthermore, the quality of the roadways on the Interstate system is starting to deteriorate. This really should not be any surprise either if you look at all the heavy trucks out on the Interstate. As part of an American Association of State Highway and Transportation Officials (AASHTO) road test group in 1958, I helped design the load-damage curves that indicate pavement thickness necessary to accommodate an 18,000-pound wheel load. Since that time, there have been two changes in the weight limits, increasing the weight load considerably. As a result, the amount of deterioration in the pavement is forcing us to take a look at new ways to rehabilitate these pavements so that they can handle the increased truck weights now in existence. One inherent obstacle to this rehabilitation is that Interstate reconstruction projects are more expensive than repairs to most primary and urban arterial highways.

Previously, one of the panelists presented figures showing urban vehicle miles traveled (VMT) under congested conditions increasing from 61 to 65 percent since 1985. Since VMT will continue to increase, we need to address this problem. Because we cannot afford to fix all the problems with the Interstate, we must find a better way to use the resources we have. Of the 65 percent VMT occurring during congestion, over half

occurs as a result of incidents. We are becoming better equipped to handle incidents in this area, and also across the country. We will probably be using the techniques we have developed with television surveillance and better coordination of emergency handling capacity in metropolitan areas to improve incident management even further. But despite these improvements, we will still need new facilities.

One of the solutions we will have to consider is how we use our money. We need to consider the costs involved with constructing new facilities, but I do not think we can, nor should we, attempt to build ourselves completely out of our problems. We can, however, as another solution, make better use of our systems.

FHWA over the past 5 years has been attempting to sell the idea of pavement and bridge management. The basic concept is that things tend to wear out at a predictable rate. Without a pavement management system, states sometimes bow to local pressure to put a thin overlay on a road to smooth out the surface but fail to address the real issue—more traffic weight and volume. Hopefully, a pavement management system would encourage the state to opt for more permanent solutions to highway problems rather than temporary quick fixes. The same concept can be applied to bridges.

We at FHWA are very interested in the Strategic Highway Research Program (SHRP) and expect to play a role in its activities. Because SHRP's pavement management process research is long term, it will give us some of the answers about managing pavement that are not available elsewhere. Also, I think that we must be concerned with the technology SHRP is developing and ensure its dissemination to other professionals in the field.

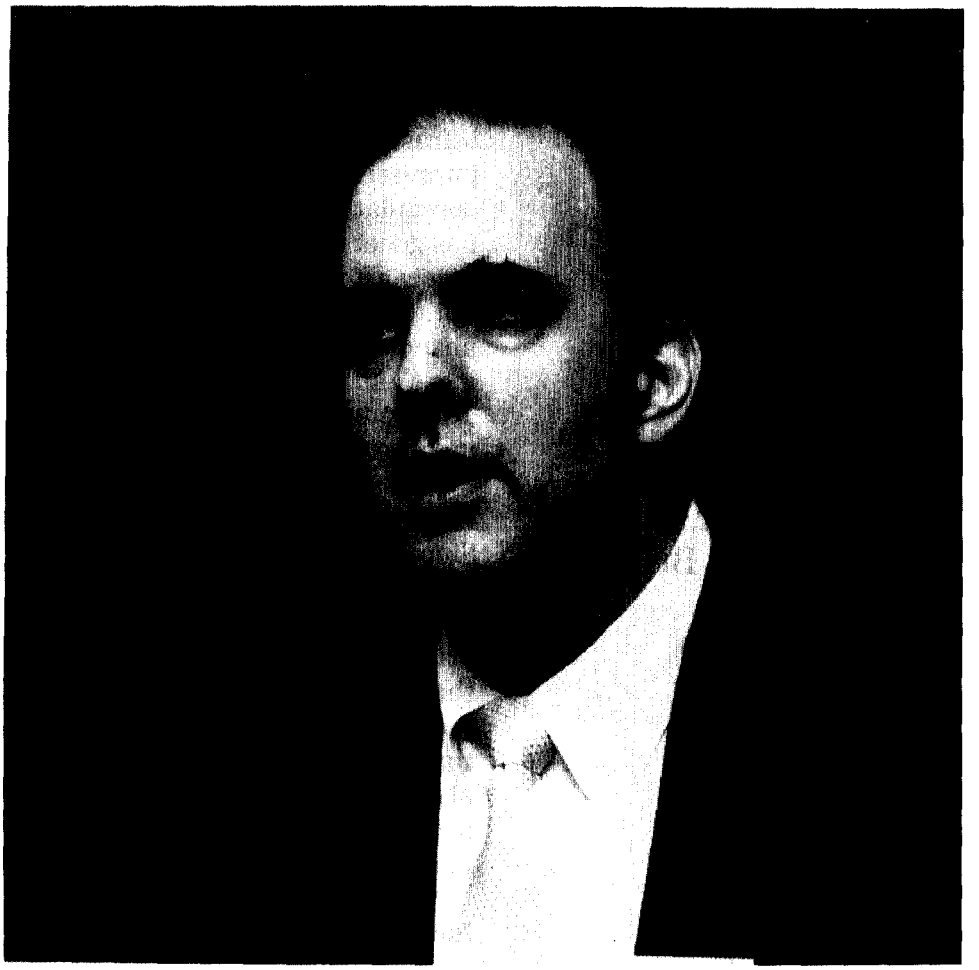
One thing that FHWA has tried to accomplish over the years is to facilitate technology transfer. However, I think one of the biggest problems now is getting research implemented. Institutional barriers exist in the state highway departments and local agencies that preclude using innovative methods. A proposed method may differ from the way a task has always been done, and the agency may not be comfortable with trying another way.

Another type of innovation that FHWA thinks is very important is Advanced Vehicle High Speed (AVHS) technology. This technology involves interaction between the highway, vehicle, and driver using the latest technical advances for better location, direction, and accident

avoidance. For example, one truck company has a project involving equipping over 1,700 trucks with the latest technology. These trucks will have communications equipment that can pinpoint locations by satellite technology and dispatchers who can record load information and prepare log books electronically. FHWA is going to have a substantially increased research effort in AVHS in the proposal we will be making to Congress.

In determining the highway system of the future, I believe we should not make "small plans." I agree with the premise recently published by Pete Colton which said that we are halfway to 2020 and we should not be letting everyone's ability to cut down, squeeze, and mold things to the money we happen to have at the moment drive the plans; because in the United States of America, we would have never gotten to where we are now if that was the philosophy we had chosen to live by.

Remarks by Martin F. Fitzpatrick, Jr.



MR. FITZPATRICK, Administrator, Office of Transportation, U.S. Department of Agriculture: Over the last 10 years, the U.S. Department of Agriculture's Office of Transportation has completed several transportation studies addressing rural infrastructure and service concerns, as well as freight and passenger mobility. This work is in keeping with the Department's agricultural marketing and rural development missions and its commitment to assist in creating and promoting an efficient transportation system to meet the needs of agriculture and rural America.

The demands on the transportation system serving agriculture and rural communities are changing. The transportation system provides for

direct and immediate access to basic commodities and access to jobs and services often located tens, if not hundreds, of miles away. Also, changes in the transportation system itself have taken place; and people now assume their mobility needs will be met. Significant public investment in infrastructure, particularly the Interstate Highway System, has led to impressive improvements in mobility and transport efficiency. And deregulation of the transportation industries—rail, air, truck, and bus—has generally improved service and reduced fares. But the modified system is affecting rural residents, farmers, businessmen, and communities. For example, rural communities have been especially affected by the abandonment of light-density railroad branch lines for freight movement and by the loss of intercity bus service for personal mobility. Today, most rural communities depend on roads for access and increasingly rely on commercial trucking for moving freight.

Rural Road and Bridge Studies

Since the road system serves as the foundation of the rural transportation system, the Office of Transportation has worked with a number of agencies and organizations to study the financing of rural roads and bridges throughout the country. Our focus has been on the roadways that serve as access to land, farms, processing plants, shipping and receiving points, centers of employment, and needed services, rather than on the Interstate Highway System. It is interesting to note that about three-fourths of all counties in the United States are considered to be nonmetropolitan; only 31 percent of these counties have an Interstate highway.

Including Interstate highways, about 81 percent of the nation's total highway mileage is classified as being rural. Even so, there is little collective understanding about the conditions of rural roads and bridges or the financing and institutional arrangements in place to maintain and improve the system. Undoubtedly, this lack of knowledge is related to the fact that only 20 percent of the rural mileage is located on the federal-aid system.

Our research of rural roads and bridges has culminated in a nationwide study done in cooperation with Western Illinois University over the last 2 fiscal years. The nationwide study builds upon two Midwestern studies involving Illinois, Minnesota, Ohio, and Wisconsin. The results of the first study, which focused on towns and townships, are reported in Financing Rural Roads and Bridges in the Midwest (October 1984). The results of the second are reported in Rural Roads and Bridges in the Midwest; Finance and Administration by Counties (July 1987).

The nationwide study was completed with the assistance of the National Associations of Towns and Townships, Counties, and County Engineers and the American Association of State Highway and Transportation Officials since responsibility for the rural road system is primarily shared by local and state governments. Today, about 71 percent of the rural road mileage is under local control, and 22 percent is under state control, but this varies considerably by state. At the local level, responsibility is divided among a number of independent, general purpose local governments, depending upon the governmental structure and laws of the state. In rural areas, these most notably include the counties, towns, and townships.

Western Illinois University surveyed state, county, town, and township highway officials in conjunction with the national organizations. Advice and consultation were also provided by the U.S. Department of Transportation's Federal Highway Administration (FHWA) and the U.S. Advisory Commission on Intergovernmental Relations. The detailed findings of the study are provided in two research reports: Rural Roads and Bridges: Federal and State Financing, and Rural Roads and Bridges: A Dilemma for Local Officials. Highlights of the study follow.

Arrangements for Service Delivery. Rural roads and bridges are constructed and maintained by numerous governments, and the assignments of responsibility are not similar in all states. There are three basic approaches, however, to financing and administering rural roads and bridges:

- A centralized approach whereby state governments work through regional offices to fund highway improvements.
- States working with a dual system of local governments (counties and towns/townships) which share the responsibility for making improvements (19 states primarily in the Northeast and Midwest).
- States working with counties which share the responsibility to make improvements in unincorporated areas (27 states).

Condition of Rural Roads. About half of the road miles maintained by counties, towns, and townships generally have earth, gravel, or loose aggregate surfaces. Much of the mileage is not in good surface condition. County highway officials reported that nearly 38 percent of the road mileage has limited failures and is barely adequate for present travel demands, or worse. Similar conditions were reported by town and township officials. The surveys also determined that not only is the present condition of rural roads cause for concern, but the trend is downward.

Only 44 percent of county highway officials reported improvements in the quality of county-maintained roads over a 2-year period; and only 43 percent of town and township officials reported such improvements.

Status of Rural Bridges. Although the road problems are significant, the bridge conditions are of special concern. Based upon data in the National Bridge Inventory, which is maintained by FHWA, 48 percent of the rural bridges that are 20 feet or greater in length and under county responsibility were found to barely meet minimum tolerable limits to be left in place. Furthermore, 57 percent of the bridges maintained by towns and townships were rated as less than barely adequate. According to the surveys, only 45 percent of the county officials and 21 percent of the town/township respondents reported the overall quality of bridges had improved between 1985 and 1987.

Costs to Maintain/Upgrade Rural Roads and Bridges. The fact that many roads and bridges maintained by counties, towns, and townships are in unsatisfactory condition to meet current service demands means that soon many local governments will face major costs if the integrity of the system is to be maintained. Since precise estimates of rehabilitation and replacement costs are not readily available, local highway officials were asked to estimate maintenance costs. County highway officials reported the annual average cost of maintaining a mile of road ranges from $1,890 per mile for loose aggregate surface roads to $5,109 for concrete or paved roads.

Given current resources, it is questionable whether many local rural governments are able to spend even $1,890 per mile for maintenance, let alone the amount required to upgrade surfaces for higher traffic volumes and weights. Data collected from county engineers in four Midwestern states during 1986 also indicate that the cost of making rural bridge improvements is substantial. The average cost per bridge was found to be nearly $96,000 in the four states. This compares with an estimated average cost of $153,000 per off-system bridge that needs to be replaced, as reported in FHWA's 1989 status report to Congress.

Trends in Financing Methods. In 1987, counties and towns/townships were responsible for 56 percent of the nation's highway mileage and spent nearly 18 percent of the highway funds. A majority of these miles are rural. In comparison, municipalities and states spent 21 and 60 percent of the funds and were responsible for about 18 and 21 percent of the mileage, respectively.

Local governments finance roads and bridges using several revenue sources, including local revenues, state highway aid, and receipts from states through the federal-aid highway program. Although the distribution of these revenue sources varies greatly by locality and state, property taxes generally are an important component of local highway finance. Dedicated property taxes for maintaining roads and bridges have remained at about 20 percent since 1977. Reliance upon intergovernmental aid from the federal and state governments, however, declined from 49 percent in 1977 to 35 percent in 1986. Towns and townships especially were affected by the loss of federal General Revenue Sharing (GRS) funds at the end of 1986 since 84 percent of them reported having used GRS funds for roads and bridges.

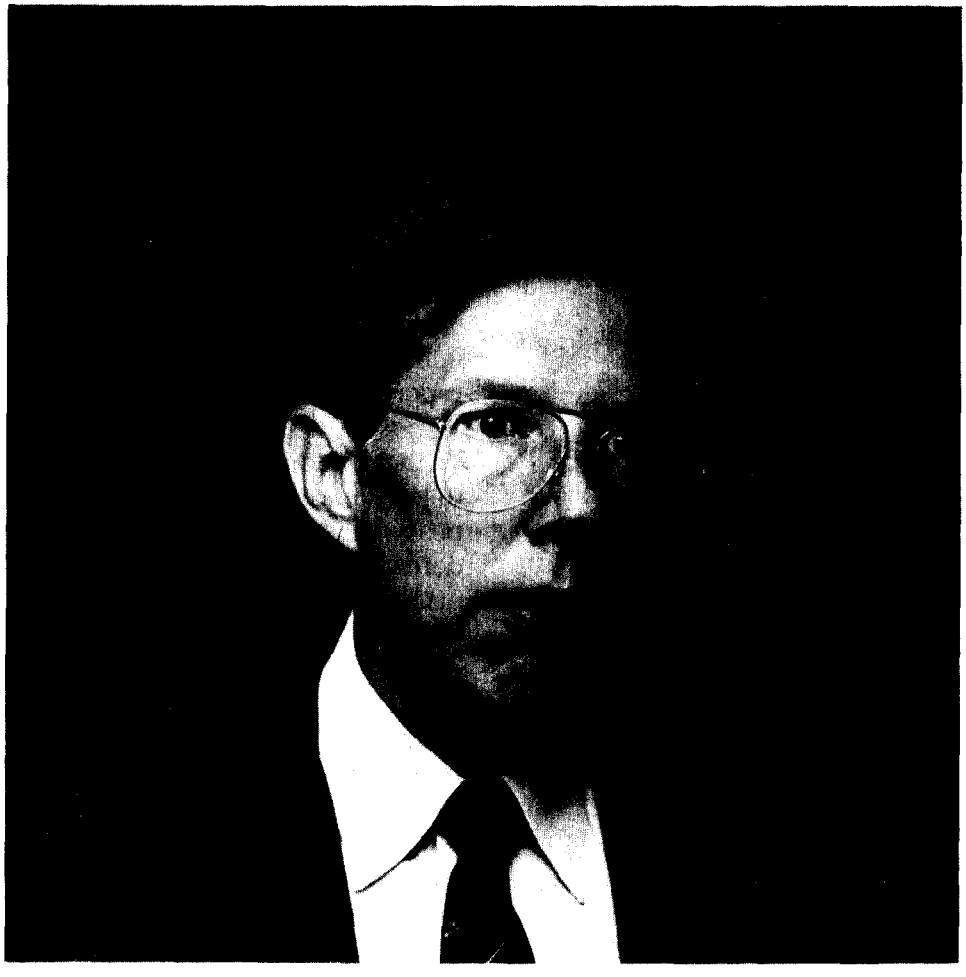
Without additional revenues, spending in the near future is not expected to keep pace with expected needs. Local rural officials report they will postpone new construction, reduce equipment expenses, and further defer maintenance in response to revenue shortfalls. Certainly, a continuation of this trend will lead to higher future expenditures and further disinvestment in the system.

Summary

Currently, we are preparing a summary of our work in the area of rural roads and bridges. Clearly, financing is a major difficulty facing all levels of government. But the issues go beyond financing because inadequate transportation affects the viability and development potential of rural America. The problems are not isolated to particular types of communities or regions of the country. They are pervasive, affecting the nation's growth, prosperity, and competitive position.

The transportation problems facing rural America are not neatly compartmentalized along modal lines, political boundaries, or levels of government. Likewise, they are not limited to the public or the private sector. Therefore, we believe the solutions are to be found through greater cooperation among the different levels of government, between the public and private sectors, and across the modes.

Remarks by Damian J. Kulash



MR. KULASH, Executive Director, Strategic Highway Research Program: We are approaching a key junction in highway research. Our construction priorities, our research program, and our highway leadership are all undergoing major changes at the same time, and the implications for highway research will be far reaching.

The Interstate construction program, which has been the backbone of the nation's highway program in recent decades, draws to a close in 1991. This is a natural turning point in the nation's overall highway program, and a lot of vigorous, healthy discussion is going on about future program priorities. The authorization for the 5-year, $150 million Strategic Highway Research Program (SHRP) also expires in 1991.

Because of the changes surrounding highway research, this is a good time to step back and first ask where do we want to go, then look at where we are and what we need to do to move closer to the ideal. Let me say, up front, that we are far from the ideal now. We need to make a lot of improvements to fill a lot of gaps. I will be particularly stressing some voids that will be left when SHRP terminates in 1993.

Criteria for Healthy Highway Research

Where do we want highway research programs to go? I believe there are five critical features that we want in our overall highway research capability:

1. Adequate Support for Highway Research. We don't have this now. Even with the large new funding commitment made for SHRP in 1987, the United States continues to spend on highway research only about 0.2 percent of what it spends on highway construction and maintenance. This is inadequate. It forces the splitting of available funds into too many minuscule projects, which are difficult to coordinate and which slow down productivity. It discourages individuals and institutions from building up the intellectual capital necessary for a rigorous high-research program. It forces research to be too risk adverse, because it cannot afford to take chances on things that might fail, however innovative. It puts too much research time into starting, stopping, coordinating, and administering. It keeps us from realizing the full payoffs of research. It is penny-wise and pound-foolish.

2. Integration of Highway Research with Broader Concerns. We have all heard about the massive importance of our highway system. We know it carries more than 90 percent of our industrial output and our personal travel; we know it accounts for a sixth of the gross national product. This means that highways are intertwined with many other important concerns: international competitiveness, regional growth, motor carriers, motor-vehicle producers, other modes of transportation, land development, the environment, and national health and safety. Because of the many important consequences of our highway system, innovations in the highway sector may significantly affect other national priorities. Research on highways must be integrated with research on related areas. For example, the highway/motor vehicle/communications issues involved in smart vehicles/smart cars require a degree of integration that far exceeds the capacity of existing organizations.

3. Stability. Some features of our highway system are intrinsic. Our massive use of indigenous materials; the need for circulation even when

capacity is limited; and risks to human health and safety. While the complexion of issues changes from year to year or decade to decade, we can foresee a clear need for further improvements in engineering, safety, and other areas. Where there is a clear future need, we can help meet it by investing in some stable, continuing capability to do research on it.

A stable commitment to areas of continuing concern builds a continuing pool of expertise to address problems within these areas. Where stability is the predominant concern, the continuity of research must be insulated from fiscal cycles, political turnovers, or ideological influences.

4. A Real Voice for Management. Probably the single most important feature of an effective research program is meaningful management involvement. This is essential for sustained funding; without management involvement, research support dwindles. There are, however, two more fundamental reasons why management involvement is crucial:

- Management identification of gaps in the overall research structure can encourage new organizations and individuals to transfer into areas where necessary skills are in short supply. Without management intervention, resources will flow more in proportion to current capabilities; they react rather than anticipate.
- Management involvement is the key to technology transfer, which must balance practical and scientific demands. Should we use a more complicated technique, or should we do more research to make it simple? Should we be willing to pay more for a more durable material, or should we change a specification to exclude some poor-performing materials? Management questions like these surround technology transfer. Management involvement within research can help ensure that the information needed to answer them is generated within the research process. Conversely, if management is convinced that organizational changes are required to exploit an innovation, its involvement can accelerate these changes.

5. Responsive to Critical Priorities. We also need an up-and-ready capability to mount crash efforts to develop solutions to key problems. There will always be new problems and issues that demand attention beyond what the stable, continuing research capabilities can provide. These are one-of-a-kind, transitory problems, not ones that warrant the creation of permanent capability. The talent to address them may be scattered throughout various operating programs and research activities, so that it cannot be harnessed as parts of a concentrated, single-purpose team.

For top priority issues we need some increased capacity to marshal the available talent and apply it within specific mission teams.

In short, if our highway research capabilities had the ideal features that I believe they should, they would

- receive adequate funding;
- be integrated with other concerns and other modes;
- give management a real voice in setting program priorities;
- contain large, stable components; and
- be capable of concentrating resources on top priorities.

Where Do We Stand Now?

While many of us may agree on these general needs, we may not share the same views of how close we are to attaining them, or which deficiencies cry out most loudly for attention. We may differ on which features can be improved, and which must be accepted with seasoned realism. I will highlight some of the improvements that I believe are possible.

Adequate Support. Our current attitude about highway research is penny-wise and pound-foolish. It leaves us with less than a critical mass both nationwide and in specific programs. The in-house programs of the Federal Highway Administration (FHWA), for example, have been severely curtailed in the last two decades. Yet, FHWA has the physical facilities and organizational structure to be a major contributor. It also continues to have an exceptional concentration of strong technical expertise on its staff. I believe that a top priority, within the overall highway research picture, is to restore the health of the FHWA research program. This means two things:

- Provide enough money to do the job.
- Give users sufficient voice in program direction and operation so that it is guided by economic and practical needs, and insulated from the influence of changing policies or entrenched capabilities.

Similarly, other parts of our established highway research structure are voicing the need for additional support. All of our existing programs—Highway Planning & Research (HP&R) activities, National Cooperative Research Program, and others—serve useful functions that have been demonstrated repeatedly. Too often, their mission is seen as part of a zero-sum game, in which one program's gain mean another's loss. This is not so. The fact is that vital research programs engender support for vital research programs. It is like antique shops. An isolated antique

shop on an obscure back road attracts an occasional passer-by, but a concentration of attractive shops on a main route generates a vigorous customer traffic that is more than proportional to the number of shops. Along antique row the shops are not really in competition: they have a common interest in getting more customers to stop in and browse. Their stock is mostly one-of-a-kind items, and they have little reason to fear the competition next door. Similarly, productive and nonduplicative highway research programs help support each other more than they compete with each other. They demonstrate the value and responsiveness of research, and other research activities benefit from this.

Integration With Broader Concerns. Our current research programs do not score well in their ability to address multimodal or multidisciplinary issues. These issues are difficult and complex, and the ability of research to resolve them is limited. Administrative jurisdiction over these broad problems is generally scattered across agencies with mode-specific or function-specific responsibilities. Legislative jurisdiction is similarly fragmented.

In view of this chopped-up jurisdiction over transportation and related matters, it simply does not make practical sense for the focus of research activities to get too far out in front of organizational realities. As a result, our research focus is itself fragmented.

I think our best chance to improve this situation lies in building broader based teams to address selective high-priority problems. For example, the need for increased interaction between truckers and highway agencies caused the American Association of State and Highway Transportation Officials (AASHTO) and the American Trucking Associations to collaborate more closely on matters of mutual concern. Similarly, the prospect of "smart highways/smart cars" appears to be leading to some sort of joint, collaborative research involving highway organizations, motor vehicle manufacturers, and the communications industry. Ad hoc adjustments like these are appropriate and are taking the most practical next step for compensating for the narrow focus of the current program. But we should recognize that the need to tailor an ad hoc response to each new problem which lies outside the group of current responsibilities is time consuming and discourages research on those topics. For example, states interested in research on some multimodal problems may be able to initiate a pooled-fund Highway Planning and Research (HP&R) study to address the problem. But this is more cumbersome than

getting support for an HP&R project that fits within a single state's interest and jurisdiction. I suspect that many useful topics never get seriously considered because the prospect of a cumbersome administrative selling job discourages professionals from advancing those needs.

Building Institutional Stability. Too much change and instability impair productivity and can generally discourage research. For highway research to be productive, there must be enough stability so that experts are ready and able to work on necessary research. Neither individuals nor organizations will make the desired commitment to a topic unless there is enough continuity and stability in funding for a field of research.

Universities, in particular, have stressed the importance of stable, continuous funding. They know first-hand that the activities that have such support gain more participation and expertise than those that do not. The National Science Foundation supports engineering research centers for this reason, and two of their centers are now devoted to areas of direct interest to highway agencies—structures and concrete.

While the objective of stable, continuous funding is in frequent conflict with the need for responsive, product-oriented research, as a nation we need both. Product-oriented research must be guided by practical and economic concerns as much as by scientific discovery. But new discoveries may or may not overlap with economic and practical needs, and some discovery-driven research can be a synergistic complement to product-oriented research.

Few of our programs, however, have the ability to support this discovery-driven research. The National Cooperative Highway Research Program, whose typical selection process begins with problem statements, is toward the product-oriented end of the scale. The Strategic Highway Research Program is entirely directed to product-oriented research. State HP&R and FHWA programs could potentially fund stable, continuous activities, but both of those programs have been under so much budget pressure that, as a practical matter, they are unable to offer much assistance of this sort. Thus, stable and continuous funding remains elusive under existing programs, at least at their current levels of support.

A Real Voice for Management. Of all the five aspects of a healthy highway research structure that I have noted, the active participation of management is the one where we have made the most noticeable change during the past several years. SHRP's mission was defined by many state

highway agencies' top managers, and they have participated actively in its management through the SHRP Executive Committee. The AASHTO Select Committee on Research has been given added stature by making it into a standing committee, and state chief administrative offices are also heavily involved. Research subjects have been prominent in discussions of state and federal leaders. This is appropriate, but it was not this way 5 years ago.

In 1984, research was not a fashionable subject. Support for it had been declining for more than 10 years. Thomas Deen, the Executive Director of the Transportation Research Board, was making speeches noting that research was held in ill repute by management. Thomas Moreland, former president of AASHTO, reported that managers had been abdicating their responsibility for research. Managerial skepticism about the manageability and value of research was apparent at all levels of government.

Today the climate is strikingly different. Research topics are part of federal proposals, AASHTO agendas, state engineering conferences, and elsewhere. Management has a positive vision that research can potentially improve how we do things. Studies are underway to explore how research can help deal with management problems. Instead of turning its back to research, management is now using research more as one of its tools for solving problems.

Why did this shift happen? I do not think it is because research has accomplished anything extraordinary during the last several years. The jury is still out on whether SHRP will deliver on its high promises and expectations. Nor did the improved atmosphere surrounding highway research come about because program funds are less stressed by budgeting pressures. Nor can one argue that we now have a clear consensus about where we should go in highway research. If our track record, our financial capability, and our vision have not changed, how can we account for the improved attitude surrounding highway research?

I believe that highway agency management is more positive because they are more involved, and that they are more involved because there are new opportunities to grab hold of in research and to help us fix problems that concern management. Both SHRP and the Select Committee on Research provide mechanisms and resources to do this.

Responsive to Critical Priorities. As we look to the future, we cannot take sustained management participation for granted. I believe the shift

we have seen in the last 5 years can just as quickly reverse itself unless management continues to find it worthwhile to direct time and attention to highway research. Further, I believe that management will not do this unless they have the resources and program structure to make their involvement as productive and rapid as possible. I believe this requires that some portion of the overall highway research effort be directed to address top management priorities, and that it be sufficiently funded to make as rapid progress as possible. This requires:

- Focus. For management to take an active role, they need a research activity in which they can select a few top priorities. Too many priorities is the same thing as no priorities. Top management brings a unique perspective on what must be done, whereas our broad, bottom-up programs are more influenced by the technical perspective of what can be done. Both perspectives are needed.
- Fast Pace. Highway management turnover and impatience for results demand the production of useful products rapidly, within a few years. This is impossible unless substantial funding and an established management process are in place. Even companies with intensive, well-managed research teams report that this is a long process, one that requires between 5 to 10 years, when a fundamentally new product is involved. This "minimum" is already discouragingly long, and if further delays are needed to arrange funding and management, the process is too drawn out to build management interest.
- Responsiveness. Research must respond to the problems and priorities targeted for action, not to the current distribution of research activity, highway problems, or expertise. If the talent to do the job is not available, then management must hire it. Part of the solution to any problem is to build a widespread understanding of the problem and get more attention directed to solving it.

Our on-going highway research activities have broad topical coverage, and at their current funding levels, they cannot concentrate resources on large-scale research without creating an unacceptable level of neglect for other responsibilities. Thus, large-scale activities have historically taken place outside the auspices of permanent organizations, and they have occurred at irregular, infrequent intervals. The creation of the AASHTO Road Test in 1958 and SHRP in 1987 have both been one-shot, ad hoc programs. The funding and the organization had to be created anew each time.

That is good for getting the agreed-upon job done, but it does not make provision for future large-scale research priorities. This is left until professional opinion reaches a sort of boiling point across many groups and organizations. This is an unduly slow and haphazard process. We can do this better if we make some organization responsible for large-scale research. That organization would identify large-scale research priorities, select appropriate ones, and fund them. It would have a clear responsibility for those functions, and it would not need to create a completely new institution each time new priorities emerge. It would be a sort of umbrella organization to assemble future one-shot, ad hoc programs to concentrate attention on new priorities as they emerge.

A New Look for Highway R&D?

Donald Frey, the former Chief Executive Officer of the Bell and Howell Company, recently described the new look in American industrial research and development (R&D). Frey points out that the influence of the large industrial laboratories has declined since the early 1980s, and that the strategy of unilaterally acquiring enough proprietary research funding for economic success is no longer a valid one. Instead, as science and research become a pool that is generally available to all, innovation becomes more driven by the market than by technology. In this context, Frey notes that, "The new look in permanence is impermanence. Ad-hoc organizations or teams are put together for specific innovative projects."[2] This picture of late 1980s industrial research certainly appears to put SHRP right on pace with today's R&D strategies. SHRP is an impermanent, ad hoc attack on the highway sector's top-priority innovative projects.

SHRP will close down in 1993 when it completes its planned life. It does not address new priorities, however urgent they may be, that lie outside SHRP's concentrated scope. SHRP's sponsors accept and understand that it is an impermanent, ad hoc activity. They were one step ahead of the times! They created an impermanent, ad hoc team that has the key features that Frey calls the "new look" in industrial R&D. But industrial America is not taking a single plunge into ad hoc research, hoping to succeed, and then calling it quits. No. They plan to be in business tomorrow, too. New problems will arise. Needs will change. Research and development priorities will change. New ad hoc teams will be needed for new R&D priorities. New ways must be found to address them. Who works on these teams depends on the topic. How they are

[2]Donald N. Frey, "R&D to the Marketplace: A New Paradigm?," The Bridge, National Academy of Engineering, Vol. 19, No. 1, Spring 1989, pp. 16-20.

arranged organizationally also varies with the needs. Each team is impermanent, but there is a permanent need to identify priorities and to find appropriate solutions.

Some organization should be responsible for periodically reviewing research needs and opportunities, doing the extensive work needed to develop a short list of priorities, and then creating targeted, fixed-term programs to address them. The impermanence of any particular program, like SHRP, is a desirable feature that encourages risk-taking. A fixed-purpose, temporary commitment to a subject leaves everyone free to go on and do other things. It limits the time and money devoted to specific explorations and makes exploration in uncertain territory more acceptable.

If we go through the coming juncture and reauthorize the federal-aid highway program and develop a national transportation policy without somehow finding an organization to assume responsibility for reviewing research needs and opportunities, I think we are making a major, long-term mistake, and that we will find ourselves back where we were 5 years ago—in a vicious spiral where management's interest and support were ratcheting downward. A variety of institutional solutions is possible. The FHWA might be a place to lodge this missing priority-setting function, if a way can be found to give state managers a directing voice in the process. Or it might be added to the functions of AASHTO's Select Committee on Research and the National Cooperative Highway Research Program. Or, if AASHTO creates a nonprofit research subsidiary to manage the Long-Term Pavement Performance, this subsidiary could also be given the responsibility and resources to identify and pursue top-priority research areas in the future. Or the Transportation Research Board might take on this role.

Changes in the Future

The demands placed on highway agencies in the coming decade will differ from those of the past. Several key trends will force changes in highway infrastructure, and this in turn will affect the priorities for research:

- Many sources of aggregate paving material are being depleted or have become inaccessible because of environmental constraints. This threatens the performance and economics of all pavements, both concrete and asphalt. It will affect which pavement designs are most economical. It will make recycling a more favorable option.

- More trucks and heavier trucks are using our highways—all 4 million miles of them. We have not always designed and built our pavements to withstand this traffic. As a result, we now see huge amounts of rutting on our highways. On some of the heaviest travelled routes, traditional pavements may not meet the needs of tomorrow's traffic. The market for rut-resistant pavements is growing and will continue to grow.
- We are losing the trained people to do the job. The surge in hiring of engineers that followed World War II is now reflected in a wave of retirements. Pros are never easy to replace. We must change the places we search for replacements. In past years, highway agencies hired most employees as entry-level engineers in their twenties, mostly white, native-born men. In the year 2000, there will be 4 million fewer working men between the ages of 20 to 34 than there are now. Eighty percent of the people entering the work force in the year 2000 will be women, minorities, or immigrants. To compete for technical talent in the future, the highway sector must attract and train groups that are not now heavily involved in highway-oriented careers.
- More and more highway-construction activity will occur on existing roads—next to, or under traffic. This is annoying and disruptive to drivers. It is dangerous and difficult for the workers. We must continue to find ways to finish construction and maintenance more quickly. In the future, we will place an even greater premium on fast-setting materials and on equipment that works efficiently within a single restricted lane.
- The budgetary constraints that dominate today's program decisions will continue in the future. The federal budget deficit will be around for years. Whether or not a new tax on motor fuels is enacted, we will continue to scramble to find the funds to maintain highway facilities. Scarce highway dollars must stretch further. They will—necessity is the mother of invention. One positive spin-off of this climate is a rebirth of enthusiasm for highway research. New initiatives are being considered for future enactment. The challenge ahead will be to convert this investment into useful new products.
- Environmental safeguards will make our job tougher. Just this year, proposed controls on asphalt-paving emissions could have seriously crippled the cost-effectiveness of hot-mix asphalt concrete, if it had been enacted. Emission requirements at cement plants have made low-alkali cements less available and more costly. In the future, as more and more of our road construction and maintenance activities occur near traffic and homes, the public will demand that we use materials and techniques that reduce the risks to highway workers and others. To remain competitive, road materials must meet tomorrow's environmental demands.

- The road ahead will be more congested. Alternate routes and lane closures will be more burdensome. Motorists increasingly will oppose detours and barriers that impede traffic flow. They will be willing to pay more to avoid disruption. Just as we now see public support for incentive clauses that reward contractors for finishing ahead of schedule, in the future we will see increased enthusiasm for higher performance. This will encourage specification of higher first-cost materials and development of designs that will last longer, require less maintenance, or require less disruption of traffic.

  The road ahead is demanding and difficult. But it offers a chance to do many things that we could not do before. It places a premium on durability, speedy construction, and performance. It opens new markets for high-performance materials and techniques, and it brings greater rewards for innovation. We need to continue to invest in research that will best prepare us to meet the needs of the future.

Panel 3: Recasting the Federal Government's Role

Remarks by Louis Gambaccini

MR. GAMBACCINI, Chief Operations Officer and General Manager, Southeastern Pennsylvania Transportation Authority: While most of my career has been within the transit industry, I have also assumed various positions within the transportation family, including Commissioner of Transportation, responsible for highways, and Chairman of the Tri-State Regional Planning Commission. I mention this because it is from these diverse perspectives that I have developed some strong views about the federal role in the future.

I would say that we are at a crossroads between problems and opportunities, one we have not seen in probably 10 to 20 years. I would venture to say even that the federal role is in disarray. The New Federalism has seen a shrinking of the federal role in transportation, particularly on the funding side, but not on the continued pervasive nature of regulatory interaction with state, local, transit, and transportation operations.

I have heard repeatedly over the last couple of years that there is no effective constituency, no voice for transportation in Washington, and I

think that is substantially true. The transportation community has gotten quite splintered and does not have a sense of or a consensus about its own future. The community cannot seem to stake out its common ground although there are some hopeful signs in the work of Project 2020.

I marvel at the proliferation of other crises that break around Washington and then seem to quickly move to the head of the priority list—things that were never even heard of as governmental activities some 10 or 20 years ago. Now, suddenly, they rise as the over-arching critical issues that consume more money than the traditional transportation components.

One example is the savings and loan bailout. In the last few months, the federal government has committed some $150 billion to $300 billion, depending on whose estimates you choose, over the next 30 years to bail out the savings and loan industry. The lower figure—$150 billion—is three times the total investment at the federal level in transit over the last 25 years, since the Urban Mass Transportation Administration (UMTA) program began. It is half again more than the 30-plus year Interstate Highway System costs, and it is three times the size of the Marshall Plan funding.

I am not making a judgment about the necessity of the federal government moving into an area like savings and loan, but it is significant that this is a function that just a couple of years ago would have been remote in anybody's thinking as a federal priority, and yet currently it eclipses—by several magnitudes—the support of basic transportation.

Another example is industrial toxic waste disposal, now estimated to cost $300 billion and growing. And, of course, drug interdiction, for which an additional $1 billion is proposed for Coast Guard efforts, which will displace a similar amount on the transit side of the ledger.

Clearly it has been a new ball game in the last 10 years. With Gramm-Rudman and the competition for shrinking funds, there is more of a brass knuckles kind of battle than ever before. In this competition, transportation really has been a "weak sister" in terms of the size of its constituency and the capacity to dramatize the nature of the crisis. There is very little constituency for maintenance, and it is difficult, short of an actual collapse or major catastrophe, to dramatize the growing crisis. We know this from the follow-on to the Fragile Foundation's

report of a year ago, which showed how little a ripple was made in the public consciousness.

In my opinion, we are backsliding. In the middle 1960s when the Department of Transportation (DOT) was created, it was a conscious effort to deal with intermodalism and the broader perspective of cross-cutting transportation issues. Creation of DOT was a bold move in that direction. In the same period, we spawned Metropolitan Planning Organizations (MPOs), hoping that somehow we could override the political jurisdictions in urban areas to perform coordinated, long-term planning at the local level. Many of these efforts have diminished through waning federal support. Yet, the extent of federal regulatory intrusion into local and regional issues has never been greater than it is today, despite the lack of support for coordination and for intermodal and interdisciplinary approaches to planning.

Creation of the Department of Transportation in the 1960s was a great step forward, but like all institutions, it needs to be reexamined from the point of view of its timeliness to current issues. The Department is in need of institutional adaptation in order to responsively serve conditions currently existing—conditions significantly different from those existing 10 or 20 years ago.

With an "outside the Beltway" perspective, the Southeastern Pennsylvania Transportation Authority (SEPTA) has its own views on the New Federalism. In the early 1980s, SEPTA embarked upon a substantial course of upgrading. Then 1983 came, bringing the Conrail divestiture. The federal government claimed major credit for this action and, indeed, performed significant work in divesting Conrail from the federal burden. The government then pocketed the purchase price of $2 billion and off-loaded the burden of commuter rail to SEPTA and the Philadelphia region. The price for rehabilitating Conrail's physical plant alone currently exceeds $2 billion.

During the same period, the federal government reduced operating assistance to SEPTA by more than 50 percent, by reducing its contribution from 20 percent of the operating budget to less than 4 percent. It also reduced its capital support by 47 percent--in constant dollars, 64 percent. During this same period, we had hoped that a Transit Trust Fund would be established as part of the gasoline tax increase, but this hope was quickly dashed as the funds were encumbered as part of the budget control effort and general fund contributions were slashed.

The federal government also stepped up its enforcement of toxic waste removal. Toxic wastes—polychlorinated-biphenols at one of our yards, for example—had for 30 to 50 years been accumulated by prior private owners. Now, under public ownership, SEPTA must accelerate the removal of that toxic waste.

We have had "get tough" attitudes about the condition of safety on that very same railroad which, in fact, we inherited from the Conrail divestiture. Additionally, we have stepped-up efforts to make the railroad accessible to handicapped and elderly users. And the ultimate irony is that at the same time we initiate these efforts, there is continued crying at the federal level of asking why the locals cannot get their act together and get these problems worked out. In my opinion, if ever there was a time for the federal government to get their act together, it is now, for all the reasons that I have indicated in the course of events of the last few years.

In this era of New Federalism, a lot of other problems have been offloaded to regional and local governments, which to a large extent are national in scope—homelessness, drugs, crime, Acquired Immune Deficiency Syndrome (AIDS), poverty programs, etc. These are severely in competition with funding from state and local levels, and we are at a point now, as evidenced by New York, New Jersey, and Massachusetts, where state revenues are declining and state budget deficits are a growing prospect not only for the present, but for the future.

I believe the federal government has to redefine its new role in light of the last 10 years and to stake out far more strategic thinking about the appropriate federal role. Specifically, it must decide how to articulate the national goals in a multitude of areas. I would not limit myself to transportation and the transportation modes, but underscore the connectivity and linkage between transportation and other major issues wherein transportation is a major strategy for remedy and for improvement. The failure to deal with transportation can only further exacerbate these problems.

I speak about the dramatic and continuing rise in oil imports, which not only increases our dependency on foreign political geopolitics, but also plays havoc with our balance of payments. I am also talking about land use and economic development, productivity, competitiveness, air pollution and the greenhouse effect, and certainly basic human rights. What are the national goals for the basic rights of mobility for those large sectors of our population who, in fact, have no access to an automobile,

whose mobility is less today than at any time in the last 80 years? I think it is a significant question that should be addressed at the national level.

All the remedies and all the solutions certainly are not the responsibility of the federal government, but a sense of vision and direction for the future of this country, and particularly preparing for the next century, is clearly part of the federal role.

At the time of the Department of Transportation's creation, the word "transportation" was inserted into a number of institutions. ARBA (American Road and Builder's Association) became ARTBA. AASHO (American Association of State Highway Officials) became AASHTO. HRB (Highway Research Board) became TRB, and virtually all of the state highway departments became DOTs (departments of transportation). The pattern of success in integration of the meaning of transportation is very diverse. There are very different levels involved in "buying into" a broader concept of intermodalism and a broader perspective of transportation's role in federal, state, and local activities.

It is significant that the Transportation Research Board is probably moving more aggressively toward giving thrust to the meaning of transportation than ever before. In fact, we are in the midst of trying to establish an Institute of Strategic Transportation Studies resulting from the unanimous view of TRB's Executive Committee. There clearly are growing problems that are outdistancing our capacity to get our arms around them. The problems grow even more complex and more diverse, yet our tendency for research and most governmental activities has been to more narrowly define the scope and parameters of the issues and problems to be attacked. The block grant clearly is a desirable direction in which to go. The Achilles heel is that if it is created in the arena of shrinking funding, it really activates the instincts of competition between the modes and causes upheaval in the political balance.

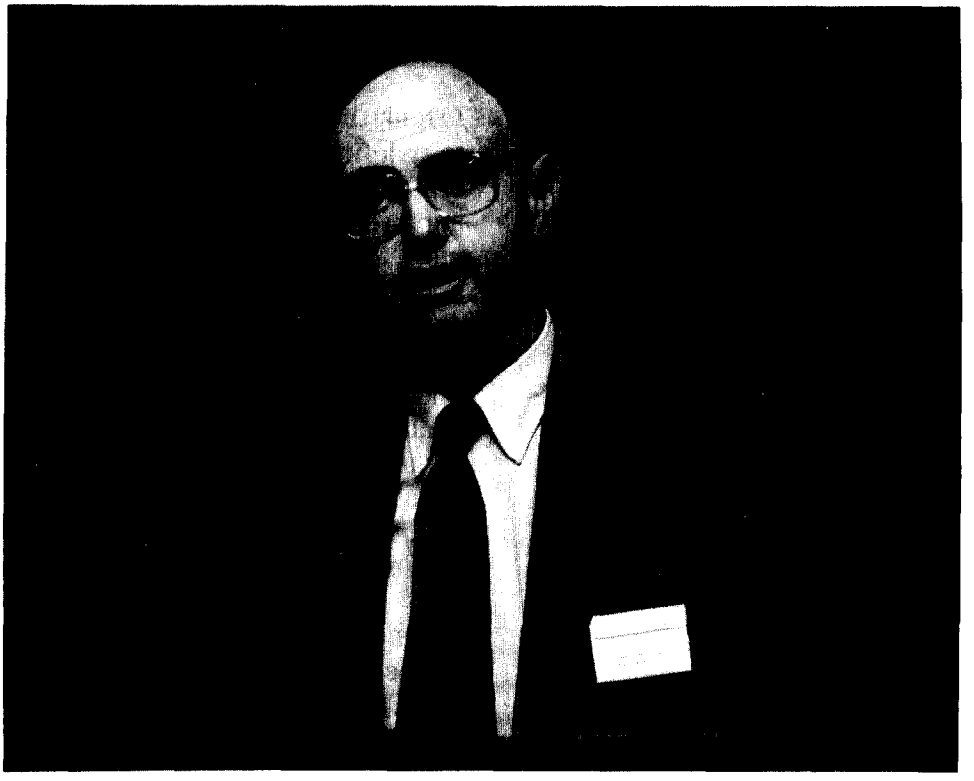
If funding is adequate and strategic planning is appropriate to the nature and size of the problem, then the block grant is the right avenue to pursue in the changing face of our nation's transportation needs. However, institutional adaptation—not confined to the U.S. Department of Transportation, but across the board at the state and local levels—is a major component of that challenge. The Metropolitan Planning Organizations were a good step forward. Yet, they certainly are not metropolitan regional governments and are not the vehicles to provide the kind of

political and rational trade-offs inherent to determining how to distribute moneys among the diverse transportation modes.

I think the federal government has an opportunity, if not an obligation, to redefine its new role in the light of changing circumstances. The federal government should place particular emphasis on strategic planning and broader research, areas that are far more illusive and difficult, yet more important than the traditional investment in technology, materials, and traffic engineering. These functions are vital and I do not mean to demean them, but it seems that critical amounts of research must be focused on those more complex issues to provide analysis, data, backup, and professional thrust to support political decisions. It is my opinion that the General Accounting Office and congressional committee staffs should and must play an important role in helping to turn directions around—not to be too quick to be timid and accepting of incrementalism, the overarching dominance of the budget deficit, and the prohibition to even think about new taxes.

Let me close by saying, on the issue of whether or not we can break out of the "no new taxes era," I believe there is beginning to be a groundswell of support to insist upon relief from state and federal governments. In the past this support has been silent, unfocused, and unorganized. Outside the Capital Beltway, there is a strong sense of the vital importance of transportation as it underpins and relates to so many other dimensions of societal need. I am quite confident and optimistic that SEPTA's constituency will have its voice heard. I believe the potential of raising the priority and visibility of the transportation issues at the federal level exists and that these issues will affect the creation of policy, including policies for financing transportation needs.

Remarks by Kevin Heanue



MR. HEANUE, Director, Office of Planning, Federal Highway Administration, U.S. Department of Transportation: What I want to do is talk program delivery, built around the block grant concept, and pose a number of questions which should be addressed as we structure a post-Interstate highway or surface transportation program.

We hear the term "risk assessment" a lot. I would like to focus on opportunity assessment. Where can we put our resources and how can we design our programs so as to maximize the number of opportunities? We must rethink our approaches and set new priorities.

Title 23 U.S.C., the basic highway code, has served us very well—the most significant accomplishment is the Interstate system, almost completed. But the highway code has grown over the years. As I was looking at it recently, I noted the first 10 sections include authorizations, federal-aid systems, apportionments, programs, plans, specifications, estimates, standards, and project agreements. I did not check the dates, but

I think all of them were in place by 1925. The code now has 158 sections, the last one being the national minimum drinking age. Only three sections have been repealed over the years. Through accretion, a very complex structure has evolved. Far too many sections say "The secretary shall not approve unless he finds . . .." We have this enormous number of federal findings which make it very difficult to deal with situations in a creative way, because of the mandatory checks or benchmarks.

I was only citing title 23. Other federal laws outside of title 23 have even more serious impacts on program administration. The National Environmental Protection Act is a major one.

Background

What have we done to overcome some of the administrative difficulties brought on by very complex laws? Back in 1954, Congress enacted the Secondary Road Plan, which permitted us to transfer to the states authority to administer most of the provisions of the secondary road (rural) highway program.

In 1973, Congress gave us a certification acceptance, whereby, for all the non-Interstate programs, a state could submit a certification that it would administer selected title 23 provisions. The provision did not address the Uniform Right-of-Way Act or environmental laws. The Federal Highway Administration (FHWA) certifies the states' procedures and states carry out certain provisions of the law.

In the late 1970s, FHWA was mandated to do an overview of the administration of the Urban system program. The study revealed a lot of concern about the time it took to get projects implemented and the inappropriateness of many federal standards. FHWA then began looking at ways to streamline the administration of the Urban program. That study ultimately led to the combined road plan proposal, which was also an attempt on the part of the Federal Highway Administration to see how we would administer a block grant.

The Block Grant Program

The Combined Road Plan (CRP) demonstration enacted by the Congress is a five-state demonstration program that gave us three additional features that none of the earlier flexibility provisions of title 23 had given us. It permitted the pooling of the urban, secondary, and off-system bridge funds. It permitted us to delegate to the states authority to approve design exceptions and to waive final inspections.

As the project load of federal highways increased and as we got into more resurfacing, restoring, and rehabilitation (3R) projects, we still, by statute, were required to go out and visit every project and make a final inspection. In many instances, the final voucher could not be paid until our engineers set foot on the job and reviewed it. Some of the minor jobs were so small the biggest time element and biggest difficulty was finding where the job was located so we could visit it.

Pooling Funds. The CRP demonstration is going very well. A lot of us had placed emphasis on the pooling of funds. Unfortunately, the states are not taking much advantage of the pooling. They see the CRP as a demonstration of a fixed duration, and they do not want to redesign their fiscal systems for a short-term program.

The feature states are using is CRP's short-term flexibility. If the money in the urban, secondary, or off-system budget does not balance out, they can borrow from another category of funds. If one project falls out of the bid-letting at the 11th hour, they do not have to come to FHWA to get approval for a substitute project. They can just advance a project and notify us after the fact.

Design Exceptions. The design exception feature has been, in my view, a very positive experience. Each state has redesigned its internal system to do a better job of managing the design exception process. In the past, the designs would be submitted to FHWA or the states would make changes and see if they could get them by without our being aware of them. Now, top-level management in the state highway departments is aware of every design exception proposed by a designer. They are probably being stricter than we are.

Final Inspections. Final inspection has never been considered a major tool to achieve better highways. A final inspection comes far too late to catch anything significant.

The CRP program is modest, but as far as I am concerned all the experiences have been positive. We have seen nothing that would lead us to believe that a block grant style of administration for certain elements in the future highway program should not be advocated.

The issue that worries most people is that far too many federal programs have been consolidated into a block grant prior to being phased out. Maybe we have to change the meaning of the term. We are striving very hard to get the freedom to better utilize FHWA staff resources but

are frustrated in that attempt because block grants are perceived as a way of phasing out programs.

Where Are We Going?

Most public thinking about the post-Interstate highway program reflects a two-tiered program: A system of national significance coupled with a block grant. Some people are using the term "block grant" and some are not. I think we definitely ought to anticipate differing styles of administration for a two-tier program. There is clearly more federal interest in the system of national significance. We have to think of incentives to achieve creative uses of the federal resources. The Urban Mass Transportation Administration (UMTA), with its discretionary programs, clearly leverages more from grant applicants than FHWA, with its apportioned funds, does from the state highway departments.

The critical issue for the post-Interstate program, is urban congestion. How do we make progress in reducing urban congestion? We need to use a whole bag of strategies. Every city needs a tailored strategy.

A number of professionals in the transportation industry advocate multimodal flexibility in the resources available to our major urban areas. We have heard talk of (high-occupancy vehicles) lanes, fringe parking, smart cars, and smart highways. What are the appropriate ways to establish the federal interest and design the federal role in the administration of a program incorporating such elements?

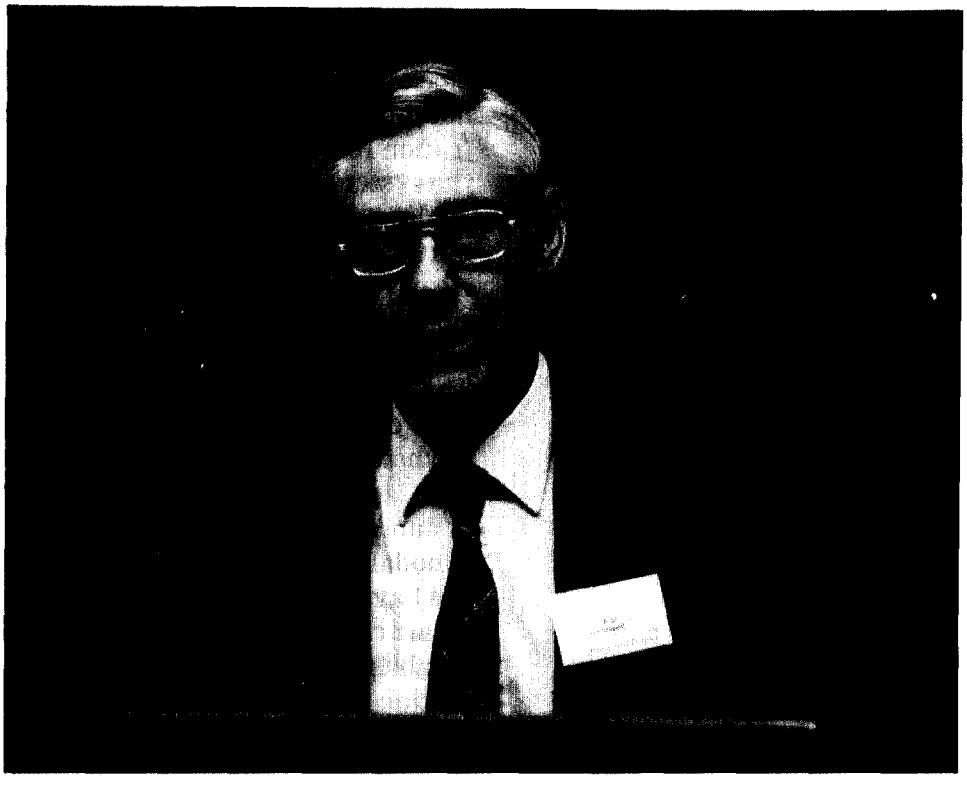
Metropolitan Planning Organizations (MPOs) have done a good job, but they're really not particularly strong institutions when you move from planning toward making more urban financing decisions. The MPOs were created in 1962 when the urban Interstate program was stalled in our large cities and there was a need to undertake sound planning and to build a local political constituency. Their role has to be re-thought.

Getting back to my opening point about an up-front rather than after-the-fact approach to federal administration, one thing I am very pleased to hear is that there seems to be a growing consensus that we need a larger and stronger research program as an element of the post-Interstate highway program. Research is the most up-front aspect of the federal program.

The pertinent questions now are: How do we bring research on line? How do we achieve the most cost-effective use of the federal dollar in that tough area of urban congestion? And how do we streamline the

administration so we are not in the states' hair, second-guessing engineering decisions, at multiple points in the project development process?

Remarks by Dr. Bruce D. McDowell



DR. MCDOWELL, Director of Government Policy Research, U.S. Advisory Commission on Intergovernmental Relations: In the short time I have been allotted today, all I can do is pepper you with a string of assertions and hope they will stimulate discussion on the issue of recasting the federal government's role in surface transportation. Before I begin I would like to say that the views expressed here are purely personal. They do not represent those of my current employer—the U.S. Advisory Commission on Intergovernmental Relations, or my previous employer, the National Council on Public Works Improvement.

Assertion 1

The transportation community should challenge the growing belief that the federal government's best role is in helping people, not places.

That policy direction got its start in 1980 with the report of the President's Commission for a National Agenda for the Eighties. It has caught on to a surprising extent. The federal government now is much more likely to write a check to an individual citizen than to a state or local government. Federal public works programs, including transportation, have declined. The tendency is to believe that the task of building the nation has been finished. It is now up to the state and local governments to maintain the facilities provided with federal capital.

That kind of thinking will consign America to the dust bin of history. We do not have the world's strongest economy by the efforts of free enterprise alone—without federal help. Our system of unimpeded interstate commerce is one that Europe is only now beginning to emulate. Our Interstate Highway System is without peer.

But if we look back, we find other nations gaining on us. If we stop building America now, we will lose the race for growing international markets. Our businesses can't compete without adequate public facilities. Our state and local governments, by themselves, cannot conceive and build superior national systems of transportation. We need new national visions for America's transportation systems of tomorrow, and visions of how the federal government can help the state and local governments provide these systems.

Assertion 2

Hitch your surface transportation vision to international competitiveness. The last time we got a major transportation vision enacted—namely, the Interstate Highway System—we had to hitch it to national defense. Now America's challenge is the world economy. Transportation is no small factor in producing and moving goods efficiently and competitively. International competitiveness is a closer link, certainly, than the old one of national defense. Foreign affairs and interstate commerce both are constitutionally enumerated responsibilities of the federal government. Their strong confluence in the 1990s will create an irresistible demand for federal action on surface transportation programs.

Assertion 3

At this stage in its history, America needs four new federal programs for surface transportation: (1) categorical grants for interstate transportation corridors of national significance, (2) block grants for local mobility, (3) intermodal coordination for goods movement, and (4) applied research for maximizing productivity improvements in surface transportation.

The categorical program should be designed to (a) preserve and protect the Interstate Highway System, (b) extend it to new destinations that have grown important since the original system was designed over 40 years ago, (c) improve productivity with new "short cut" links, congestion bypasses, and capacity enhancements (like high occupancy vehicle lanes and ramp metering), and (d) preserve and utilize existing but underutilized interstate rail rights-of-way that would be irreplaceable in future years.

The block grant program should combine all other federal aid for construction, maintenance, and operation of surface transportation highways, buses, and rail transit facilities and equipment. Certain minimum earmarks may be necessary to preserve transit services, but the emphasis should be on flexibility in meeting the unique surface mobility needs of each of the nation's urban and rural economies under the decision processes of state and local governments cooperating through effective regional planning organizations.

The intermodal coordination program for goods movement should track the flow of goods into, out of, and within the nation to build an information base useful for improving the productivity of these movements. It also should provide a secretariat for a joint government-industry intermodal goods movement coordination group. The purpose of this group should be to explore issues such as containerization, intermodal transfer facilities and documentation systems, size and weight conventions, and international regulation.

The applied research program should be established at a level of at least 1 percent of all federal, state, and local surface transportation spending—far above current starvation levels. It should be a cooperative program. It should heavily involve the nation's universities and their transportation and transportation-related professors, researchers, and students. It should be aimed at upgrading the transportation professions to a new, attractive, high-tech calling capable of raising the productivity and reliability of surface transportation services well into the next century. Its three top priority research topics should be to find better ways of

- protecting and increasing the productivity of surface transportation rights-of-way, whether they are highway, rail, or a combination; the right-of-way is the basic resource; what we do with it in the future is the variable; smart cars/smart highways, high speed rails, or as yet

unimagined means of conveyance will occupy the right-of-way and increase capacity;
- increasing the reliability of surface transportation services to minimize (a) disruptions to just-in-time deliveries, (b) down-time from accidents, and (c) delays in getting employees to work; and
- precisely measuring the performance of the system against publicly acceptable goals for (a) synchronizing the provision of public works with the pace of development, (b) providing specified levels of service, and (c) reducing deferred maintenance liabilities to manageable levels.

Assertion 4

Conditions attached to federal aid still should be an important means of improving transportation practices. Although state and local governments need substantial flexibility to tailor new practices to their unique circumstances, the federal government should not hesitate to promote demonstrated improvements emerging from the applied research program. Such practices might include adequate public facilities ordinances that put legal teeth into the concept that land development and transportation facilities should be coordinated. Typically, we talk about this concept idly—like the weather—and do nothing about it. This is disabling to transportation programs, but it can change. There is a practical way to proceed toward action.

Widespread use of impact fees and traffic mitigation measures to help approach the desired transportation/land development balance also should be promoted by federal-aid conditions. And of course, so should the use of the new language of transportation performance—including realistic public sector asset accounting that accurately measures the amount of deferred maintenance and regularly reports this to the public.

Conclusion

So, in brief, these are my prescriptions for a strong federal role in surface transportation in the coming decade and the next century:

- Do not default on the people vs. places issue.
- Hitch your surface transportation vision to the irresistible lure of international competitiveness.
- Redesign existing federal surface transportation programs into four new intermodal ones geared to (1) getting the most out of our precious Interstate transportation corridors, (2) enhancing local mobility, (3) coordinating the movement of goods, and (4) finding better ways to reach these goals with more, better trained people.

- And, finally, do not be afraid to use federal-aid requirements to promote better ways of doing things.

These prescriptions are bold, but not far out. They are firmly based in the Constitution. There is good precedent for them. I invite you to consider them.

Remarks by Charilyn Cowan

MS. COWAN, Group Director, Capital Resources, National Governors' Association: One of the challenges that we have been struggling with while defining the federal role in surface transportation is deciding what it is that we want as a nation. Typically, when we talk about what it is that we want the government to do, we think first about the federal government. People often think about the federal government role and then equate that to the national role. They are not quite the same. We need to decide two things: What is it that we want as a nation and what part should be the responsibility of the federal government?

Things are not as easy as they were 30 years ago. There was a tremendous national consensus to develop the Interstate Highway System. The roles were clear. Now the Interstate system is nearly complete. More than half of the states are getting one-half of 1 percent minimum allocations in the Interstate program, and what we are seeing is a series of symptoms indicating discontent with the program—these include demonstration projects and the ever-increasing number of restrictions on federal funds. The former Governor of Indiana, Robert D. Orr, expressed the dilemma currently facing the states when he said,

"The largest single public works project in our nation's history is nearing completion. The development and construction of an interstate network of free highways opened up vast areas of the United States, providing new travel opportunities and expanding the safe and efficient flow of commerce.

"This magnificent accomplishment grew out of a strong consensus on the need for a national program of highway development and improvement—an historic partnership between the federal government and the states. It was a partnership in which the federal government took the policy and financing lead while the states assumed the primary responsibility for administration and implementation.

"We are now at a crossroads. Will we continue the partnership or are new arrangements more appropriate as we look to the future? Must success lead to stagnation and inflexibility, or can we use this major turning point to set new objectives, reassess our respective roles, and restructure programs and financing mechanisms to meet our responsibilities?"

The governors are trying to balance what it is that they want to have happen nationally while maintaining the very strong interest and control they have developed over domestic programs.

The concerns that the governors have with the program include the obligation ceilings; not being able to get the revenues back out of the trust funds; not being able to spend the trust funds down; and the mandates and sanctions. The very strong consensus held by the governors is that there should continue to be a federal role. We have 45 governors who say they want a continued federal presence, though not necessarily an expanded federal role. What they are seeing is that states and local governments are putting far more money, relatively speaking, into infrastructure. Additionally, state government is the level of government which binds and integrates transportation spending with other program spending to meet overall economic development objectives.

The critical issue that needs to be addressed is the one of control. If we are going to renegotiate the inter-governmental relationship, does a great deal more control go to the local level or go to the states? What should be the overall level of investment and the relative shares? What is the investment priority order between local gridlock and commuter concerns and the commercial need for national systems needed for international competitiveness? Other issues which also need to be addressed include the funding mechanisms—specifically capital budgeting and trust fund.

One of the other things that governors are very strongly concerned about is their ability to raise bond financing given the problems with tax-exempt bonds. The Anthony Commission will be coming up with some proposals for addressing that issue legislatively, and the governors are strongly supporting moves in that direction.

Our nation's research and development commitment is another issue that the National Governors' Association is strongly concerned about. The governors this year are focusing on "America in Transition." One of the problems that has been identified is that we are not investing enough resources in either people or places, to use Bruce McDowell's terminology. America's investment in research is lagging seriously behind that of other countries. The United States is spending about 1.7 percent of our gross national product (GNP) on nondefense-related research and development (R&D). Our principal competitors, West Germany and Japan, are spending more than 2.5 percent of their GNP on this type of R&D. Also, if you look at the federal agency spending on R&D, transportation R&D has been reduced over the last 7 years by about 40 percent.

One final thought: In trying to develop a new national consensus for the direction of the federal highway program, I think we need to think about the role that an efficient transportation system plays in the economic performance of a nation—particularly in the actual assembly of products. If our distribution system is inefficient, if our intermodal connections do not work well, then we are not going to be able to compete now or in the 21st century.

Remarks by Gerald A. Donaldson

MR. DONALDSON, Associate Director for Highway Safety, Center for Auto Safety: Highway safety under the Federal-Aid Highway Act is a long story of what might have been. But the combination of a fragmented statutory document, a federal agency perennially bent on turning over its stewardship responsibilities to the state grantees, and a lack of application of safety principles to all facets of the regular construction programs of the states, has continuously submerged safety in favor of mobility and durability as the main goals of the program.

Congress, largely unwittingly, made a fatal error some 16 years ago when it ghettoized safety in the federal-aid highway program through

the use of the categorical safety construction programs. These programs, now consolidated in sections 130 and 152, provide very low funding for relatively minor safety work. This approach effectively cordons off safety from the rest of the multi-billion-dollar regular authorization program. In fact, to this moment, no regular federal-aid program must undergo any federally mandated, explicit, separate review and approval for safety adequacy. Only routine Plans, Specifications and Estimates (PS&ES) approval, either through the divisions or under certification acceptance, is required.

When the Arab oil embargo struck in the early seventies and at-the-pump revenues plummeted, the states, having for many years systematically deferred maintenance and rehabilitation of their roads and bridges on the older non-Interstate systems, came to Congress for a bail-out. That rescue was a new concept, 3R (Resurfacing, Restoration, and Rehabilitation), whose avowed purpose was to save and restore asphalt. For the first time, the federal government was in the heavy maintenance business. Here was a major opportunity to correct serious safety deficiencies of alignment, cross-section, and roadside environment by establishing strong, controlling safety improvement principles that would govern the use of federal 3R dollars. But the Federal Highway Administration (FHWA) and the states fought off any effort to require changes in hazardous conditions as an integral goal of 3R in favor of laying new riding surfaces on existing alignments.

Some of you know the long history of the battle over safety in the 3R program and how hard it was, through litigation and congressional oversight hearings, to have "safety" mentioned as an attribute of the 3R effort or to have the low-funded safety categorical programs in each state coordinated with the design and execution of 3R projects. These legislative and program revisions were, however, too weak, so safety is still an elusive, unmeasured feature on 3R projects.

Unfortunately, this is just as true with the safety categorical programs. The states as a whole have never complied with sections 130 and 152 as written, and Congress apparently is content to accept this. The states use specious means to prioritize projects for the paltry funding under the two provisions and employ statistically invalid measures for evaluating cost-effectiveness. Despite the passage of 16 years since the legislation in 1973, many states have not performed the systematic engineering surveys that document all hazardous locations on their public roads.

So where is safety in our federal-aid program? Advocates of the status quo will react with wonder to these charges and assert that it obviously is "everywhere" in the program. Is it? Let's heed the words of Professor Ezra Hauer of the University of Toronto as he describes the product of the special Transportation Research Board study on what should be the controlling safety principles of the 3R effort:

"A committee was set up. To assist it, several experts in the field were hired to review what is known about the relationship between safety and some key highway features. The answers sought by the committee were not for minutiae of design but such basic questions as: how many accidents are saved by widening narrow lanes or shoulders, how many by reconstructing a sharp curve or by making the sight distances on a crest longer. When the reports of the experts came in, a sorry picture had emerged. The committee was led to conclude that, despite the widely acknowledged importance of safety in highway design, the scientific and engineering research necessary to answer these question (i.e., about the relationship between roadway geometry and safety) is quite limited, sometimes contradictory, and often insufficient to establish firm and scientific defensible relationships. . . . Coming after half a century of modern road building this is an alarming finding."[1]

GAO has asked me how safety would be helped or harmed by a federal-aid block grant approach in the statute. For me, "block grant" is a four-letter word spelled with 10 letters. Block grant is not simply a neutral alternative funding method to gain supposed cost efficiencies in the use of federal assistance. It is a political concept, and a partisan one at that. Block grant is laissez faire federalism. And federalism means reduced federal oversight, reduced national uniformity in health and safety goals and methods of achieving them, reduced data and program compliance information, and reduced accountability in the manifold senses of the term. Block grant means deregulation.

And right now the propaganda mill of FHWA is cranking up with the showpiece production of the Combined Road Demonstration Program (CRP) to convince Congress to displace federal responsibilities for safety, durability, and economy of maintenance even further into the hands of the states. No cotton candy from the county fair was ever as sweet as the saccharine accounts of the CRP currently being internally generated by FHWA for later consumption by Congress. There really has been only lukewarm enthusiasm and uninspired quality performance by most of the CRP-participant states—that is, from the ones that accepted the offer. A few even declined, one quite hilariously on the basis that it would generate too much new paperwork! However, the agency has very

[1]Ezra Hauer, "A Case for Science-Based Road Safety Design and Management," University of Toronto, 1988.

carefully coddled the block grant demo in one upper Midwestern state to ensure a centerpiece of claimed success for the program when the interim and final congressional reports are filed.

Let's go back for a moment and view the CRP in the context of agency regulatory history. Long before federalism was a gleam in the eyes of Reagan's handlers, FHWA was hard at work turning over the regulatory machinery of the federal role to the state grant recipients. In the late sixties, the Secondary Road Plan (SRP) was allowing state self-approval of collector PS&ES. This virus expanded in the early seventies to the Primary and Urban systems with the advent of certification acceptance (CA).

I hope that the GAO will go back and review the supposed achievements of SRP and CA. Quite a few states still have no or only partial CA, for a variety of reasons that I will not go into here. Regardless of the levels of participation, the important outcome of SRP and CA was the extent to which FHWA division-level personnel have had their hands tied by a transfer of federal stewardship responsibilities to state management. FHWA concluded a CA review several years ago which, not surprisingly, gave glowing accounts of CA's success. But we were suspicious, and so, through Freedom of Information Act requests, we discovered the depth of disaffection by division engineers with CA, how it hamstrung their ability to confront the states with the inadequacies of their road programs and reduced federal officials' oversight functions to "process reviews." Process reviews mean, simply, one looks at paper, not at highways or bridges, a serious federal management failure that, for example, was recently pointed out in strong terms by the National Transportation Safety Board in its review of the nation's bridge safety inspection program.

With SRP, FHWA leadership cut off their agency field representatives at the ankles. With CA, they cut them off at the knees. And with the divide-and-conquer 3R policy that allowed each state to establish its own procedures and standards for 3R projects, they effectively cut them off at the hips.

The CRP is FHWA's prelude to expanding the CA concept as far as Congress will let the agency take it. This is federalism at its worst. As one official at the agency asserted in a handwritten memo, CRP is the agency's golden opportunity to stretch federal law as far as it can go in turning over the administration of the federal-aid program to the states.

And what drops out? Important data acquisition, direct federal assessment and verification of project adequacy in meeting statutory goals, and even the direct federal evaluation of the states' section 116 maintenance responsibilities. These and other expressions of concern are not my inferences, but the substance of fearful remarks already emerging among FHWA's division personnel. They understand very well that CRP's expansion into a block grant formula will tie their hands even more tightly than ever in dealing with the state highway departments.

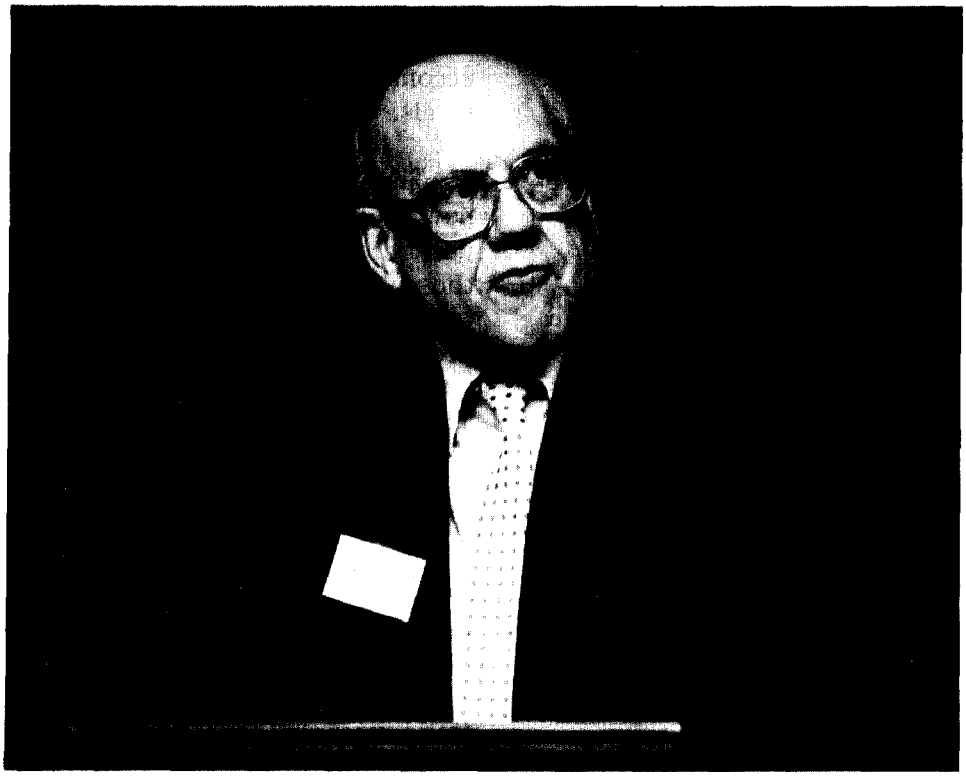
What surprises me most of all is the extent to which GAO has warmed to the block grant concept over recent years. As envisioned by FHWA, this involves not only a transfer of most federal direct oversight and approval functions to state administration, but also a considerable abbreviation of the federal highway program presence. As the administration's bills prior to the 1982 Surface Transportation Assistance Act and 1987 Surface Transportation and Uniform Relocation Assistance Act amply demonstrate, federalism block grants mean amputation of the Secondary and Urban Highway Systems and of all nonfederal-aid systems, as well as Secondary and Urban bridges, from the section 144 funding scheme. So the states will get the classic Reagan block grant approach: less federal stewardship, but also less federal money. What remains after radical surgery is left on a stump with a note not unlike the one attached to the small bottle Alice found in the long hallway at the start of Lewis Carroll's book. Instead of "Drink me," it says "Spend me. (I trust you.)" A block grant like this may make GAO's accounting simpler, but it can do nothing to ensure that national goals of public health and safety can be realized on our country's highways and bridges.

In the public interest and consumer advocacy communities, we view the years of Reagan deregulation and efforts at block grant funding as one of the most tragic chapters in American political history. It will take us many years to recover from the health and safety setbacks that were achieved by undermining the regulatory missions of our agencies like Environmental Protection Agency, Consumer Product Safety Commission, Department of Energy, Interior, National Highway Traffic Safety Administration, and many others. In regard to highways, we believe that we must institute specific performance goals for safety in the regular federal-aid highway program and that a strengthened federal oversight role with more reporting, not less, is necessary. We also need a restructured statutory tool to accomplish this because the Federal-Aid Highway Act is an excellent lesson in how Topsy grew. Given the excessive, willy-nilly grafting of new and uncoordinated provisions onto this

act over the last few decades, including pork-barrel demonstration projects by the hundreds and even supposed safety-oriented provisions such as section 120(d), this statute no longer articulates either clear goals for America's highway program or a clear mission for the federal and state highway departments and is in desperate need of wholesale redrafting.

Panel 4: Innovative Highway Financing Through the Use of Tolls

Remarks by H. Joseph Rhodes



MR. RHODES, Director, Office of Policy Development, Federal Highway Administration, U.S. Department of Transportation: The question of how to raise revenues to finance the construction, maintenance, and operation of highways has been an important policy issue for as long as there have been highways. Certainly, issues related to tax and revenue policies to support the nation's future transportation programs will be an important part of the discussion of future transportation policies.

Over the years, federal, state, and local governments have supported highway programs with a variety of revenue sources, ranging from fees charged directly to users, such as motor fuel taxes, vehicle registration fees, and tolls, to general revenues such as income taxes and local property assessments. In 1987, all highway revenue sources combined generated $66.5 billion for highway purposes. About $2.4 billion of this amount was derived from tolls on highways, bridges, and ferries. About one-half of the highway revenue total was collected by the states; 29 percent by municipalities, counties, and townships; and 22 percent by the federal government. Even this seemingly massive investment pales

in comparison to some estimates of future investment levels required to maintain and operate highway systems, as well as to expand capacity to accommodate expected travel growth and improve current service levels.

The investment/needs gap has caused many states and localities to defer new projects in favor of essential maintenance funded through highway-user receipts. The need for additional revenues appears most critical in those states and localities that must accommodate growing volumes of traffic in suburban areas or in particular corridors while meeting other pressing transportation needs.

The important question then, obviously, is from what sources can we expect to generate sufficient revenues to meet future highway needs? Certainly, current revenue sources will continue to play a major role in future highway program funding; however, there are factors such as inflation, energy prices and improved fuel economy, increased use of alternative fuels, or use of motor fuel taxes for deficit reduction that may limit the revenue productivity of some of these sources.

Toll Financing

One source, toll financing, has been used throughout transportation history to supplement user taxes or other public financing when these other funds are limited or not available. As we continue through an era of constrained resources and ever-increasing transportation needs, toll financing represents a viable option in many circumstances. Whether or not toll financing takes on a greater role in the future will depend largely on how its relative advantages and disadvantages apply to specific situations.

Pros and Cons of Toll Financing

Among the advantages commonly noted is the fact that tolls levied on specific vehicles using specific routes represent the most precise form of "pay-as-you-go" financing. By contrast, motor fuel taxes are broadly based and apply to all vehicles on all roads. Because of the wide variations in the costs and use from one road to another, financing of roads using motor fuel or other broad-based taxes means that some road users will pay more than their share of costs while others pay less. Of course, the direct payment of tolls makes their incidence more visible and more real to the user than the remote effect of motor fuel taxes, which are not stated separately as part of each purchase.

Another often-cited advantage is that in some cases toll financing allows completion of highway projects and the resulting benefits to the economy to occur sooner than would be possible through existing federal and state programs. This is because complete project funding is available upon initiation of the project through the issuance of bonds. Toll financing avoids the need to "accumulate" funding within a particular program category in order to finance high-priority projects. However, the ability to rapidly complete a toll project depends on the existence of appropriate legal authority to sell bonds. The improved operating conditions and increased capacity resulting from more immediate highway construction benefit both the traveling public, through decreased operating costs and travel time, and the general public, through increased reliability on the transportation of commodities over the highways.

A third advantage of toll financing is that it moves maintenance and operation "off-budget." Toll bonding agreements almost always require adequate funds for inspection, operation, maintenance, and debt service. This is because the typical financial arrangement for a toll facility requires annual in-depth inspection and maintenance reports to protect users and bondholders. Often, toll facilities are able to generate revenue in excess of operation and maintenance costs once the initial construction debt has been repaid. These funds can be used on other projects in a state or local area to further relieve the pressure for scarce funds available from other sources. Even if the use of the toll revenues is restricted to particular facilities, the public highway budget is relieved of the burden of financing travel needs satisfied through toll roads.

A seldom utilized but available option is the allocation of space on congested highways through the imposition of tolls, that is, congestion pricing that encourages users to make more efficient choices of route or mode. If each highway driver is charged according to the marginal costs associated with that driver's use of the road, each additional highway user would pay an amount just equal to the costs he or she imposes by entering the traffic stream (including pavement damage costs, congestion costs, and any other costs associated with highway use). Implementation of such a highway pricing scheme would be fraught with technological and political difficulties, but some believe that "several factors are converging to make congestion pricing . . . a serious possibility for curbing congestion and reducing the need for expensive capacity expansion."[1]

[1]Kenneth Small, Clifford Winston, and Carol Evans, Road Work: A New Highway Pricing and Investment Policy (Brookings: Washington, D.C., 1989).

There are, of course, certain disadvantages associated with toll financing. Among the chief drawbacks to toll financing is the interest cost of borrowing funds. This cost can vary considerably depending on the particular financing arrangement, bond interest rates at the time of issuance, the feasibility of the project, and the issuing agency's credit rating. The willingness of the legislative authority of a state or other governmental entity to guarantee payment on bonds issued by a toll authority can, of course, reduce toll project interest costs. The feasibility of particular projects can also be enhanced through federal, state, local, or private-sector financial participation.

Another major disadvantage is the cost of collecting tolls, an extra expense that is not incurred on projects supported by other taxes. In 1983, it was estimated that the cost of toll collection in the United States averaged about 18 percent of gross revenues, compared to 1 percent for collection of motor fuel taxes. The delay and increased fuel consumption associated with waiting time at toll collection plazas must also be considered. These costs may someday be reduced significantly through the application of automatic vehicle identification technology and computerized billing procedures, although neither has yet been utilized extensively.

Finally, some view tolls as double taxation. The motorist who pays a toll is also paying a tax on the fuel consumed while traveling on the toll facility. Others would hold that toll financing does not differ from the cross-subsidy that occurs through motor fuel taxation where revenues earned from travel on high-volume roads are used to support low-volume facilities. Nevertheless, by paying motor fuel taxes in addition to tolls, the level of cross-subsidization between users is increased and the precise "pay-as-you-go" advantages of toll financing are diluted.

Historic Federal Toll Policy

The use of highway tolls has been a popular method of financing highway improvements for many state and local governments. However, since 1916, federal policy has generally prohibited the use of toll financing where federal funds are involved. There are exceptions to the traditional federal restrictions against the use of tolls on federal-aid highways. These include the use of tolls to finance construction of federal-aid bridges, tunnels, and their approaches; tolls to finance the construction of approaches to toll roads on the Interstate system; and more recently, the use of Interstate resurfacing, restoring, rehabilitating, and reconstruction (4R) funds on Interstate toll roads.

Considerable pressure has been building in recent years to modify the currently restrictive federal policy on the use of toll financing. Many states and local governments are seeking additional revenue sources, especially one like toll financing that clearly places the costs directly on users. Further, allowing greater state financing flexibility is consistent with the federalism principles that have been espoused by recent administrations. These pressures culminated with the enactment of a toll pilot program in 1987 to ascertain the merits of federal financial participation in a variety of toll projects.

Toll Pilot Projects Authorized by the 1987 Act

Section 120 of the Surface Transportation and Uniform Relocation Assistance Act of 1987 provided authorization for seven states to participate in a toll pilot program. The act specified five states: California (Orange County), Texas, Pennsylvania, Florida, and South Carolina. Delaware and Colorado were selected at the discretion of the U.S. Secretary of Transportation. Subsequent appropriations acts have added Georgia and West Virginia to the specified states. Pennsylvania's project extends 3.5 miles into West Virginia. Each of the other selected projects lies totally within the state.

The law places several conditions on the selected projects. Each project can only be new construction or reconstruction to increase capacity of a non-Interstate system highway. In contrast to the typical 75 percent federal share, the federal share on these projects may not exceed 35 percent. An agreement must be executed between the state and federal Department of Transportation (DOT) limiting the use of the toll revenues to the specific facility. However, unlike most past toll agreements involving federal funds, toll collections may be continued after the construction debt has been retired. The projects must be publicly owned and operated. For each project, federal-aid funds may be used only this one time, except where the pilot project is for reconstruction to expand capacity on a facility that was originally constructed using federal-aid funds. Any new mileage added by these projects shall not be used to increase a state's apportionment in the future.

To date, only five of the nine projects have been specifically identified. They range from 3 miles in Florida at an estimated $46 million to 58 miles of new construction in Pennsylvania for $1,200 million and 70 miles of reconstruction in West Virginia for $210 million.

Pennsylvania's project is probably the most extensive and has progressed well. A toll agreement was executed with the Pennsylvania Department of Transportation (PennDOT) in February 1988. A separate

agreement was executed between PennDOT, Pennsylvania Turnpike Commission, and West Virginia to accommodate the 3.5 mile southern terminus in West Virginia. One section between I-70 and US-40 is under construction. Another section involving the construction of an interchange with I-70 is ready to begin. Each will use 35 percent primary funds.

Florida's project has been stalled. It is a connection of the Sawgrass Expressway to I-95 in Deerfield Beach, Florida. This 3-mile project has an estimated cost of $46.1 million. The Sawgrass, a toll highway, has been losing between $12 million and $20 million per year for its owner Broward County. The state of Florida has indicated that it would assume ownership and operation when the legislature directs. However, the transfer has become controversial and the legislation has not been enacted.

Texas' toll project will be 58.5 miles of the main lanes of the eastern and southern portions of Beltway 8 in Houston. The estimated cost is $691 million. The agreement has not yet been executed. The program has not advanced, awaiting some local and state decisions.

Delaware has chosen the US-13 relief route from 15 miles south of Dover to north of St. Georges, about 23 miles north of Dover. The 38-mile project has an estimated cost of $500 million. The agreement was executed in May of 1988. Work is expected to begin in the summer of 1989.

West Virginia has chosen the entire length of Appalachian Development Corridor L (US-19) from near Beckley to near Sutton. This 70-mile proposal is expected to cost $210 million. The construction would be undertaken by the West Virginia Department of Highways. The agreement has not yet been executed.

The four states that have not yet designated projects are California, South Carolina, Colorado, and Georgia.

In California, local decisions and coordination with California Department of Transportation are underway. The 1988 DOT Appropriations Act permitted the state's facilities to be located in more than one highway corridor. Under consideration are the San Joaquin Hills corridor, the Foothill Freeway, and the Eastern Freeway.

South Carolina has several options under consideration. The leading contender appears to be US-501 from Conway to Myrtle Beach.

The Secretary has approved the Denver Beltway, Route 470, for Colorado's project. The Colorado Highway Commission has designated C 470, E 470, and W 470, with conditions that no currently available federal-aid funds can be spent on the projects unless Congress provides specific discretionary funds or Colorado's apportionments increase significantly. This proposal is being considered by the Federal Highway Administration (FHWA) and details will be worked out, if possible.

Finally, Georgia executed an agreement for GA-400 in north Atlanta in August 1988. Construction has begun, but with 100 percent state funds. This decision was apparently made to keep options open. The state has indicated an intent to use substantial federal-aid funds later. However, it has also discussed the possibility of removing the project from the program, inasmuch as it is expected to generate excess revenues that could be used on other routes.

Conclusion

Whatever the future of highway finance holds, toll financing will play some role. Whether that role grows beyond its present dimension is unclear at this point, though all signs indicate that more states and local governments are willing to consider tolls as a financing alternative in certain situations. One key to the future attractiveness of toll financing is greater implementation of automated collection technologies. And, obviously, an expanded federal role in financing toll projects will improve their feasibility and entice more states to consider their merits in future programming and financing decisions.

Remarks by Ralph L. Stanley

MR. STANLEY, Chief Executive Officer and Chairman of the Board of Directors, the Toll Road Corporation of Virginia: What I wanted to do today is describe a project I have been working on for the last 4 years. It is the extension of the existing Dulles Toll Road from where it ends near Dulles Airport out 15 miles to Leesburg.

I want to give you some of the background, as I see it, on the larger issues surrounding surface transportation infrastructure. What I see are the enormous needs in the next 15 to 20 years for transportation and other infrastructure projects and trends which I believe are not going to change for the balance of the century.

These trends are, first, an enormous need for rehabilitation and construction of new infrastructure—highways and bridges are the leading examples. Second, there will be funding constraints. Third, there is a change in people's transportation patterns. I used to make speeches about the Washington, D.C., Metro system when I was Urban Mass Transit Administration (UMTA) Administrator. It is a wonderful and

delightful subway system, but it has been built in a pattern that simply does not reflect the economic development of this area.

I used to go out West and ask how many people knew of the city of Tyson's Corner in Fairfax County, Virginia—no one did. It is bigger than downtown Denver and more people work there. There is no mayor of Tyson's Corner. But Tyson's Corner has a transportation problem that is like downtown Denver. What that shows is what a lot of urban planners call "urban villages," with reverse commuting patterns—where the people commute out of urban centers to work rather than into them. It is remarkable and occurring all over the country.

The other example I would like to use is Stamford, Connecticut, which for 50 years has been a commuter town on the Metro North Rail Line into New York City. We did a study when I was at UMTA that showed more people got off the morning train coming out of New York to work in Stamford than got on in Stamford to go to work into New York.

It is also happening in New Jersey. The reverse commute just to the west of the Hudson River from residents of New York City and Queens and other areas is remarkable. It is a pattern that our transportation system has to catch up with which creates even greater funding problems.

But to bring all the global issues down to 15 miles of highway out in Northern Virginia. I want to describe the policy and the legislation that we are operating under; I am committed to it not only because I think it is a good idea, but I believe that there is a niche market for toll facilities where there is a lot of private capital available. I think if we are successful it is something that is going to provide a great example for niche markets around the country.

I agree that tolls on parts of the Interstate and a lot of the other toll ideas being proposed are not necessary and would not raise that much money. But there is a niche market where there is a demand, and that is what we are trying to serve.

Legislative Background

Now for the background on the legislation that we are operating under. In the fall of 1987, Governor Baliles formed a commission to look for innovative traffic solutions. One was dart rail and the other was the possibility of resurrecting private funding for toll roads. In 1988, the General Assembly passed legislation based on this latter idea, which allows public service companies like ours to apply like a utility to raise the

money. What I think this law has done very well is separate the policy from what I call blocking and tackling building of a road and running it. The law took effect July 1, 1988. I figured that what we would have to do the first time through the process was put together a team that was unassailable in terms of qualifications. I renamed the company "Toll Road Corporation of Virginia" for two reasons: One, you knew what business we were in; two, I did not want to use what the Washington Post calls the "D" word, which is "development." I made a very conscious decision. We have no funding from anybody with a development interest. We are in one business, which is building and running a road. We will never have a development interest, so there was no conflict of interest in where we went.

We interviewed the investment banks in New York and there was enormous interest because of the success of these kinds of projects abroad. England has just established private toll road financing. It is sweeping the world. Once investment bankers realized there is a law which allows a franchise, there was incredible competition.

We chose American First Securities from Virginia and Goldman Sachs and Company as the financing team. Parsons Brinckerhoff, Quade, and Douglas is doing the engineering. Kiewit Eastern Company, which has built as much or more Interstate than just about anyone, is the construction contractor. Johnson and Higgins is the insurance company. Bollmer Associates, a New York firm, is doing the traffic study.

One of the articles about the project said that the team we have assembled is the road-building equivalent of the 1927 Yankees. I knew that going through this, particularly the first time, there would be very serious policy questions to ask, and some of them were going to be, "Have you ever built a road before? Have you ever financed one? Have you ever done any engineering on it? Who is doing the traffic studies?" I wanted to have a supremely qualified team for this first project.

The policy implementing the law has three basic steps. We are about to go through the first and most critical. We have formally applied and completed the application showing construction costs, the alignment, and the public interest test. We have proposed a toll schedule, but we are regulated like utilities by the State Corporation Commission. The law gives us no more than a reasonable rate of return.

But one thing I would stress: We are going to raise $146 million, not only to build the road, which is $120 million, but to subsidize it for the first 7

to 8 years. I deliberately chose a toll rate that is right in the middle of the rate on the existing toll road so that I knew what would be comparable. And there are Routes 7 and 50 with no tolls, which are the competition. As I said, we have got to price the product in such a way so as to pay back the debt that we raised.

We are raising equity. You cannot do it just on toll financing, alone, so we are raising $40 million in equity. And the way the law works, we get a certificate to build, own, and operate the road for approximately 40 years. In the beginning there is a significant loss. But if you look at the construction costs, building a toll road today is a tremendous investment given escalation, particularly in land costs.

The application is currently under review by the Commonwealth Transportation Board (CTB), which votes on July 20 whether to approve it or not. The Virginia Highway Department has indicated how they would build the road if my application were to fail. However, they would use revenues from the existing toll road, which is running a considerable surplus, to finance the extension.

Our position has been to let the state use that surplus for projects we would not compete on. If we are successful we will raise $146 million. The Virginia Department of Transportation spent anywhere from $113 million to $170 million all of last year. The bonding capacity of Virginia's current toll surplus is $180 million. Therefore, if this project is approved, the road funding in Northern Virginia could go from about $150 million to close to $500 million in the next 12 months.

The CTB makes the decision July 20th. We then go to the Corporation Commission like a utility for an initial rate of return and they review our capital structure. We are not a monopoly, so they are looking now for precedents on how to regulate it. We have both the market pressures of regulation, as well as the Corporation Commission. The Commission can have a hearing any year if they feel the toll is too high. However, I will not need to know from the Corporation Commission in Richmond if the toll is too high, because we have got to price the road in a competitive fashion and maintain it, in order to have people use it.

If the Corporation Commission says yes, Leesburg, Loudoun, and Fairfax in Fairfax County have the opportunity to veto it. Again, I do not think there are any issues out there that would rise to the level of

issuing a veto. Indeed, Fairfax County very much wants to keep the surplus, because 81 percent of it is paid by Fairfax drivers in Fairfax County and is needed for some of its critical projects.

If we get the certificate, we have up to 2 years to commence construction. We are ready to begin late this year and finish it in 1991. Then we have the road for 40 years during which it is regulated.

The other thing that is innovative in Virginia's toll legislation is the lack of the power of emminent domain and access to the surplus for the corporation building the road. Why? Most of the land assemblage for the road has already occurred. We have only 17 landowners, but it is in their great interest to donate the rights-of-way. Regarding this issue of not having emminent domain, I went in very early and said "I don't have it, won't ask for it, and can't finance the road if you make me pay. If one person makes me pay, they'll all make me pay." And after two or three meetings, we successfully acquired the land. That is something the state could not do because it has surplus funds and the right of emminent domain. If it had taken the land by emminent domain, the state would have had to buy it. We have all the land from Route 659 inward.

But the other innovative part of the legislation is it immediately sets up an improvement fund. We get our reasonable rate of return and no more. Then if the toll road is a success, the improvement fund would redistribute the surplus through the area to improve the secondary roads that are not toll roads. That function makes sure that all of those toll revenues that exceed our reasonable rate of return go right back into funding roads that are adjacent or nearby our project.

Again, we see it as a niche market. I keep saying to the Virginia Highway Department that most of the highways in Northern Virginia are not eligible for this. I would not put a toll on and finance them. But if we are successful, this niche market, which can relieve traffic corridors like the Dulles corridor, is going to be a nationwide model for what can be done.

Remarks by John Archer

MR. ARCHER, Managing Director, Government Affairs, American Automobile Association: The American Automobile Association is against toll roads as a general principle, believing that to the maximum extent possible, all highway facilities should be toll-free. We believe that this policy is the underlying principle of the federal-state highway program and that it has been instrumental in developing and preserving a vast network of quality toll-free highways.

Since the federal-aid highway program began, states generally have been prohibited from tolling new or existing federally assisted roads. Use of federal funds is permitted in construction of certain bridges and tunnels, but states must agree to end tolls upon retirement of debt. (Some toll roads were incorporated into the Interstate system in 1956, and seven demonstration projects were authorized by the last Surface Transportation Act.)

Proposals to relax federal toll policy—either to use Highway Trust Fund revenues for construction of new federal-aid highways or to allow states

to toll existing roads—would represent a major change. Instead of a pay-as-you-go system based on fuel taxes already collected, responsibility for funding highway maintenance and construction increasingly would be loaded onto future trips of highway users (build now, pay now, and pay later, too!). Furthermore, commingling of tax and toll funds undermines the stated justification for toll road construction—the expansion of available funds for road construction.

Disadvantages of Toll Roads

There are several reasons why the use of toll funding for highway construction is a bad deal for the American motorist:

Expense: Toll roads are the most expensive roads to build. Interest costs alone can double or triple the cost of construction. Capital costs are between 5 and 10 percent higher for toll roads, and 15 percent of toll revenues are needed just for toll collection. In contrast, only 1 percent of motor fuel taxes is devoted to tax collection.

To convert toll-free roads to toll roads, capital and operating costs are an even larger share of the overall cost of adding capacity or improving the road. According to the Congressional Budget Office, these costs are "likely to swamp the economic gains stemming from rapid completion."

Disguised Taxation: Proponents of toll roads claim toll revenues will allow construction or expansion of highways without "requiring any new highway taxes." Motorists already pay federal gasoline taxes into the Highway Trust Fund for the construction and maintenance of roads. To ask them to pay again for the same roads in the form of tolls is double taxation.

According to Congressional Budget Office estimates, new toll roads will impose per car charges of 8 to 10 cents per mile or from $1.60 to $2 per 20 miles of car travel. The average car runs 20 miles (or more) on a gallon of gasoline. Therefore, such toll charges would be the equivalent of gas taxes ranging from $1.60 to $2 per gallon of gasoline.

Where toll revenues may be used for other transportation purposes beyond the tolled facility, the inequity of the toll road user tax is multiplied. Motorists are singled out to shoulder the cost of other facilities in the state. Toll roads simply become "cash-cows," providing revenue for other projects but offering little or no benefit to those who pay the tolls. For example, in New York City, bridge and tunnel tolls are $1.75 per

trip. If tolls were used solely to cover bridge and tunnel operating costs, toll rates would be no more than 35 cents today.

Responsiveness to User Needs

Toll roads provide few exits in order to minimize the numbers and, therefore, the costs of toll personnel. Users can't get off the road at convenient places, and people living in small communities often don't have convenient access to toll roads built adjacent to them.

Toll road users often are locked in to higher priced gasoline stations, food establishments, and other services. In a closed system without competition, the highway user has no choice among concessionaires and may be overcharged.

Toll roads, bridges, and tunnels cause delays and annoyances. The American motorist values hassle-free driving; drivers don't want their daily commute or holiday travel to be a series of stops and starts or long frustrating waits to pay tolls.

Maintenance and improvement of toll-free roads in the same travel corridors as a toll road is likely to take a lower priority simply because the toll road is available or because of competitive threats to the financial success of the toll road.

A Threat to the Highway Trust Fund: Toll roads are being promoted as a "quick fix" to spending limitations imposed under Gramm-Rudman. The assumption is made that traditional highway financing mechanisms are not working. On the contrary, major increases in both federal and state tax rates since 1980 indicate that highway users continue to be willing to pay for highway improvements that they are convinced are necessary. Yet, imposition of tolls on new highways, and particularly on highways already constructed with federal aid, will destroy public confidence in the trust fund concept and stimulate strong public resistance to fuel taxes for free roads.

Harmful to Tourism: Toll roads add to the overall cost of travel, discouraging individuals from auto travel and raising operating costs for providers of group transportation. For example, it costs more than $16 in tolls alone to travel round-trip from Washington, D.C., to New York City, only 240 miles away.

Of course, some may not agree with these conclusions regarding tolls. It is often contended that we need an increase in road money quickly and that, therefore, toll financing is the way to go. While toll financing might

be helpful in the short run, in the long run it would destroy support for the road program, for the reasons earlier mentioned—and one more. If extensively employed, toll road financing could become a great invitation to diversion of fuel taxes.

Impact Fees

In lieu of toll financing, impact fees, which are charges imposed on local property owners who benefit from the proposed road, should be explored fully. These fees are particularly attractive options when new development creates additional traffic necessitating road construction. In some instances, such assessments are an alternative to toll financing because they provide additional funds for road construction while still allowing the road to remain free of tolls.

The commingling of highway user funds and tolls violates the implicit promise of a toll-free highway system made when motorists began paying literally hundreds of billions of dollars in highway user fees.

Remarks by John J. Hassett

MR. HASSETT, Former Executive Director, International Bridge, Tunnel and Turnpike Association: The International Bridge, Tunnel and Turnpike Association is the worldwide spokesman for the toll highway industry. It supports and promotes the use of toll financing as an effective alternate or supplement to tax financing of the design, construction, operation, and maintenance of transportation facilities wherever it is practical, feasible, and prudent.

As we look at the present situation in surface transportation in the United States, it seems quite apparent that the time is ripe for a future highway financing framework that permits, and even encourages, the

use of alternative funding mechanisms, especially tolls, wherever state and local governments find them to be appropriate.

The time is ripe because conditions are right. There is, first of all, general agreement that an increased level of highway investment is necessary. This would be true even if the states were permitted to expend every federal tax dollar collected. The American Association of State Highway and Transportation Officials (AASHTO) Bottom Line report concluded that there is a shortfall of at least $14 billion annually to bring the present highway system up to par, let alone address the acknowledged needs of our growing highway user population. Second, everyone appears committed to continuation of user fees—which include both taxes and tolls—as the way to meet highway needs. There is also a consensus that a mix of financing sources will be required for the future, both near and long term. We seem to be heading for greater dependence on state and local governments for tomorrow's mobility. And within the federal framework, plans on the table call for greater discretion and flexibility in financing, with the federal partner offering every possible assistance to reach the goals of 2020 and beyond.

Additionally, two new conditions are emerging that could further influence decisions toward tolls. The first is the development of public/private cooperation in the building of public infrastructure projects. Even before the privatization philosophy became a full-blown movement, the concept of impact fees and donation of rights-of-way from adjacent landowners had begun to affect and abet the financing of new and needed roads in suburban areas. Now proposals for full privatization of road projects are popping up with greater frequency, and they offer persuasive evidence that there are more ways to get a highway built today than there were just a few short years ago.

The second new condition improving prospects for tolls is coming from within the toll industry itself, and from new technology that is beginning to affect other segments of efficient surface transportation as well. The potential value of AVI (automatic vehicle identification) and other related electronic means of classifying, tracking, and controlling the movement of trucks, buses, and cars, is so mind-boggling that as yet we cannot fully anticipate all their virtues, innovations, and possible savings. The application of AVI to toll collection will be one of the first commercial adaptations of the process. It will immediately result in reduction of congestion, faster passage of vehicles through toll plazas and, eventually, lower costs of toll collection.

These developments create a climate for policy and legislative implementation that is already changing people's minds, leading them to reconsider long-held policy positions opposed to the introduction of tolls. While we are not so naive as to believe such changes will come overnight, we tend to think that broad acceptance of these fundamental trends already constitutes substantial progress in the right direction.

Let me illustrate. In 1987, the federal government took a big step toward modifying its long-standing opposition to tolls when it endorsed a limited program of federal assistance to toll financing in nine states as a demonstration program. Although still in its early stages, the program is moving steadily forward where conditions are favorable. Federally aided toll roads are under construction in Pennsylvania, Georgia, and Delaware, while planning and design are under way to some extent in Texas, West Virginia, and California. It is worth noting that of the nine states authorized to use federal funds for toll roads, four do not at present have any toll roads. That indicates a recognition that conventional tax funding was not going to provide enough money to build what was needed and a willingness to change direction on toll policy to try to get the job done. Of those four states, Georgia, South Carolina, and California have not previously built or operated any publicly owned toll roads, while Colorado did have a successful experience with its Denver-Boulder Toll Road in the 1950s and 1960s, allowing the road to become toll-free while construction bonds were paid off. The remaining five states have one or more toll roads in operation in Delaware, Florida, Pennsylvania, Texas, and West Virginia.

The federal legislation spurred new state legislation. There has been important landmark legislation implementing tolls in California and Texas. California's legislature reversed its traditional no-toll-road policy last year, while Texas cleared the way for joint toll projects to be developed by the Texas Turnpike Authority and the State Department of Highways and Transportation.

In Colorado, the federal toll option has not yet been utilized, but a 50-mile public toll project is under way, launched by three counties and the city of Aurora. This project has had a great influence in rounding up citizen support for a new international airport in the Denver area, since the road will provide speedy access between Denver and the new airport east of the city.

In any event, when the Congress gets around to looking at the record of the Federal-aid Toll Road Demonstration program, it can hardly escape

the conclusion that it has already had some significant impact in encouraging roadbuilding and other transportation improvements that probably would not otherwise have taken place with only a small expenditure of federal dollars, but a very impressive incentive to creative financing.

With the demonstration program for starters, the International Bridge, Tunnel and Turnpike Association (IBTTA) would like to see such a toll road option available to any state that would care to exercise it, on any road it wishes to build or improve. As you know, the federal contribution on these toll projects is limited to 35 percent of project costs. It is too early to tell if this is a proper or practical ratio of federal to state and local dollars. At least one state has suggested that providing less federal money but providing it up front, might be an even more helpful incentive to getting projects started. Time and experience will give us all better guidance in this area as the other projects move along in other states.

We do not believe it will be a difficult task to integrate the public and private toll option into the ongoing highway program that must be enacted in the next 2 years by the Congress. It simply requires that federal legislation be written to encourage, rather than discourage, the states to examine and adopt innovative financing schemes, including public/private partnerships, to utilize current bonding authority which already exists in many states for road improvement, and to permit greater cooperation between states and their county and city governments.

The states are already moving toward these positions. At the recent series of Transportation 2020[2] hearings and public forums, the clamor for reduction of road funding categories and other segmentation of federal-aid funds was heard throughout the land. Given the premise that the federal government will assist the states in such flexible pursuits, it follows that toll agencies should also be freed from tri-partite agreements signed years ago with the Federal Highway Administration and state highway and transportation departments, which call for removal of tolls when bonds or other financial obligations are paid off. It is simply inconsistent for the federal government to foster toll road construction on the one hand, and to deny that option to the state at some future date. This applies also to states which signed agreements to obtain

[2]The 2020 project is a coalition of transportation business leaders and government officials working together to identify and develop a consensus plan to deal with transportation needs through the year 2020.

resurfacing, restoring, rehabilitating, and reconstruction (4R) funds for their Interstate toll road mileage, even though these funds might never be spent on those Interstate toll roads.

The decision to continue or discontinue tolls on a facility should be made by each state, based on its own economic and political situation and its then-current surface transportation needs, goals, and available funding. Another restriction, the requirement that all federal-aid funds must be repaid before tolls may be imposed on a section of federal-aid highway, is also inconsistent with changing federal policy and should also be repealed.

I think all of us in the highway business at any time in the past 30 years or so feel justifiably proud of the great system that has been built in this country, with the creation of the Interstate program and the upgrading of our arterial network. We look upon the winding-down of the Interstate program with some trepidation, recognizing that any future program will be far less dramatic and inspirational; that it will be more in the nature of a shoring-up, fix-it-here, fix-it-there type of plan, although it will be no less visionary, no less expensive, than its predecessor. We are surely going to be faced with other great infrastructure needs in the years ahead, so we will have to stretch our highway dollars. The opportunities of the marketplace, under proper supervision and control, should govern our future financing choices.

Summing up, our legislative goals for tomorrow's highway program are three: (1) removal of federal restrictions to the application of innovative toll financing where appropriate; (2) relief from tri-partite agreements that would reduce the amount of funding available; and (3) permission to use federal funds on a fair-share basis for cooperative highway construction and reconstruction projects utilizing tools, where states and local governments deem such projects practical and necessary.

We think these goals are fully compatible with consensus plans for the future highway program in this country. Thank you.

Remarks by Robert E. Farris

MR. FARRIS, Vice President, Policy Division, American Trucking Associations: As we near the completion of the Interstate system and consider how to finance the projects that meet our most pressing current needs, we revisit an old topic, toll financing.

When debating how it would finance the Interstate program in the 1950s, Congress gave serious consideration to building a national system of limited-access toll highways. In the final analysis, however, Congress endorsed the pay-as-you-go system of collecting user taxes and the creation of a federal Highway Trust Fund to provide a continuous source of funding.

Pressured for new construction to relieve congestion and to provide new limited-access highways, highway officials and legislators once again are evaluating the merits of toll financing. As taxpayers, toll-road patrons, and an industry completely dependent on a coordinated system of high quality roads, trucking has a substantial interest in this debate.

In reviewing its policy on the best direction for a new federal highway program, the American Trucking Associations (ATA) too has given serious thought to the pros and cons of toll financing. ATA concluded that toll financing has been effectively used in limited circumstances to provide new capacity in areas of extreme congestion where other methods of financing have not been feasible. Also, turnpikes often provide superior productivity benefits for the trucking industry, allowing the operation of turnpike doubles and triples.

However, we believe the pay-as-you-go system of financing has been tremendously successful in building a network of highways that is the envy of the world. We support keeping our federal-aid system, where approximately 90 percent of truck traffic occurs, a toll-free system.

ATA has five principal concerns about the liberalization of toll financing:

1. The previous methods used to finance toll roads and the labor-intensive toll-collection systems have made toll roads some of the most expensive roads to build and operate.

2. Collection of federal and state highway user taxes for fuel consumed on toll roads, in addition to collection of tolls, compounds operating cost. There is no indication that a change in federal policy toward toll facilities would be accompanied by a reduction in traditional federal highway taxes to address this problem.

3. In some instances toll revenues are diverted to nonhighway and even nontransportation projects. Use of tolls to subsidize transit in New York is the classic example, but Florida, Maine, Maryland, and New Jersey also fund other projects with tolls. Oklahoma is currently considering use of toll revenues to support business ventures such as industrial parks. Toll roads must not be used as thinly veiled general tax collection mechanisms.

4. If toll financing is made a more attractive option for states, through mingling of federal user revenues, some will choose toll financing over traditional financing for reasons of political expediency rather than

financial efficiency. New limited-access roads could be predominantly built as toll roads.

5. Existing methods of toll collecting cause lengthy delays on toll road high-use days.

In reviewing its policy, ATA also considered one of the many forms of tolls, congestion pricing. Because this type of "demand management" strategy is designed to discourage travel, rather than enhance mobility, and because it attempts to tell motorists who have already paid for a facility they cannot use it, the trucking industry strongly opposes congestion pricing.

The motor carrier industry has long shown its willingness to pay the highway user taxes needed to guarantee the freedom of transportation that is so essential to our national economy. But we ask that they be assessed and applied in the most efficient and equitable manner possible. We are looking forward to a healthy debate over new financing alternatives, and there are many, tolls being only one alternative. Trucking companies will advocate and support the emergence of a new, sound, and forward-looking national highway program. We are now at a "crossroads" in our nation's transportation history. Many avenues are open to us. We must choose the next route carefully, for we'll set a course that may well guide us for the next three to four decades, just as the Interstate program has since 1956.

Seminar Panelists' Biographies (In order of presentation)

Panel 1: Transportation Overview

Lester P. Lamm is the President of Highway Users Federation for Safety and Mobility, which is a coalition of 400 businesses and associations working for better highways. He has played a key role in the Transportation 2020 effort that is developing proposals for a new highway program. He came to the Highway Users Federation in 1986 after a 31-year career with the Federal Highway Administration and its forerunner, the U.S. Bureau of Public Roads. He culminated his federal career in 1982 as Federal Highway Administration's Deputy Administrator.

Richard D. Morgan is the Executive Director of the Federal Highway Administration (FHWA), U.S. Department of Transportation. As Executive Director, Mr. Morgan is FHWA's Chief Engineer. He is a registered professional engineer and a member of the Ohio Bar.

Thomas B. Deen is the Executive Director of the Transportation Research Board (TRB). He was appointed to this post by the President of the National Academy of Sciences in 1980. TRB stimulates research on the nature and performance of transportation systems and encourages the application of its research findings. Mr. Deen has occupied positions in federal, state, and local government, and the private sector. Most recently, he was President of Alan M. Voorhees and Associates, a transportation planning and engineering firm. Mr. Deen was educated at the University of Kentucky, University of Chicago, and Yale University.

Francis B. Francois is the Executive Director of the American Association of State Highway and Transportation Officials (AASHTO). Founded in 1914, AASHTO represents the departments concerned with transportation and highways in the 50 states, the District of Columbia and Puerto Rico, to foster the development, operation, and maintenance of an integrated national transportation system. The active members of AASHTO are the duly constituted heads and other chief directing officials of the member transportation and highway agencies. Mr. Francois also serves as ex-officio member of the Executive Committee of the Transportation Research Board and the Strategic Highway Research Program. Prior to joining AASHTO, Mr. Francois was a member of the County Council of Prince George's County, Maryland. He earned his engineering degree at Iowa State University and his law degree at George Washington University.

Robert G. Stanley is the American Public Transit Association's (APTA) Deputy Executive Director of Policy and Programs. APTA represents the public interest in providing safe, efficient, and economical transit services. It is an Association with over 900 transit service members. Mr.

Stanley is responsible for directing APTA's Transit 2000 project, an effort to set a strategic direction for the transit industry in the years ahead and to formulate new national policies and programs. Prior to joining APTA, Mr. Stanley served for 3 years in the Urban Mass Transportation Administration and 5 years with Barton-Aschman Associates consulting on a variety of transportation and urban development projects.

Panel 2: Federal-Aid Highway System Preservation and Research Needs

Dr. T. Peter Ruane is the President and Chief Executive Officer of the American Road and Transportation Builders Association, which is a national federation of public and private transportation construction interests. The Association is organized to advocate and promote actions that are necessary to achieve an adequate transportation development program in the United States. Dr. Ruane is a graduate of Loyola College of Baltimore, Maryland, and holds a master's degree from the Pennsylvania State University and a doctorate from the George Washington University in Washington, D.C.

E. Dean Carlson is FHWA's Associate Administrator for Engineering and Program Development. He has held numerous FHWA positions, including former Regional Administrator in Kansas City, Missouri, and former Director of two FHWA headquarters offices—FHWA's Office of Engineering and Office of Highway Safety. Mr. Carlson received a civil engineering degree from the University of Nebraska and later attended the University of Texas.

Martin F. Fitzpatrick, Jr. has served as Administrator of the U.S. Department of Agriculture's (USDA) Office of Transportation (OT) since February 1981. Created in 1978, OT brought together traffic managers, economists, engineers, and agricultural marketing specialists from several USDA agencies to help solve the problems of agricultural transportation systems. In his capacity as OT Administrator, Mr. Fitzpatrick has served as a member of the U.S. Department of Transportation's National Motor Carrier Advisory Board since 1982, and as a member of the Inland Waterway Users Board of the U.S. Army Corps of Engineers since 1987.

Damian Kulash is the Executive Director of the Strategic Highway Research Program. This program is a $150 million, 5-year results-oriented research program that focuses on a few key components of the highway system. Mr. Kulash was formerly the director for special projects at the Transportation Research Board, where he managed TRB's

policy studies, syntheses of current practice, and computer-based information services. Prior to joining TRB in 1982, Mr. Kulash was Deputy Assistant Director of the Congressional Budget Office, National Resources and Commerce Division, where he directed many transportation-related evaluations for congressional committees. Mr. Kulash holds a B.S. in Industrial Management and a Ph.D. in Civil Engineering from the Massachusetts Institute of Technology.

Panel 3: Recasting the Federal Government's Role

Louis J. Gambaccini has been Chief Operations Officer and General Manager of the Southeastern Pennsylvania Transportation Authority since August 1988. His professional background includes various positions held at The Port Authority of New York and New Jersey. He also served as New Jersey's Commissioner of Transportation and the first Chairman of the New Jersey Transit Corporation. Mr. Gambaccini is a graduate of the University of Connecticut with a bachelor's degree in government. He has a master's degree in public administration from Syracuse University and has done doctoral work in public administration at New York University.

Kevin E. Heanue a native of Massachusetts, has been with the Federal Highway Administration and its predecessor agencies since 1958. In 1979 he became the Director of the Office of Planning which administers the statewide and urban planning programs. Mr. Heanue is a graduate of Tufts University and holds a master's degree from Georgia Tech.

Bruce D. McDowell is Director of Government Policy Research at the Advisory Commission on Intergovernmental Relations (ACIR) in Washington, D.C. From April 1986 to April 1988 he was Director of Governmental Studies, National Council on Public Works Improvement. In his position as a Senior Analyst at ACIR from 1972 to 1985, Dr. McDowell prepared reports and draft legislation on federal urban development programs, substate regionalism, regional transportation, federal-aid requirements, citizen participation, reform of the federal-aid system, and intergovernmental consultation processes (including Office of Management and Budget Circular A-95). Dr. McDowell holds bachelor and doctoral degrees from American University and the Master of City Planning degree from the Georgia Institute of Technology.

Charilyn Cowan is a senior manager with the National Governor's Association (NGA). As director of NGA's Capital Resources Group, Ms. Cowan has management responsibilities for four of NGA's seven standing committees, which include the Economic Development and Technological

Innovation Committee and the Transportation, Commerce and Communications Committee. Ms. Cowan is also NGA's General Counsel, providing legal advice to governors and NGA. Since 1979 she has advised the nation's governors on transportation issues. Her responsibilities include policy development and coordination, legislative strategy development, lobbying on issues of critical importance to the states, technical assistance to states, and developing research priorities.

Gerald Donaldson is the Associate Director for Highway Safety at the Center for Auto Safety in Washington, D.C. Prior to joining the Center, Mr. Donaldson chaired the transportation division of the D.C. Federation of Civic Associations and taught at the George Washington University. Mr. Donaldson graduated Phi Beta Kappa from Tulane University and holds a Ph.D. from the University of Virginia.

Panel 4: Innovative Highway Financing Through Use of Tolls

Joseph Rhodes is the Director of the Office of Policy Development at FHWA. Between 1980 and 1987 he was Special Assistant to FHWA's Administrator. Between 1968 and 1980, Mr. Rhodes served in varying executive capacities at AASHTO, including Acting Executive Director from 1978 to 1980.

Ralph L. Stanley has served as the Chief Executive Officer and the Chairman of the Board of Directors of the Toll Road Corporation of Virginia since inception. Previously, Mr. Stanley was Administrator of the Urban Mass Transportation Administration. Mr. Stanley also has been appointed by President Reagan to the President's Commission on Privatization and is a member of the Privatization Council's Board of Directors. Prior to assuming his position as Administrator, Mr. Stanley served as Chief of Staff to Secretary of Transportation Elizabeth Dole and as Special Assistant for Policy for former Secretary Drew Lewis. He received his J.D. from Georgetown University and his B.A. from Princeton University.

John Archer is the Managing Director of the American Automobile Association's (AAA) Government Affairs program. Mr. Archer is a member of the Transportation Alternatives Group, the Steering Committee of the Highway Policy Advisory Committee, and the Policy Committee of the Highway Users Federation. He is also Chairman of the Administrative and Scope Committees of the National Committee on Uniform Traffic Laws and Ordinances and vice chairman of the Executive Committee. He is a member of the American Bar Association, the Maryland Bar, and the Traffic Laws Committee of the National Transportation Research Board.

Before coming to AAA, Mr. Archer was a legislative counsel for the Maryland Legislative Reference Bureau and a legislative assistant in two congressional offices. Mr. Archer graduated with High Honors from the University of Maryland and is an alumnus of the Georgetown Law Center.

John J. Hassett has held numerous positions in the transportation industry since 1948. He operated his own consulting firm from 1963 to 1982. His clients included the International Bridge, Tunnel, and Turnpike Association (IBTTA), the American Association of Motor Vehicle Administrators, Insurance Institute for Highway Safety, Driving School Association of America, American Road and Transportation Builders Association, and other associations in the highway transportation field. In 1982, Mr. Hassett was named Executive Director of IBTTA which represents almost all its toll facilities in the United States. He also served as Chairman of the Road Gang, Washington's transportation luncheon club, in 1985. He retired as Executive Director of IBTTA on December 31, 1987, and now serves as consultant to the Association on a full-time basis through 1989. Mr. Hassett is a graduate of Georgetown University.

Robert E. Farris was appointed to the position of Vice President of the American Trucking Association's policy division in May 1989. Prior to this appointment, Mr. Farris served as FHWA's Administrator from June 1988 and prior to this time served for 2 years as FHWA's Deputy Administrator. Before joining FHWA, Mr. Farris served as Commissioner of the Tennessee Department of Transportation from 1981 to 1985.

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